DVD+RW Receiver

LX9000R/22/25/29

Service
Service
Service

Service Manual

For servicing the DVD+RW Basic Engine we refer to
Service Manual 3122 785 12473
DVD+RW Basic Engine VAE8015, VAE8020
Only designated workshops can perform these repairs!

DVD+ReWritable

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**CLASS 1
LASER PRODUCT**

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Version 1.0

PHILIPS

TECHNICAL SPECIFICATION

General:

Mains voltage :230V ±10% for EU versions
:120V ±10% for USA version
Mains frequency :50 Hz - 60Hz
Power consumption mains :100 W
Power consumption standby :≤ 20 W
Power consumption low power stand-by :≤ 5 W

TV Tuner

Test equipment:Fluke 54200 TV Signal generator
Test streams:PAL BG Philips Standard test pattern

System: PAL B/G, PAL D/K, SECAM L/L', PAL I

RF - Loop Through:
Frequency range :45 MHz - 860 MHz
Gain: (ANT IN - ANT OUT) :-6 dB to 0dB

Radio Interference:
input voltage /3 tone method (+40 dB min) :no limit

Receiver:
PLL tuning with AFC for optimum reception
Frequency range :45.25 MHz - 857 MHz
Sensitivity at 40 dB S/N :≤ 60dBmV at 75W (video unweighted)

Video Performance:
Channel : 25 / 503,25 MHz,
Test pattern : PAL BG PHILIPS standard test pattern
RF Level :74 dBV
Measured on SCART 1
Frequency response :0 - 4.00 MHz +0-4dB
Group delay (0.1 MHz - 4.4 MHz) :0 nsec ± 150nsec

Audio Performance:
Audio Performance Analogue - HiFi:

Frequency response at SCART 1
(L+R) output :100 Hz - 12 kHz / 0± 3dB
S/N according to DIN 45405, 7, 1967 and PHILIPS standard test pattern video signal :FM: ≥ 50dB
AM ≥ 45dB, unweighted
Harmonic distortion (1 kHz, ± 25 kHz deviation) :FM ≤ 1.5%
AM ≤ 2%

Audio Performance NICAM:

Frequency response at SCART 1
(L+R) output :40 Hz - 15 kHz 0 ± 3dB
S/N according to DIN 45405, 7, 1967 and PHILIPS standard test pattern video signal :≥ 60 dB unweighted
Harmonic distortion (1 kHz) :≤ 0.5 %

Tuning
Automatic Search Tuning
scanning time without antenna :typ. 3 min. PAL
stop level (vision carrier) :≥ 37dBmV
Maximum tuning error of a recalled program :± 62.5 kHz
Maximum tuning error during operation :± 100 kHz

Tuning Principle
automatic B,G, I, DK and L/L'detection
manual selection in "STORE" mode

Audio Tuner

Frequency range FM :87.5 MHz - 108 MHz
AM :531 kHz – 1602 kHz (EU)
530 kHz – 1700 kHz (USA)
Sensitivity at 26 dB S/N FM :≤ 5µV
AM :≤ 3250µV/m

IF FM :10.7MHz
AM :450kHz

Harmonic distortion
FM (RF=1mV, ∆f=75kHz) : ≤ 3% (1% typ.)
AM (RF=50mV/m, m=80%) : ≤ 5% (4% typ.)

Analogue Inputs

SCART 1 (Connected to TV)

Pin Signals:
1 Audio R 1.8V RMS
2 Audio R
3 Audio L 1.8V RMS
4 Audio GND
5 Blue/Chroma GND
6 Audio L
7 Blue out/ Chroma in: 0.7Vpp ± 0.1V into 75 Ohm (*)
8 Function switch <2V = TV
>4.5V / <7V = asp. ratio 16:9 DVD
>9.5V / <12V = asp. ratio 4:3 DVD
9 Green GND
10 P50 control
11 Green 0.7Vpp ± 0.1V into 75 Ohm (*)
12 Nc
13 Red/Chroma GND
14 fast switch GND
15 Red out/ Chroma out 0.7Vpp ± 0.1V into 75 Ohm (*)
± 3dB 0.3Vpp Chroma (burst)
16 fast switch RGB/ CVBS or Y <0.4V into 75 Ohm = CVBS
>1V / <3V into 75 Ohm = RGB
17 Y/CVBS GND OUT
18 Y/CVBS GND IN
19 CVBS/Y 1Vpp ± 0.1V into 75 Ohm (*)
20 CVBS/Y
21 Shield

SCART 2 (Connected to AUX)

Pin Signals:
1 Audio R 1.8V RMS
2 Audio R
3 Audio L 1.8V RMS
4 Audio GND
5 Blue/Chroma GND
6 Audio L
7 Blue in/ Chroma out ± 3dB 0.3Vpp Chroma (burst)
8 Function switch
9 Green GND
10 P50 control
11 Green
12 Nc
13 Red/Chroma GND
14 fast switch GND
15 Red in/ Chroma in
16 fast switch RGB/ CVBS or Y
17 CVBS GND OUT
18 CVBS GND IN
19 CVBS/Y/RGB sync 1Vpp ± 0.1V into 75 Ohm (*)
20 CVBS/Y
21 Shield

(*) for 100% white

Audio/Video Front Input Connectors
Audio
Input voltage : 2 Vrms
Input impedance : >10kW

Video - Cinch
Input voltage : 1 Vpp ± 3dB
Input impedance : 75 W

Video - YC (Hosiden)
Input voltage Y :1Vpp ± 3dB
Input impedance Y :75 W
Input voltage C :burst 300 mVpp ± 3 dB
Input impedance C :75 Ohm

Video Performance

All outputs loaded with 75 Ohm
SNR measurements over full bandwidth without weighting.

SCART (RGB)
SNR : > -65 dB on all outputs
Bandwidth : 4.8 MHz ± 2dB

Audio Performance CD

Cinch Output Rear

Output voltage 2 channel mode	:1.8Vrms ± 2dB
Channel unbalance (1kHz)	:<1dB
Crosstalk 1kHz	:<-85dB
Crosstalk 20Hz-20kHz	:<-70dB
Frequency response 20Hz- 20kHz	:±0.5dB max
Signal to noise ratio	:>80 dB
Dynamic range 1kHz	:>75dB
Dynamic range 20Hz-20kHz	:>70dB
Distortion and noise 1kHz	:<-70dB
Distortion and noise 20Hz-20kHz	:<-55dB
Intermodulation distortion	:<-77dB
Mute	:>95dB
Outband attenuation	:>40dB above 30kHz

Scart Audio

Output voltage 2 channel mode	:1.4Vrms ± 2dB
Channel unbalance (1kHz)	:<1dB
Crosstalk 1kHz	:<-85dB
Crosstalk 20Hz-20kHz	:<-70dB
Frequency response 20Hz- 20kHz	:± 0.5dB max
Signal to noise ratio	:>80 dB
Dynamic range 1kHz	:>75dB
Dynamic range 20Hz-20kHz	:>70dB
Distortion and noise 1kHz	:<-70dB
Distortion and noise 20Hz-20kHz	:<-55dB
Intermodulation distortion	:<-70dB
Mute (spin-up, pause, access)	:>85dB
Outband attenuation	:>40dB above 25kHz

Digital Output

Coaxial

CDDA/ LPCM (incl MPEG1)	:according IEC958
MPEG2, AC3 audio	:according IEC1937
DTS	:according IEC1937, amendment 1

Digital Video Input (IEEE 1394)

Applicable Standards
Implementation according:
IEEE Std 1394-1995
IEC 61883 - Part 1
IEC 61883 - Part 2 SD-DVCR (02-01-1997)
Specification of consumer use digital VCR's using 6.3 mm magnetic tape - dec.1994
Mechanical connection according: Annex A of 61883-1

P50 System Control

Via SCART pin nr 10

Power Amplifier

Power stage protection :temperature and short circuit
Output power
Stereo mode (1kHz, 10% distortion) :2x 70W rms
Surround mode (1kHz, 10% distortion)

Front	:2x 80W rms
Centre	:80W rms
Surround	:2x 80W rms
Sub Woofer	:80W rms

Headphone

3.5mm stereo jack, 8 - 600 Ohm
2.8V EMF

Dimensions and Weight

Height of feet	:10mm
Apparatus tray closed	:WxDxH :435 x 405 x 96mm
Weight without packaging	:appr. 9 kg (main set) appr. 19.7kg (speaker boxes)
Weight in packaging	:appr. 28.7 kg

Laser Output Power & Wavelength

DVD

Output power during reading	:0.8mW
Output power during writing	:20mW
Wavelength	:660nm

CD

Output power	:0.3mW
Wavelength	:780nm

LOCATION OF PRINTED BOARDS

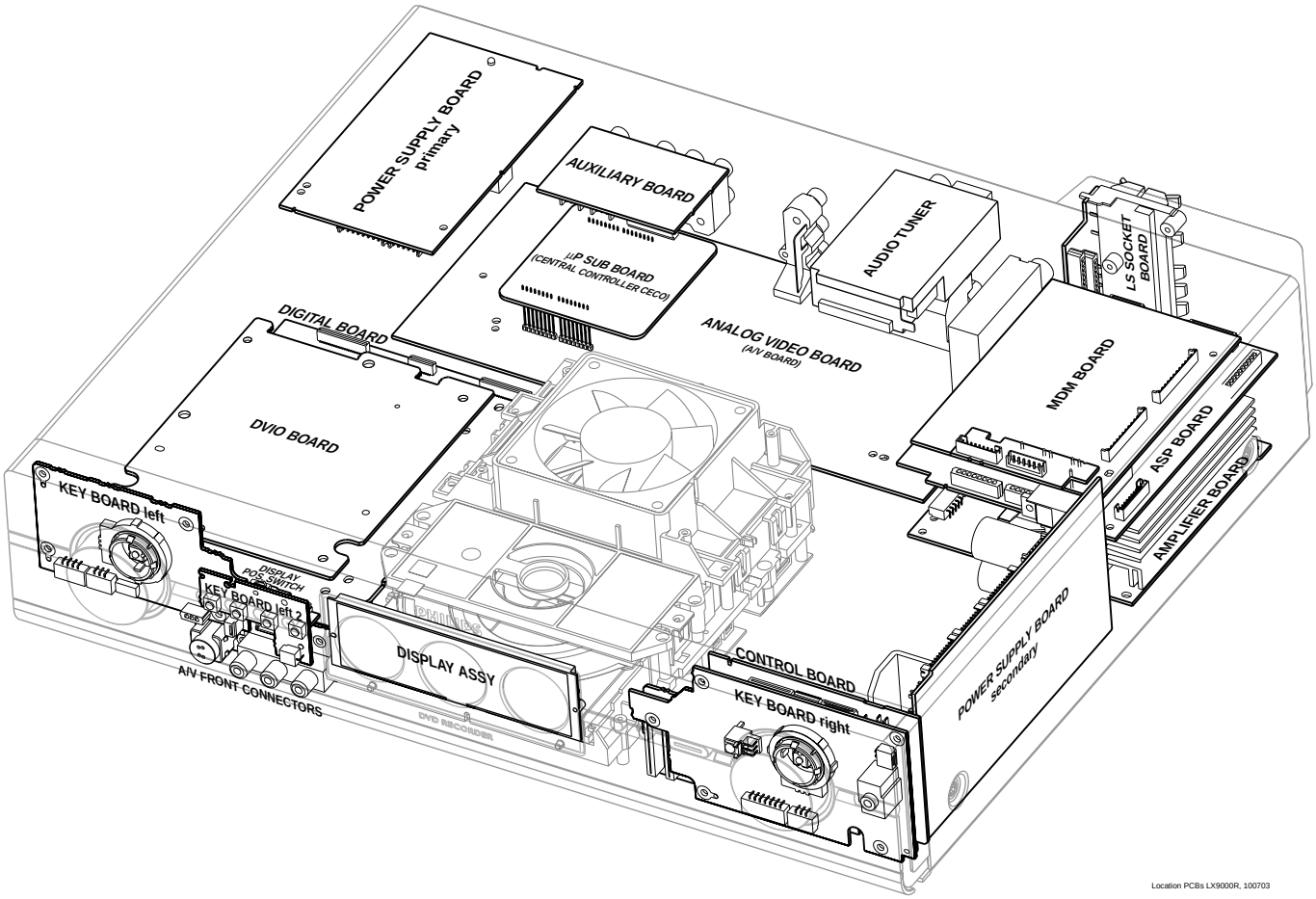


figure 1

ESD

(GB) WARNING
All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

(F) ATTENTION
Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING
Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB) AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat	large	1200x650x1.25mm	4822 466 10953
	small	600x650x1.25mm	4822 466 10958
anti-static wristband			4822 395 10223
connection box (3 press stud connections, 1MΩ)			4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)			4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)			4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)			4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)			4822 310 10671
wristband tester			4822 344 13999

SAFETY

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

(F)
Les normes de sécurité exigent que l`appareil soit remis à l`état d`origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkeliijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB) **DANGER**: Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

CLASS 1
LASER PRODUCT

(S) Varning !
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(DK) Advarsel !
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(FIN) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

(GB)
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

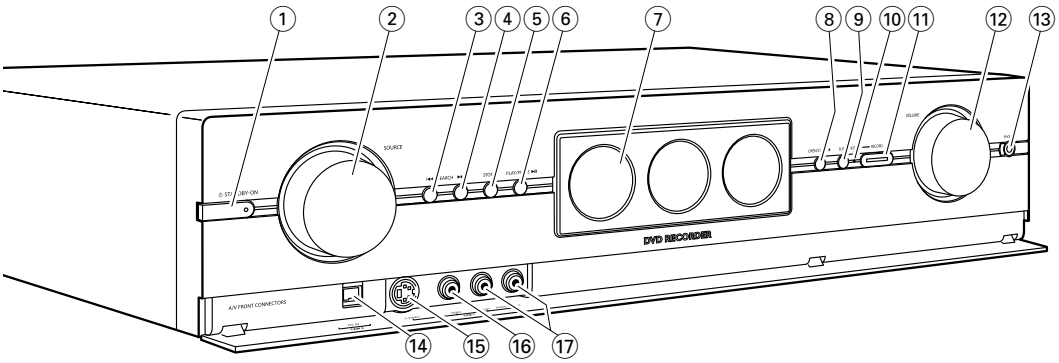
(F)
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

BRIEF OPERATING INSTRUCTIONS

The following excerpt of the Owner´s Manual serves as a very short introduction to the set.
The complete Owners Manual can be downloaded in several languages from the Internet site of Philips Customer Care Center: **www.p4c.philips.com**

English

Controls and connections



Controls on the front

① ⏻ **STANDBY·ON**
switches the set on or to standby

② **SOURCE**
selects a source

③ **I◄◄ SEARCH**
skips to the beginning of the current or previous chapter/title/track of the inserted disc, searches backwards

④ **SEARCH ►►I**
skips to the beginning of the next chapter/title/track of the inserted disc, searches forwards

⑤ **STOP ■**
stops playback or recording

⑥ **PLAY/PAUSE ►II**
starts/pauses playback

⑦ display/DVD recorder drawer

⑧ **OPEN/CLOSE ▲**
opens/closes the DVD recorder drawer

⑨ **SURR.**
selects the different surround modes

⑩ **INSTANT – RECORD** (status light)
indicates if immediate recording is possible

⑪ **RECORD**
starts recording a TV channel or an external video source selected on the DVD recorder system (the key is illuminated while recording is in progress)

⑫ **VOLUME**
adjusts the volume

Connections on the front

⑬ **PHONES**
3.5 mm headphone socket

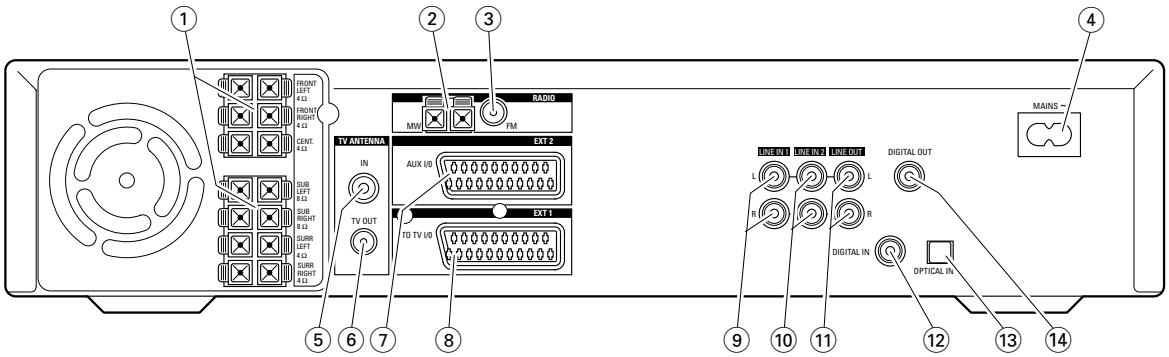
⑭ **DV IN / CAM 2**
connect to the i.Link output of your Digital Video (DV) or Digital 8 camcorder

⑮ **S-VIDEO / CAM 1**
connect to the S-video output of your Hi-8 or S-VHS camcorder

⑯ **VIDEO / CAM 1**
connect to the video (CVBS) output of your camcorder

⑰ **AUDIO LEFT/RIGHT / CAM 1**
connect to the audio output of your camcorder

Controls and connections



Connections on the rear

① connect to the supplied speakers

② **RADIO / MW**
connect to the MW antenna

③ **RADIO / FM**
connect to the FM antenna

④ **MAINS ~**
After all other connections have been made,
connect the mains lead to the wall socket.

⑤ **TV ANTENNA / IN**
connect to the TV antenna

⑥ **TV ANTENNA / TV OUT**
connect to the TV antenna input of your TV

⑦ **EXT 2 / AUX I/O**
connect to the SCART socket of an external video appliance

⑧ **EXT 1 / TO TV I/O**
connect to the SCART socket of the TV

⑨ **LINE IN 1 L/R**
connect to the analogue audio output of an external appliance (e. g. tape deck, CD changer, …)

⑩ **LINE IN 2 L/R**
connect to the analogue audio output of an external appliance (e. g. tape deck, CD changer, …)

⑪ **LINE OUT L/R**
connect to the analogue audio input of an external appliance (e. g. tape deck, …)

⑫ **DIGITAL IN**
connect to the digital coaxial output of a digital appliance

⑬ **OPTICAL IN**
connect to the digital optical output of a digital appliance

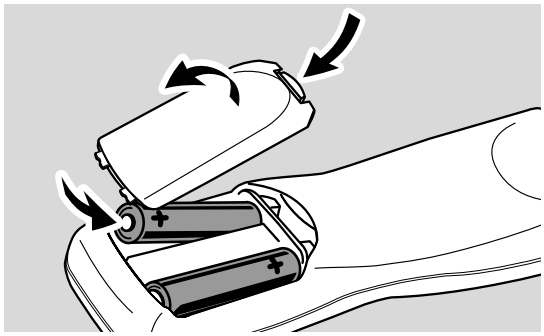
⑭ **DIGITAL OUT**
connect to the digital coaxial input of a digital appliance

Before starting with the connections, make sure all appliances that you want to connect as well as the DVD recorder system are disconnected from the power sockets.

Remote Control

English

Inserting the batteries



1 Open the battery compartment of the remote control and insert 2 alkaline batteries, type **AA** (R06, UM-3).

2 Close the battery compartment.

Do not use old and new or different types of batteries in combination.

Remove batteries if they are empty or if the remote control will not be used for a long time.

Batteries contain chemical substances, so they should be disposed of properly.

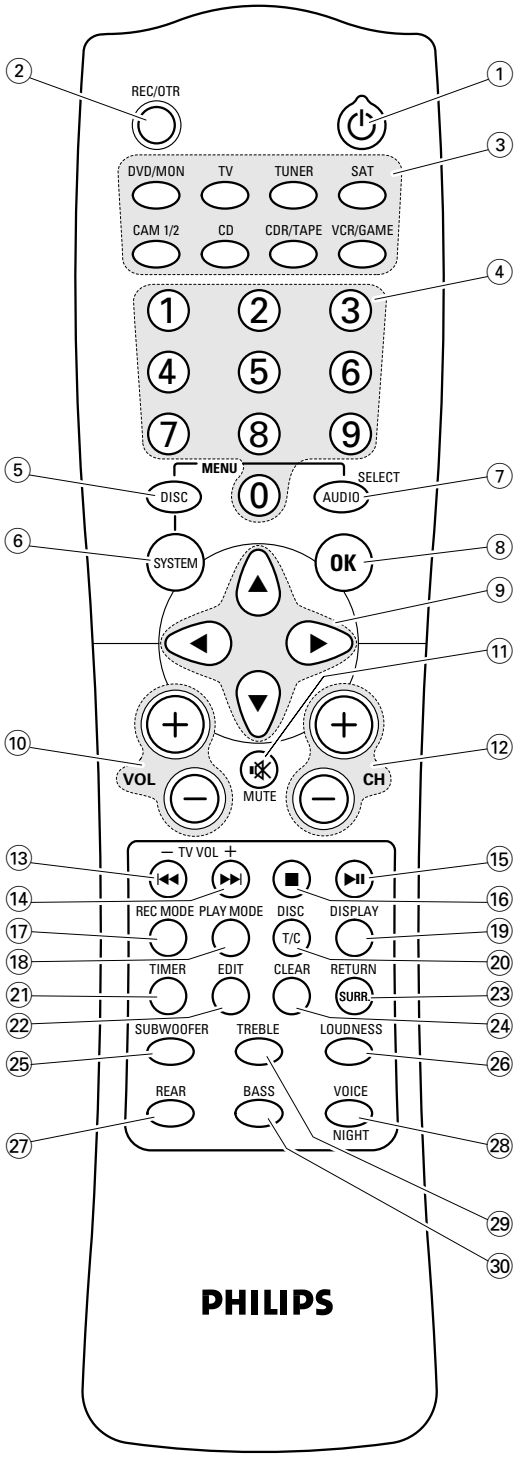
Using the remote control

With this remote control you can control the DVD recorder system as well as other Philips appliances such as a Philips TV, VCR or CD player.

To control a Philips appliance, briefly press the corresponding source key (TV, SAT, CAM 1/2, CD, CDR or VCR) on the remote control. Some of the remote control keys, e. g. ⏻, 0–9, CH+, CH–, ⏮, ⏭, ■, ⏯ can be used to control the appliance then. To control the DVD recorder system with these keys, press TUNER or DVD/MON.

To select a source on the DVD recorder system, keep the source key (TV, SAT, CAM 1/2, CD, CDR or VCR) on the remote control pressed for 1 second.
To select CAM 2 (or TAPE, GAME), first select CAM 1 (or CDR, VCR), then keep the corresponding key pressed for 1 second.

To control the DVD recorder system, please point the remote control at the DVD recorder system and not at the TV.



Remote Control

Remote control keys

① ⏻
switches the DVD recorder system and a Philips appliance on or to standby

② **REC/OTR**
starts recording the TV channel or video source selected on the DVD recorder system

③ **DVD/MON**
selects the disc in the tray or the TV channel selected on the DVD recorder system

TV
selects the TV

TUNER
selects the radio tuner, selects the waveband and switches between FM mono and FM stereo

SAT
selects a connected satellite receiver

CAM 1/2
selects the camcorder inputs on the front

CD
selects a connected CD player

CDR/TAPE
selects a connected CD recorder, tape deck or similar

VCR/GAME
selects a connected VCR or game console

④ **0–9** to key in numbers 0–9

⑤ **DISC MENU**
enters the disc menu

⑥ **SYSTEM MENU**
enters the system menu of the DVD recorder system

⑦ **AUDIO MENU / SELECT**
enters the audio menu of the DVD recorder system and selects an option in the system menu

⑧ **OK**
confirms menu options

⑨ **Arrow keys ◀, ▲, ▶, ▼**
to move in a menu

⑩ **VOL+, VOL–**
increases/decreases the volume of the DVD recorder system

⑪ 🔇
mutes the sound of the DVD recorder system

⑫ **CH+, CH–**
selects a TV channel on the DVD recorder system and selects a preset radio station

⑬ **⏮ / –TV VOL**
skips to the beginning of the current or previous chapter/title/track of the inserted disc, searches backwards, tunes to a radio station with a lower frequency and decreases the volume of a Philips TV

⑭ **⏭ / TV VOL+**
skips to the beginning of the next chapter/title/track of the inserted disc, searches forwards,
tunes to a radio station with a higher frequency and increases the volume of a Philips TV

⑮ **⏯**
starts/pauses playback and closes the disc tray

⑯ ■
stops playback or recording

⑰ **REC MODE**
selects a recording mode: HQ, SP, SP+, LP, EP or EP+

⑱ **PLAY MODE**
selects different playback modes like REPEAT or SHUFFLE

⑲ **DISPLAY**
selects various display information

⑳ **T/C / DISC**
switches between title, track and chapter and changes discs on a Philips CD changer

㉑ **TIMER**
enters the timer recording menu

㉒ **EDIT**
enters the menu Favorite Scene Selection

㉓ **SURR. / RETURN**
selects the different surround modes and returns to the previous menu on a (Super) Video CD

㉔ **CLEAR**
clears an entry (eg. timer preset)

㉕ **SUBWOOFER** (in combination with VOL+ or VOL–)
adjusts the subwoofer volume

㉖ **LOUDNESS**
switches loudness on and off

㉗ **REAR** (in combination with VOL+ or VOL–)
adjusts the volume of the rear speakers

㉘ **VOICE / NIGHT**
switches Clear Voice or Night mode on or off

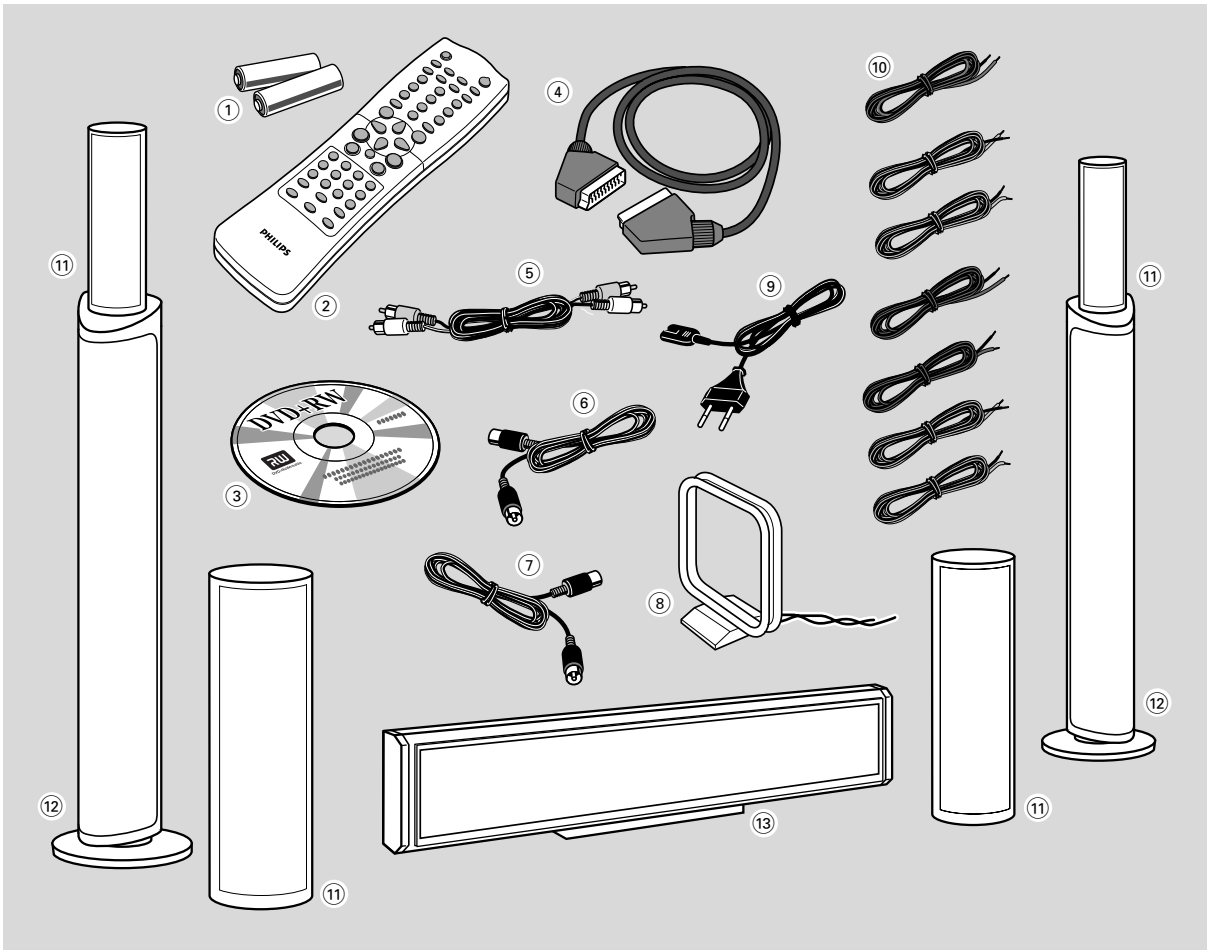
㉙ **TREBLE** (in combination with VOL+ or VOL–)
adjusts the treble

㉚ **BASS** (in combination with VOL+ or VOL–)
adjusts the bass

Quick use guide

LX9000R

English



General information

This Quick use guide gives a rough overview and helps to quickly start with basic steps. Please read the supplied user´s manual for detailed information.

Supplied accessories

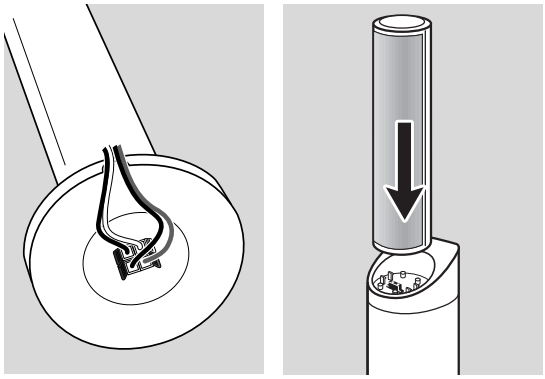
① 2 batteries for the remote control, type AA
② 1 remote control
③ 1 blank DVD+RW disc
④ 1 SCART cable
⑤ 1 cinch audio cable
⑥ 1 TV antenna cable
⑦ 1 FM antenna cable
⑧ 1 MW loop antenna
⑨ 1 AC mains cable
⑩ 7 speaker cables with colour coded ends
⑪ 2 front speakers and 2 rear speakers
⑫ 2 subwoofers integrated in the speaker stands
⑬ 1 centre speaker

Quick use guide

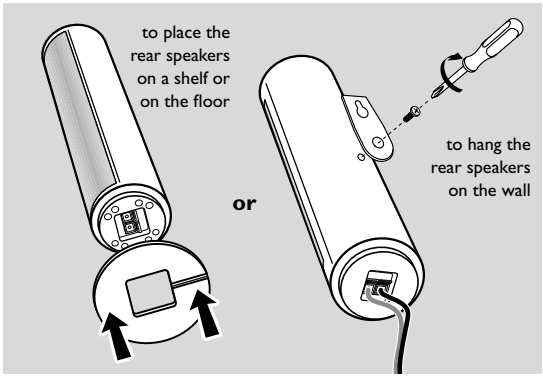
LX9000R

Assembling the speakers

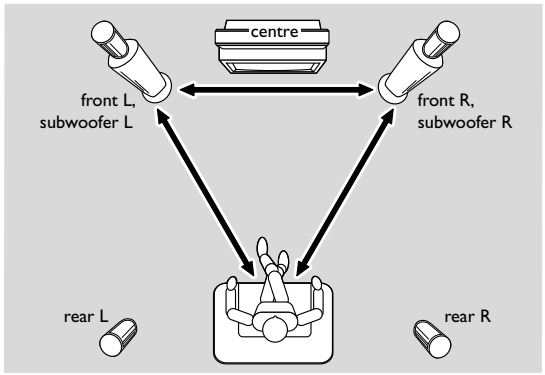
Subwoofers and front speakers



Rear speakers



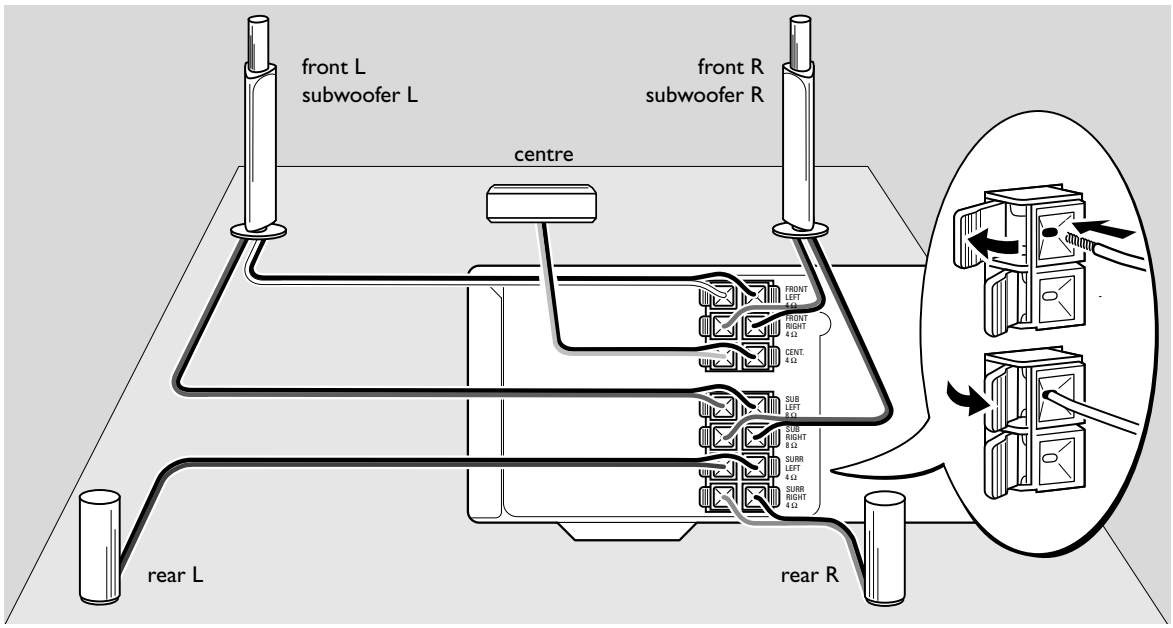
Positioning the speakers



Connecting the speakers

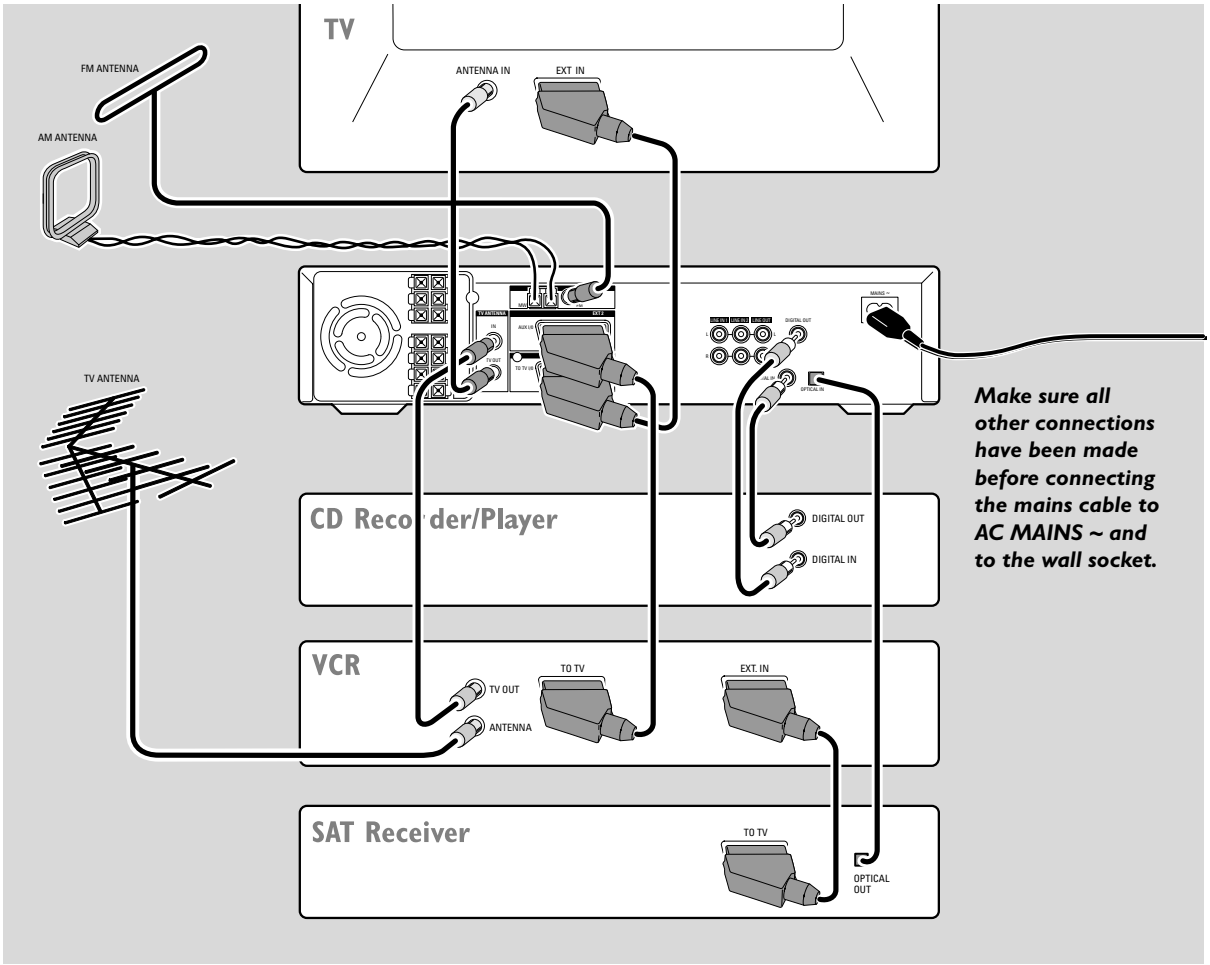
Connect the speakers using the supplied speaker cables. Match the colours of the speaker sockets and the speaker cables:

Speaker	+	–
Front Left	white	black
Front Right	red	black
Centre	green	black
Subwoofer Left	violet	black
Subwoofer Right	violet	black
Rear Left	blue	black
Rear Right	grey	black



Quick use guide

LX9000R



Connections

Scart inputs/outputs of your other appliances can be named:

– TO TV/MONITOR, EURO-AV OUT,…
– AUX, EXT, I/0, EURO-AV IN,…

Initial installation

When you connect the DVD recorder system to the mains supply for the first time, you need to perform some basic settings. Please observe the TV screen and the display of the DVD recorder system.

1 Switch on your TV.

2 Connect the supplied mains cable to AC MAINS ~ and to the wall socket. If the DVD recorder system is in demo mode, press ⏻ to cancel the demo mode.
➜ IS TV ON? is displayed on the DVD recorder system.

3 If necessary set the TV to the correct audio/video channel for the DVD recorder system. Such channels may be called AUX or AUXILIARY IN, AUDIO/VIDEO or A/V IN, EXT1, EXT2 or EXTERNAL IN, etc. These channels are often near channel 00.

Note: If your TV supports EasyLink, the TV and the DVD recorder system exchange information via the SCART cable. In this case, **EasyLink loading data from TV, please wait** *will appear on the TV. Some of the following settings will be done automatically then.*

4 ➜ The menu **Menu Language** appears on the TV screen.

Press ▲ or ▼ to select the language in which the display messages should appear on the TV screen. Then press OK.

5 ➜ The menu **Audio language** appears.

Press ▲ or ▼ to select the language in which DVDs should preferably be played, if the language is available on the disc. Then press OK.

Quick use guide

LX9000R

6 ➜ The menu **Subtitle Language** appears.

Press ▲ or ▼ to select the language in which subtitles should preferably be displayed, if subtitles in the language are available on the disc. Then press OK.

7 ➜ The menu **TV Shape** appears.

Press ▲ or ▼ to select the screen format. This setting will have an effect only with DVDs supporting different screen formats.

➜ **4:3 letterbox**: for a wide-screen picture (cinema format) on a conventional 4:3 TV set with black borders at the top and bottom of the screen.

➜ **4:3 panscan**: for a full-height picture with cropped edges.

➜ **16:9**: for a wide-screen TV set.

Then press OK.

8 ➜ The menu **Country** appears.

Press ▲ or ▼ to select the country where the DVD recorder system is used. If your country does not appear, select **Other**. Then press OK.

9 ➜ **If you have connected the antenna - press OK** appears.

If you connected the DVD recorder system to a TV antenna or a cable TV system, press OK.
If not, connect the antenna, then press OK.

➜ **Searching for TV channels** appears. The search may take several minutes.

10 ➜ **Time**, **Year**, **Month** and **Date** appear.

If the time and date are set correctly continue with step 13, else press ▼ or ▲ repeatedly to select either **Time**, **Year**, **Month** or **Date**.

11 Press ◀ or ▶ or 0–9 repeatedly to set the correct value.

12 Repeat steps 10–11 until all settings of the time and date are correct.

13 Press OK.

➜ CONTINUE WITH SPECIAL AUDIO SETTINGS is scrolled on the DVD recorder system.

Next, you will be asked

– about the distances between the speakers and your preferred listening position and

– to which socket you connected your TV and other appliances.

14 ***If you want to continue with these advanced settings:***
Press OK. For details, see "Advanced settings" on page 17 in the user´s manual.

If you do not want to continue, the standard settings below will be used for the speaker distances and the connections:

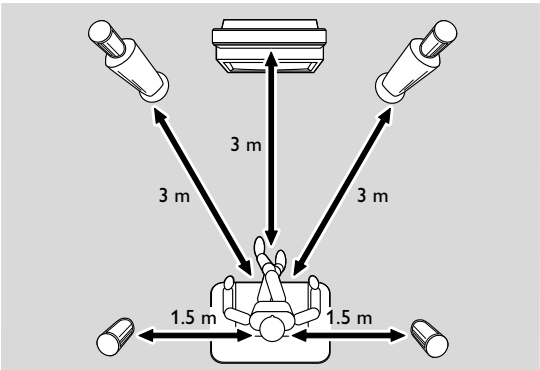
Press ▼ to select NO, then press OK to confirm.

➜ AUTOINSTALL is displayed. The DVD recorder system searches for available radio stations and stores them in its memory.

➜ After the search INSTALLATION COMPLETE is scrolled and a radio station is played. The DVD recorder system is ready to play.

Standard settings for the speaker distances and the connected appliances

To change these settings later on, see "When adding appliances or changing the connections of appliances" and "When changing the speaker setup" in the user´s manual.

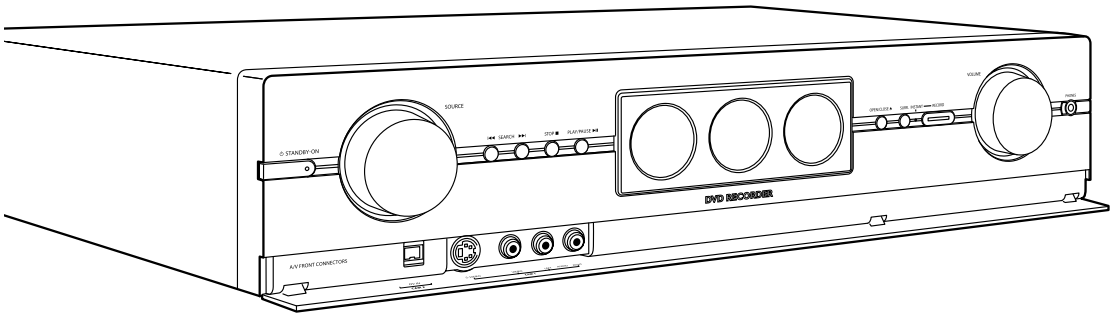


appliance	is connected to
TV	EXT 1 TO TV I/O
satellite receiver	EXT 2 AUX I/O
VCR (video recorder)	EXT 2 AUX I/O
game console	EXT 2 AUX I/O
CD player	DIGITAL IN
CD recorder	LINE IN 1
tape deck	LINE IN 2

Note: The satellite receiver, VCR and game console are connected in a "chain". See illustration on the page to the left.

Quick use guide

LX9000R



Discs for playback and recording

– **DVD+R**
can be recorded once and played on standard DVD players and DVD recorders, if finalised.

– **DVD+RW**
can be recorded, erased and re-recorded many times and played on DVD+RW compatible DVD players and DVD recorders if finalised.

DVD+ReWritable

Discs for playback only

Discs with the following logos can be played:

Playback

1 Press OPEN/CLOSE ▲ on the set to open the drawer and insert a disc (printed side up) in the tray.

2 Press OPEN/CLOSE ▲ on the set again. If necessary, press PLAY/PAUSE ▶II to start playback.

- To interrupt playback, press PLAY/PAUSE ▶II.
- To resume playback, press PLAY/PAUSE ▶II again.

3 To stop playback press STOP.

Selecting a source

- Turn SOURCE on the DVD recorder system or keep a source key on the remote control pressed for 1 second to select either:
  - the disc in the DVD recorder system
  - MONITOR: the internal TV tuner of the DVD recorder system (only selectable by pressing DVD/MON on the remote control)
  - TV: the TV
  - CAM 1: a camcorder connected to CAM1
  - CAM2: a camcorder connected to CAM2
  - SAT: a connected satellite receiver
  - VCR: a connected VCR (video recorder)
  - GAME: a connected game console
  - the radio tuner of the DVD recorder system
  - TAPE: a connected tape deck or similar audio recording appliance
  - CDR: a connected CD recorder
  - CD: a connected CD player/changer

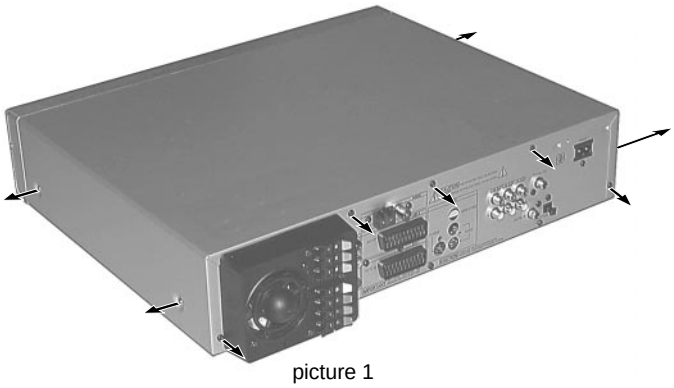
  ➜ The sound of the source is played on the DVD recorder system.

  Note: If SOURCE NOT AVAILABLE is scrolled please read "When adding appliances or changing the connections of appliances" in the user´s manual.

DISMANTLING INSTRUCTIONS

Dismantling the *Top Cover*

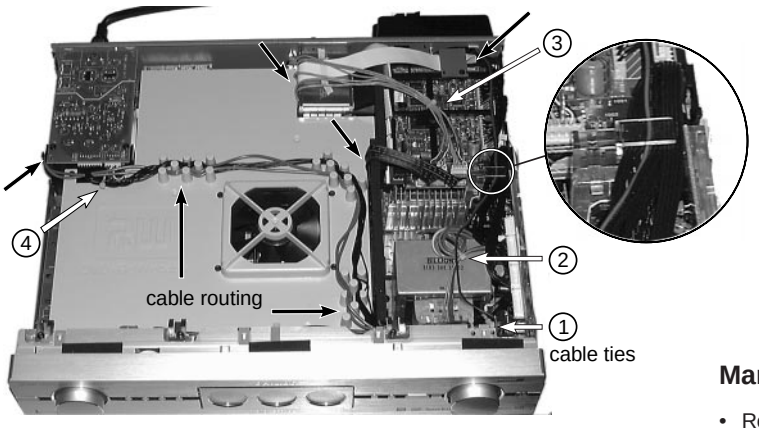
- Remove 9 screws as shown in picture 1.
- Raise top cover at the rear and pull it backwards.



picture 1

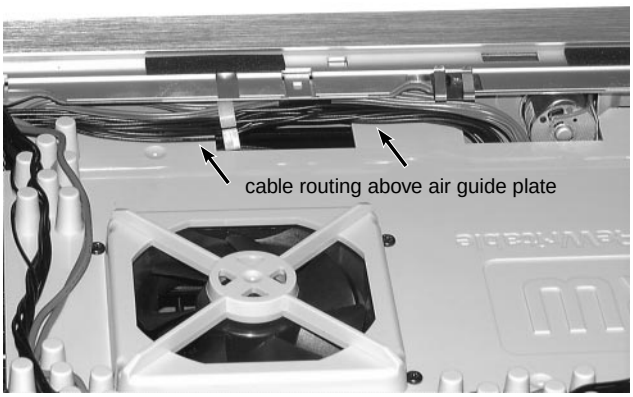
Details of correct *Wire Routing*

CABLE ROUTING DETAILS



picture 2

CABLE ROUTING DETAILS



picture 3

Manual opening of the tray

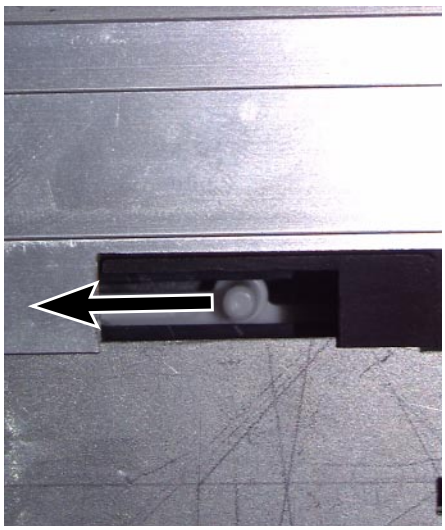
In case the loader is defect or cannot be opened electrically, proceed as follows:

a) Display can be moved out electrically

- Press *Open/Close* to move display out first.
- The tray can now be released by means of screwdriver. Through a slot on the bottom side of the front cabinet the locking slider of the tray can be accessed. Move the white pin of the slider to the left side (see picture 4). The tray will move out a bit and is now released.
- Pull the tray out.

b) Display cannot be moved out electrically

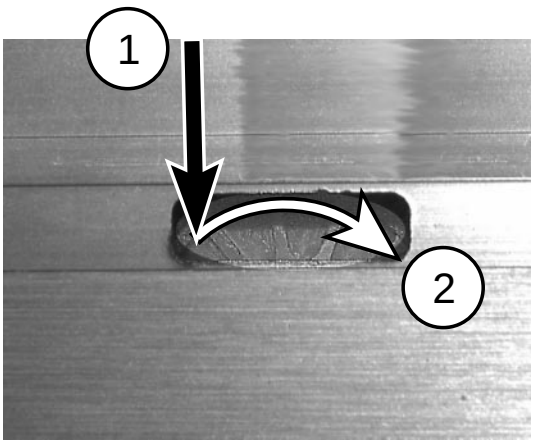
- Remove top cover as shown in picture 1.
- Move the display manually out as shown in picture 5.
- Release tray as described above.



picture 4

Manual opening of the display

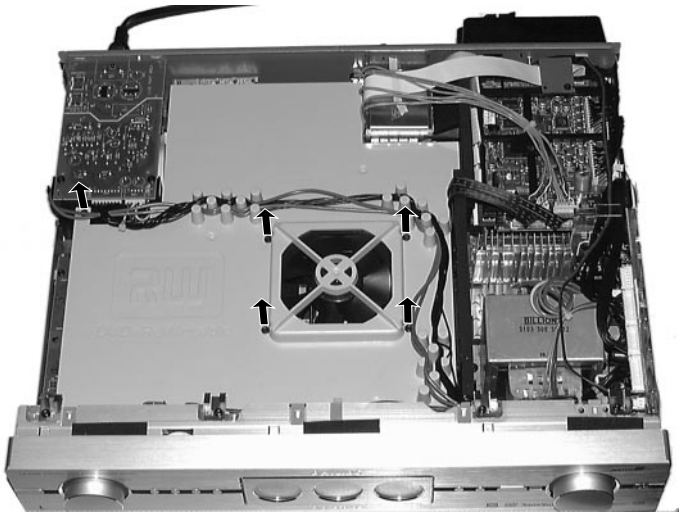
- Remove top cover as shown in picture 1.
- The display can now be moved by means of a screwdriver. Through a slot on the top side of the front cabinet the gear wheel of the moving mechanism can be accessed. Push the gear wheel down in order to dis-engage the motor. Then turn the wheel clockwise → see picture 5. Repeat as long as the display has moved completely out.



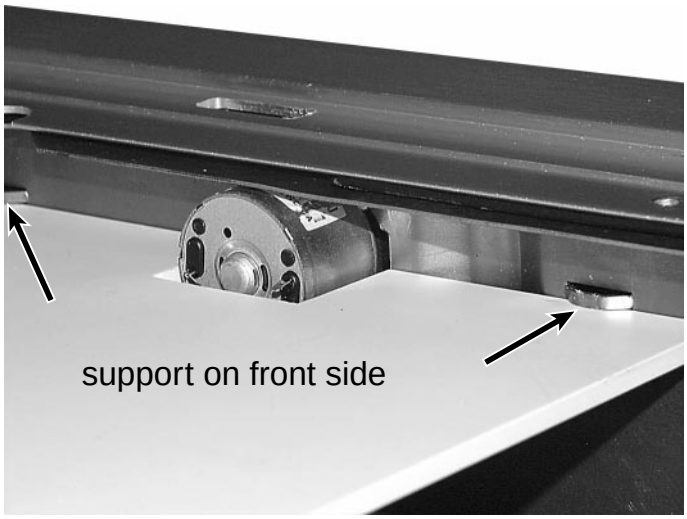
picture 5

Removal of *Air guide plate*

- Remove 5 screws as shown in picture 6.
- Remove cables from the guidings
- Raise airguide plate at the rear to release it from the guidings at the front side and pull it up.



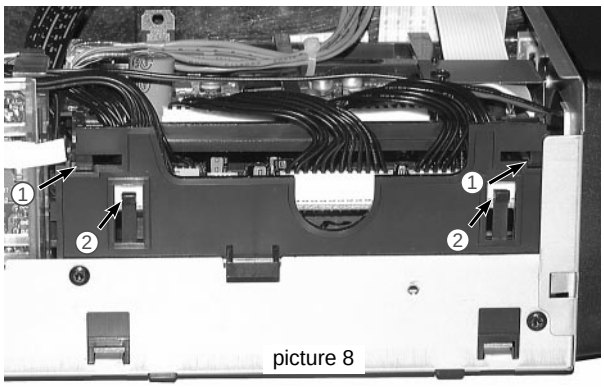
picture 6



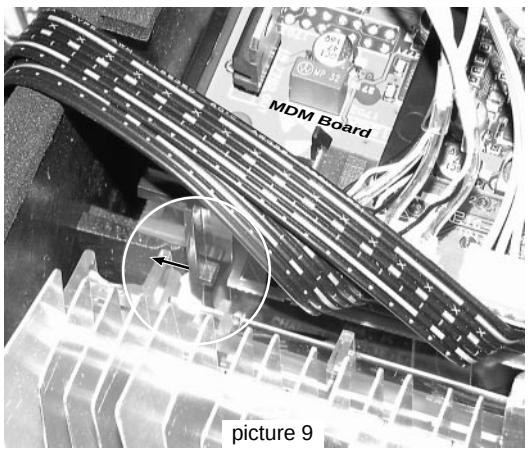
picture 7

Dismantling the *MDM Board*

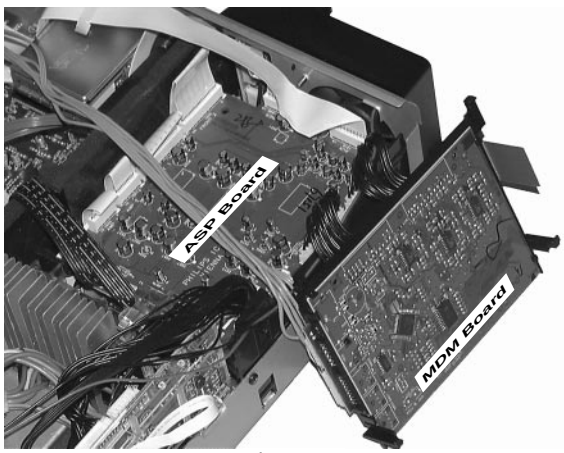
- Release catches ① as shown in picture 8.
- Lift MDM Board on the outer side and move it left to release hooks (at the inner side the support frame is 2x hooked onto the ASP Board → picture 9 shows hook on the left side)
- Raise the board up and turn it out to it´s service position → see picture 10



picture 8



picture 9



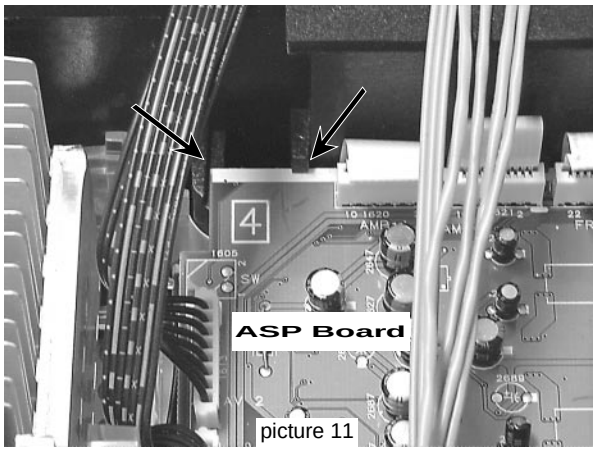
picture 10

Mounting the *MDM Board*

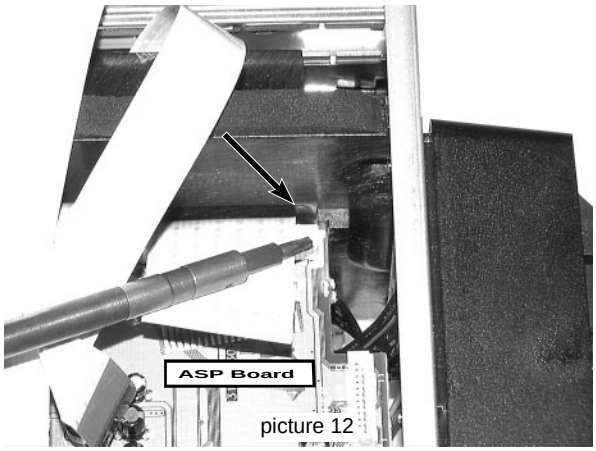
- To mount the MDM board proceed in reverse order to description above.
- Take care that hooks at the backside (left side) are positioned correctly and move the board to the outside to fix the hooks.
- Press the board on the outer side down until catches ① engage.

Dismantling the *ASP Board*

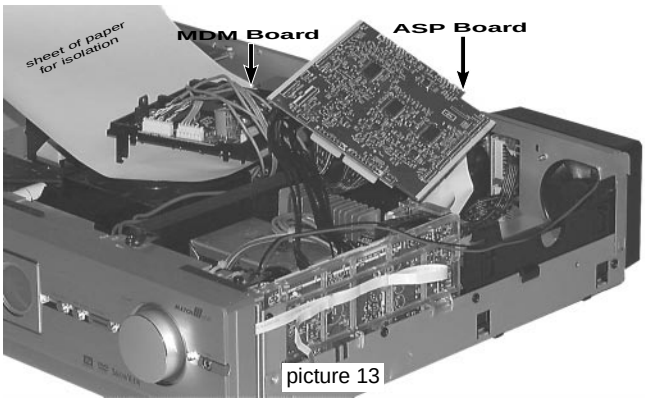
- Dismantle MDM Board (as described before) first.
- Release catches ② as shown in picture 8.
- Lift ASP Board on the outer side and pull it out (at the inner side the board is 2x held by guidings on the thermal partition → pictures 11 and 12 show the guidings on both sides)
- Raise the board up and turn it, together with the MDM Board, up to it´s service position → see picture 10



picture 11



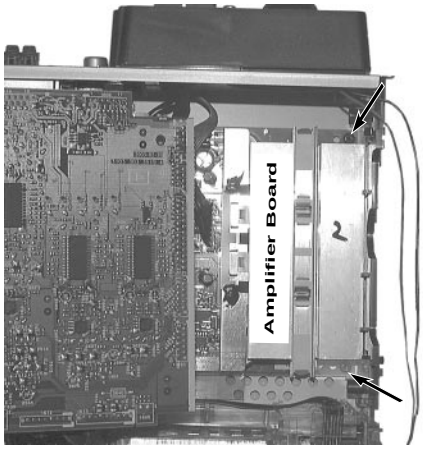
picture 12



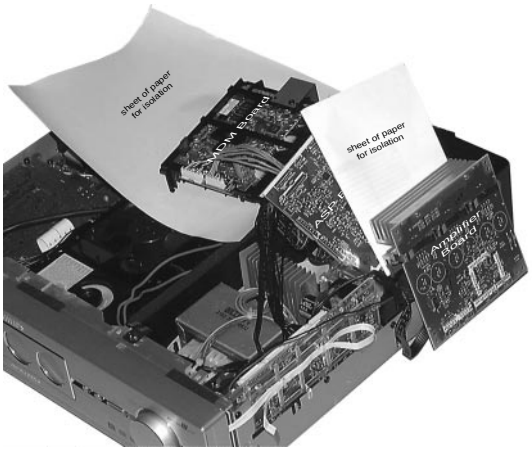
picture 13

Dismantling the *Amplifier Board*

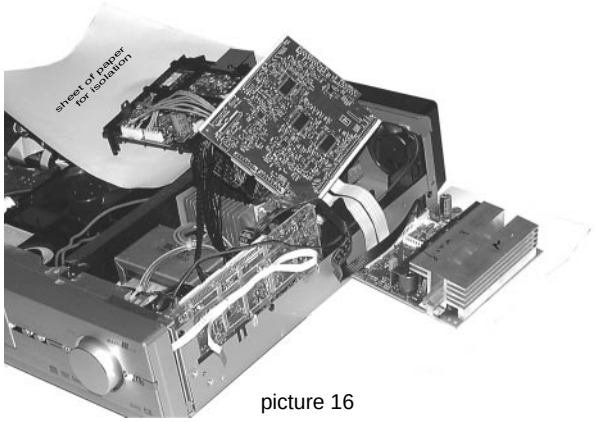
- Dismantle MDM Board and ASP Board (as described before) first.
- Remove 2 screws as shown in picture 14.
- If necessary, plug cables to loadspeaker socket off.
- Put Amplifier Board in a desired service position as shown in pictures 15 and 16.



picture 14



picture 15



picture 16

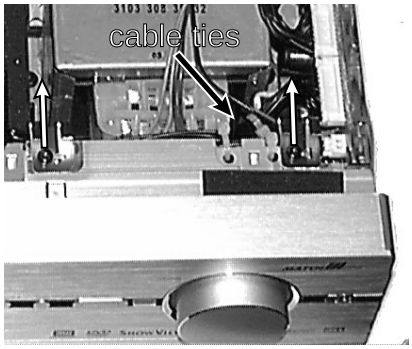
Mounting the *ASP Board*

- To mount the ASP board proceed in reverse order to description above.
- Take care that the board is fed correctly into the guidings at the backside (left side).
- Press the board on the outer side down until catches ② engage.

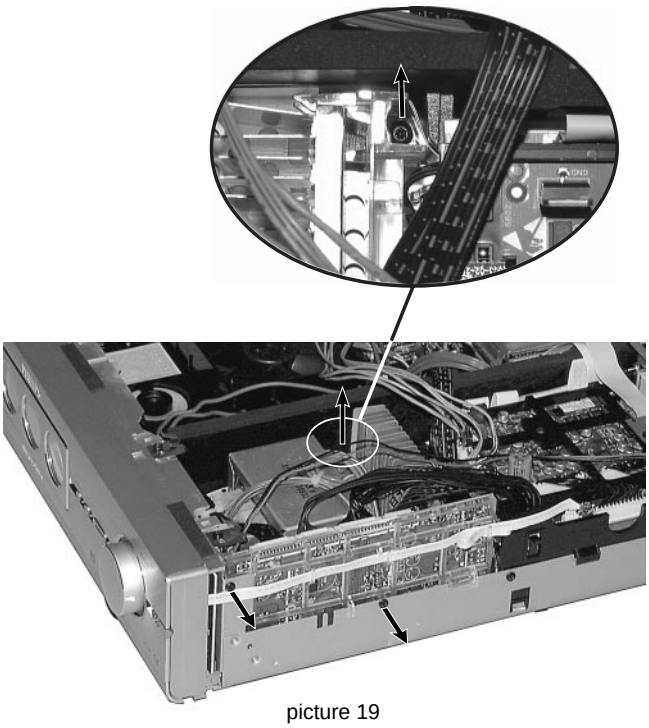
Dismantling the *Power secondary Board*

- Dismantle MDM- and ASP Board (as described before) first.
- Unplug headphone cable from ASP Board and put it out from the catches on the Power secondary support frame.
- Release all cables on top → see picture 17
- Release cable to Amplifier Board from the catches on the rear side of the support frame.
- Remove contact springs and cable ties as shown in picture 18 and give cables a proper free length for dismantling.
- Remove 3 screws as shown in picture 19
- Raise the board up and put it to a desired service position → see picture 20

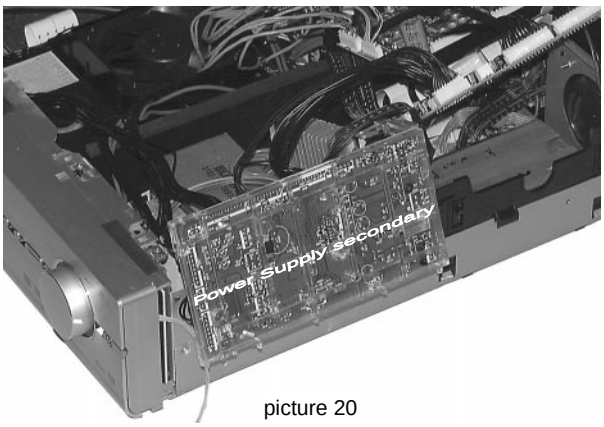
picture 17



picture 18



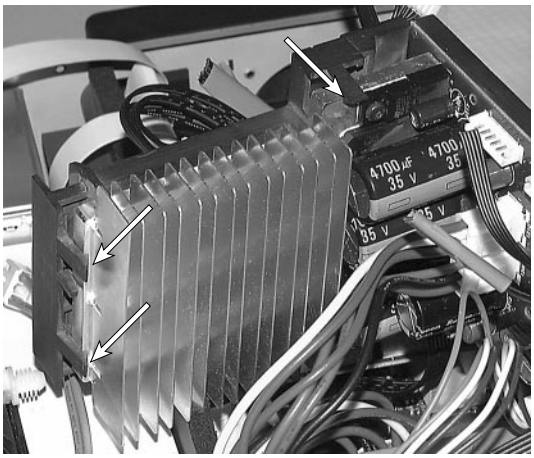
picture 19



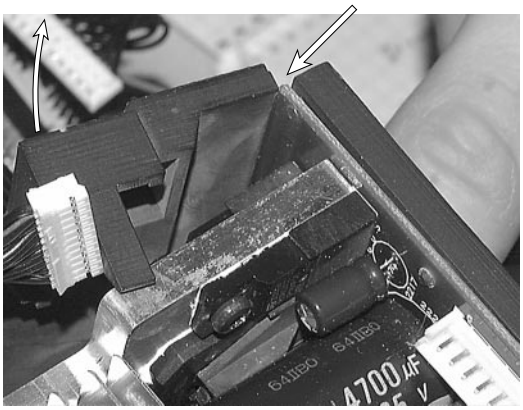
picture 20

Dismantling the *support frame* of the Power secondary Board

- Dismantle the Power secondary Board as described before.
- Loosen 2 screws from the component side of the board.
- Release 3 catches as shown in picture 21.
- Turn the released part of the support frame away as shown in picture 22.
  The printed circuit board will now automaticly be released on the rear edges and can be taken off.



picture 21



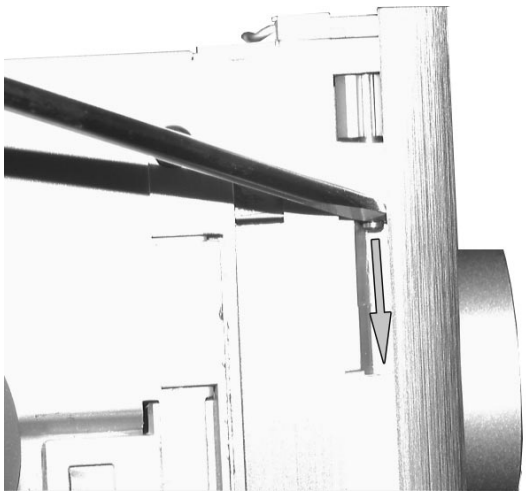
picture 22

Dismantling the *Front panel assembly*

The front panel assy consists of 2 cabinet parts, the ornamental aluminium front and the plastic front cabinet where the printed circuit boards and other technical parts are mounted.
Dependent on the location which is wanted to be accessed the front panel assy can be detached either as complete assy or separated in aluminium front and plastic front.
To avoid scratches on the ornamental part it is recommended always to remove the aluminium front first.

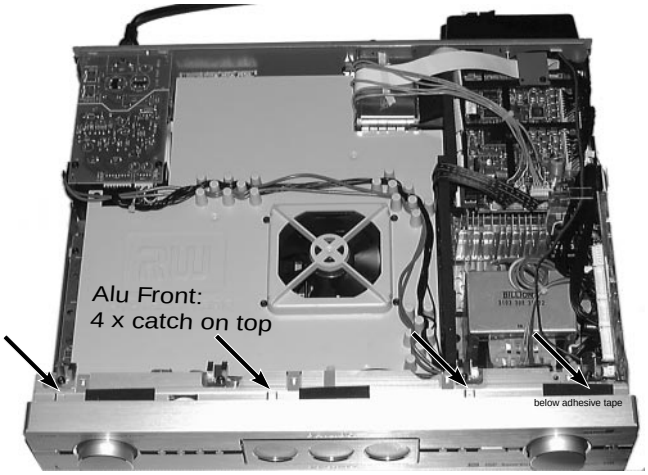
Attention:
During dismantling and mounting the front panel assy the connection pins of the display-motor may touch the metal cabinet. This short circuit easy causes a destruction of safety resistor 3550, located on Key Board left. Charged capacitors deliver sufficient energy even when the set is switched off.

Therefore insolate the motor connections with a piece of insolating tape before pulling out the front assy!



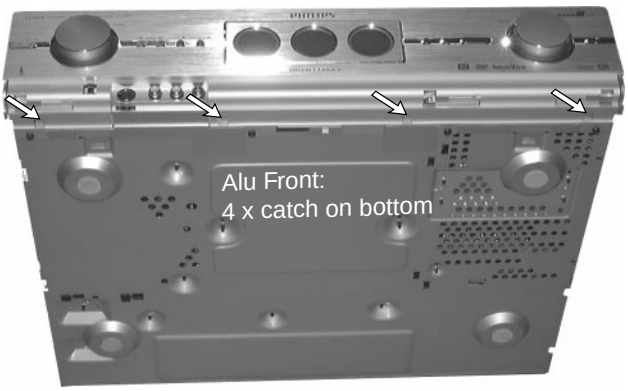
picture 25

Dismantling the *ornamental Aluminium Front*
- Loosen 8 screws as shown in picture 23 and 24.
- Remove the front flap by loosening the axles first → see picture 25
- Release 7 catches as shown in picture 26 and 27.
- Pull Aluminium Front slightly frontwards.

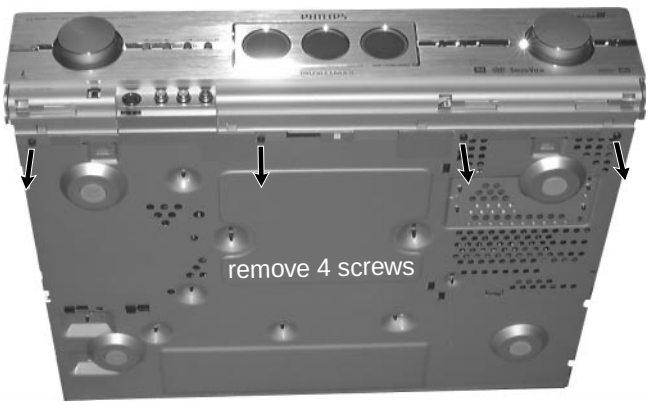


picture 26

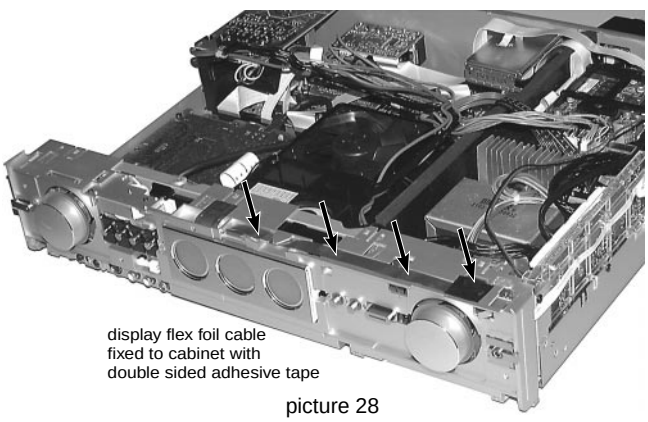
picture 23



picture 27



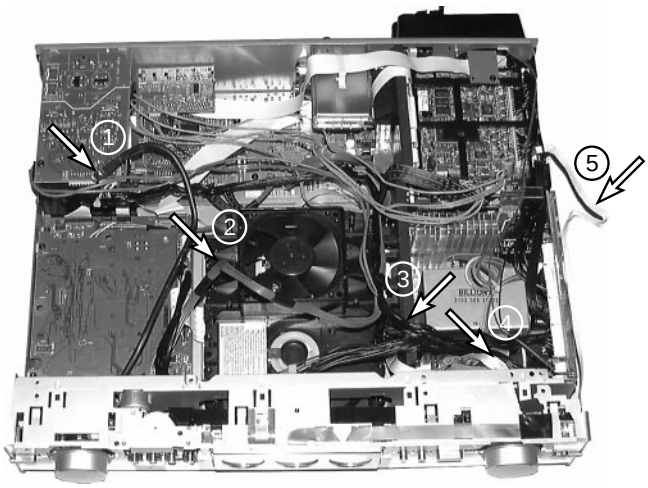
picture 24



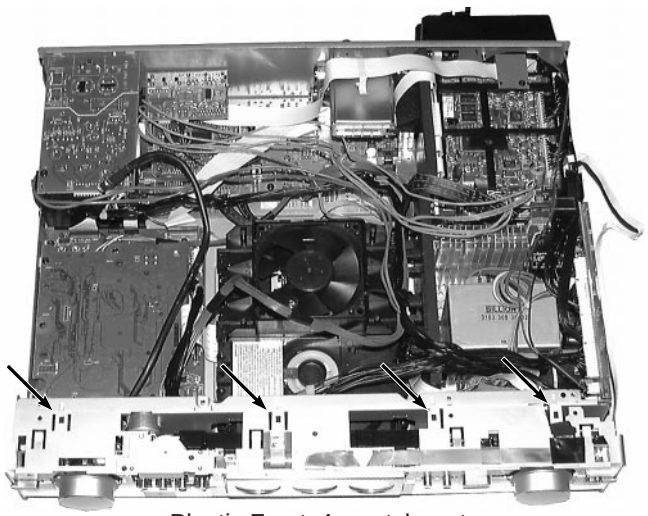
picture 28

Dismantling the *Plastic Front cabinet*

- Loosen 8 screws as shown in picture 23 and 24.
- Plug Firewire cable from DVIO Board off ① and release all cables as shown in picture 29 to give them a proper free length for moving front assy out.
- Release 6 catches as shown in picture 30 and 31.
- Pull Plastic Front slightly frontwards while taking care of the cables, especially to the flat foil cable ④ on the right side.
- Put front cabinet on the table as shown in picture 32.

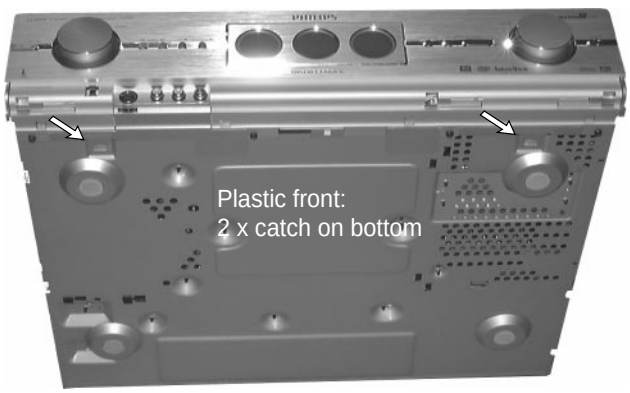


picture 29

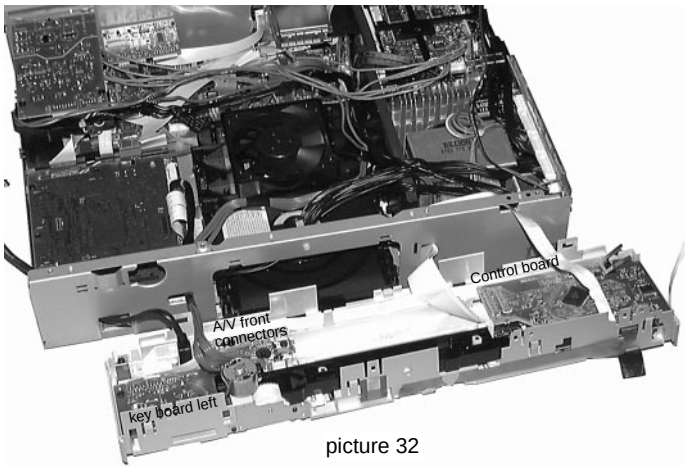


Plastic Front: 4 x catch on top

picture 30



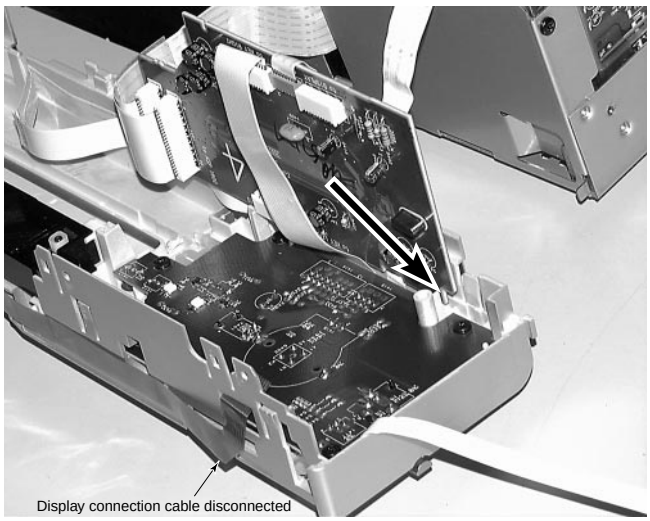
picture 31



picture 32

Service position *Control board / Key Board right*

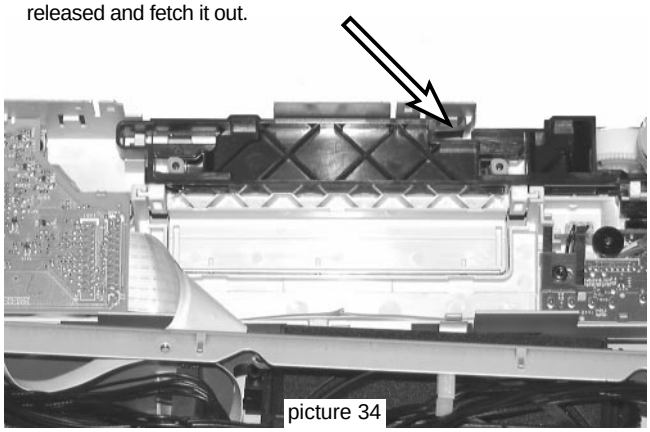
- Dismantle front assy as described before.
- Plug off flex foil cable to display.
- Loosen 1 screw.
- Lift the board on the rear side first in order to release it from the catches on the front side.
- Turn Control Board up and fix it in the slot as shown in picture 33.



picture 33

Dismantling the *Slider of the display moving mechanism*

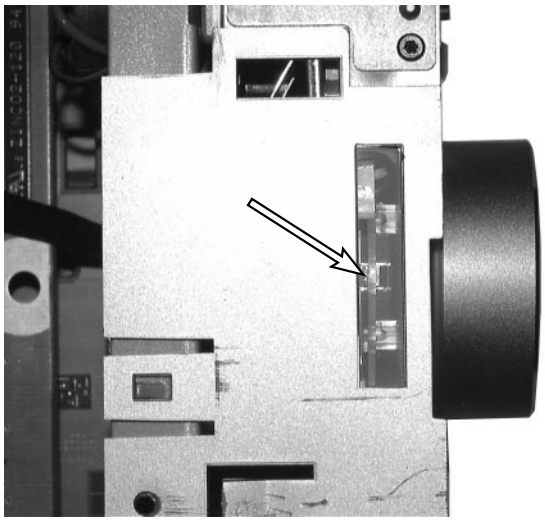
- Dismantle Front assembly as described before and put it to service position as shown in picture 33.
- Release catch as shown in picture 34, move slider left until it is released and fetch it out.



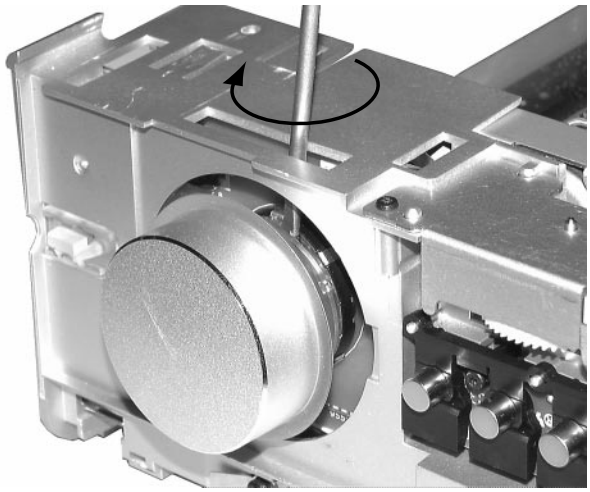
picture 34

Dismantling *Knobs of the Rotary Encoders*

- Dismantle ornamental Aluminium Front as described before.
- Turn the knob to a position as shown in picture 35.
- Put a flat screwdriver in between the black plastic part of the rotary encoder and the transparent plastic part of the knob → see picture 35.
- Turn the screwdriver in order to press the transparent part of the knob over the catch on the encoder → see picture 36. (this may need some force)
- Repeat 3x, the knobs are caught 4 times.



picture 35



picture 36

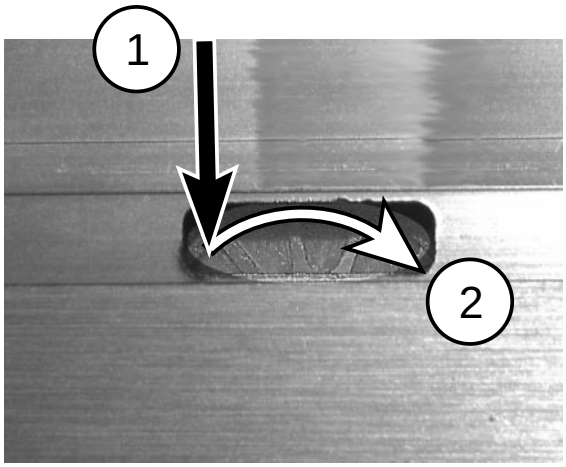
Mounting *Knobs onto the Rotary Encoders*

- Align guidings and simply push the knob onto the rotary encoder until the catches engage.

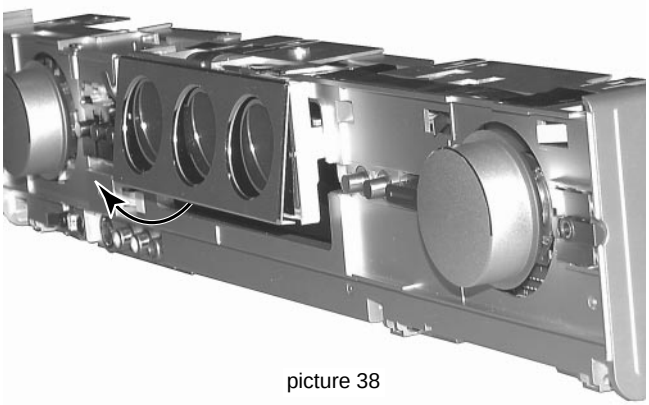
ATTENTION:
Be aware that when the knob has to be replaced by a new one, pos. 149, 151 and 152 respectively pos. 152, 177 and 178 have to be ordered.
The 3 parts have to be mounted together by the repair technician.

Dismantling the *Display*

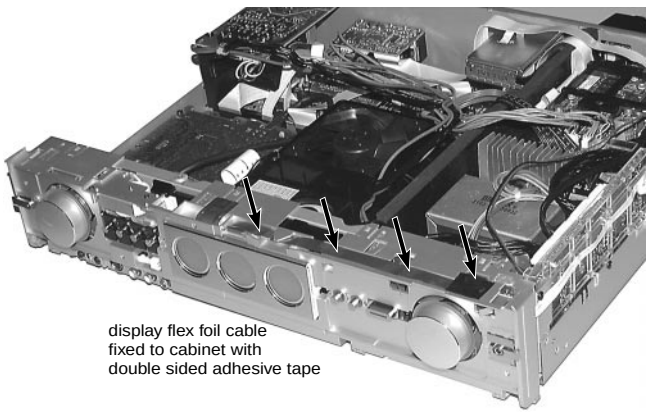
- Dismantle ornamental Aluminium Front as described before.
- Move the display manually up by means of a screwdriver. Through a slot on the top side of the front cabinet the gear wheel of the moving mechanism can be accessed. Push the gear wheel down in order to dis-engage the motor. Then turn the wheel clockwise → see picture 37. Repeat as long as the display has moved completely out.
- Loosen 3 screws on the bottom side of the display.
- Remove the ornamental cover as shown in picture 38.
- Move the display manually down as described before, but turning the gear wheel counter clockwise.
- Plug off the connection cable from the Control Board and loosen it carefully from the adhesive tapes → see picture 39.
- Now thread the connection cable out of the plastic front cabinet and remove display.



picture 37



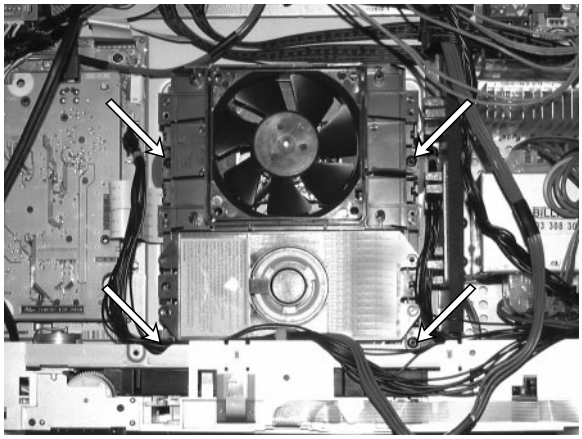
picture 38



picture 39

Dismantling the *DVD Basic Engine*

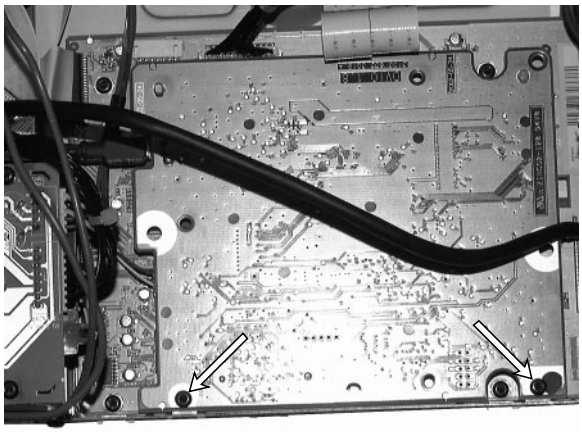
- Dismantle Top Cover and Air guide plate as described before.
- Loosen 4 screws as shown in picture 40.
- Plug off cables and fetch the module out.



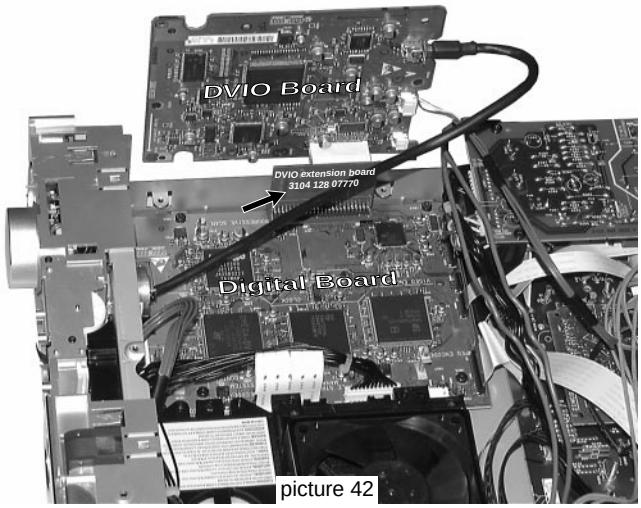
picture 40

Dismantling the *DVIO Board*

- Dismantle Top Cover and Air guide plate as described before.
- Loosen 2 screws as shown in picture 41.
- Disconnect DVIO Board from Digital Board (board to board connector).
- Take extension board 3104 128 07770 and re-connect DVIO Board with Digital Board. If necessary, disconnect cable (8006) to Analog Board.
  The DVIO Board is now in a proper service position → see picture 42.



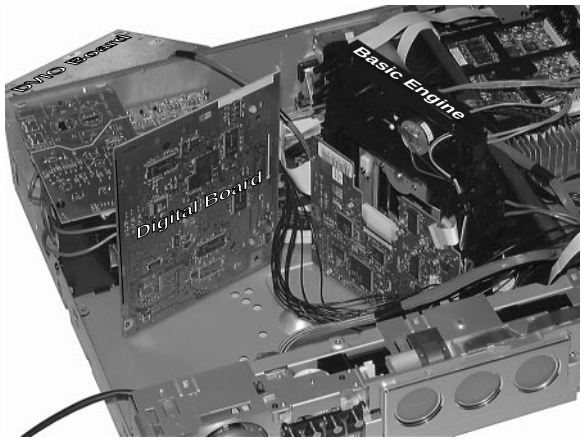
picture 41



picture 42

Dismantling the *Digital Board*

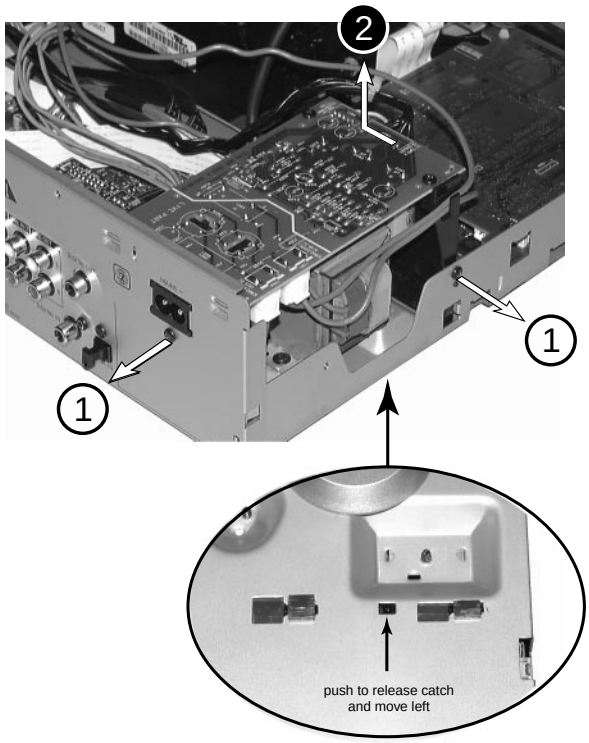
- Dismantle Top Cover and Air guide plate as described before.
- If necessary, remove DVIO Board first. See description before.
- Loosen 4 screws to dismantle Digital Board.
- To get access to the bottom side, the board can be put to a service position as shown in picture 43.



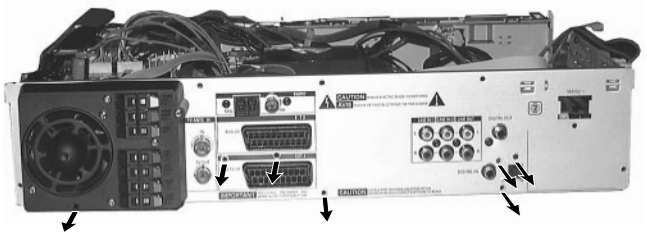
picture 43

Dismantling the *A/V Board*

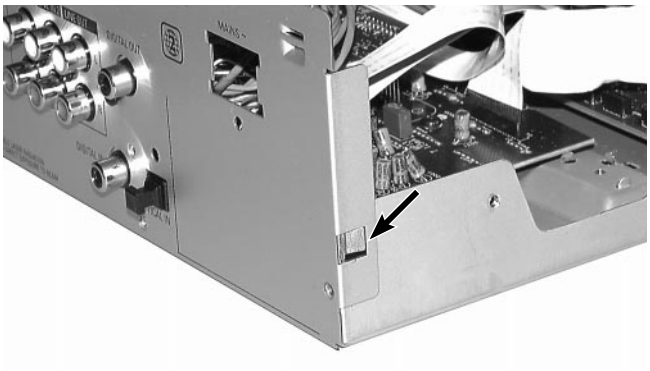
- Dismantle Top Cover and Air guide plate as described before.
- Dismantle Power primary Board as shown in picture 44.
- Dismantle Standby-transformer and put it together with the Power primary Board next to the set.
- Loosen 7 screws from rear cabinet as shown inpicture 45.
- Release catches on both sides of the rear cabinet and move it backwards as far as cable lengts allow → picture 46 shows the left side catch.
- Loosen 3 screws as shown in picture 47.
- Plug off cables to Auxiliary Board.
- Turn A/V Board to service position as shown in picture 48.



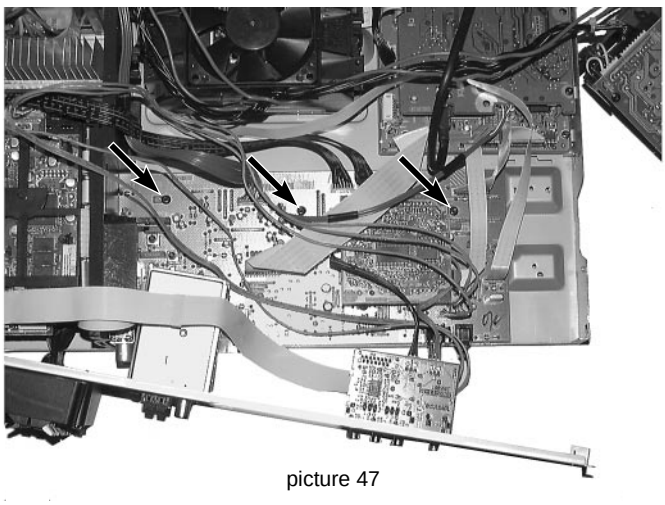
picture 44



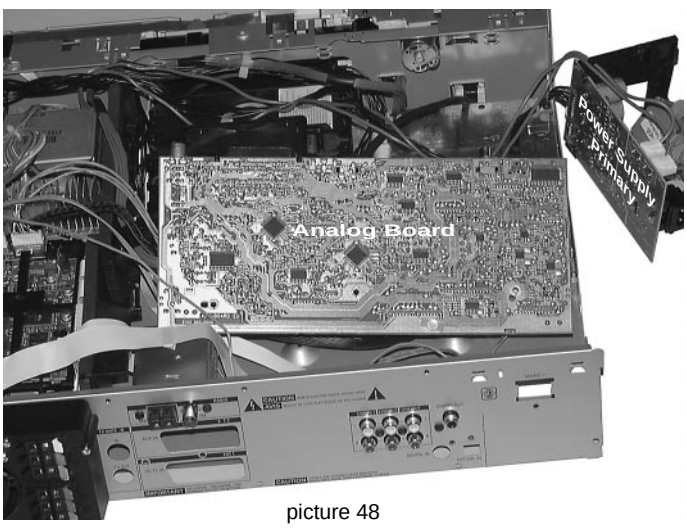
picture 45



picture 46



picture 47



picture 48

SERVICE TOOLS

TORX T10 screwdriver with shaftlength 150mm.....4822 395 50423
TORX screwdriver set SBC 163.....4822 295 50145

Audio signal disc SBC 429 .....4822 397 30184
Playability test disc SBC444.....4822 397 30245
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A.....4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30dB level
without "pause").....4822 397 30155

Sub chassis 8 test disc CD.....7104 099 28362
MPTD printed test disc CVP02.18A.....7104 099 91691
MPTD printed test disc CVP02.18C 7104 099 97941
Burn in test disc DL LVP04.15.....7104 099 91041
MPTD thin test disc CVP02.60.....7104 099 97931

NLT 01.00 link test disc DVDROM settings.....7104 099 98502
Blank DVD+RW disc RICOH 7104 099 98582
Blank DVD+R disc RICOH.....7104 099 94001

TRADE MODE

The sets are equipped with a special TRADE MODE.
This mode blocks the Open/close key on the front panel of the set to prevent customers from fetching out CDs from exhibition sets.

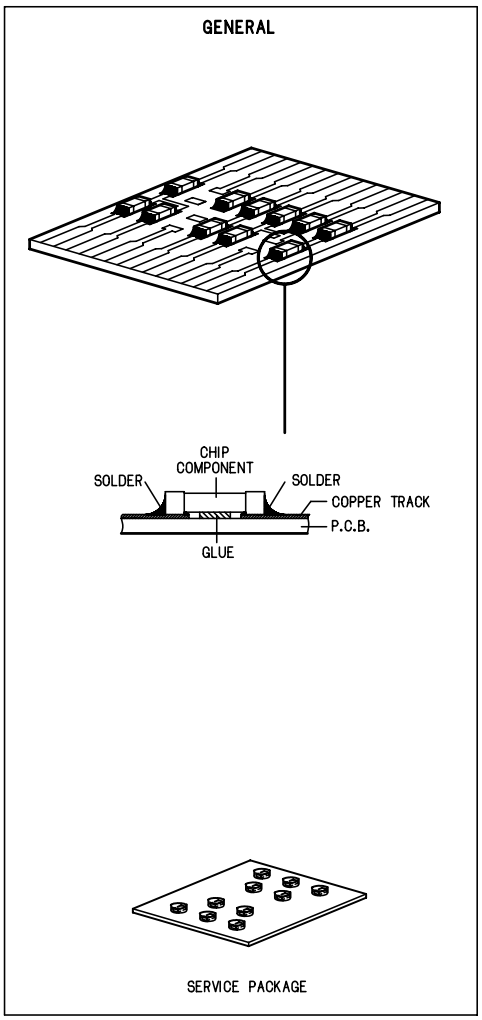
The Trade mode can be switched on/off as follows:
Hold Stop & Open/Close keys depressed for more than 5s (press STOP key first).
→ Display shows for 2s
LOCK TRAY ON else LOCK TRAY OFF

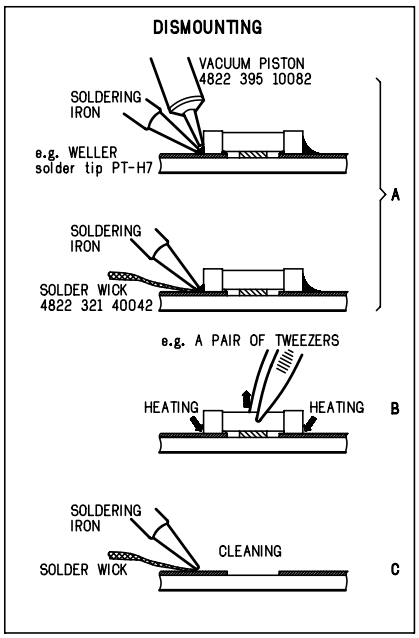
DEMO MODE

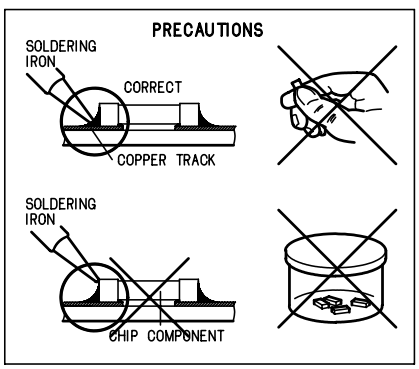
The DEMO MODE displays various features of the set and will start automatically when no key has been pressed for several minutes or during Standby mode.

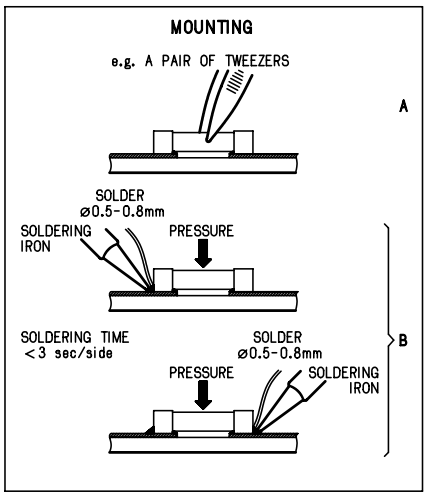
The Demo mode can be switched on/off as follows:
1) Switch the set to [Standby]
2) Press the [STOP] key on the set for more than 5s
→ Display shows
DEMO MODE ON else DEMO MODE OFF

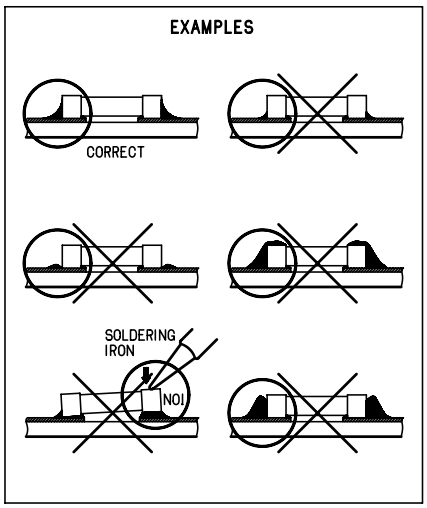
HANDLING CHIP COMPONENTS











SERVICE TESTPROGRAM
OVERVIEW ALL TESTS

SERVICE TESTS APPARATUS

To enter Service Testprogram hold ***Open/Close*** button depressed while plugging mainscord in.

* To leave Service Testprogram plug mains cord off.
* In the main menu the sound settings (volume, ...) and tray work as in normal mode.

'SV' stands for Service mode
'V.XX' stands for Version number of the software used in the Front (Display) µP.

To check versions of the DVD+RW software use OSD.

The left hand display shows.	The center display shows.	The right hand display shows the version number of the front µP - software.
SV	LX 9000-R	V-XX

SELECT TEST

|◄◄ or ►►| button pressed? N / Y

Test menu

TEST	Display shows
	LX 9000-R
Quartz test	QUARTZ
Temperature test	NTC
EEPROM test	EEPROM
EEPROM format	EP FORMAT
Display test	DISPLAY
Key test	KEY TEST
AUDIO TUNER test	TUNER
MDM board test	MDM TEST
AMPLIFIER test	AMP TEST

Select test (◄◄ / ►►)

The center display shows next or previous test of the test menu.

|◄◄ or ►►| button pressed? Y / N

START TEST

PLAY button pressed? N / Y

Start actual selected test.

For detailed description of the various tests see next pages.

DVD PLAYER TEST (script)

To start the DVD Player test hold ***Open/Close & PLAY*** buttons depressed while plugging mainscord in.

→ DIGITAL BOARD & A/V BOARD TEST

→ BASIC ENGINE TEST

For detailed description of the DVD player scripts see page 31 ff.

END-USER DIAGNOSTICS (DVD+RW module)

To enter END-USER DIAGNOSTICS hold ***PLAY*** button depressed while plugging mainscord in.

For detailed description of the End-User Diagnostic see page x ff.

FORCED DOWNLOAD OF OLDER SOFTWARE VERSION

To enable loading of an older software version hold ***RECORD & PLAY*** buttons depressed while plugging mainscord in.

TRADE MODE

To switch Trade Mode on/off hold ***STOP & Open/Close*** buttons depressed for more than 5s.

TRADE MODE
The sets are equipped with a special TRADE MODE. This mode blocks the Open/Close-key on the front panel of the set to prevent customers from fetching out discs from exhibition sets.
The tray can only be opened with the remote control.

The Trade mode can be switched on/off as follows:
Hold the ***STOP & Open/Close*** keys depressed for more than 5s (press *STOP* key first).
→ Display shows for 2s
LOCK TRAY ON else LOCK TRAY OFF

DEMO MODE

Switch set to Standby first. To switch Demo Mode on/off hold ***STOP*** button depressed for more than 5s.

DEMO MODE
The DEMO MODE displays various features of the set and will start automatically when no key has been pressed for several minutes or during Standby mode.
The Demo mode can be switched on/off as follows:
1) Switch the set to [Standby]
2) Press the [STOP] key on the set for more than 5s
→ Display shows
DEMO MODE ON else DEMO MODE OFF

VIRGIN MODE (DVD+RW module)

To reset the set to Virgin Mode hold ***STANDBY*** button depressed while plugging mainscord in.

TOGGLE MODULATOR CHANNEL

for USA version only

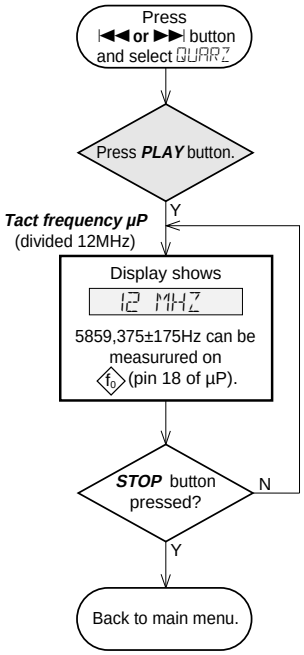
To toggle Modulator Channel (channel 3/4) hold ***RECORD*** button depressed while plugging mainscord in.

TOGGLE VIDEO MODE

for USA version only

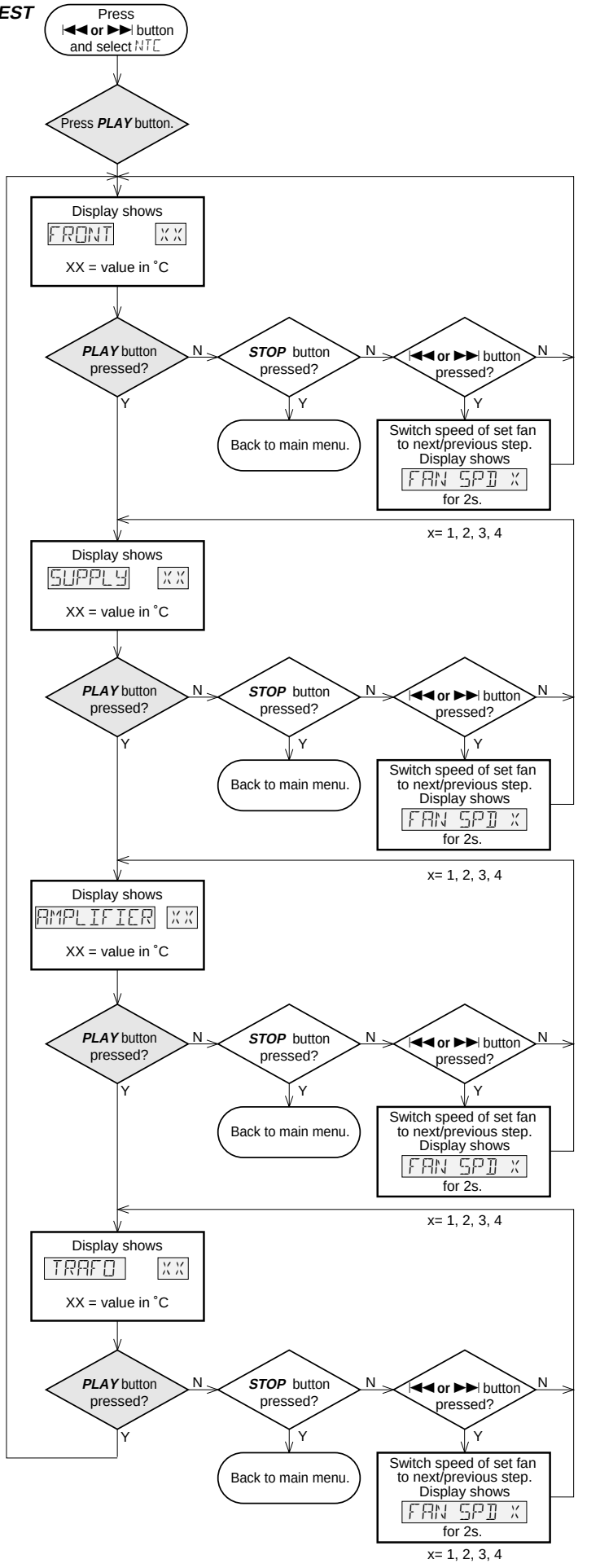
To toggle Video Mode (interlace/progressive scan) hold ***STOP*** button depressed while plugging mainscord in.

QUARTZ TEST



The Quartz test allows a quick check of the oscillator of the Front µP without any influence to the oscillator circuitry by the test equipment.
The factory can check if the correct quartz has been assembled.
A 50% duty pulse of the divided oscillator frequency is put on pin 18 of the µP (MDM_SCL).
To avoid dismantling of the front cabinet the test signal can best be measured on pin 9 of 1802, located on the MDM board.

TEMPERATURE TEST



TEMPERATURE TEST

The temperature test is used to check the NTC resistors which measure various temperatures to control the speed of the basic engine fan and the set fan.

NTC Front: sensor for ambient temperature, located on Key board left.

Controls the fan of the basic engine.

NTC Supply: sensor for the temperature of the heatsink on the Power Secondary board.

NTC Amp(lifier): sensor for the temperature of the heatsink on the Power Amplifier board.

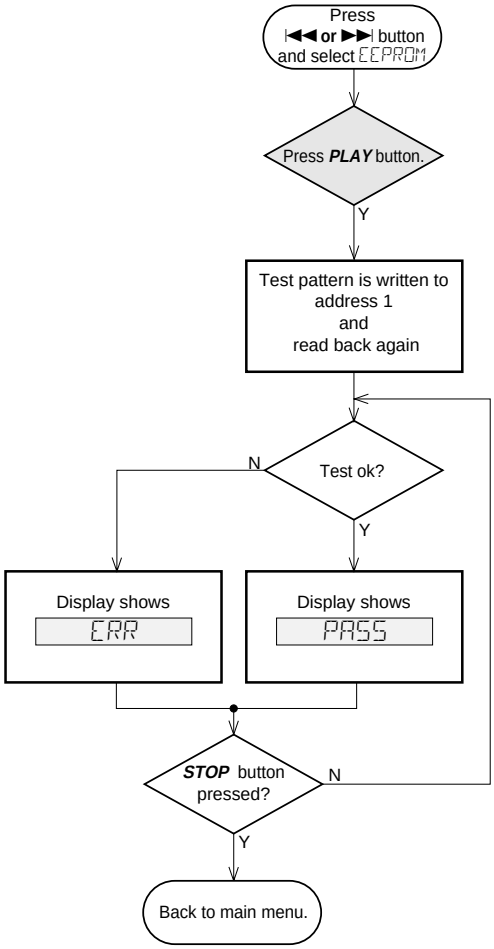
NTC Trafo: sensor for the temperature of the main transformer.

The signals NTC Supply, NTC Amp and NTC Trafo are compared with a special algorithm and result in the control signals SetFan1 and SetFan2 which control the speed of the set fan.

In each test step of the temperature test the speed of the set fan can be set in four steps.

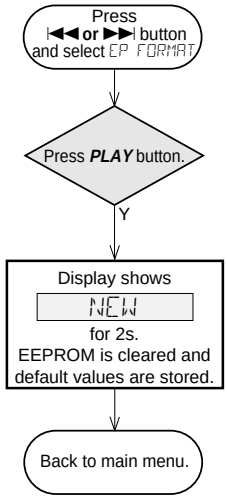
servtest LX9000R sh 2, 040503

EEPROM TEST



The test checks writing and reading of data to the EEPROM.
A test pattern is written to the first location in the EEPROM.
PASS is displayed when the test pattern is read back correctly, else ERR.

FORMAT EEPROM



Each software module using the EEPROM is forced to write the default values in its part of the EEPROM.

This test should only be used to clear the EEPROM in case of a µP-"hangup".

DISPLAY TEST

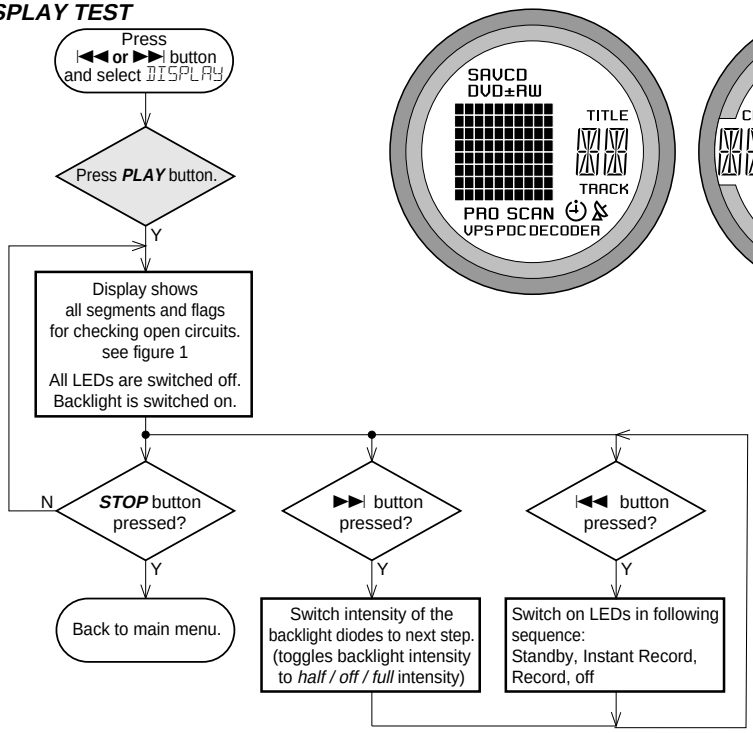
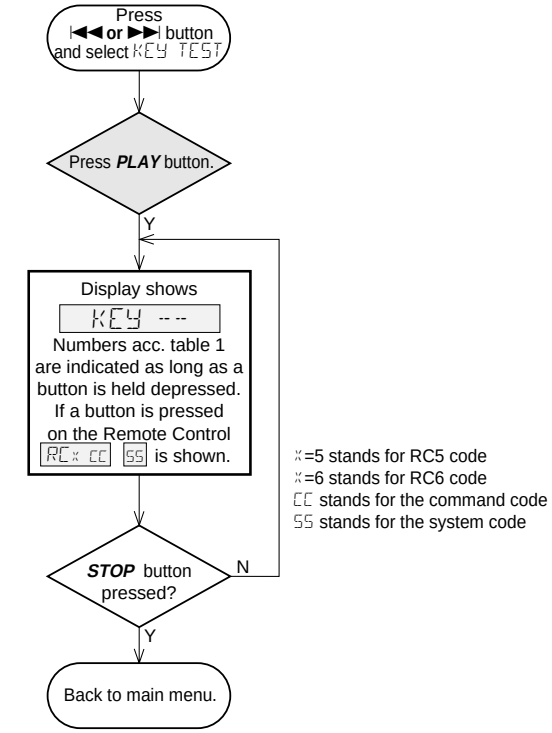


fig. 1

The DISPLAY test is intended to check the driver circuits, the display module and the LEDs for open- or short-circuits.
The LEDs *Standby*, *Instant Record* and *Record* can be switched on/off separately.
The intensity of the backlight LEDs can be switched in 3 steps: full, half, off

KEY TEST

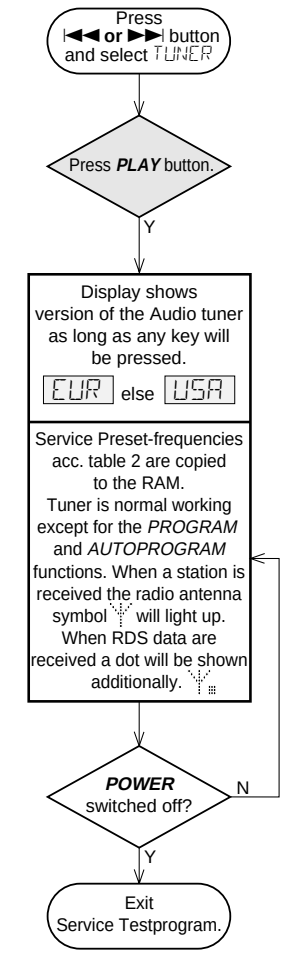


KEY CODES

KEY	KEY CODE
STANDBY/ON	1
PREVIOUS |◄◄	2
NEXT ►►|	3
STOP	4 (exit)
PLAY/PAUSE	5
OPEN/CLOSE	6
SURROUND	7
RECORD	8

table 1

AUDIO TUNER TEST



SERVICE PRESET FREQUENCIES

REGION / PRESET	EUR EUROPE FM/MW /22/25/29	USA USA FM/AM /37
1	87,5 MHz	87,5 MHz
2	108 MHz	108 MHz
3	531 kHz	530 kHz
4	1602 kHz	1700 kHz
5	558 kHz	560 kHz
6	1494 kHz	1500 kHz
7	98 MHz	98 MHz
8	---	---

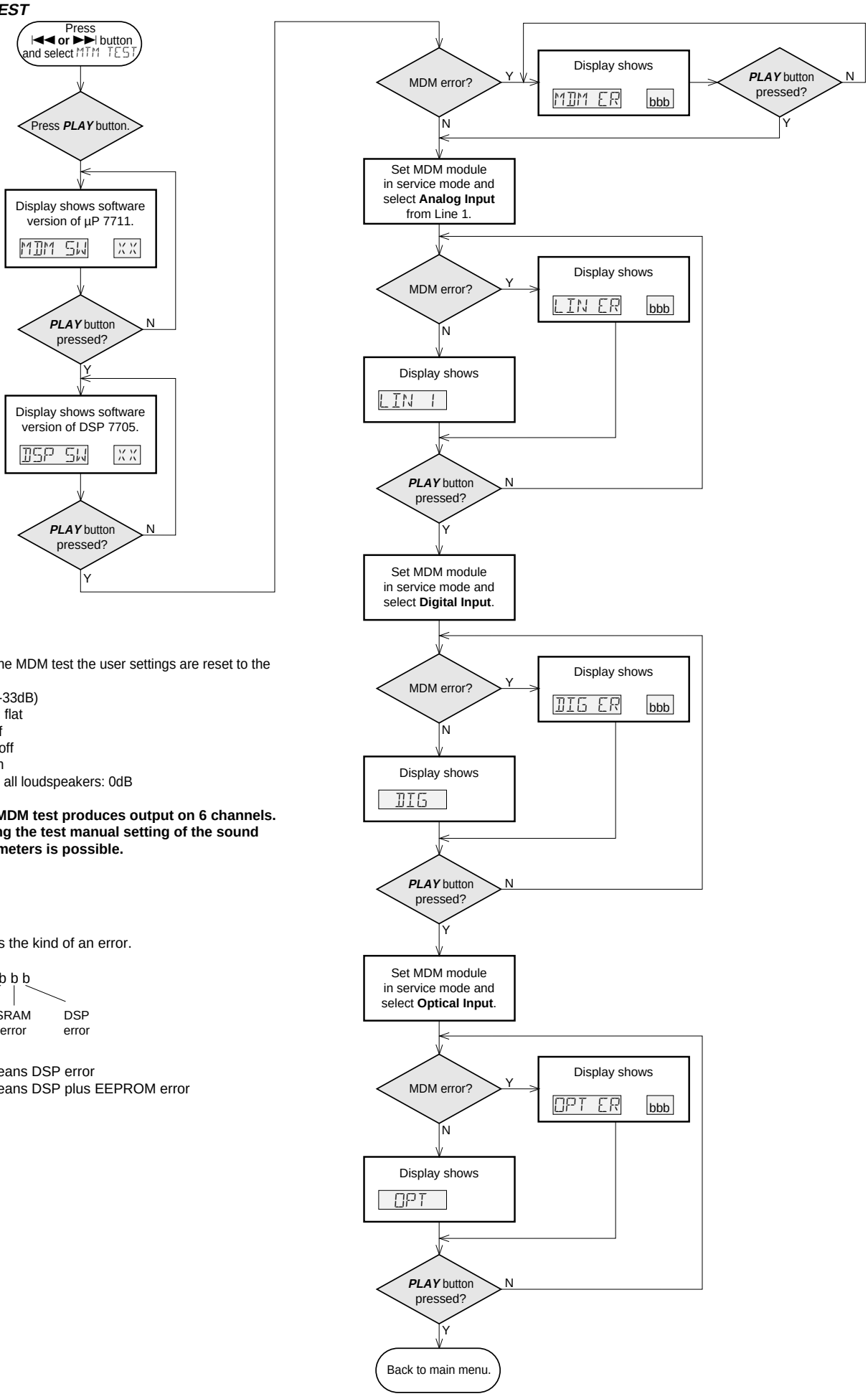
table 2

Key	*Function*
NEXT ►►|	manual tuning + auto search
PREV |◄◄	manual tuning + auto search
STOP ■	preset down
PLAY ►	preset up
OPEN/CLOSE	band switch (FM stereo, FM mono, AM)

table 3

The Audio tuner test is intended to read out the tuner version selected by the front µP.
The correct tuner version is defined by the version detection resistor 3444 mounted on the Front - Control board. 3444 mounted = USA version without RDS.
The stored preset frequencies serve as provision for other tuner modules only.

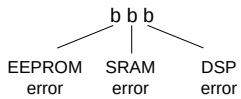
MDM TEST



By entering the MDM test the user settings are reset to the initial values:
Volume: 10 (-33dB)
Bass, Treble: flat
Loudness: off
Clear Voice: off
Bass ALC: on
Delta volume all loudspeakers: 0dB

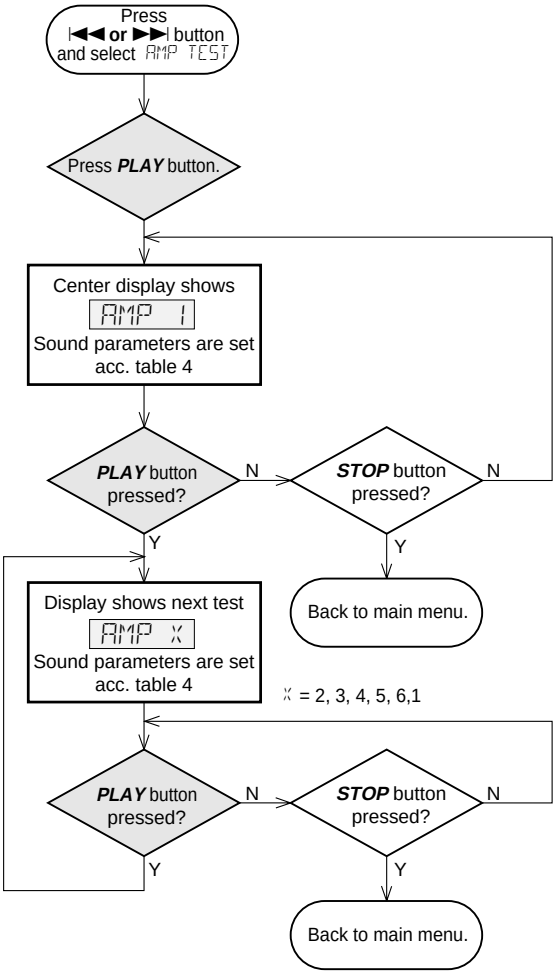
Note: The MDM test produces output on 6 channels. During the test manual setting of the sound parameters is possible.

ERRORS:
bbb indicates the kind of an error.



e.g. 001 means DSP error
101 means DSP plus EEPROM error

AMPLIFIER TEST



The Amplifier test is intended for testing the analog modes of the amplifier and the sound processor settings.

By entering the MDM test the user settings are reset to the initial values:
Volume: 10 (-33dB)
Bass, Treble: flat
Loudness: off
Clear Voice: off
Bass ALC: on
Delta volume all loudspeakers: 0dB

Note: The AMPLIFIER test produces output on 6 channels. During the test manual setting of the sound parameters is possible.

Test mode	**Audio INPUT**	**Bass ALC**	**MUTE** (Headhone and Loudspeakers)	**MUTE Line out**
AMP 1	Line in 1	off	off	off
AMP 2	Line in 2	off	off	off
AMP 3	Ext. 1	off	off	off
AMP 4	Ext. 2	off	off	off
AMP 5	Line in 1	on	off	off
AMP 6	Line in 2	on	on	on

table 4

5. Diagnostic Software DVD

Due to the complexity of the DVD recorder, the time to find a defect in the recorder can become long. To reduce this time, the recorder has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the DVDR hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Player script interface
3. Menu and command interface

5.1 End User/Dealer Script Interface

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone DVD recorder. You only need a cinch audio and video cable for the test. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the recorder is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the recorder. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the recorder because the nuclei in this mode don't cover the complete functionality of the recorder.

5.1.2 Contents

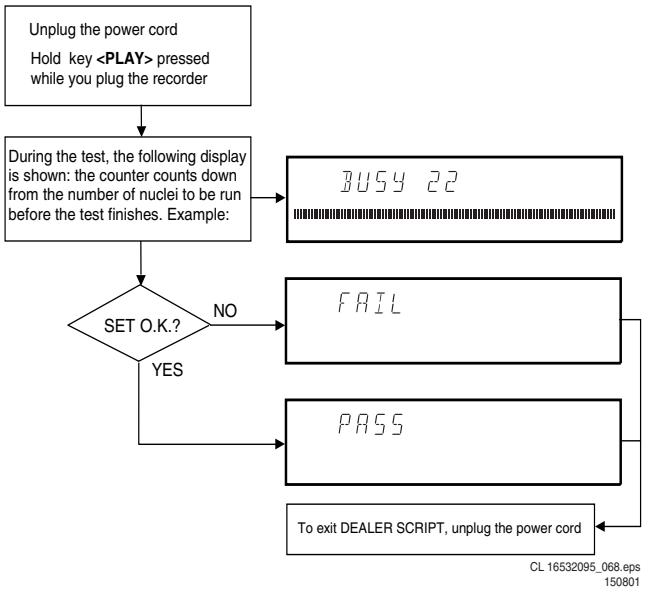


Figure 5-1

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD recorder. The nuclei called in the End user/ Dealer script are the following:

Counter	Nucleus	Name	Description
22	104	HostdSdramWrR	checks all memory locations of the 4MB SDRAM
21	106	HostdDramWrR	checks all the DRAM connected to the microprocessor of the digital board
20	123	HostdI2cNvram	checks the data line (SDA) and the clock line (SCL) of the I2C bus between the host decoder and NVRAM
19	202	SAA7118I2c	checks the interface between the Host I2C controller and the AVENC SAA7118 Video Input Processor
18	200	VideoEncI2c	checks the interface between the host I2C controller and Empress SAA6752
17	207	AudioEncI2c	checks the I2C connection between the host decoder and Empress SAA6752
16	204	AudioEncAccess	tests the HIO8 interface lines between the host decoder and the audio encoder
15	203	AudioEncSramAccess	checks the access of the SRAM by the audio encoder (address and data lines).
14	205	AudioEncSramWrR	tests the SRAM connected to the audio encoder
13	206	AudioEncInterrupt	tests the interrupt line between the host decoder and the audio encoder
12	300	VsmAccess	checks whether the VSM interrupt controllers and DRAM are accessible
11	303	VsmInterrupt	checks both interrupt lines between the VSM and the host decoder
10	302	VsmSdramWrR	tests the entire SDRAM of the VSM
9	1400	Clock11_289MHz	switches the A_CLK of the micro clock to 11.2896 MHz
8	1401	Clock12_288MHz	switches the A_CLK of the micro clock to 12.288 MHz
7	601	BeS2Bengine	checks the S2B interface with the Basic Engine by sending an echo command
6	500	DisplayEcho	checks the interface between the host processor and the slave processor on the display board
5	700	AnalogueEcho	checks the interface between the host processor and the microprocessor on the analogue board
4	711	AnalogueNvram	checks the NVRAM on the analogue board
3	706	AnalogueTuner	checks whether the tuner on the analogue board is accessible

Counter	Nucleus	Name	Description
2	901	LoopAudioUserDealer	This nucleus tests the components on the audio signal path The host decoder - The analogue board - The audio encoder - The VSM Attention: the rear cinch audio out has to be connected to the front cinch audio in.
1	906	LoopVideoUserDealer	Nucleus for testing the components on the video signal system path: - The VIP - The video encoder - The VSM - The host decoder - The analogue board Attention: the rear cinch video out has to be connected to the front cinch video in.

5.2 Player Script Interface

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the DVD recorder's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the DVD recorder must be connected to a TV set.
To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the DVDR module) require that a DVD+RW disc is inserted.
Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

5.2.2 Structure of the Player Script

The player script consists of a set of nuclei testing the hardware modules in the DVD recorder: the Display PWB, the Digital PWB, the Analogue In/Out PWB and the DVDR module. Nuclei run by the player test need some user interaction; in the next table this interaction is described. The player test is done in two phases:

- Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log information can be useful to determine any error that occurred recently during normal operation of the DVD player.
- The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

STEP	DESCRIPTION	NUCLEUS
1	Press **OPEN/CLOSE** and **PLAY** at the same time and POWER ON the recorder to start the playerscript	2
2	The local display shows **FPSEGMENTS**. Press **STOP** to skip this nucleus.	502
3	The local display shows **FPLABELS**. Press **STOP** to skip this nucleus.	503
4	The local display shows **FPLIGHT ALL**. Press **STOP** to skip this nucleus.	520
5	The local display shows **FPLED**. Press **STOP** to skip this nucleus.	504
6	The local display shows **FPKEYBOARD**. Press **STOP** for more than one second to skip this nucleus.	505
7	The local display shows **FPREMOTE CONTROL**. Press **STOP** to skip this nucleus.	506
8	The local display shows **FPDIMMER**. Press **STOP** to skip this nucleus.	518
9	The local display shows **ROUTE VIDEO**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	712
10	The local display shows **ROUTE AUDIO**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	713
11	The local display shows **COLOUR-BAR ON**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	120
12	The local display shows **PINK NOISE ON**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	115
13	The local display shows **PINK NOISE OFF**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	116
14	The local display shows **SINE ON**. Press **PLAY** to start the test. Press **STOP** to stop the sine. Press **STOP** to skip this nucleus.	117
15	The local display shows **COLOUR-BAR OFF**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	121
16	The local display shows **BERESET**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	603
17	The local display shows **BETRAY OPEN**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	616
18	The local display shows **BETRAY CLOSE**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	615

STEP	DESCRIPTION	NUCLEUS
19	The local display shows **BEWRITE READ**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	617
20	The local display shows **BETRAY OPEN**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	616
21	The local display shows **BETRAY CLOSE**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus.	615
22	The local display shows **READ ERRORLOG**. Press **PLAY** to start the test. Press **STOP** to skip this nucleus. If the player test succeeded, the user/dealer script will start in an endless loop. If the player test failed, the local display will display FAIL and the error code	633

Remark
In case of a failure, the display shows " FAIL XXXXXX ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Unplug the set and restart the player script. By pressing the STOP key, it is possible to jump over the failure and to continue the player script.

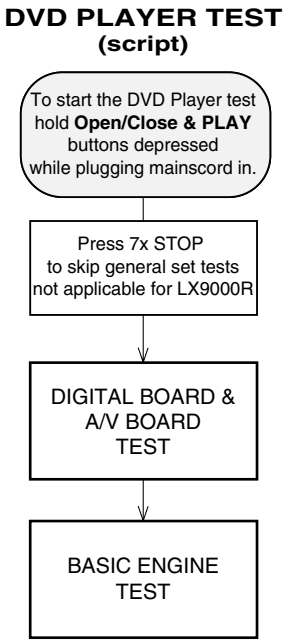


Figure 5-2

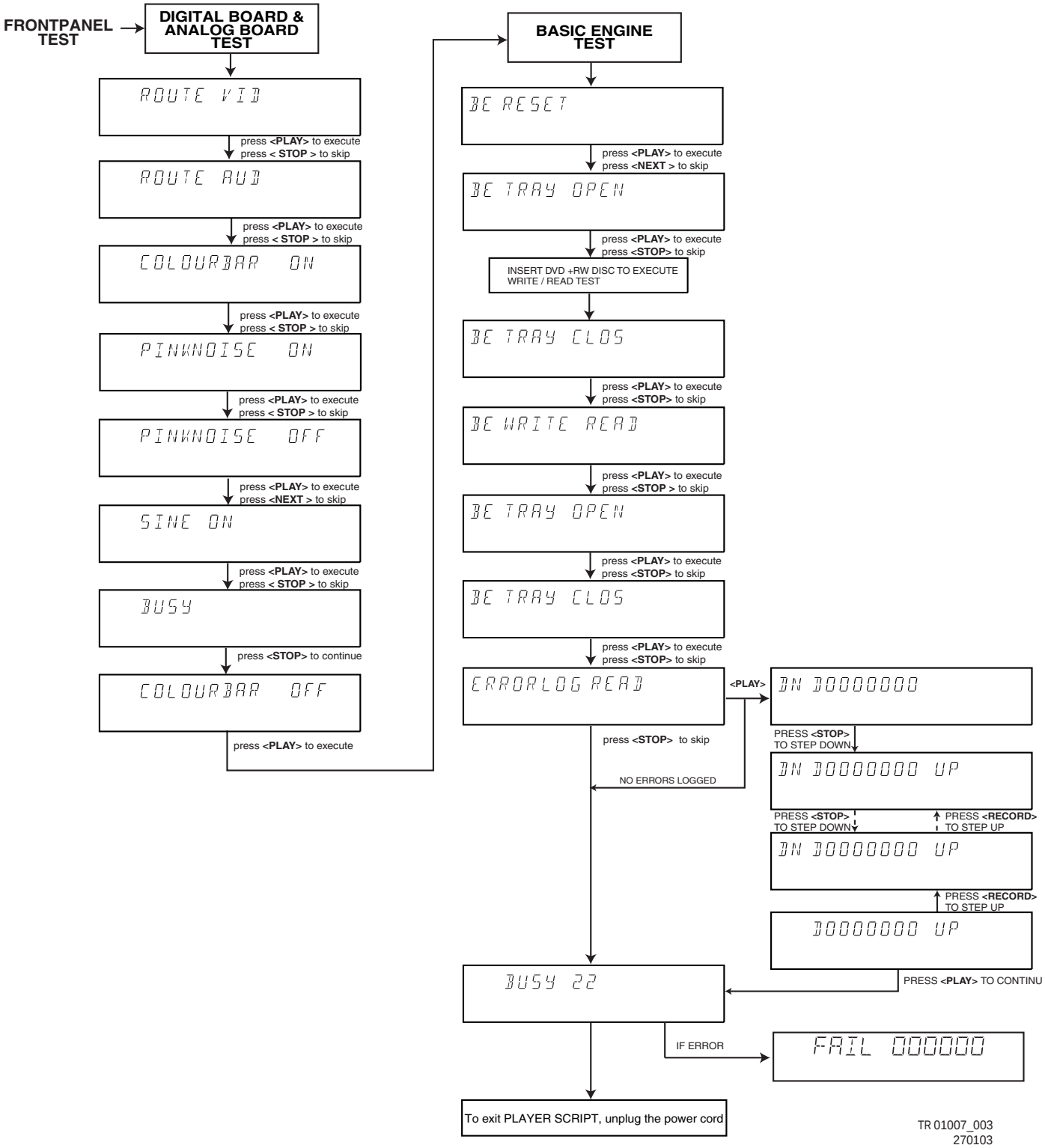

FRONTPANEL TEST
DIGITAL BOARD & ANALOG BOARD TEST
ROUTE VID
press <PLAY> to execute
press < STOP > to skip
ROUTE AUD
press <PLAY> to execute
press < STOP > to skip
COLOURBAR ON
press <PLAY> to execute
press < STOP > to skip
PINKNOISE ON
press <PLAY> to execute
press < STOP > to skip
PINKNOISE OFF
press <PLAY> to execute
press <NEXT > to skip
SINE ON
press <PLAY> to execute
press < STOP > to skip
BUSY
press <STOP> to continue
COLOURBAR OFF
press <PLAY> to execute
BASIC ENGINE TEST
BE RESET
press <PLAY> to execute
press <NEXT > to skip
BE TRAY OPEN
press <PLAY> to execute
press <STOP> to skip
INSERT DVD +RW DISC TO EXECUTE WRITE / READ TEST
BE TRAY CLOS
press <PLAY> to execute
press <STOP> to skip
BE WRITE READ
press <PLAY> to execute
press <STOP > to skip
BE TRAY OPEN
press <PLAY> to execute
press <STOP> to skip
BE TRAY CLOS
press <PLAY> to execute
press <STOP> to skip
ERRORLOG READ
<PLAY>
DN 00000000
PRESS <STOP> TO STEP DOWN
DN 00000000 UP
press <STOP> to skip
NO ERRORS LOGGED
PRESS <STOP> TO STEP DOWN
PRESS <RECORD> TO STEP UP
DN 00000000 UP
PRESS <RECORD> TO STEP UP
00000000 UP
PRESS <PLAY> TO CONTINU
BUSY 22
IF ERROR
FAIL 000000
To exit PLAYER SCRIPT, unplug the power cord
TR 01007_003
270103

Figure 5-3

5.2.3 Error Log

Explanation:
The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 19. The last reported error is shown as DN D0000000, the oldest visible error as D0000000 UP and the errors in between as DN D0000000 UP. DN stands for DOWN, UP stands for UPWARDS. The shown error codes are identical to the Nuclei Error Codes (paragraph 5.4).

5.2.4 Trade Mode

TRADE MODE
When the recorder is in Trade Mode, the recorder cannot be controlled by means of the front key buttons, but only by means of the remote control.

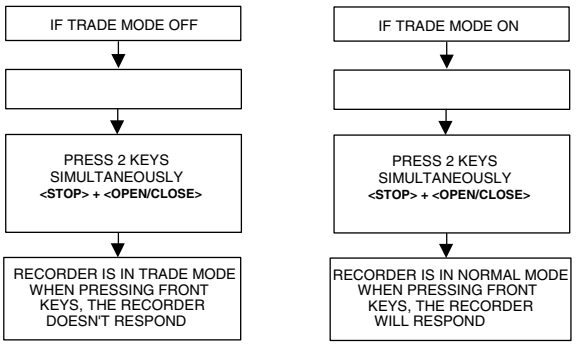


Figure 5-4

5.2.5 Virgin mode

If you want that the recorder starts up in Virgin mode, follow this procedure:
- Unplug the recorder
- plug the recorder again while you keep the STAND BY/ON key pressed
- the set starts up in Virgin mode.

5.3 Menu and Command Mode Interface

5.3.1 Nuclei Numeration

Each nucleus has a unique number of four digits. This number is the input of the command mode.

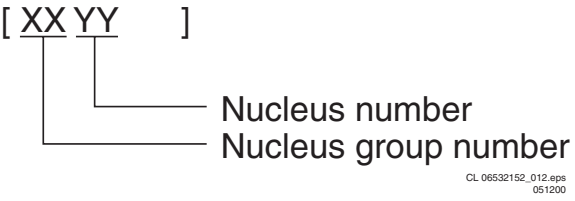


Figure 5-5

The following groups are defined:

Group number	Group name
0	Basic / Scripts
1	Host decoder (Sti5505 and memory)
2	Audio / video encoder (DVDR only)
3	VSM (DVDR only)
4	NVRAM
5	Front Panel
6	Basic Engine
7	Analogue board (DVDR only)
8	DVIO (DVDR only)
9	Loop nuclei (DVDR only)
10	Library sub nuclei (I2C nuclei)
11	User interface
12	Furore (SACD only)
13	DAC (SACD only)
14	Miscellaneous

5.3.2 Error Handling

Each nucleus returns an error code. This code contains six numerals, which means:

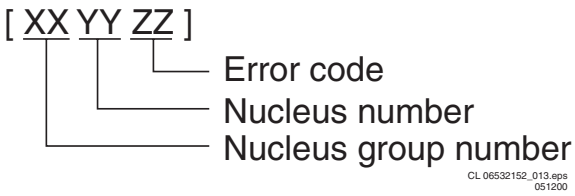


Figure 5-6

The nucleus group numbers and nucleus numbers are the same as above.

5.3.3 Command Mode Interface

Set-Up Physical Interface Components
Hardware required:
- Service PC
- one free COM port on the Service PC
- special cable to connect DVD recorder to Service PC

The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD recorder. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).
Code number of PC interface cable: 3122 785 90017

Activation
Plug the recorder to the mains and the following text will appear on the screen of the terminal (program):

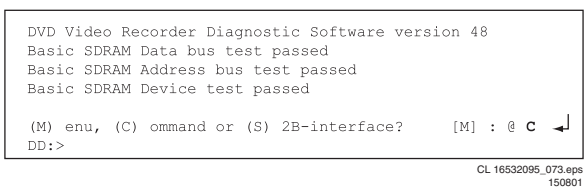


Figure 5-7

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt ("DD>") will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command Overview
We provide an overview of the nuclei and their numbers. This overview is preliminary and subject to modifications.

Host Decoder [01]

[xx yy] Number	Nuclei
100	Checksum Flash
101	Flash Write Access 1
102	Flash Write Access 2
103	Flash Write Read
104	SdRam Write Read
105	SdRam Write Read Fast
106	Dram Write Read
107	Dram Write Read Fast
108	Hardware Version
109	Mute On
110	Mute Off
115	Pink Noise On
116	Pink Noise Off
117	Sine On
118	Sine Burst 1kHz
119	Sine Burst 12kHz
120	Colour-bar On Note: Use nuclus 712 with parameter 07 to route the signals to the analogue board output
121	Colour-bar Off
122	NvramWrR
123	NvramI2c
130	Boot Version
131	Application Version
132	Diagnostics Version
133	Download Version
134	Write / read I2C message to / from digital board
135	Video Test Signal OnNote: Use nuclus 712 with parameter 07 to route the signals to the analogue board output. Input: 135 [a] [b] a: Number of test image, 0. Horizontal colour-bar 1. White 2. Yellow 3. Light blue 4. Green 5. Magenta 6. Red 7. Blue 8. Black 9. Colour triangle (execution time is 12 seconds) 10. Test image for progressive scan (execution time is 6 seconds) b: Video standard, 0. PAL BDGHI 1. NTSC
136	Video Test Signal Off
137	Macrovision Off

Audio Video Decoder [02]

[xx yy] Number	Nuclei
200	Video Encoder I2C
202	SAA7118 I2C
203	Audio Encoder SRAM Access
204	Audio Encoder Access
205	Audio Encoder SRAM Write Read
206	Audio Encoder Interrupts
207	Audio Encoder I2C
208	SAA7118 select input
209	Empress Version

VSM [03]

[xx yy] Number	Nuclei
300	Register Access
301	SDRAM Access
302	SDRAM Write Read
303	Interrupt lines
304	VSM Interconnection
305	UART

NVRAM [04]

[xx yy] Number	Nuclei
400	Reset
401	Read
402	Modify
403	UniqueNr Read
404	Read Error Log
407	Reset Error Log
409	Line2 Region-Code Reset
410	UniqueNr Store

Front Panel [05]

[xx yy] Number	Nuclei
500	Echo
501	Version
502	Segment
503	Label
504	Led
505	Keyboard
506	Remote-Control
507	Segment Starburst
508	Segment Vertical
509	Segment Horizontal
514	Beeper
515	Discbar
516	Discbar Dots
517	Vu / Grid
518	Dimmer
519	Blinking
520	Light All Segments
522	Flap Open
523	Flap Close

Basic Engine [06]

[xx yy] Number	Nuclei
600	S2B Pass
601	S2B Echo
602	Version
603	Reset
604	Focus On
605	Focus Off
606	Disc Motor On
607	Disc Motor Off
608	Radial On

[xx yy] Number	Nuclei
609	Radial Off
615	Tray In
616	Tray Out
617	Write Read
618	Write Read Endless Loop
619	Selftest
620	BE Test
621	Laser Test
622	Spindle (Disc) Motor Test
623	Focus Test
624	Sledge Motor Test
625	Sledge Motor Slow
626	Tilt
627	EEPROM Read
628	EEPROM Write
629	Optimise Jitter
630	Radial ATLS Calibration
631	Get Statistics Information
632	Reset Statistics Information
633	BE Read Error Log
634	BE Reset Error Log
638	Get Self Test Result
639	Radial Initialisation
640	Get OPU info

Analog Board [07]

[xx yy] Number	Nuclei
700	Echo
703	Boot Version
704	Hardware Version
705	Clock Adjust
706	Tuner
707	Frequency Download
708	Data Slicer
709	Sound Processor
710	AV Selector
711	Nvram
712	Route Video
713	Route Audio
715	Set Slash Version
716	Application Version
717	Diagnostics Version
718	Download Version
720	Bargraph Level Adjustment
721	Clock correction
722	Clock reference
723	Re-virginise Recorder
724	Flash Checksum
725	Tuner frequency selection Europe: To make video and audio signals from the tuner available on Scart2, send command "712 08". For Nafta/Apac: To make the black/white Video available on Y/C Rear Out connector, send command “712 08” Input: 725 [frequency in MHz*16] [system] System: NTSC=16, PAL BG=16, PAL I=32, PAL DK=48, SEC L=64, SEC LS=80, SEC BG=96, SEC DK=112
727	Set virgin bit
728	Clear Virgin Bit
729	Write / read I2C message to / from analogue board

[xx yy] Number	Nuclei
730	Store external presets
731	Get slash version
732	AFC Reference Voltage Tuner
736	Get EPG Version
737	Get operating hours in Tuner Mode

DVIO [08]

[xx yy] Number	Nuclei
800	Check DVIO board presence
801	Reset DVIO
802	DVIO Access
803	Get DVIO error codes
804	Get DVIO module Ids
805	Execute DVIO module SelfTestInput: 805 [a] [b]Parameters: a=1/0…full Ram test, b=1/0…cable connected
806	Set DVIO led on.
807	Set DVIO led off.

Loop Nuclei [09]

[xx yy] Number	Nuclei
900	Digital Audio Loop(no function in Gen. 1.5 and Lead)
901	User / Dealer Audio Loop
902	Digital Video Loop
903	Digital Video VBI Loop
904	System Video Loop
905	System Video VBI Loop
906	User / Dealer Video Loop
907	User / Dealer Video VBI Loop
908	System Audio Loop SCART
909	System Audio Loop CINCH
910	Digital DVIO Video Loop
911	System Video Vip

Miscellanious [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz
1401	Clock 12.288 MHz
1412	Progressive Scan I2C
1413	Progressive Scan test image on
1414	Progressive Scan test image off
1415	Progressive Scan Route Enable
1416	Progressive Scan Route Disable

Scripts [00]

[xx yy] Number	Nuclei
1	UserDealer Script
2	Player Script

Routing Audio and Video

Route Video
Nucleus Number: 712
Description
This nucleus routes the video signals on the analogue board to the destination determined by the input parameters

The paths that are available for video routing and their description (Nafta region):
Example
DD:> 712 01
71200: Video routing on the Analogue Board OK.
Test OK @

PATH ID	DESCRIPTION
00	No Routing.
01	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
02	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
03	Input Audio Signal is routed from FRONT Cinch In to Digital Board.(This is same as path id 01)
04	Input Signal is from Rear Cinch In1 and it will be routed to Digital Board..
05	No routing.
06	No routing.
07	No routing.
08	No Routing.
09	No routing.
10	No Routing.
11	No Routing.
12	No Routing.
13	Input Signal is from Digital Board and it will be routed to the digital board.
14	No routing.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board.
16	Input signal is AUDIO from dvio board and will be routed to Digital Board.
17	No routing.
18	No routing.
19	No routing.
20	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
21	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
22	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
23	The Audio signal received from the Digital board will be outputted on Modulator channel 3. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.

Route Audio
Nucleus Number: 713
Description
This nucleus routes the audio on the analogue board to the destination determined by the input parameters
The paths that are available for audio routing and their description (Europe version)
EXAMPLE
DD:> 713 00
71300: Audio routing on the Analogue Board OK.
Test OK @

PATH ID	DESCRIPTION
00	Input signal is from FRONT AUDIO IN and will be routed to the digital board.(This is done so that nucleus 901 works)
01	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
02	No Routing.
03	Input signal is AUDIO from SCART1 and will be routed to the digital board.
04	Input signal is AUDIO from SCART2 and will be routed to the digital board.
05	No routing.
06	No routing.
07	Input Audio signal is from the digital Board and it will be routed to the Scart 1 and Scart2
08	Input AUDIO signal from TUNER and will be routed to SCART2.
09	Input signal is AUDIO from SCART1 and will be routed to SCART2.
10	Input audio signal from Scart2 is routed to Scart1.
11	Input Audio signal is routed from DVIO to Scart2.
12	
13	No Routing.
14	Input is Audio Signal from DVIO and it will be routed to Digital Board.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board..
16	No routing.
17	No Routing.
18	Input signal is from FRONT AUDIO IN and will be routed to SCART2.
21	Input signal is from FRONT AUDIO IN and will be routed to the digital board.(This is done so that nucleus 909.1 works)

5.3.4 Menu Mode Interface

Activation
Plug the recorder to the mains and the following text will appear on the screen of the terminal (program):

```
DVD Video Recorer Diagnostic Software version 48
Basic SDRAM Data bus test passed
Basic SDRAM Address bus test passed
Basic SDRAM Device test passed

(M) enu, (C) ommand or (S) 2B-interface?     [M] : @ M ↵

Main Menu

1.   Digital Board            ->
2.   Analogue Board           ->
3.   Front Panel              ->
4.   Basic Engine             ->
5.   DVIO                     ->
6.   Progressive Scan Board   ->
7.   Loop tests               ->
8.   Log                      ->
9.   Scripts                  ->

Select>
```

Figure 5-8

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Menu Structure

The following menu structure is given after starting up the DVD recorder in menu mode. The symbol -> indicates that the current menu choice will invoke the display of a submenu.

Main Menu
1.Digital Board ->
2.Analogue Board ->
3.Front Panel ->
4.Basic Engine ->
5.DVIO ->
6.Progressive Scan Board ->
7.Loop Tests ->
8.Log ->
9.Scripts ->

Digital Board Menu
1.Host Decoder ->
2.VSM ->
3.AVENC ->
4.NVRAM ->

Host Decoder Menu
1.Flash Checksum
2.Flash1 Write Access
3.Flash2 Write Access
4.Flash Write/Read
5.Host SDRAM Write/Read
6.Host SDRAM Fast Write/Read
7.Host DRAM Write/Read
8.Host DRAM Fast Write/Read
9.I2C NVRAM
10.NVRAM Write/Read
11.Engine S2B Echo
12.Versions ->
13.Audio Mute ->
14.Colourbar ->
15.Pink Noise ->
16.Sine Generate ->

Digital Board Versions Menu
1.Hardware Version
2.Bootcode version
3.Applications Version
4.Diagnostics Version
5.Download Version

Audio Mute Menu
1.Audio Mute On
2.Audio Mute Off

Colourbar Menu
1.Colourbar On
2.Colourbar Off

Pink Noise Menu
1.Pink Noise On
2.Pink Noise Off

Sine Generate Menu
1.Sine On
2.Sine Burst 1kHz
3.Sine Burst 12kHz

VSM Menu
1.Register Access
2.SDRAM Access
3.VSM SDRAM Write/Read
4.Interrupt Lines
5.VSM Interconnection
6.UART

Basic Engine Menu

AVENC Menu
1.Empress ->
2.Video Input Processors ->

Empress Menu
1.Version number

Video Input Processors Menu
1.SAA7118 I2C Access

NVRAM Menu
1.Read Error Log
2.Reset Error Log
3.Read DVIO Unique ID

Analogue Board Menu
1.Echo
2.Obsolete
3.Route Video Input back to Digital board
4.Route Audio Input back to Digital board
5.Flash Checksum
6.Versions ->
7.Components ->
8.Re-virginize Recorder ->

Analogue Board Versions Menu
1.Hardware Version
2.Bootcode version
3.Application version
4.Diagnostics version
5.Download version

Analogue Components Menu
1.Tuner
2.Data Slicer
3.Sound Processor
4.AV Selector
5.NVRAM

Analogue Board Re-virginize Menu
1.Re-virginize Recorder
2.Set Virgin-bit
3.Clear Virgin-bit
4.Store external presets

Front Panel Menu
1.Echo
2.Version
3.Flap Control ->
4.Segment Test ->
5.Light Labels
6.Led test
7.Keyboard test
8.Remote Control
9.Beep
10.Disc Bar
11.Disc Bar Dots
12.Vu Grid
13.Dimmer
14.Blink
15.Light All Segments

Flap Control Menu
1.Open Flap
2.Close Flap

Segment Test Menu
1.Starburst
2.Light Horizontal Segments
3.Light Vertical Segments
4.Light All Segments

1.Reset

2.S2B Pass-through
3.S2B Echo
4.Focus On
5.Focus Off
6.Version
7.Self Test
8.Get Self Test Result
9.Basic Engine Test
10.Laser Test
11.Focus Test
12.Tilt Test
13.Optimise Jitter
14.Statistics Info
15.Log ->
16.Spindle Motor ->
17.Radial ->
18.Sledge ->
19.Tray ->

Basic Engine Error Log
1.Read Error Log
2.Reset Error Log

Basic Engine Spindle Motor Menu
1.Spindle Motor On
2.Spindle Motor Off
3.Spindle Motor Test

Basic Engine Radial Menu
1.Radial On
2.Radial Off
3.Radial Initialisation
4.Radial ATLS Calibration

Basic Engine Sledge Menu
1.Sledge test
2.Sledge test slow

Basic Engine Tray Menu
1.Tray In
2.Tray Out

DVIO Menu
1.Check Presence
2.Reset
3.Access
4.Error Codes
5.Module Identifiers
6.Led ->

DVIO Led Menu
1.Led On
2.Led Off

Progressive Scan Board Menu
1.I2C Access
2.Test Image On
3.Test Image Off

Loop Tests Menu
1.Digital Board Loops ->
2.User/Dealer Loops ->
3.System Loops ->
4.Basic Engine Loops ->

Digital Board Loops Menu
1.Obsolete
2.Digital Video Loop
3.Digital Video Loop VBI

User/Dealer Loops Menu
1.User/Dealer Audio Loop
2.User/Dealer Video Loop
3.User/Dealer Video Loop VBI

System Loops Menu
1.System Video Loop
2.System Video Loop VBI
3.System Audio Loop SCART(EURO)
4.System Audio Loop CINCH (NAFTA)

Basic Engine Loops Menu
1.Basic Engine write read
2.Basic Engine write read endless loop

Log Menu
1.Read Error Log
2.Reset Error Log

Script Menu
1.User/Dealer Script
2.Player Script

5.4 Nuclei Error Codes

In the following table the error codes will be described.

Error Nr	Error String
10000	"Checksum is OK"
10001	"segment name Checksum doesn't match" or "segment name segment not found"
10100	""
10101	"FLASH 1 Write access test failed"
10200	""
10201	"FLASH 2 Write access test failed"
10300	""
10301	"FLASH write test failed"
10302	"FLASH write command failed"
10303	"FLASH write test done max. number of times"
10400	""
10401	"HostDec SDRAM Memory data bus test goes wrong."
10402	" HostDec SDRAM Memory address bus test goes wrong."
10403	" HostDec SDRAM Physical memory device test goes wrong."
10500	""
10501	" HostDec SDRAM Memory data bus test goes wrong."
10502	" HostDec SDRAM Memory address bus test goes wrong."
10503	" HostDec SDRAM Physical memory device test goes wrong."
10600	""
10601	"HostDec DRAM Memory data bus test goes wrong."
10602	"HostDec DRAM Memory address bus test goes wrong."
10603	"HostDec DRAM Physical memory device test goes wrong."
10700	""
10701	"HostDec DRAM Memory data bus test goes wrong."
10702	"HostDec DRAM Memory address bus test goes wrong."
10703	"HostDec DRAM Physical memory device test goes wrong."
10800	"Host Decoder version(cut) number: version number""Digital hardware version"
10801	"Can not find version in FLASH."
10900	""

Error Nr	Error String
10901	"Error muting audio"
11000	""
11001	"Error demuting audio"
11500	""
11501	"Init of I2C failed"
11502	"The selection of the clock source failed"
11504	"The demute of the audio failed"
11600	""
11601	"Init of I2C failed"
11602	"The mute of the audio failed"
11700	""
11701	"Init of I2C failed"
11702	"The muting of the audio failed"
11703	"The demute of the audio failed"
11704	"The selection of the clock source failed"
11707	"Setup of Front panel failed"
11708	"Sine on Front panel keyboard failed"
11800	""
11801	"Init of I2C failed"
11802	"The muting of the audio failed"
11803	"The demute of the audio failed"
11804	"The selection of the clock source failed"
11805	"Error cannot start VSM audio in port"
11900	""
11901	"Init of I2C failed"
11902	"The muting of the audio failed"
11903	"The demute of the audio failed"
11904	"The selection of the clock source failed"
11905	"Error cannot start VSM audio in port"
12000	""
12001	"Invalid input
12100	""
12200	""
12201	"I2C bus busy before start"
12202	"NVRAM access time-out"
12203	"No NVRAM acknowledge"
12204	"NVRAM time-out"
12205	"NVRAM Write/Read back failed"
12300	""
12301	"I2C bus busy before start"
12302	"NVRAM read access time-out"
12303	"No NVRAM read acknowledge"
12304	"NVRAM read failed"
13000	"Bootcode application version : bootversion"
13001	"Can not find version in FLASH."
13100	"Recorder application version : recorderversion"
13101	"Can not find version in FLASH."
13200	"Diagnostics application version : diagversion"
13201	"Can not find version in FLASH."
13300	"Download application version : downloadversion"
13301	"Can not find version in FLASH."
13700	""
13701	"Turning off MacroVision failed"
20000	""
20001	"I2C bus busy before start"
20002	"Video Encoder access time-out"
20003	"No acknowledge from Video Encoder"
20004	"No data send/received to or from Video Encoder"
20005	"SAA7118 VIP can not be initialised"
20200	""
20201	"I2C bus busy before start"

Error Nr	Error String
20202	"SAA7118 VIP access time-out"
20203	"No acknowledge from SAA7118 VIP"
20204	"No data received from SAA7118 VIP"
20300	""
20301	"Error audio encoder SRAM access cannot initialise I2C"
20302	"Error audio encoder SRAM access cannot reset DSP through I2C"
20303	"Error audio encoder SRAM access cannot download boot"
20304	"Error audio encoder cannot download test code"
20305	"Error audio encoder cannot obtain result of test"
20306	"Error audio encoder SRAM access stuck-at-zero data line "
20307	"Error audio encoder SRAM access stuck-at-one data line "
20308	"Error audio encoder SRAM access stuck-at-one address line "
20309	"Error audio encoder SRAM access address line address line x is connected to data line data line y"
20310	"Error audio encoder SRAM access address lines address line x and address line y are connected "
20311	"Error audio encoder SRAM access data lines data line x and data line y are connected "
20312	"Error audio encoder SRAM access illegal data received"
20400	""
20401	"Error audio encoder access cannot initialise I2C"
20402	"Error audio encoder access cannot reset DSP through I2C"
20403	"Error audio encoder accessing ICR register"
20404	"Error audio encoder access stuck-at-zero of data line "
20405	"Error audio encoder access stuck-at-one of data line "
20406	"Audio encoder access data lines data line x and data line y are interconnected "
20500	""
20501	"Error audio encoder SRAM WRR cannot initialise I2C"
20502	"Error audio encoder SRAM WRR cannot reset DSP through I2C"
20503	"Error audio encoder WRR cannot download boot"
20504	"Error audio encoder cannot download test code"
20505	"Error audio encoder SRAM WRR cannot obtain result of test"
20506	"Error audio encoder WRR SRAM stuck-at-zero data bit "
20507	"Error audio encoder WRR SRAM stuck-at-one data bit "
20508	"Error audio encoder WRR SRAM data lines data line x and data line y are connected"
20509	"Error audio encoder WRR SRAM illegal data received"
20600	""
20601	"Error audio encoder interrupt cannot initialise I2C"
20602	"Error audio encoder interrupt cannot reset DSP through I2C"
20603	"Error audio encoder cannot download test code"
20604	"Error occurred accessing VSM"
20605	"Audio encoder interrupt not received"
20606	"Error occurred while activating the encoder"
20607	"Error audio encoder interrupt cannot initialise empress"
20608	"Error occurred while getting interrupt reason"

Error Nr	Error String
20700	""
20701	"Error audio encoder I2C cannot reset DSP through I2C"
20702	"Error audio encoder cannot download boot"
20703	"Error audio encoder cannot download TEST code"
20704	"Error audio encoder I2C bus busy"
20705	"Error audio encoder I2C cannot write slave address"
20706	"Error audio encoder I2C no acknowledge received"
20707	"Error audio encoder I2C cannot send/receive data"
20708	"Error audio encoder received data through I2C was invalid"
20800	""
20801	"I2C access failed."
20802	"SAA7118 VIP can not be initialised."
20803	"Invalid input"
20900	"B1.B2. B3.B4. B5.B6. B7.B8. B9.B10. B11.B12."
20901	"Firmware download of EMPRESS failed"
20902	"I2C bus busy before start"
20903	"EMPRESS access time-out"
20904	"No acknowledge from the EMPRESS"
20905	"No data send to the EMPRESS"
20906	"No data received from the EMPRESS"
30000	""
30001	"VSM SDRAM Bank1 Memory databus test goes wrong."
30002	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30003	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30004	" VSM SDRAM Bank2 Memory databus test goes wrong."
30005	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30006	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30007	"VSM SDRAM Bank1 VSM interrupt register A has a -stuck at- error for value:"
30008	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value:"
30100	""
30101	"VSM SDRAM Bank1 Memory databus test goes wrong."
30102	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30103	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30104	" VSM SDRAM Bank2 Memory databus test goes wrong."
30105	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30106	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30200	""
30201	"VSM SDRAM Bank1 Memory databus test goes wrong."
30202	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30203	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30204	" VSM SDRAM Bank2 Memory databus test goes wrong."
30205	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30206	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30300	""
30301	"VSM interrupt register A has a -stuck at- error for value:"
30302	"VSM interrupt register B has a -stuck at- error for value:"
30303	"Interrupt A wasn't raised."
30304	"Interrupt B wasn't raised."
30305	"Interrupts A and B were raised."
30400	""
30401	"VSM SDRAM Bank1 Memory databus test goes wrong."
30402	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30403	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30404	" VSM SDRAM Bank2 Memory databus test goes wrong."
30405	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30406	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30500	""
30501	"Communication with the analogue board fails."
30502	"Echo test to analogue board returned wrong string."
40000	""
40001	"NVRAM Reset; I2C failed"
40100	"NVRAM address = 0xaddress -> Byte value = 0xvalue"
40101	"NVRAM Read; I2C failed"
40102	"NVRAM Read; Invalid input"
40200	""
40201	"NVRAM Modify; I2C failed"
40202	"NVRAM Modify; Invalid input"
40300	"DV Unique ID = id"
40301	"NVRAM Read DV Unique ID; I2C failed"
40400	"\r\n Error log:\r\n errorString \r\n Ő "
40401	"NVRAM error log; I2C failed"
40402	"NVRAM error log is invalid"
40403	"Front panel failed"
40700	""
40701	"NVRAM error log reset; I2C failed"
40900	"Region code Change counter is reset"
40901	"NVRAM region code reset; I2C failed"
41000	""
41001	"NVRAM Store DV Unique ID; I2C failed"
41002	"NVRAM Store DV Unique ID; Invalid input"
50000	""
50007	"Execution of the command on the analogue board failed."
50008	"The frontpanel could not be accessed by the analogue board."
50009	"The echo from the frontpanel processor was not correct."
50100	" Front panel version: FPversion "
50102	"Execution of the command on the analogue board failed."
50103	"The frontpanel could not be accessed by the analogue board."
50200	""

Error Nr	Error String
50204	"Execution of the command on the analogue board failed."
50205	"The frontpanel could not be accessed by the analogue board."
50206	"The frontpanel did not show a starburst."
50207	"The user skipped the FP-which pattern test."
50208	"The user returned an unknown confirmation: confirmation "
50209	"The frontpanel did not show horizontal segments."
50210	"The frontpanel did not show vertical segments."
50300	""
50304	"Execution of the command on the analogue board failed."
50305	"The frontpanel could not be accessed by the analogue board."
50306	"The frontpanel did not light all labels."
50307	"The user skipped the rest of the FP-label test."
50308	"The user returned an unknown confirmation: confirmation"
50400	""
50404	"Execution of the command on the analogue board failed."
50405	"The frontpanel could not be accessed by the analogue board."
50406	"The LED's could not be turned on."
50407	"The user skipped the rest of the FP-LED test."
50408	"The user returned an unknown confirmation: confirmation"
50500	""
50502	"Front panel Keyboard; test failed"
50503	"Front panel Keyboard; test aborted"
50504	"Front panel Keyboard; not all keys were pressed"
50505	"Front panel keyboard I2C connection failed"
50506	"Unable to get slashversion"
50600	""
50602	"Front panel Remote control; test failed"
50603	"Front panel Remote control; test aborted"
50604	"Front panel remote control; can not access FP"
50605	"Front panel remote control; no user input received"
50700	""
50701	"Execution of the command on the analogue board failed."
50702	"The frontpanel could not be accessed by the analogue board."
50703	"The frontpanel did not show a starburst."
50704	"The user skipped the FP-starburst test."
50705	"The user returned an unknown confirmation: confirmation "
50800	""
50801	"Execution of the command on the analogue board failed."
50802	"The frontpanel could not be accessed by the analogue board."
50803	"The frontpanel did not show vertical segments."
50804	"The user skipped the FP-vertical segments test."
50805	"The user returned an unknown confirmation: confirmation "
50900	""
50901	"Execution of the command on the analogue board failed."
50902	"The frontpanel could not be accessed by the analogue board."
50903	"The frontpanel did not show horizontal segments."

Error Nr	Error String
50904	"The user skipped the FP-horizontal segments test."
50905	"The user returned an unknown confirmation: confirmation "
51400	""
51401	"Execution of the command on the analogue board failed."
51402	"The frontpanel could not be accessed by the analogue board."
51403	"The beeper did not sound."
51404	"The user skipped the FP-Beep test."
51405	"The user returned an unknown confirmation: confirmation"
51500	""
51501	"Execution of the command on the analogue board failed."
51502	"The frontpanel could not be accessed by the analogue board."
51503	"The discbar did not display properly."
51504	"The user skipped the discbar test."
51505	"The user returned an unknown confirmation: confirmation"
51600	""
51601	"Execution of the command on the analogue board failed."
51602	"The frontpanel could not be accessed by the analogue board."
51603	"The discbar dots did not display properly."
51604	"The user skipped the discbar dots test."
51605	"The user returned an unknown confirmation: confirmation"
51700	""
51701	"Execution of the command on the analogue board failed."
51702	"The frontpanel could not be accessed by the analogue board."
51703	"The VU grid did not display properly."
51704	"The user skipped the VU gridtest."
51705	"The user returned an unknown confirmation: confirmation"
51800	""
51801	"Execution of the command on the analogue board failed."
51802	"The frontpanel could not be accessed by the analogue board."
51803	"The frontpanel could not be dimmed."
51804	"The user skipped the FP-Dim test."
51805	"The user returned an unknown confirmation: confirmation"
51900	""
51901	"Execution of the command on the analogue board failed."
51902	"The frontpanel could not be accessed by the analogue board."
51903	"The frontpanel did not show segments blinking."
51904	"The user skipped the FP-blinking test."
51905	"The user returned an unknown confirmation: confirmation"
52000	""
52001	"Execution of the command on the analogue board failed."
52002	"The frontpanel could not be accessed by the analogue board."
52003	"The frontpanel did not show all segments lit."
52004	"The user skipped the FP-light all segments test."

Error Nr	Error String
52005	"The user returned an unknown confirmation: confirmation"
52200	""
52201	"Communication with Analogue Board fails."
52202	"Frontpanel can not be accessed by the Analogue Board."
52300	""
52301	"Communication with Analogue Board fails."
52302	"Frontpanel can not be accessed by the Analogue Board."
60000	""
60100	""
60101	"Basic Engine returned error number 0xerrornumber"
60102	"Parity error from Basic Engine to Serial"
60103	"Communication time-out error"
60104	"Unexpected response from Basic Engine"
60105	"Echo loop could not be closed"
60106	"Wrong echo pattern received"
60200	"Version: nr1.nr2.nr3"
60201	"Basic Engine returned error number 0xerrornumber"
60202	"Parity error from Basic Engine to Serial"
60203	"Communication time-out error"
60204	"Unexpected response from Basic Engine"
60205	"Front Panel failed."
60300	""
60301	"Basic-Engine time-out error"
60400	""
60401	"Basic Engine returned error number 0xerrornumber"
60402	"Parity error from Basic Engine to Serial"
60403	"Communication time-out error"
60404	"Unexpected response from Basic Engine"
60405	"Focus loop could not be closed"
60500	""
60501	"Basic Engine returned error number 0xerrornumber"
60502	"Parity error from Basic Engine to Serial"
60503	"Communication time-out error"
60504	"Unexpected response from Basic Engine"
60600	""
60601	"Basic Engine returned error number 0xerrornumber"
60602	"Parity error from Basic Engine to Serial"
60603	"Communication time-out error"
60604	"Unexpected response from Basic Engine"
60700	""
60701	"Basic Engine returned error number 0xerrornumber"
60702	"Parity error from Basic Engine to Serial"
60703	"Communication time-out error"
60704	"Unexpected response from Basic Engine"
60800	""
60801	"Basic Engine returned error number 0xerrornumber"
60802	"Parity error from Basic Engine to Serial"
60803	"Communication time-out error"
60804	"Unexpected response from Basic Engine"
60805	"Radial loop could not be closed"
60900	""
60901	"Basic Engine returned error number 0xerrornumber"

Error Nr	Error String
60902	"Parity error from Basic Engine to Serial"
60903	"Communication time-out error"
60904	"Unexpected response from Basic Engine"
61500	""
61501	"Basic Engine returned error number 0xerrornumber"
61502	"Parity error from Basic Engine to Serial"
61503	"Communication time-out error"
61504	"Unexpected response from Basic Engine"
61600	""
61601	"Basic Engine returned error number 0xerrornumber"
61602	"Parity error from Basic Engine to Serial"
61603	"Communication time-out error"
61604	"Unexpected response from Basic Engine"
61700	""
61701	"BE tray-in command failed"
61702	"BE read-TOC command failed"
61703	"BE VSM interrupt initialisation failed"
61704	"BE set irq command failed"
61705	"BE no disc or wrong disc inserted"
61706	"BE rec-pause command failed"
61707	"BE VSM BE out DMA initialisation failed"
61708	"BE VSM BE out initialisation failed"
61709	"BE VSM BE out DMA start failed"
61710	"BE VSM BE out start failed"
61711	"BE rec command failed"
61712	"BE VSM out underrun error occurred"
61713	"BE record complete interrupt not raised"
61714	"BE get irq command failed"
61715	"BE no interrupt was raised by BE"
61716	"BE VSM DMA out not finished"
61717	"BE stop command after writing failed"
61718	"BE VSM Sector processor initialisation failed"
61719	"BE VSM sector processor DMA initialisation failed"
61720	"BE VSM sector processor DMA start failed"
61721	"BE VSM sector processor start failed"
61722	"BE seek command failed"
61723	"BE VSM sector processor error occurred"
61724	"BE read timeout occurred"
61725	"BE stop command after reading failed"
61726	"BE difference found in data at disc sector 0xdiscsector"
61727	"This nucleus cannot be executed because the Self-Test failed"
61800	""
61801	"BE i2c initialisation failed"
61802	"This nucleus cannot be executed because the Self-Test failed"
61900	""
61901	"The SelfTest failed with result: 0xnr1 0xnr2 0xnr3"
61902	"Basic Engine returned error number 0xerrornumber"
61903	"Parity error from Basic Engine to Serial"
61904	"Communication time-out error"
61905	"Unexpected response from Basic Engine"
62000	""
62001	"Self-Test : errorstring1 Laser-Test : errorstring2 SpindleM-Test: errorstring3 SledgeM-Test : errorstring4 Focus-Test : errorstring5"
62100	"The forward sense level is 0xlevel"

Error Nr	Error String
62101	"Basic Engine returned error number 0xerrornumber"
62102	"Parity error from Basic Engine to Serial"
62103	"Communication time-out error"
62104	"Unexpected response from Basic Engine"
62200	""
62201	"The BE-self-diagnostic-spindle-motor-test failed"
62202	"Basic Engine returned error number 0xerrornumber"
62203	"Parity error from Basic Engine to Serial"
62204	"Communication time-out error"
62205	"Unexpected response from Basic Engine"
62300	""
62301	"The BE-focus-test failed"
62302	"Basic Engine returned error number 0xerrornumber"
62303	"Parity error from Basic Engine to Serial"
62304	"Communication time-out error"
62305	"Unexpected response from Basic Engine"
62400	""
62401	"The BE-self-diagnostic-sledge-motor-test failed"
62402	"Basic Engine returned error number 0xerrornumber"
62403	"Parity error from Basic Engine to Serial"
62404	"Communication time-out error"
62405	"Unexpected response from Basic Engine"
62500	""
62600	""
62700	"BE EEPROM address = address -> Byte value = 0xvalue"
62701	"Basic Engine returned error number 0xerrornumber"
62702	"Parity error from Basic Engine to Serial"
62703	"Communication time-out error"
62704	"Unexpected response from Basic Engine"
62705	"BE read EEPROM; invalid input"
62800	""
62801	"Basic Engine returned error number 0xerrornumber"
62802	"Parity error from Basic Engine to Serial"
62803	"Communication time-out error"
62804	"Unexpected response from Basic Engine"
62805	"BE write EEPROM; invalid input"
62900	""
62901	"Basic Engine returned error number 0xerrornumber"
62902	"Parity error from Basic Engine to Serial"
62903	"Communication time-out error"
62904	"Unexpected response from Basic Engine"
62905	"Radial loop could not be closed"
63000	""
63001	"Basic Engine returned error number 0xerrornumber"
63002	"Parity error from Basic Engine to Serial"
63003	"Communication time-out error"
63004	"Unexpected response from Basic Engine"
63100	" Number of times Tray went Open/Closed : nr1"" Total hours the CD laser was on : nr2"" Total hours the DVD laser was on : nr3"" Total hours the write laser was on : nr4"
63101	"Basic Engine returned error number 0xerrornumber"
63102	"Parity error from Basic Engine to Serial"

Error Nr	Error String
63103	"Communication time-out error"
63104	"Unexpected response from Basic Engine"
63200	""
63201	"Basic Engine returned error number 0xerrornumber"
63202	"Parity error from Basic Engine to Serial"
63203	"Communication time-out error"
63204	"Unexpected response from Basic Engine"
63300	Momentary errors (Byte 1 - Byte 7) : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Cumulative errors (Byte 1 - Byte 7): : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Fatal errors (Oldest - Youngest) : : 0xb1 0xb2 0xb3 0xb4 0xb5
63301	"Basic Engine returned error number 0xerrornumber"
63302	"Parity error from Basic Engine to Serial"
63303	"Communication time-out error"
63304	"Unexpected response from Basic Engine"
63400	""
63401	"Basic Engine returned error number 0xerrornumber"
63402	"Parity error from Basic Engine to Serial"
63403	"Communication time-out error"
63404	"Unexpected response from Basic Engine"
63500	""
63501	"Basic Engine returned error number 0xerrornumber"
63502	"Parity error from Basic Engine to Serial"
63503	"Communication time-out error"
63504	"Unexpected response from Basic Engine"
63505	"errorstring ÖThe basic engine will reject all player commands"
63900	""
63901	"Basic Engine returned error number 0xerrornumber"
63902	"Parity error from Basic Engine to Serial"
63903	"Communication time-out error"
63904	"Unexpected response from Basic Engine"
64000	"BE OPU number = opunumber"
64001	"Basic Engine returned error number 0xerrornumber"
64002	"Parity error from Basic Engine to Serial"
64003	"Communication time-out error"
64004	"Unexpected response from Basic Engine"
64100	"The data was successfully written on and read from a DVD disc"
64101	"The tray-in command failed"
64102	"The read-TOC command failed"
64103	"The VSM interrupt initialisation failed"
64104	"The set irq command failed"
64105	"No disc or wrong disc inserted"
64106	"The rec-pause command failed"
64107	"The VSM BE out DMA initialisation failed"
64108	"The VSM BE out initialisation failed"
64109	"The VSM BE out DMA start failed"
64110	"The VSM BE out start failed"
64111	"The rec command failed"
64112	"The VSM out underrun error occurred"
64113	"The record complete interrupt was not raised"
64114	"The get irq command failed"
64115	"There was no interrupt raised by BE"
64116	"The VSM DMA did not finished"
64117	"The stop command after writing failed"

Error Nr	Error String
64118	"The VSM Sector processor initialisation failed"
64119	"The VSM sector processor DMA initialisation failed"
64120	"The VSM sector processor DMA start failed"
64121	"The VSM sector processor start failed"
64122	"The seek command failed"
64123	"The VSM sector processor error occurred"
64124	"The read timeout occurred"
64125	"The stop command after reading failed"
64126	"There was a difference found in data at a specific disc sector"
64127	"The result of the self test contains errors"
64128	"An error interrupt was raised by BE"
64129	"The calibrate-record command failed"
64130	"To many retries"
64131	"BE update RAI command after writing failed"
64132	"BE find first recordable address command failed"
64133	"DVD+R disc is full"
64200	""
64201	"BE i2c initialisation failed"
64202	"This nucleus cannot be executed because the Self-Test failed"
70000	"Echo test OK"
70001	"Echo test returned wrong string."
70002	"Communication with Analogue Board fails"
70300	"SoftwareVersion"
70301	"Can not find segment in FLASH ROM on the Analogue Board"
70302	"Communication with Analogue Board fails"
70400	"HardwareVersion"
70401	"Can not find segment in FLASH ROM on the Analogue Board"
70402	"Communication with Analogue Board fails"
70500	"Clock adjusted OK"
70501	"Can not adjust the clock on the Analogue Board."
70502	"Wrong date/time text size."
70503	"Communication with Analogue Board fails"
70600	"Tuner accessibility test OK"
70601	"Can not access tuner on the Analogue Board."
70602	"Communication with Analogue Board fails"
70700	"Frequency download OK"
70701	"Wrong frequency table size."
70702	"Can not download the frequency table into the analogue NVRAM."
70703	"Can not download the frequency table into the analogue NVRAM."
70704	"Communication with Analogue Board fails"
70800	"Data slicer test OK"
70801	"Test of the Data slicer on the Analogue Board fails."
70802	"Communication with Analogue Board fails"
70900	"Sound Processor test OK"
70901	"Test of the Sound Processor on the Analogue Board fails."
70902	"Communication with Analogue Board fails"
71000	"AV Selector test OK"
71001	"Test of the AV Selector on the Analogue Board fails."
71002	"Communication with Analogue Board fails"
71100	"NVRAM test OK"
71101	"Test of the NVRAM on the Analogue Board fails."
71102	"Communication with Analogue Board fails"
71200	"Video routing on the Analogue Board OK"

Error Nr	Error String
71201	"Routing the video on the Analogue Board fails."
71202	"Invalid input."
71203	"Communication with Analogue Board fails"
71300	"Audio routing on the Analogue Board OK"
71301	"Routing the audio on the Analogue Board fails."
71302	"Invalid input."
71303	"Communication with Analogue Board fails"
71500	""
71501	"Invalid slash version, default slash version is set."
71502	"Setting the slash version on the Analogue Board fails."
71503	"Communication with Analogue Board fails"
71600	"ApplicationVersion"
71601	"Can not find segment in FLASH ROM on the Analogue Board"
71602	"Communication with Analogue Board fails"
71700	"DiagnosticsVersion"
71701	"Can not find segment in FLASH ROM on the Analogue Board"
71702	"Communication with Analogue Board fails"
71800	"DownloadVersion"
71801	"Can not find segment in FLASH ROM on the Analogue Board"
71802	"Communication with Analogue Board fails"
72300	""
72000	""
72001	"Adjusting BarGraphLevel failed"
72002	"Communication with Analogue Board fails"
72100	""
72101	"Storing clock correction failed"
72102	"Value out of range : default value stored "
72103	"Invalid input."
72104	"Communication with Analogue Board fails"
72200	""
72201	"Initialising the 1Hz signal on the Clock IC failed"
72202	"Communication with Analogue Board fails"
72301	"Clearing the NVRAM on the Analogue Board fails"
72302	"Communication with Analogue Board fails"
72400	"segment checksum is : checksum which is correct" for every segment
72401	"segment could not be found" or "segment checksum is : checksumC ,however it should be : checksumE" for every segment
72402	"Communication with Analogue Board fails"
72900	"Date received"
72901	"Data returned"
72902	"Communication on I2C-bus failed on the Analogue Board fails."
72903	"Communication with Analogue Board fails"
73000	""
73001	"Storing the external presets on the Analogue Board fails"
73002	"Communication with Analogue Board fails"
73100	"0xslashversion" where slashversion is the slash version read from the analogue board
73101	"Error while reading out slash version."
73102	"I2C Write error."
73103	"I2C Read error."
73104	"Communication with Analogue Board fails"
73200	""
73201	"Storing the Reference Voltage for the Tuner failed"
73202	"Invalid input."

Error Nr	Error String
73203	"Communication with Analogue Board fails"
80000	"The DVIO module is present in the system."
80001	"The DVIO module is not present in the system."
80100	"The DVIO module has been reset OK."
80101	"The DVIO module is not present in the system."
80102	"The DVIO module could not be reset."
80103	"Could not initialise I2C before Reset."
80200	"The accessibility of the DVIO module is OK."
80201	"The DVIO board is not present in this DVDR."
80202	"Could not initialise I2C."
80203	"Unable to reset the DVIO module."
80204	"Unable to receive the reset indication from the DVIO module."
80205	"Unable to send the configuration to the DVIO module."
80206	"Unable to download the chip ID to the DVIO module."
80207	"Unable to set the mode of the DVIO module to IDLE."
80208	"Software Error in function HandleStateAwaitingReply !!"
80209	"Maximal number of retries reached by HandleStateSending !!"
80210	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80211	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80212	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80213	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80214	"VSM UART error timeout transmitting command"
80215	"VSM UART error timeout receiving reply"
80216	"VSM UART frame error occurred receiving from DVIO board"
80217	"VSM UART parity error occurred receiving from DVIO board"
80218	"The confirmation/indication from the DVIO module is invalid."
80300	"The accessibility of the DVIO module is OK."
80301	"The DVIO board is not present in this DVDR."
80302	"Could not initialise I2C."
80303	"Unable to reset the DVIO module."
80304	"Unable to receive the reset indication from the DVIO module."
80305	"Unable to send the configuration to the DVIO module."
80306	"Unable to download the chip ID to the DVIO module."
80307	"Unable to set the mode of the DVIO module to IDLE."
80308	"Software Error in function HandleStateAwaitingReply !!"
80309	"Maximal number of retries reached by HandleStateSending !!"
80310	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80311	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80312	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80313	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80314	"VSM UART error timeout transmitting command"
80315	"VSM UART error timeout receiving reply"

Error Nr	Error String
80316	"VSM UART frame error occurred receiving from DVIO board"
80317	"VSM UART parity error occurred receiving from DVIO board"
80318	"The confirmation/indication from the DVIO module is invalid."
80400	"The accessibility of the DVIO module is OK."
80401	"The DVIO board is not present in this DVDR."
80402	"Could not initialise I2C."
80403	"Unable to reset the DVIO module."
80404	"Unable to receive the reset indication from the DVIO module."
80405	"Unable to send the configuration to the DVIO module."
80406	"Unable to download the chip ID to the DVIO module."
80407	"Unable to set the mode of the DVIO module to IDLE."
80408	"Software Error in function HandleStateAwaitingReply !!"
80409	"Maximal number of retries reached by HandleStateSending !!"
80410	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80411	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80412	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80413	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80414	"VSM UART error timeout transmitting command"
80415	"VSM UART error timeout receiving reply"
80416	"VSM UART frame error occurred receiving from DVIO board"
80417	"VSM UART parity error occurred receiving from DVIO board"
80418	"The confirmation/indication from the DVIO module is invalid."
80500	""
80501	"The DVIO board is not present in this DVDR."
80502	"The I2C could not be initialised."
80503	"The DVIO module could not be reset."
80504	"Unable to receive the reset indication from the DVIO module."
80505	"Unable to send the configuration to the DVIO module."
80506	"Unable to download the chip ID to the DVIO module."
80507	"Unable to set the mode of the DVIO module to IDLE."
80508	"Software Error in HandleStateAwaitingReply function!"
80509	"Maximal number of retries reached by HandleStateSending!"
80510	"Maximal number of retries (NACK's) reached "(HandleStateSending)
80511	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80512	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80513	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80514	"VSM UART error timeout transmitting command"
80515	"VSM UART error timeout receiving reply"
80516	"VSM UART frame error occurred receiving from DVIO board"

Error Nr	Error String
80517	"VSM UART parity error occurred receiving from DVIO board"
80518	"The confirmation/indication from the DVIO module is invalid."
80519	"Setting the DVIO module in/out diagnostics mode failed"
80520	"Invalid input"
80521	"Getting the errors of the self-test failed"
80522	"Self-test failed"
80600	""
80601	"The DVIO board is not present in this DVDR."
80602	"The I2C could not be initialised."
80603	"The DVIO module could not be reset."
80604	"Unable to receive the reset indication from the DVIO module."
80605	"Unable to send the configuration to the DVIO module."
80606	"Unable to download the chip ID to the DVIO module."
80607	"Unable to set the mode of the DVIO module to IDLE."
80608	"Software Error in HandleStateAwaitingReply function!"
80609	"Maximal number of retries reached by HandleStateSending!"
80610	"Maximal number of retries (NACK's) reached "(HandleStateSending)
80611	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80612	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80613	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80614	"VSM UART error timeout transmitting command"
80615	"VSM UART error timeout receiving reply"
80616	"VSM UART frame error occurred receiving from DVIO board"
80617	"VSM UART parity error occurred receiving from DVIO board"
80618	"The confirmation/indication from the DVIO module is invalid."
80619	"Setting the DVIO module in/out diagnostics mode failed"
80700	""
80701	"The DVIO board is not present in this DVDR."
80702	"The I2C could not be initialised."
80703	"The DVIO module could not be reset."
80704	"Unable to receive the reset indication from the DVIO module."
80705	"Unable to send the configuration to the DVIO module."
80706	"Unable to download the chip ID to the DVIO module."
80707	"Unable to set the mode of the DVIO module to IDLE."
80708	"Software Error in HandleStateAwaitingReply function!"
80709	"Maximal number of retries reached by HandleStateSending!"
80710	"Maximal number of retries (NACK's) reached "(HandleStateSending)
80711	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80712	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80713	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80714	"VSM UART error timeout transmitting command"
80715	"VSM UART error timeout receiving reply"
80716	"VSM UART frame error occurred receiving from DVIO board"
80717	"VSM UART parity error occurred receiving from DVIO board"
80718	"The confirmation/indication from the DVIO module is invalid."
80719	"Setting the DVIO module in/out diagnostics mode failed"
90121	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90122	"Error: audio data in host memory contains silence!"
90123	"There is no correct audio frame in the buffer"
90124	"The audio frame has an illegal version bit"
90125	"The audio frame has an illegal bitrate-index"
90126	"The audio frame has an illegal sampling rate"
90127	"The CRC of the audio frame is wrong"
90128	"The audio frame is not MPEG-I layer II !"
90129	"Error cannot de-mute DAC on analogue board"
90200	""
90201	"Initialisation of I2C failed"
90202	"Initialisation of VIP and EMPIRE failed"
90203	"Initialisation of PLL / Link failed."
90204	"Next descriptor address set wrong."
90205	"Turning on the colourbar failed"
90206	"No I2C communication possible to start video encoder."
90207	"Starting the video encoder failed."
90208	"Transfer of data from video encoder to VSM failed."
90209	"Stopping the encoder failed."
90210	"Turning off the colourbar failed."
90211	"Cannot intialize hostdecoder parallel input"
90212	"Cannot initialise VSM AV-out DMA port"
90213	"Cannot initialise VSM AV-out port"
90214	"Cannot start VSM AV-out DMA port"
90215	"Cannot start VSM AV-out port"
90216	"Transfer of data from VSM to host decoder failed."
90217	"VSM and Hostdec memory do not match (compared after transfer)"
90218	"Decoding of the video data in the hostdecoder memory failed"
90219	"The data in the hostdecoder is not equal to a colourbar"
90220	"The video encoder did not return the Group Of Picture count."
90221	"The video encoder did not receive data from the VIP."
90223	"Initialisation of VIP and EMPRESS failed"
90224	"The video encoder did not return the current status."
90225	"The video encoder timed out in BUSY mode. (no VIP input)"
90226	"The video encoder did not return the current bitrate."
90227	"The video encoder did not switch to ENCODING mode."
90228	"The video encoder could not start from STOP/IDLE mode."

Error Nr	Error String
90229	"The video encoder did not switch from IDLE to STOP mode."
90300	""
90301	"Initialisation of I2C failed"
90302	"I2C communication to VIP failed"
90303	"Initialisation of VIP failed"
90304	"Generation of Close Caption data failed"
90305	"VIP not locked to video signal"
90306	"Initialisation of VBI Extractor failed
90307	"No CC data received"
90308	"Closed Caption data overrun"
90309	"Closed Caption data does not match"
90310	"Switch off ColourBar failed"
90400	""
90401	"Initialisation of I2C failed"
90402	"Initialisation of VIP and EMPIRE failed"
90403	"Initialisation of PLL / Link failed."
90404	"Next descriptor address set wrong."
90405	"Turning on the colourbar failed"
90406	"No I2C communication possible to start video encoder."
90407	"Starting the video encoder failed."
90408	"Transfer of data from video encoder to VSM failed."
90409	"Stopping the encoder failed."
90410	"Turning off the colourbar failed."
90411	"Cannot intialize hostdecoder parallel input"
90412	"Cannot initialise VSM AV-out DMA port"
90413	"Cannot initialise VSM AV-out port"
90414	"Cannot start VSM AV-out DMA port"
90415	"Cannot start VSM AV-out port"
90416	"Transfer of data from VSM to host decoder failed."
90417	"VSM and Hostdec memory do not match (compared after transfer)"
90418	"Decoding of the video data in the hostdecoder memory failed"
90419	"The data in the hostdecoder is not equal to a colourbar"
90420	"The video encoder did not return the Group Of Picture count."
90421	"The video encoder did not receive data from the VIP."
90422	"Execution of the command on the analogue board failed."
90423	"Initialisation of VIP and EMPRESS failed"
90424	"The video encoder did not return the current status."
90425	"The video encoder timed out in BUSY mode. (no VIP input)"
90426	"The video encoder did not return the current bitrate."
90427	"The video encoder did not switch to ENCODING mode."
90428	"The video encoder could not start from STOP/ IDLE mode."
90429	"The video encoder did not switch from IDLE to STOP mode."
90500	""
90501	"Initialisation of I2C failed"
90502	"I2C communication to VIP failed"
90503	"Initialisation of VIP failed"
90504	"Generation of Close Caption data failed"
90505	"VIP not locked to video signal"
90506	"Initialisation of VBI Extractor failed

Error Nr	Error String
90507	"No CC data received"
90508	"Closed Caption data overrun"
90509	"Closed Caption data does not match"
90510	"Switch off ColourBar failed"
90511	"Execution of the command on the analogue board failed."
90600	""
90601	"Initialisation of I2C failed"
90602	"Initialisation of VIP and EMPIRE failed"
90603	"Initialisation of PLL / Link failed."
90604	"Next descriptor address set wrong."
90605	"Turning on the colourbar failed"
90606	"No I2C communication possible to start video encoder."
90607	"Starting the video encoder failed."
90608	"Transfer of data from video encoder to VSM failed."
90609	"Stopping the encoder failed."
90610	"Turning off the colourbar failed."
90611	"Cannot intialize hostdecoder parallel input"
90612	"Cannot initialise VSM AV-out DMA port"
90613	"Cannot initialise VSM AV-out port"
90614	"Cannot start VSM AV-out DMA port"
90615	"Cannot start VSM AV-out port"
90616	"Transfer of data from VSM to host decoder failed."
90617	"VSM and Hostdec memory do not match (compared after transfer)"
90618	"Decoding of the video data in the hostdecoder memory failed"
90619	"The data in the hostdecoder is not equal to a colourbar"
90620	"The video encoder did not return the Group Of Picture count."
90621	"The video encoder did not receive data from the VIP."
90622	"Execution of the command on the analogue board failed."
90623	"Initialisation of VIP and EMPRESS failed"
90624	"The video encoder did not return the current status."
90625	"The video encoder timed out in BUSY mode. (no VIP input)"
90626	"The video encoder did not return the current bitrate."
90627	"The video encoder did not switch to ENCODING mode."
90628	"The video encoder could not start from STOP/ IDLE mode."
90629	"The video encoder did not switch from IDLE to STOP mode."
90700	""
90701	"Initialisation of I2C failed"
90702	"I2C communication to VIP failed"
90703	"Initialisation of VIP failed"
90704	"Generation of Close Caption data failed"
90705	"VIP not locked to video signal"
90706	"Initialisation of VBI Extractor failed
90707	"No CC data received"
90708	"Closed Caption data overrun"
90709	"Closed Caption data does not match"
90710	"Switch off ColourBar failed"
90711	"Execution of the command on the analogue board failed."
90800	""

Error Nr	Error String
90801	"Error routing the audio back to the digital board."
90802	"Error cannot initialise I2C"
90803	"Error cannot initialise VIP"
90804	"Error cannot set ADC enable pin"
90805	"Error cannot set VSM audio clock"
90806	"Error preparing the 12kHz audio-sine"
90807	"Error cannot initialise audio encoder"
90808	"Error cannot initialise VSM audio in port"
90809	"Error cannot initialise VSM audio in DMA port"
90810	"Error cannot initialise VSM audio out DMA port"
90811	"Error cannot initialise audio VSM out port"
90812	"Error cannot initialise host decoder audio in"
90813	"Error loop audio user/dealer cannot start audio encoder"
90814	"Error cannot start VSM audio in DMA port"
90815	"Error starting the 12kHz audio-sine"
90816	"Error transfer data from audio encoder to VSM"
90817	"Error cannot start VSM AV out DMA port"
90818	"Error cannot start VSM AV out port"
90819	"Error transfer data from VSM to host decoder"
90820	"Error: audio data in host memory and VSM memory differ"
90821	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90822	"Error: audio data in host memory contains silence!"
90823	"There is no correct audio frame in the buffer"
90824	"The audio frame has an illegal version bit"
90825	"The audio frame has an illegal bitrate-index"
90826	"The audio frame has an illegal sampling rate"
90827	"The CRC of the audio frame is wrong"
90828	"The audio frame is not MPEG-I layer II !"
90829	"Error cannot de-mute DAC on analogue board"
90900	""
90901	"Error routing the audio back to the digital board."
90902	"Error cannot initialise I2C"
90903	"Error cannot initialise VIP"
90904	"Error cannot set ADC enable pin"
90905	"Error cannot set VSM audio clock"
90906	"Error preparing the 12kHz audio-sine"
90907	"Error cannot initialise audio encoder"
90908	"Error cannot initialise VSM audio in port"
90909	"Error cannot initialise VSM audio in DMA port"
90910	"Error cannot initialise VSM audio out DMA port"
90911	"Error cannot initialise audio VSM out port"
90912	"Error cannot initialise host decoder audio in"
90913	"Error loop audio user/dealer cannot start audio encoder"
90914	"Error cannot start VSM audio in DMA port"
90915	"Error starting the 12kHz audio-sine"
90916	"Error transfer data from audio encoder to VSM"
90917	"Error cannot start VSM AV out DMA port"
90918	"Error cannot start VSM AV out port"
90919	"Error transfer data from VSM to host decoder"
90920	"Error: audio data in host memory and VSM memory differ"
90921	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90922	"Error: audio data in host memory contains silence!"
90923	"There is no correct audio frame in the buffer"
90924	"The audio frame has an illegal version bit"
90925	"The audio frame has an illegal bitrate-index"
90926	"The audio frame has an illegal sampling rate"
90927	"The CRC of the audio frame is wrong"
90928	"The audio frame is not MPEG-I layer II !"
90929	"Error cannot de-mute DAC on analogue board"
140000	""
140001	"I2C to Clock failed" or "I2C initialisation failed"
140100	""
140101	"I2C to Clock failed" or "I2C initialisation failed"
141200	""
141201	"Progressive Scan Board I2C bus busy"
141211	"Progressive Scan Board I2C FLI2200 bus busy"
141212	"Progressive Scan Board I2C FLI2200 read access time-out"
141213	"Progressive Scan Board I2C FLI2200 no read acknowledge"
141214	"Progressive Scan Board I2C FLI2200 read failed"
141215	"Progressive Scan Board I2C FLI2200 write access time-out"
141216	"Progressive Scan Board I2C FLI2200 no write acknowledge"
141217	"Progressive Scan Board I2C FLI2200 write failed"
141218	"Progressive Scan Board I2C FLI2200 failed"
141221	"Progressive Scan Board I2C AD7196 bus busy"
141222	"Progressive Scan Board I2C AD7196 read access time-out"
141223	"Progressive Scan Board I2C AD7196 no read acknowledge"
141224	"Progressive Scan Board I2C AD7196 read failed"
141225	"Progressive Scan Board I2C AD7196 write access time-out"
141226	"Progressive Scan Board I2C AD7196 no write acknowledge"
141227	"Progressive Scan Board I2C AD7196 write failed"
141228	"Progressive Scan Board I2C AD7196 failed"
141300	""
141301	"Progressive Scan Route Enable failed"
141302	"Generating test image in Hostdecoder failed"
141400	""
141401	"Progressive Scan Route Disable failed"
141402	"Turning off test image in Hostdecoder failed"
141500	""
141501	"Progressive Scan Board I2C failed"
141600	""
141601	"Progressive Scan Board I2C failed"

DVIO 1.8 Error Codes

Error Code		Id	Description	Hardware
0	0x00	DVIOC_ERR_DDS_OK	No Error	
6	0x06	DVIOC_ERR_DDS_UNKNOWN	Unknown Error(including UART communication error)	
17	0x11	DVIOC_ERR_DDS_TNF_1	Link chip incorrect responding	µPD72893, Link
18	0x12	DVIOC_ERR_DDS_TNF_2	No link register access or link reset failed	µPD72893, Link
23	0x17	DVIOC_ERR_DDS_TNF_7	Link reset failed	µPD72893, Link
38	0x26	DVIOC_ERR_DDS_TNF_16	Expecting no 1394 node with GUID connectivity, while detecting connection	
39	0x27	DVIOC_ERR_DDS_TNF_17	Expecting 1394 node with GUID connectivity, while not detecting connection	
48	0x30	DVIOC_ERR_DDS_UPINTRAMA	Internal ram problem in address lines	µPD78F0988, Wrapper
50	0x32	DVIOC_ERR_DDS_UPEXTRAMA	External ram problem in address lines	µPD4564163G5, SDRAM
51	0x33	DVIOC_ERR_DDS_UPEXTRAMD	External ram problem in data lines	µPD4564163G5, SDRAM
58	0x3A	DVIOC_ERR_DDS_ROMCHK	Checksum of codespace 0x0000-0x1f80, 0x2000-0xeffd is not correct	µPD78F0988, Wrapper
244	0xF4	DVIOC_ERR_LINK_HWPHY	PHY chip not responding(PHY down report received)	µPD72852, Phy
245	0xF5	DVIOC_ERR_LINK_HWLINK	LINK chip not responding	µPD72893, Link

5.5 Loop tests

The following loops can be distinguished:

- Loops performed on the digital board only
- User Dealer loops performed on the digital and analogue board
- System loops performed via an external connection: outputs are looped back to the inputs.

5.5.1 Nucleus 900: Digital Audio Loop

This nucleus tests the audio path through the digital board

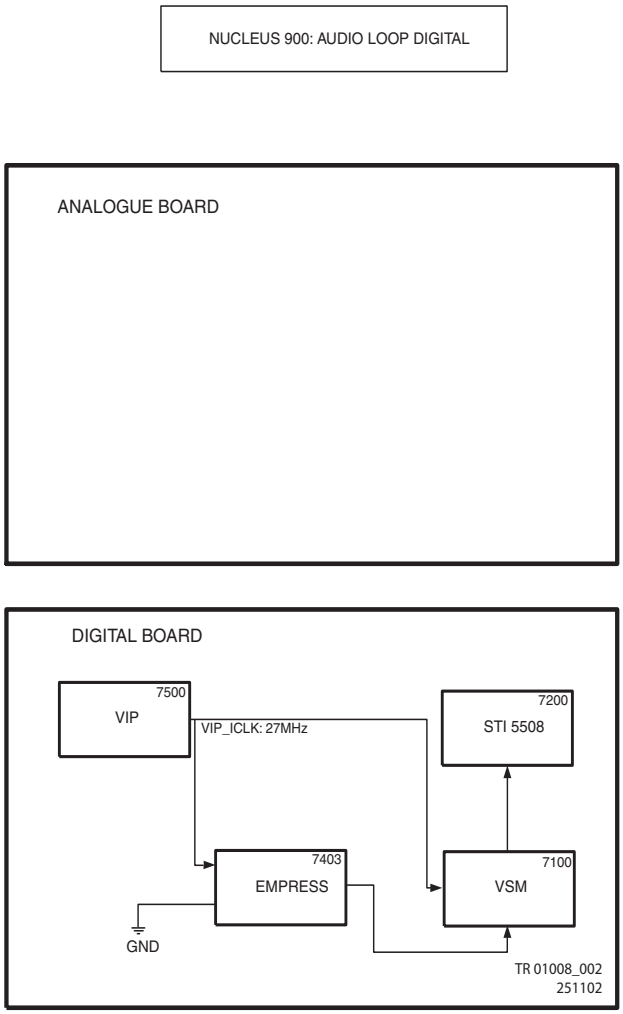


Figure 5-9

5.5.2 Nucleus 901: Audio User Dealer Loop

This Nucleus is only possible in NAFTA sets.
A PCM audio sine of 12kHz is generated in the Host Decoder for a while and sent to the analogue board. The signal coming from the analogue board is encoded again and sent to the memory of the host decoder for comparison. This nucleus tests the components on the audio signal path:

- Host decoder
- Flex connection between connector 1602 (digital board) and connector 1900 (analogue board)
- DAC
- Op-amp
- Scart switch IC
- ADC
- Audio Encoder
- VIP
- VSM

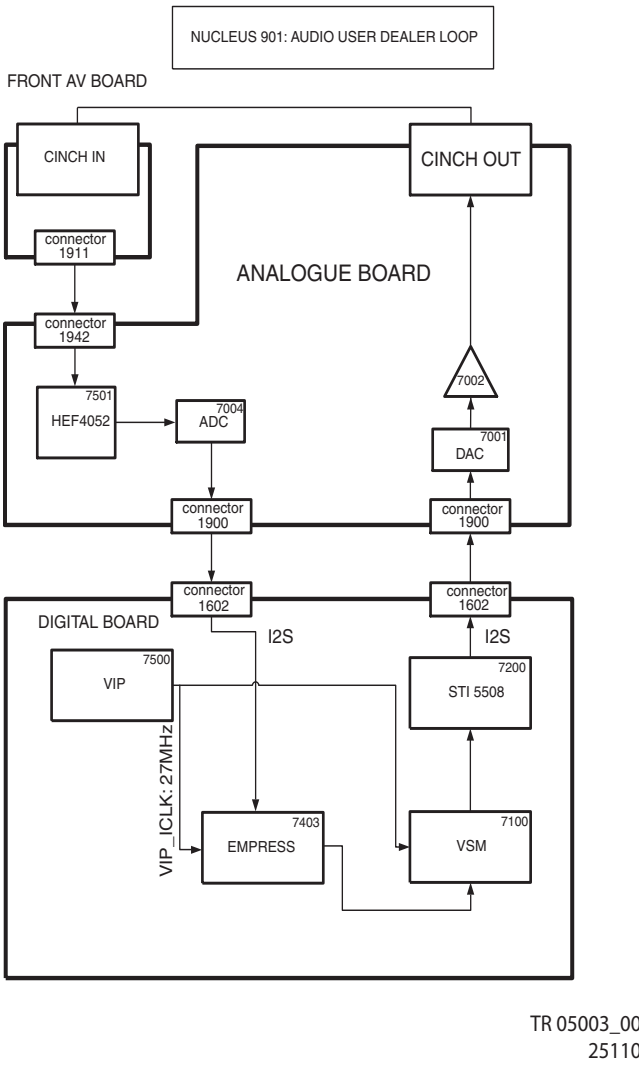


Figure 5-10

5.5.3 Nucleus 902: Digital Video Loop

A colourbar generated in the host decoder is looped through the VIP, Empire, and VSM and checked again in the host decoder. The following components are tested on the video signal path:

- VIP
- Empire
- VSM
- Host decoder

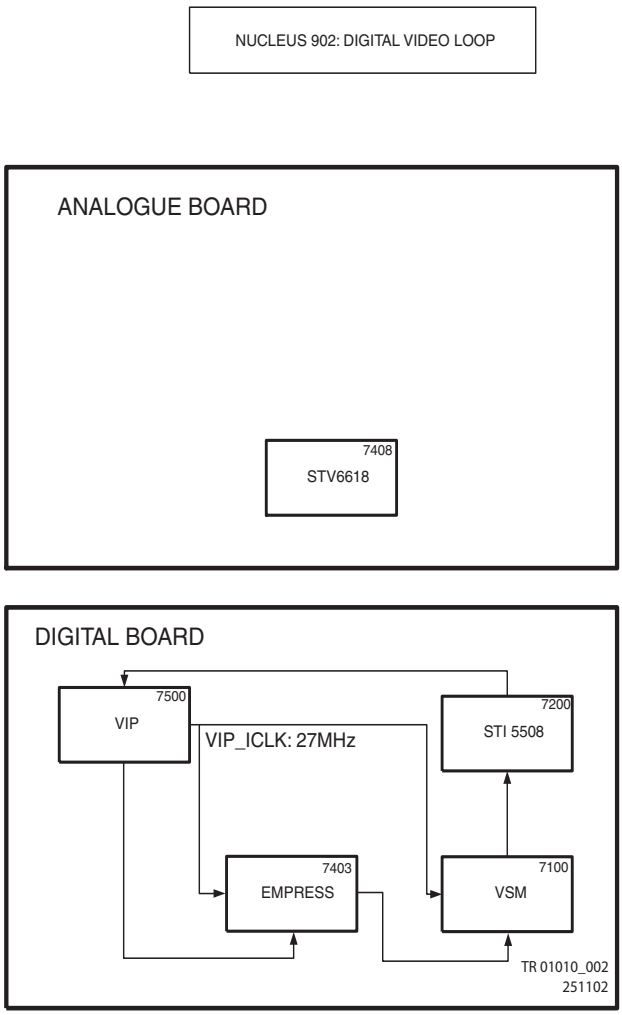


Figure 5-11

5.5.4 Nucleus 903: Digital Video VBI Loop

Nucleus for testing the components on the video VBI signal path:

- The VIP
- The VSM
- The Host Decoder

This is done by using the internal test signal source (digital board only)

Remark: this test is only successful if nucleus 121 is carried out first.

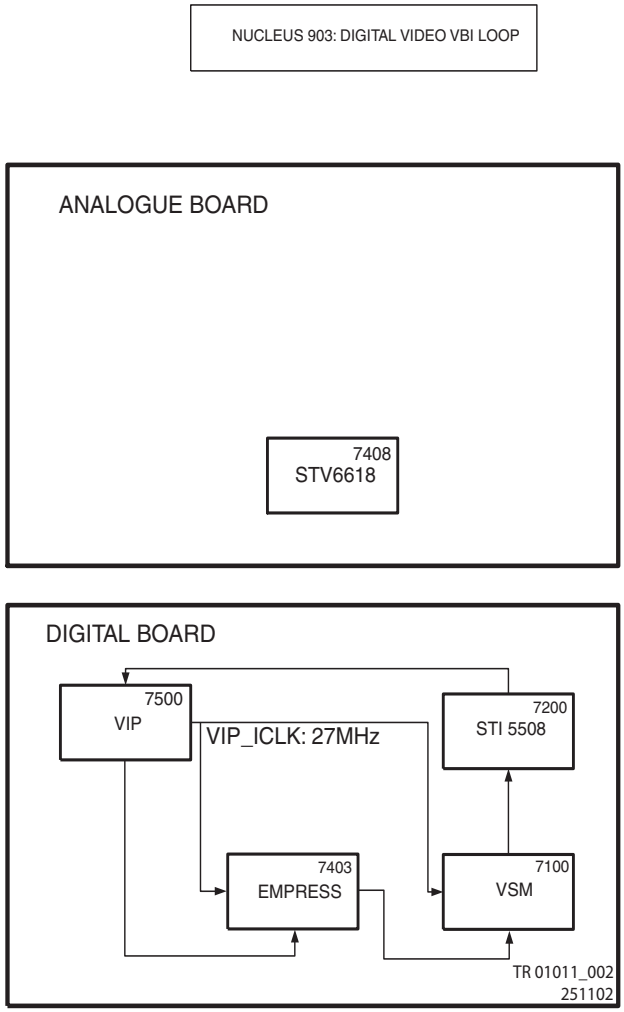


Figure 5-12

5.5.5 Nucleus 904: System Video Loop

Nucleus for testing the components on the video signal system path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board the video signal will be routed to the SCART (EUROPE) or CINCH (NAFTA). There it will be looped back externally by means of the proper cable

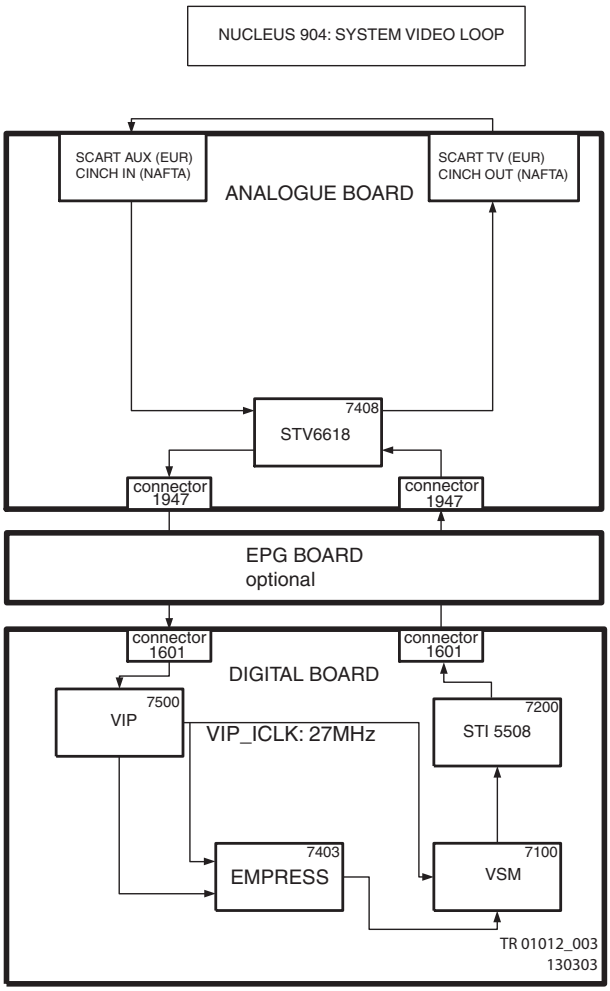


Figure 5-13

5.5.6 Nucleus 905: System Video VBI Loop

This nucleus tests the components on the video signal path:

- The VIP
- The VSM
- The Host Decoder

The video CVBS signal is routed to the output of the analogue board where it will be looped back by means of an external cable

Remark: this test is only successful if nucleus 121 is carried out first.

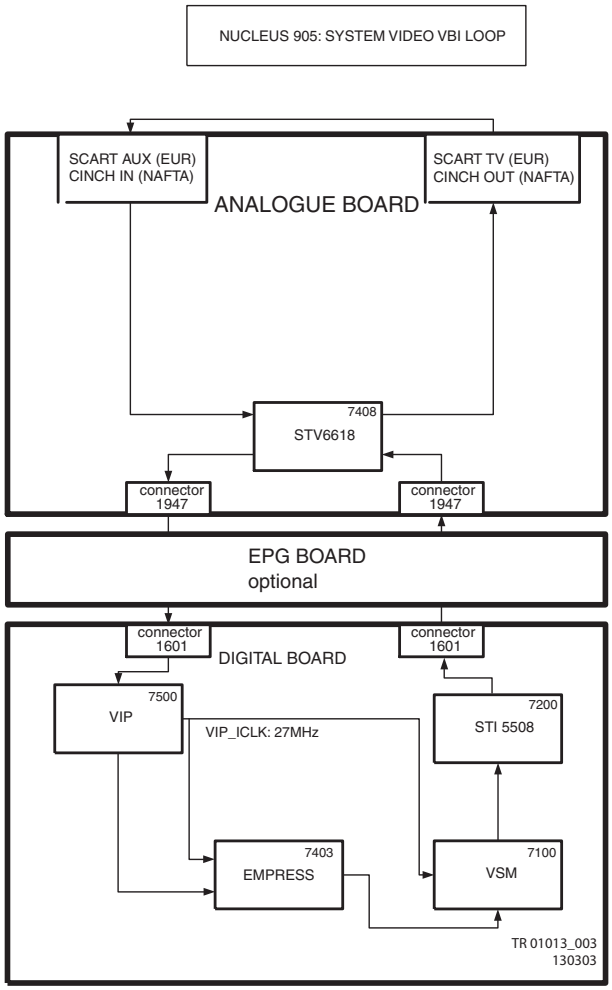


Figure 5-14

5.5.7 Nucleus 906: Video User Dealer Loop

Nucleus for testing the components on the video signal system path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board, the video signal is internally routed back to the digital board.

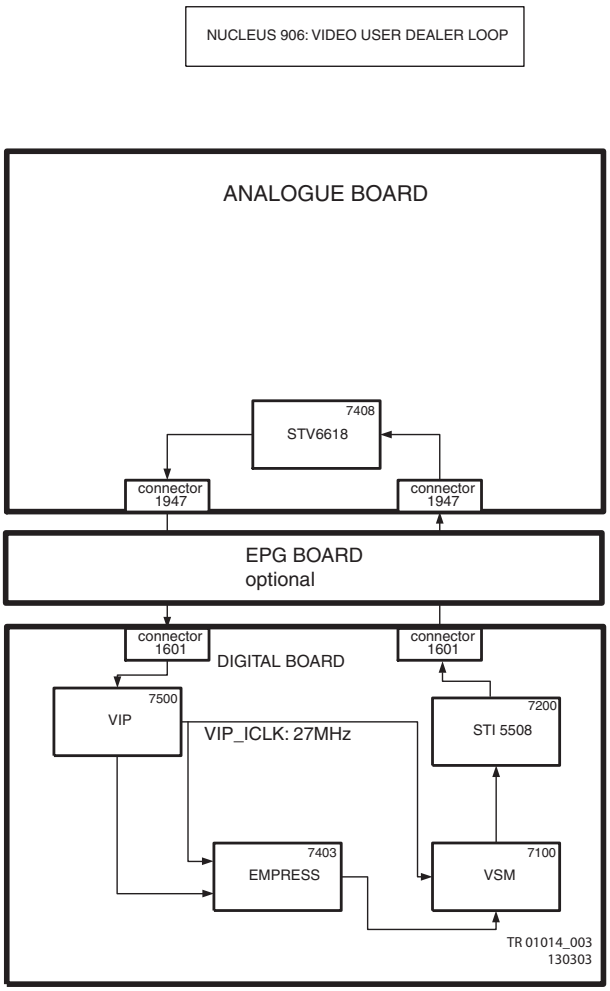


Figure 5-15

5.5.8 Nucleus 907: Video VBI User Dealer Loop

This nucleus tests the components on the video VBI signal path:

- The VIP
- The VSM
- The Host Decoder

The signal is routed back internally on the analogue board
Remark: this test is only successful if nucleus 121 is carried out first.

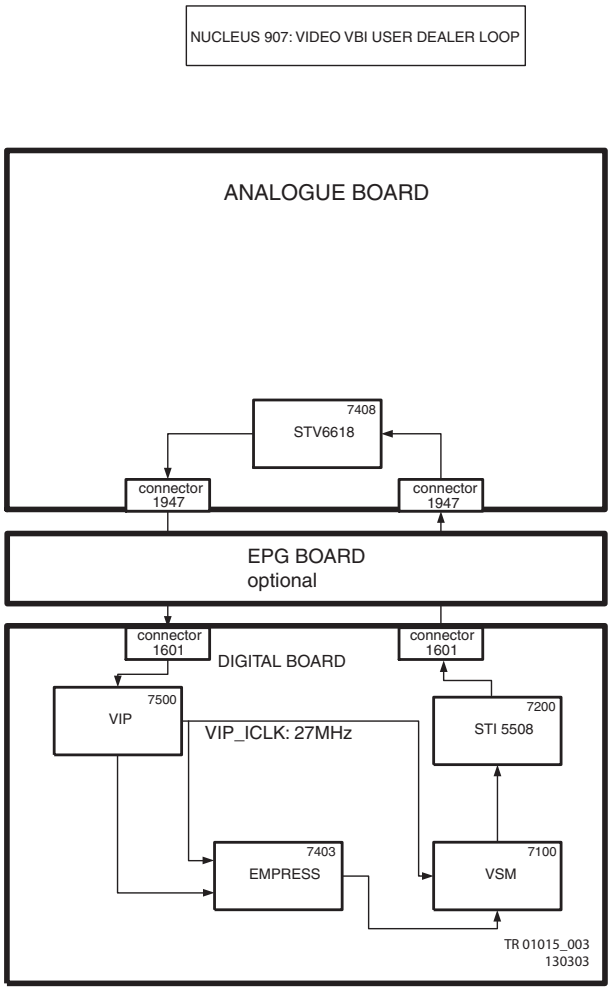


Figure 5-16

5.5.9 Nucleus 908: System Audio Loop Scart (Europe)

Nucleus for testing the components on the audio signal path:
- The hostdecoder
- The analogue board
- The audio encoder
- The VSM

On the analogue board, audio is passed to the SCART connector, where a SCART cable needs to be used to loop back the audio signal to the digital board

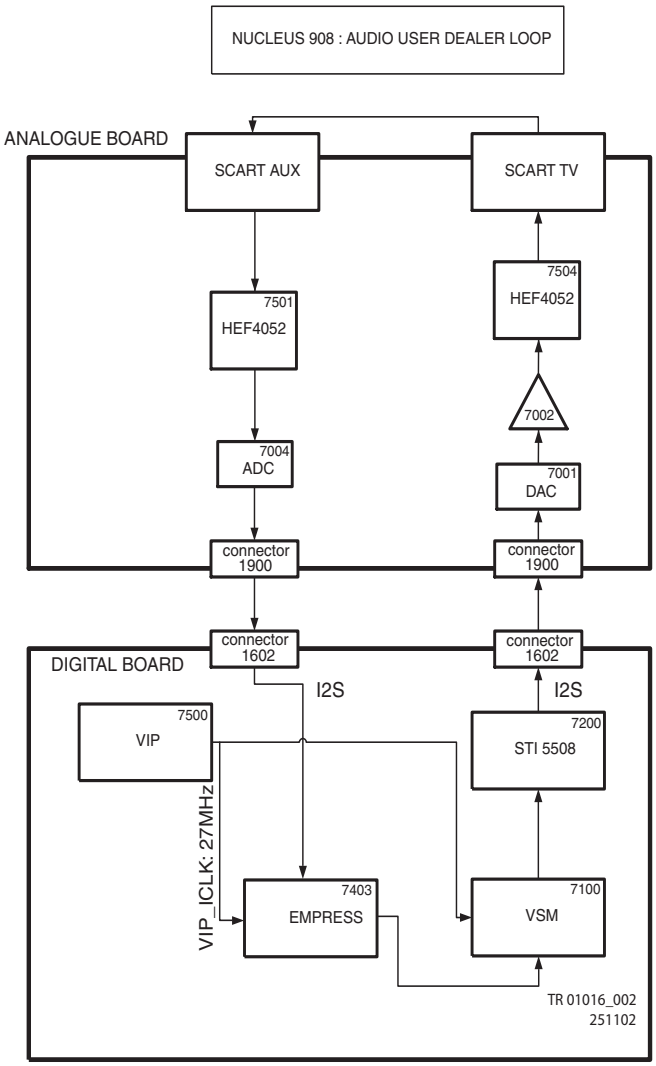


Figure 5-17

5.5.10 Nucleus 909: System Audio Loop CINCH (Nafta)

Nucleus for testing the components on the audio signal path:
- The hostdecoder
- The analogue board
- The audio encoder
- The VSM

A parameter has to be specified to select the appropriate output routing. This parameter is identical to nucleus 713.

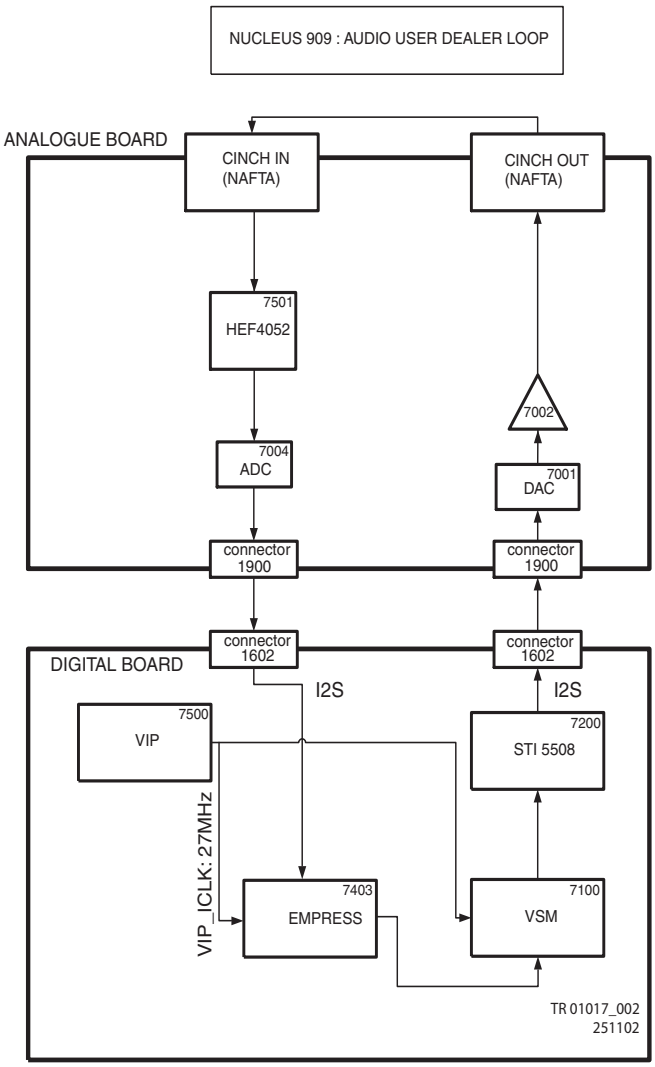


Figure 5-18

5.5.11 Nucleus 910: DVIO Video Input

Nucleus for testing the components on the video signal path:
- The DVIO board
- The VIP
- The video encoder
- The VSM
- The host decoder

Note :This Test is not valid for Nafta in DVDR-Lead. For Europe the sound will be available on scart 2.

5.5.12 Nucleus 911: DVIO Video VIP

Nucleus for testing the components on the video signal system path:
- The host decoder
- The analogue board
- The VIP

On the analogue board the video signal will be routed accord-

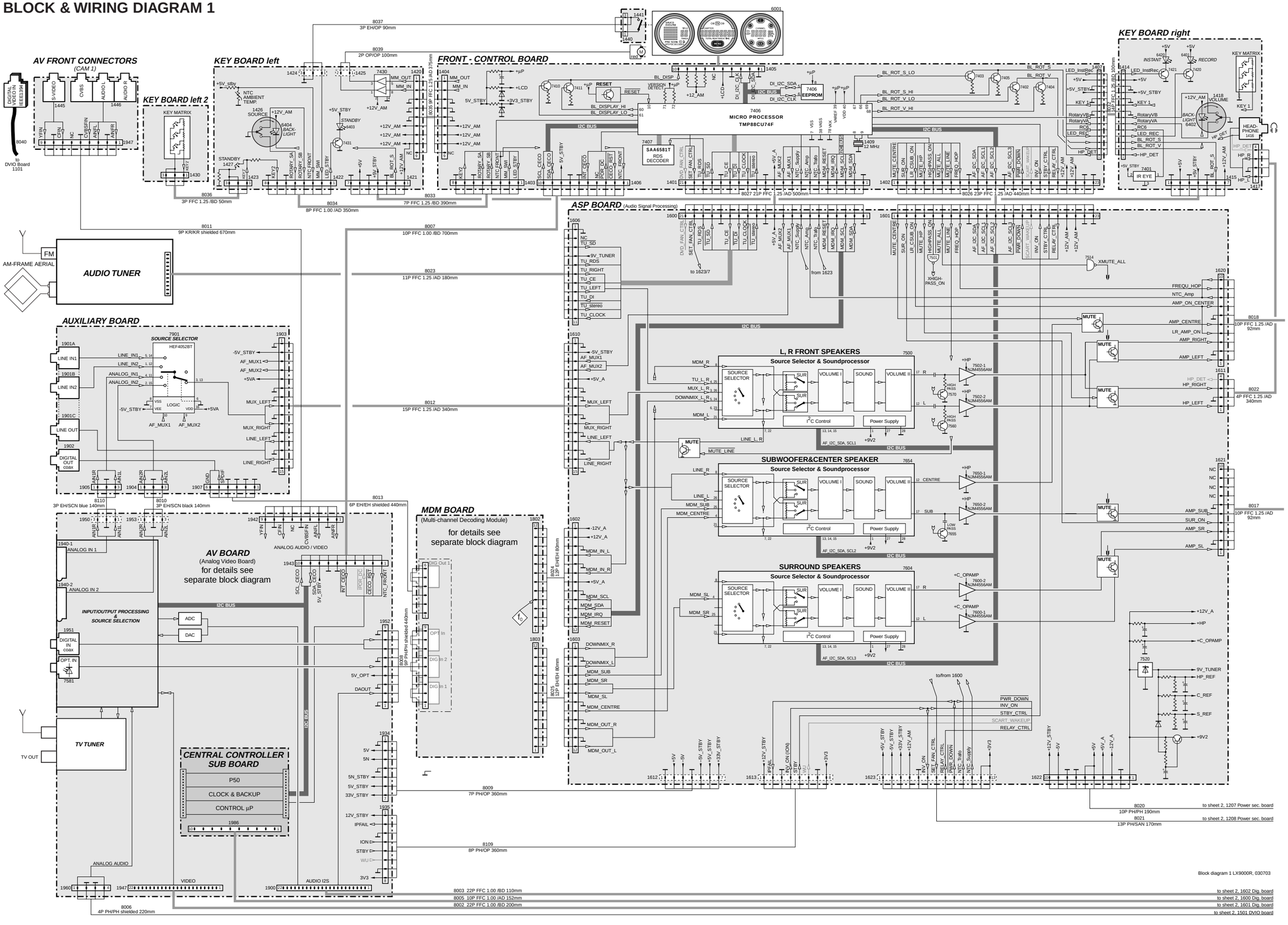
ing to the parameter. There it will be looped back externally by means of the proper cable.

The correct Routing path has to be selected by a parameter:

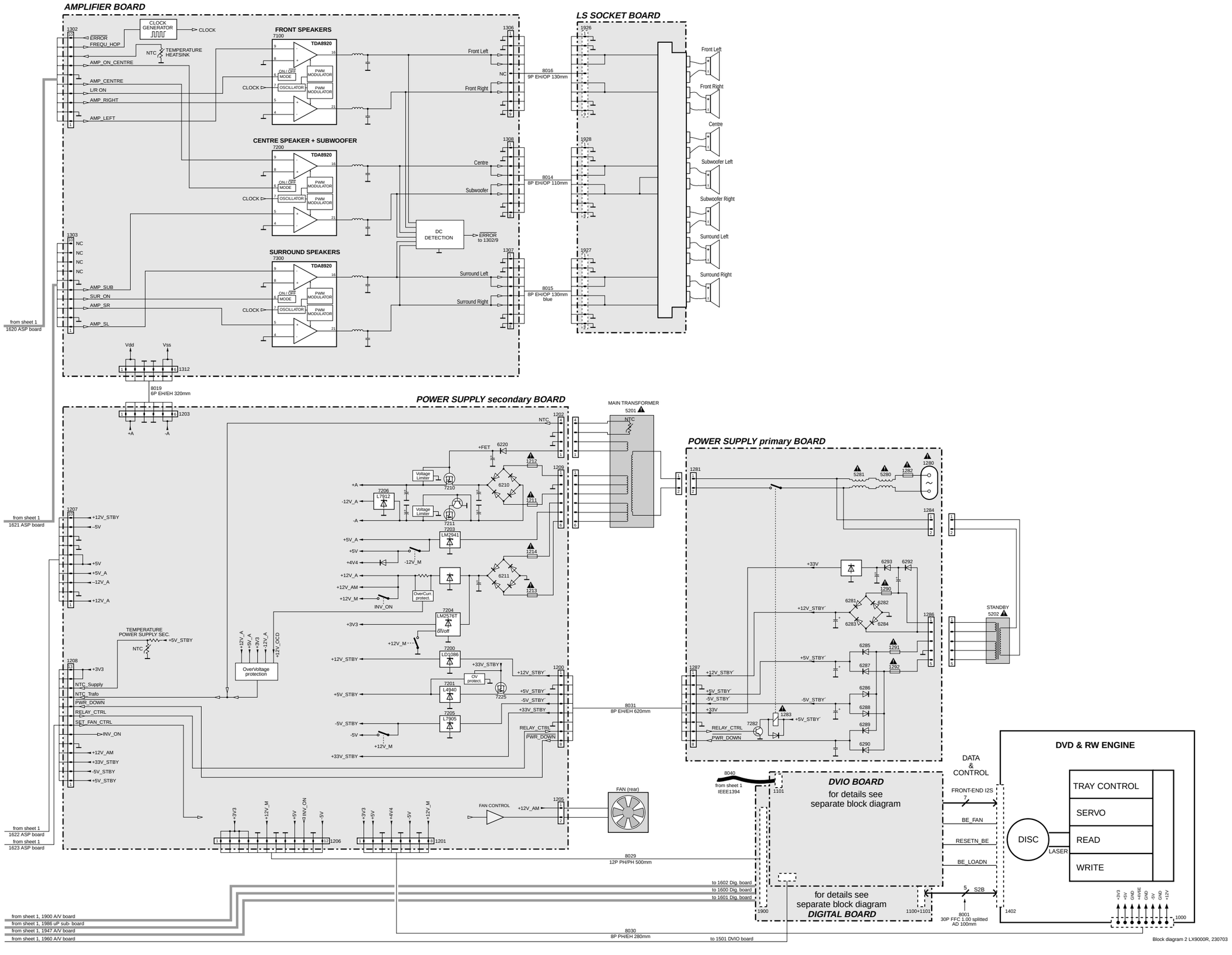
Analog board Version	Selectable parameter	Internal call to nucleus 712
01	1	712.21
11	1	712.21
31	2	712.17
31	3	721.18
31	3	712.19
41	2	712.17
41	3	712.18
41	4	712.19
41	5	712.20
71	4	712.19

Remark: Nucleus 704 gives the analog board version

BLOCK & WIRING DIAGRAM 1

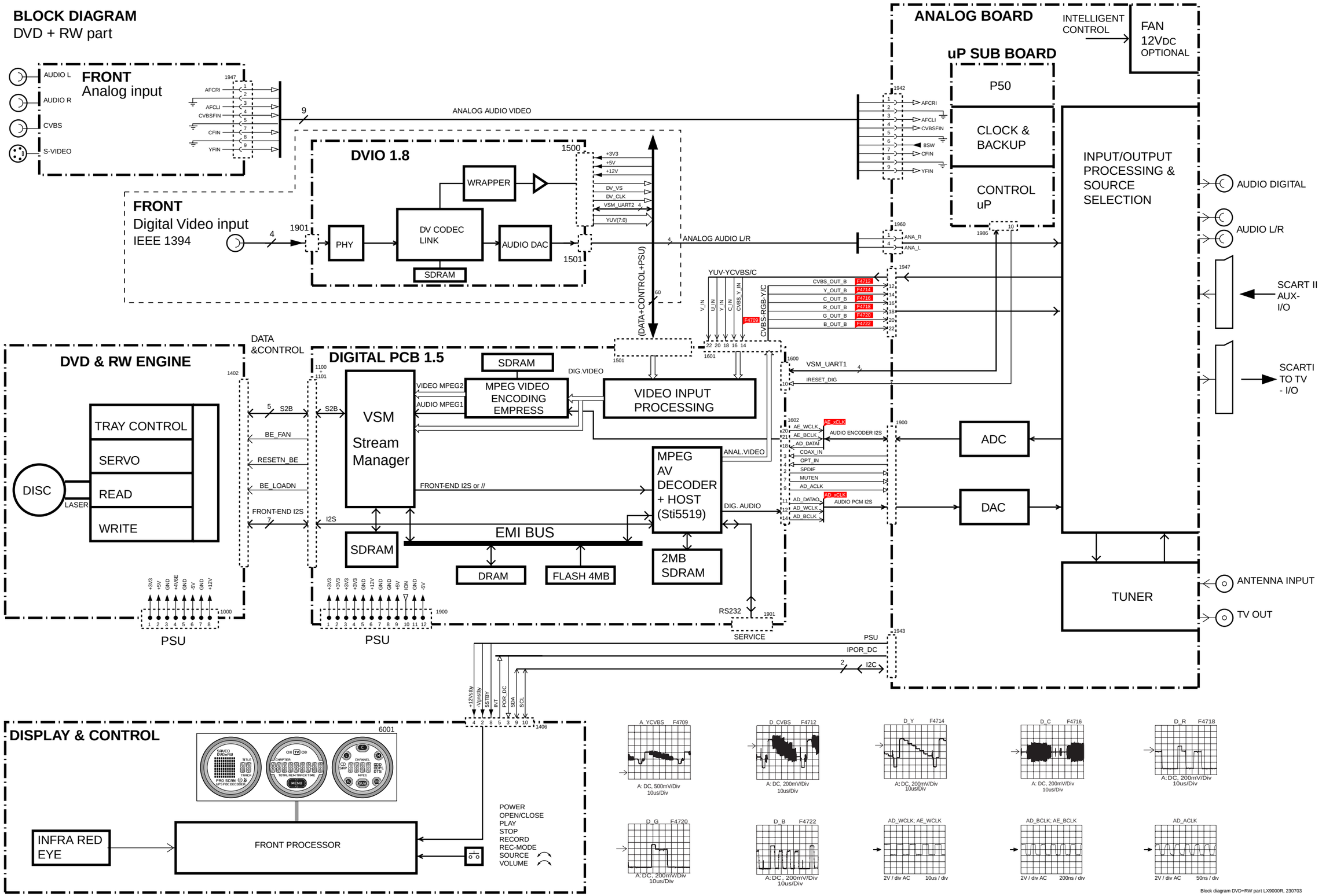


BLOCK & WIRING DIAGRAM 2



Block diagram 2 LX9000R, 230703

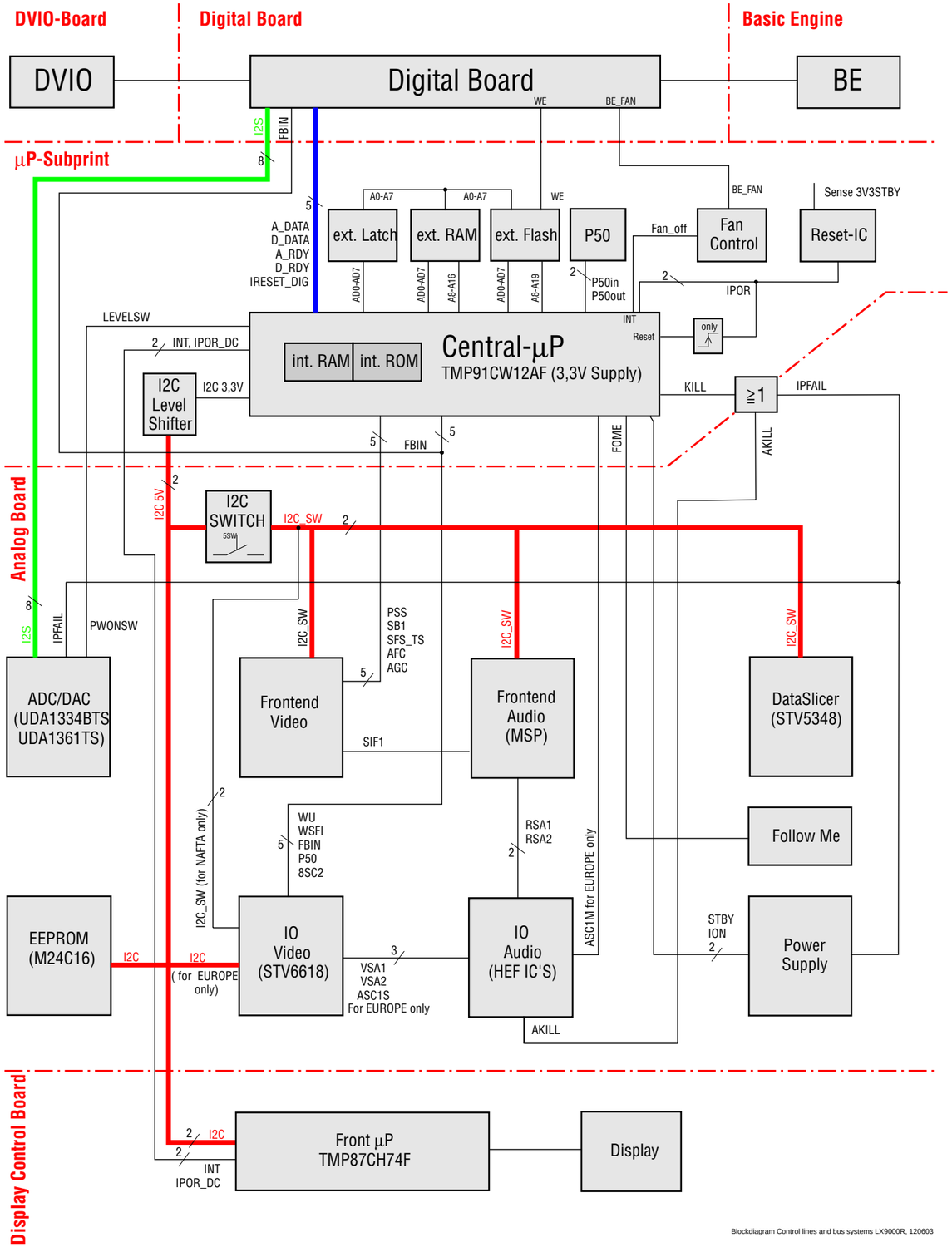
BLOCK DIAGRAM
DVD + RW part



Block diagram DVD+RW part LX9000R, 230703

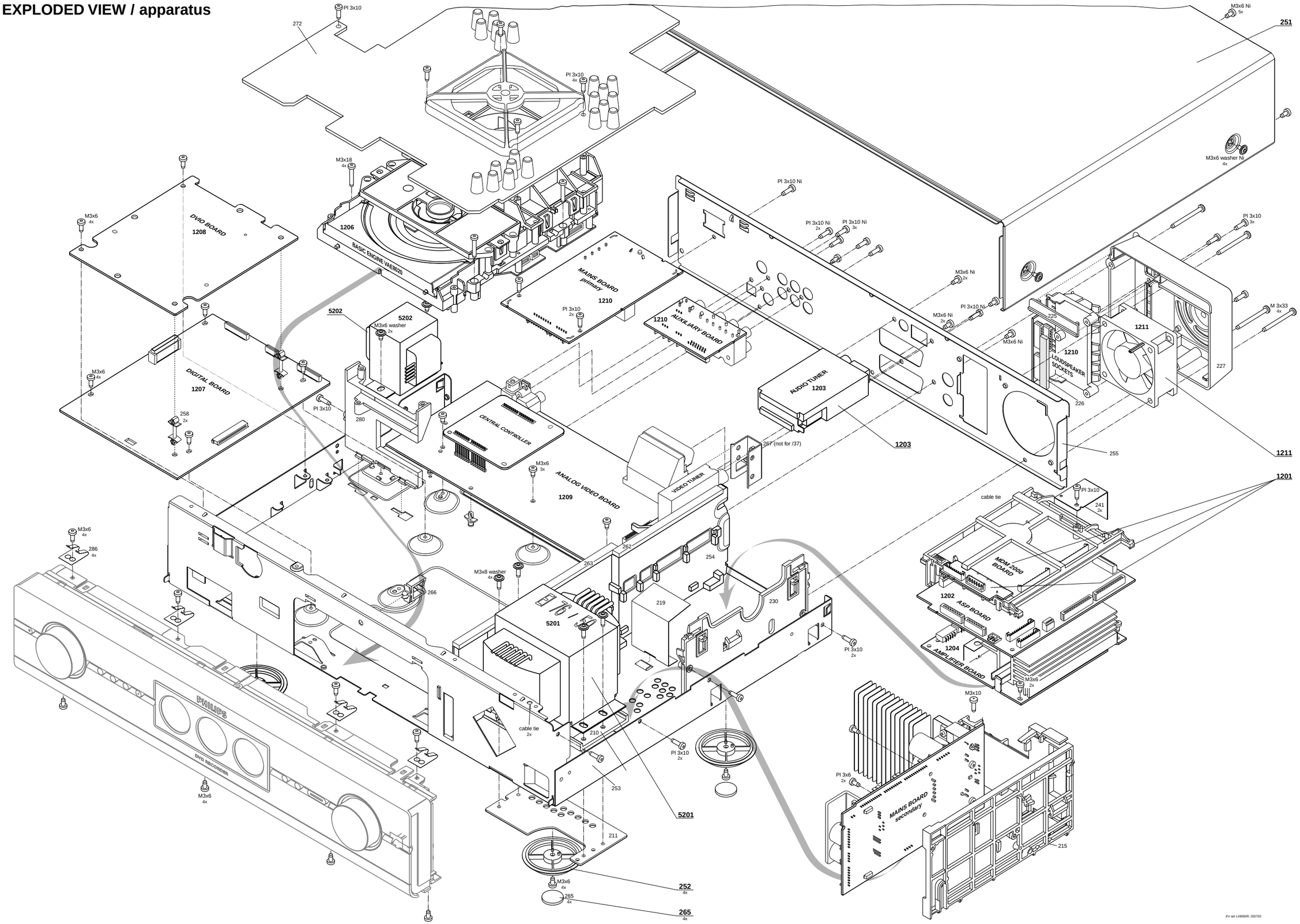
Blockdiagram

Control Lines and Bus Systems DVD+RW part

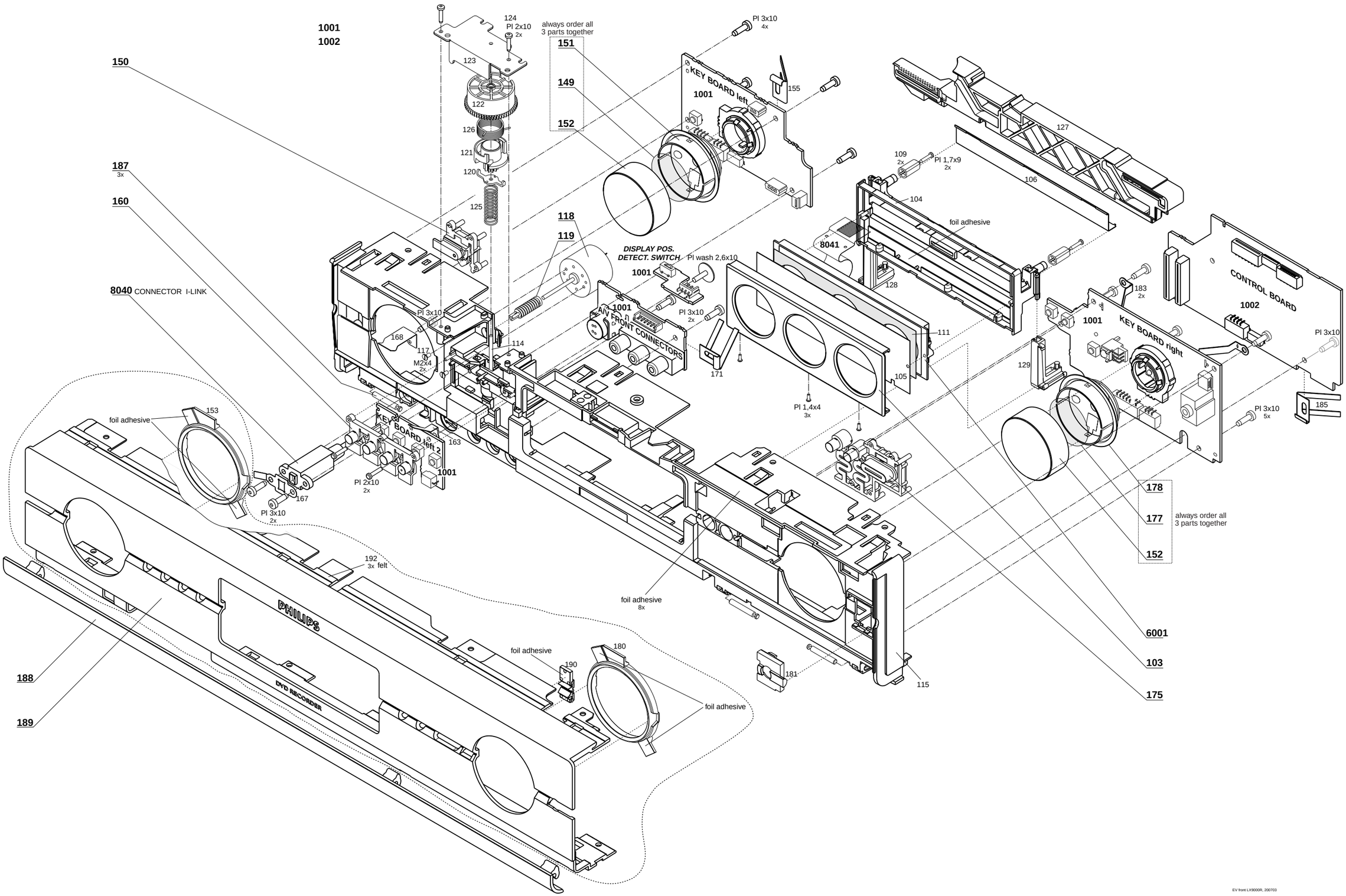


Blockdiagram Control lines and bus systems LX9000R, 120603

EXPLODED VIEW / apparatus



EXPLODED VIEW / Front assembly



EV front LX9000R, 200703

1401 H5 1402 H8 1403 H12 1404 H13 1405 A8 1406 A10 1407 A12 1408 H3 1409 E10 2400 A3
2401 B7 2402 B7 2403 H2 2404 H3 2405 E3 2406 F1 2407 F1 2408 F1 2409 F4 2410 A5
2411 E6 2412 G13 2413 G13 2414 G13 2415 G7 2416 G7 2417 B5 2418 D3 2419 C3 2420 B2
2421 C7 2422 F8 2423 F11 2424 F8 2425 F10 2426 F11 2427 F10 2428 F11 2429 G5 2430 G5
2431 G10 2432 G11 3401 A2 3402 A1 3403 B5 3404 A6 3405 A6 3406 B2 3407 B3 3408 A3
3409 B2 3410 A4 3411 A3 3412 A5 3413 B7 3414 B8 3415 B8 3416 B9 3417 B9 3418 B9
3419 B10 3420 B10 3421 B10 3422 B10 3423 B11 3424 B11 3425 B8 3426 B8 3427 B9 3428 B9
3429 B9 3430 B9 3431 B10 3432 B10 3433 B10 3434 B11 3435 B11 3436 A2 3437 C3 3438 D3
3439 C6 3440 C6 3441 C8 3442 C7 3443 C8 3444 D13 3445 D7 3446 H3 3447 D8 3448 G3
3449 D7 3450 C13 3451 B4 3452 A4 3453 B4 3454 D8 3455 D7 3456 D8 3457 D12 3458 E12
3459 D7 3460 D12 3461 E8 3462 E7 3463 E12 3464 E8 3465 E12 3466 F4 3467 F4 3468 E8
3469 E8 3470 E9 3471 E9 3472 E9 3473 E9 3474 E10 3475 E11 3476 E11 3477 E11 3478 E8
3479 E8 3480 E9 3481 E9 3482 E9 3483 E10 3484 E11 3485 E11 3486 E11 3487 G4 3488 G4
3489 E6 3490 G11 3491 F10 3492 F6 3493 F6 3494 G12 3495 G13 3496 G13 3497 F5 3498 F5
3499 G10 3501 C12 3502 F10 3503 E12 3504 E12 3505 C1 3506 C2 3507 C3 3508 D2 3509 D3
3510 C12 3511 C12 3512 B11 3513 B11 3514 F9 3515 G6 3516 G7 3517 G6 3518 G6 3519 G6
3520 G6 3521 D12 3522 D12 3523 D12 3524 D12 3525 C12 3526 F9 3527 F9 3528 F9 3529 G12
3530 G12 3531 B13 3532 B13 3533 C12 3534 C12 3535 F8 3536 F8 3537 A7 3538 A7 3539 A8
3540 A9 3541 A9 3542 B12 3543 B12 3544 A10 3545 A9 3546 B4 3547 B1 3548 C2 3549 D2
3550 D2 3551 D5 3552 D5 3553 E5 3554 E4 3555 E4 3556 E4 3557 G7 3558 G7 3559 A6
3560 B12 3561 A12 4001 D6 4400 A10 4401 A9 4402 E5 4403 E5 4404 G8 4405 B12 4406 D9
5401 B7 5402 E3 6410 A6 6411 A6 6412 A6 6413 A6 6414 A6 6415 A6 6416 A6 6417 A6
7408 E7 7409 G12 7410 C2 7411 D2 7412 A10 7413 E5 7414 E4 7415 G7 7416 B12 7417 A12
7401 D12 7402 D12 7403 A8 7404 A9 7405 B2 7406 D9 7407 E2
F400 A8 F401 H9 F402 D12 F403 A8 F404 A9 F405 A9 F406 A10 F407 A12 F408 A12 F409 A13
F410 A13 F411 A13 F412 A14 F413 A14 F414 A8 F415 A8 F416 A8 F417 C12 F418 A11 F419 A12
F420 A13 F421 A13 F422 A13 F423 A13 F424 E3 F425 A14 F426 A10 F427 A11 F428 A11 F429 A11
F430 B8 F431 D12 F432 C12 F433 F5 F434 F5 F435 H5 F436 H5 F437 H5 F438 H6 F439 H6
F440 H6 F441 H7 F442 H7 F443 H7 F444 H7 F445 H8 F446 H8 F447 H8 F448 H9 F449 H9
F450 H9 F451 H9 F452 H10 F453 H10 F454 H11 F455 H12 F456 H12 F457 H12 F458 H12 F459 H13
F460 H13 F461 H14 F462 H14 F463 E7 F464 H5 F465 H5 F466 H6 F467 H6 F468 H6 F469 H6
F470 H7 F471 A15 F472 H7 F473 H8 F474 H8 F475 H8 F476 H9 F477 H9 F478 H9 F479 H10
F480 H10 F481 H10 F482 H11 F483 H11 F484 H12 F485 H12 F486 H12 F487 H14 F488 A5
F489 B5 F490 B5 F491 C5 F492 C5 F493 D5 F494 A10 F495 A10 F496 F12 F497 G6 F498 G6
F499 G6 F500 G6 F501 F8

FRONT - CONTROL

BACKLIGHT INTENSITY

ROTARY ENCODER VOLUME

ROTARY ENCODER SOURCE

DISPLAY

.../.../...V full/half/no backlight all voltages measured in service mode, "Display Test"

RDS DECODER

7407 SAA6581T

57 Khz BANDPASS (8th ORDER)

POW SUPPL & RESET

CLOCKED COMP

RDS/RBDS DEM

TEST CTRL

OSC & CLK

SIGNAL QUALITY DET

to Display

to A/V 1943 2

to Key RIGHT 1414

EEPROM

7408 M24C02

RESET

VERSION DETECTION

Version	3444	3450
USA no RDS	X	
DEMO mode (default ON)		X

8-Bit high breakdown v. P6 output port with latch

8-Bit high breakdown voltage P7 output port with latch

8-Bit h. break. v. P8 out w. latch

80k pull down

P6-P9 source open drain

7406 TMP88CU74F

VFT driver circuit (automatic display)

Program Counter | ROM | RAM | CPU

8-Bit A/D Converter

3-B. I/O P3 (tristate) | 8-Bit Input/Output P1 (tri state) | 8-Bit I/O P2 sink o.drain | 8-Bit Input/Output P0 (tri-state)

to ASP 1600 1

to ASP 1601 1

to Key LEFT 1422

to Key LEFT 1420

* for AV3 DVD module only

1) without RDS only

2) for AV2 DVD module only

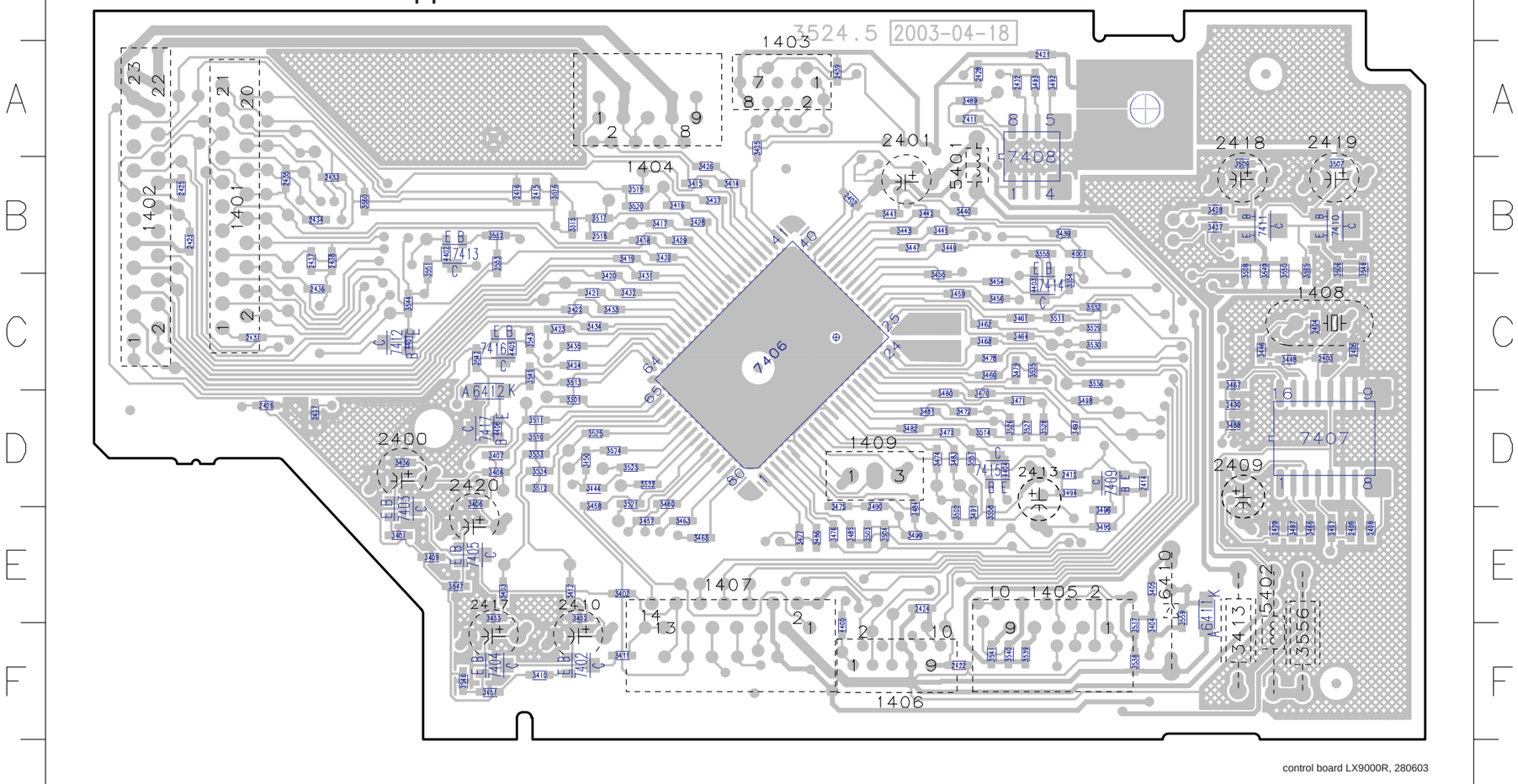
EVM ...V DC voltages measured with display closed (no movement)

.../...V on/off (* means "floating, not defined")

LX9000R CONTROL, 130603

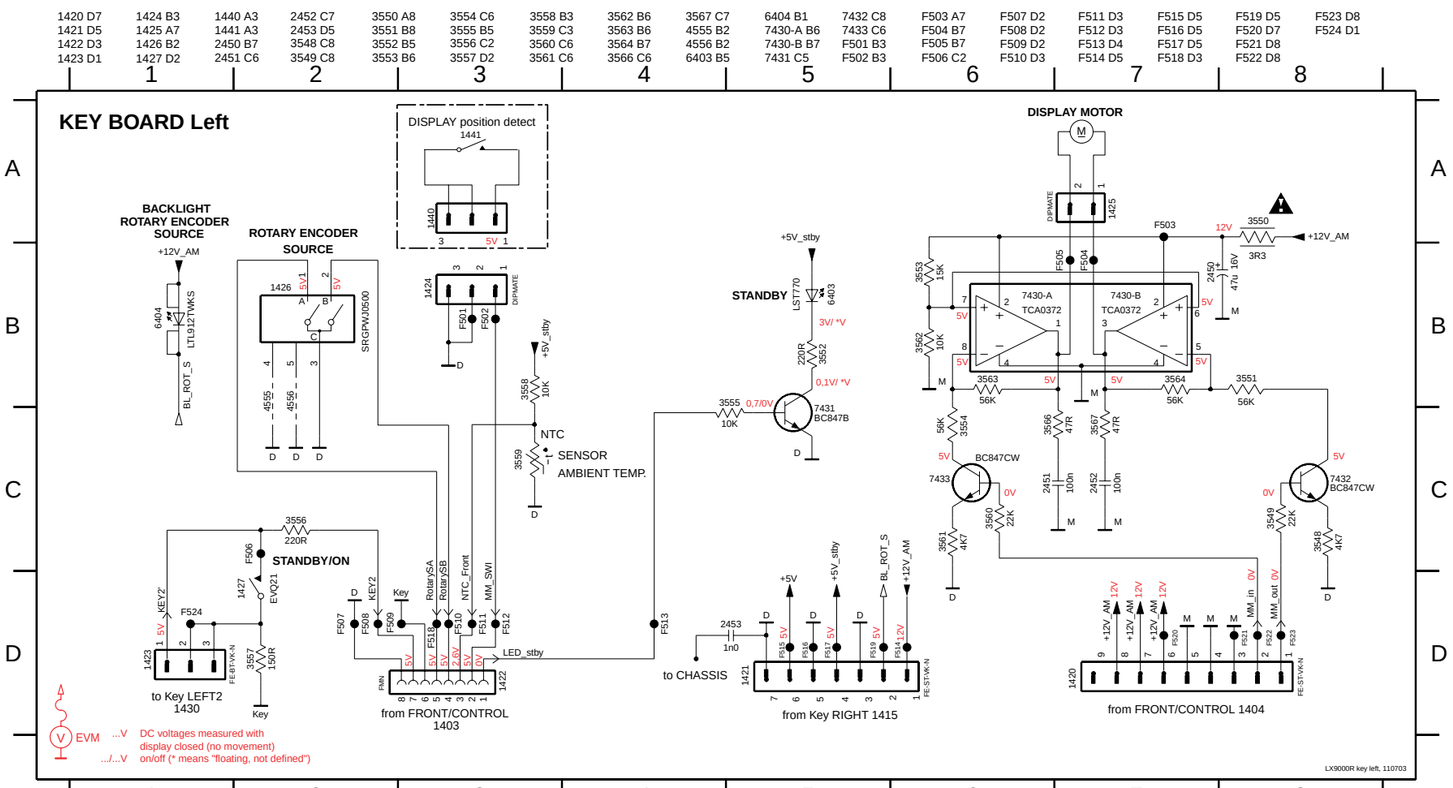
2402 B7
2403 C11
2404 C11
2405 C11
2406 E11
2407 E11
2408 E11
2411 A8
2412 D8
2414 D9
2415 B4
2416 B4
2421 A8
2422 F7
2423 B1
2424 E7
2425 B1
2426 D2
2427 D2
2428 A8
2429 E10
2430 D10
2431 C1
2432 A8
2433 B2
2434 B2
2435 B2
2436 C2
2437 B2
2438 B2
2439 A6
3401 E3
3402 E5
3403 E4
3404 F9
3405 E9
3406 D3
3407 D4
3408 D4
3409 E3
3410 F4
3411 F5
3412 E4
3414 B6
3415 B5
3416 B5
3417 B5
3418 B5
3419 B5
3420 C4
3421 C4
3422 C4
3423 C4
3424 C4
3425 A6
3426 B5
3427 B5
3428 B5
3429 B5
3430 B5
3431 C5
3432 C5
3433 C5
3434 C4
3435 C4
3436 D3
3437 B10
3438 B10
3439 B8
3440 B8
3441 B7
3442 B7
3443 B7
3444 D4
3445 B7
3446 C10
3447 B7
3448 C10
3449 B7
3450 D4
3451 F3
3452 E4
3453 E4
3454 C8
3455 C7
3456 C8
3457 E5
3458 D4
3459 C7
3460 D5
3461 C8
3462 C8
3463 E5
3464 C8
3465 E5
3466 E11
3467 C10
3468 C8
3469 C8
3470 D8
3471 D8
3472 D8
3473 D7
3474 D7
3475 D6
3476 E6
3477 E6
3478 C8
3479 C8
3480 D7
3481 D7
3482 D7
3483 D7
3484 E7
3485 E7
3486 E6
3487 E10
3488 D10
3489 A8
3490 D7
3491 E8
3492 A8
3493 A8
3494 D8
3495 E9
3496 E9
3497 D8
3498 D9
3499 E7
3501 D4
3502 E7
3503 E7
3504 E7
3505 B10
3506 B11
3507 B11
3508 B10
3509 B10
3510 D4
3511 D4
3512 D4
3513 C4
3514 D8
3515 B4
3516 B4
3517 B4
3518 B4
3519 B5
3520 B5
3521 D5
3522 D5
3523 D5
3524 D5
3525 D4
3526 D8
3527 D8
3528 D8
3529 C9
3530 C9
3531 C8
3532 C9
3533 D4
3534 D4
3535 C8
3536 C9
3537 F9
3538 F9
3539 F8
3540 F8
3541 F8
3542 C3
3543 C4
3544 C3
3545 C4
3546 F3
3547 E3
3548 B11
3549 B10
3550 B10
3551 B3
3552 B4
3553 B4
3554 C8
3555 B8
3557 D8
3558 E8
3559 E9
3560 B2
4001 B9
4400 F6
4401 C3
4402 B3
4403 C8
4404 D8
4405 C4
4406 D4
6411 E10
6412 D3
7402 F4
7403 E3
7404 F4
7405 E3
7406 C6
7407 D11
7408 A8
7409 D9
7410 B11
7411 B10
7412 C3
7413 B3
7414 C8
7415 D8
7416 C4
7417 D3

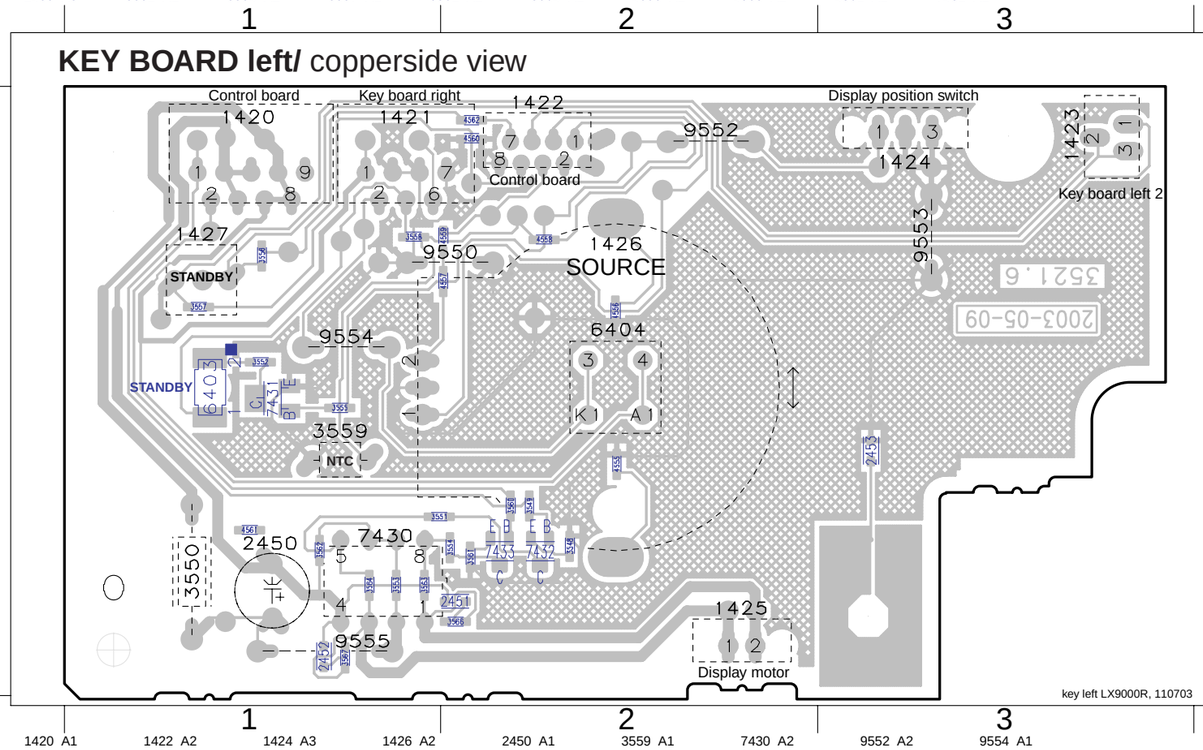
CONTROL BOARD/ copperside view

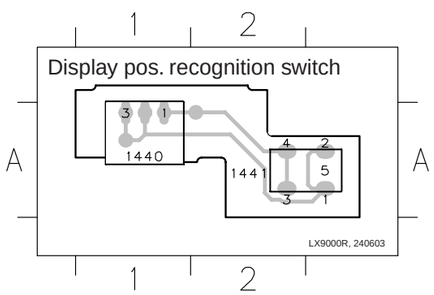


control board LX9000R, 280603

1401 B1
1402 B1
1403 A6
1404 B5
1405 E8
1406 F7
1407 E6
1408 C11
1409 E7
2400 D3
2401 A7
2409 D10
2410 E4
2413 D8
2417 E4
2418 A10
2419 A11
2420 D3
3413 F10
3556 F10
5401 B8
5402 F10
6410 E9

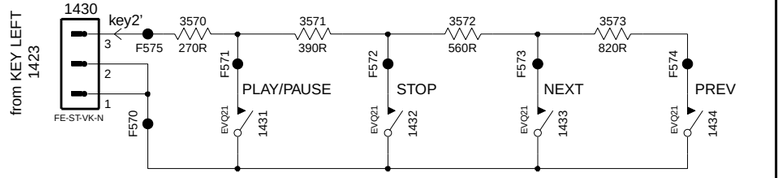

KEY BOARD Left
DISPLAY position detect
1441
1440
DISPLAY MOTOR
BACKLIGHT ROTARY ENCODER SOURCE
ROTARY ENCODER SOURCE
SRGPWJ0500
STANDBY
LST770
6403
7431 BC847B
NTC
SENSOR AMBIENT TEMP.
7430-A TCA0372
7430-B TCA0372
BC847CW
7433
7432
STANDBY/ON
EVQ21
to Key LEFT2 1430
from FRONT/CONTROL 1403
to CHASSIS
from Key RIGHT 1415
from FRONT/CONTROL 1404
EVM ...V DC voltages measured with display closed (no movement)
.../...V on/off (* means "floating, not defined")
LX9000R key left, 110703


KEY BOARD left/ copperside view
Control board
Key board right
Control board
Display position switch
Key board left 2
STANDBY
SOURCE
NTC
Display motor
key left LX9000R, 110703


Display pos. recognition switch
1440
1441
LX9000R, 240603

1430 A1 1431 A2 1432 A3 1433 A3 1434 A4 3570 A2 3571 A2 3572 A3 3573 A4 F570 A1 F571 A2 F572 A3 F573 A3 F574 A4 F575 A2

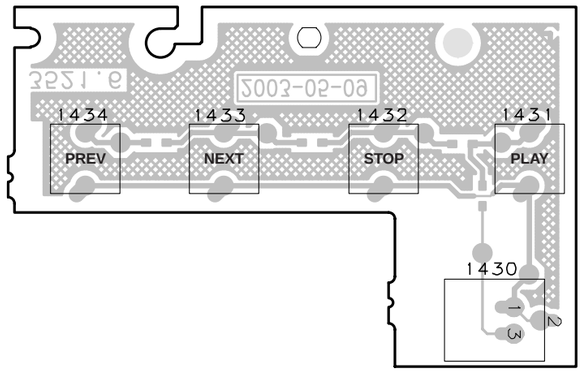
KEY BOARD left2



key left 2 LX9000R, 010703

1430 A1
1431 B1
1432 B2
1433 B3
1434 B3

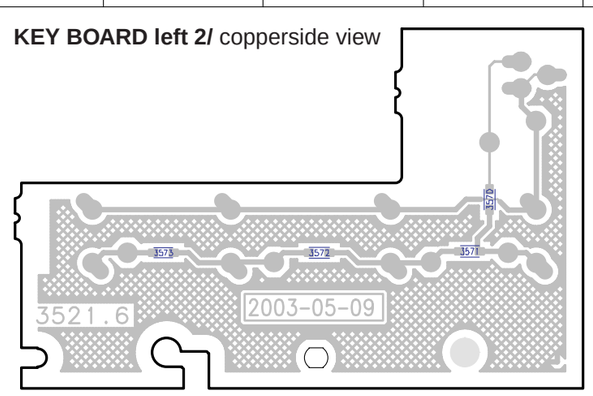
KEY BOARD left 2/ componentside view



key bord left 2 LX9000R, 100703

3570 A3
3571 B3
3572 B2
3573 B1

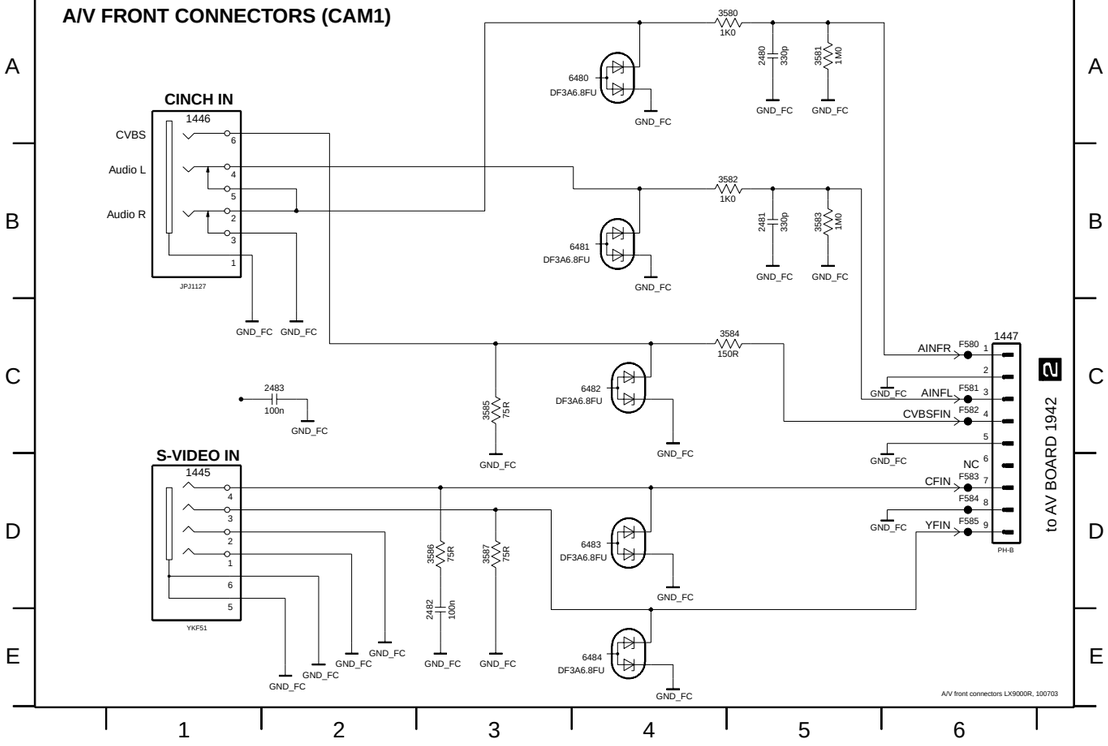
KEY BOARD left 2/ copperside view



key bord left 2 LX9000R, 100703

1445 D1 1446 A1 1447 C6 2480 A5 2481 B5 2482 E3 2483 C2 3580 A5 3581 A5 3582 B5 3583 B5 3584 C5 3585 C3 3586 D3 3587 D3 6480 A4 6481 B4 6482 C4 6483 D4 6484 E4 F580 C6 F581 C6 F582 C6 F583 D6 F584 D6 F585 D6

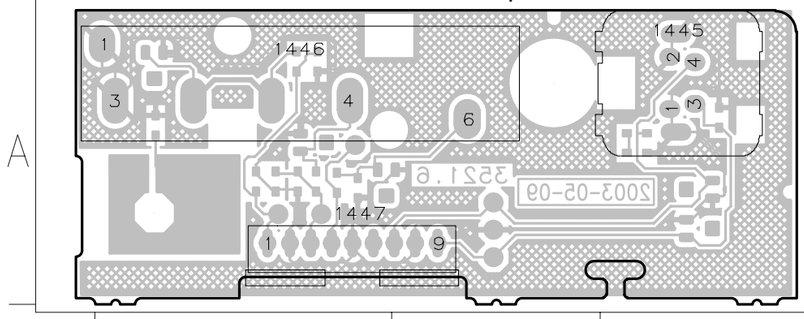
A/V FRONT CONNECTORS (CAM1)



A/V front connectors LX9000R, 100703

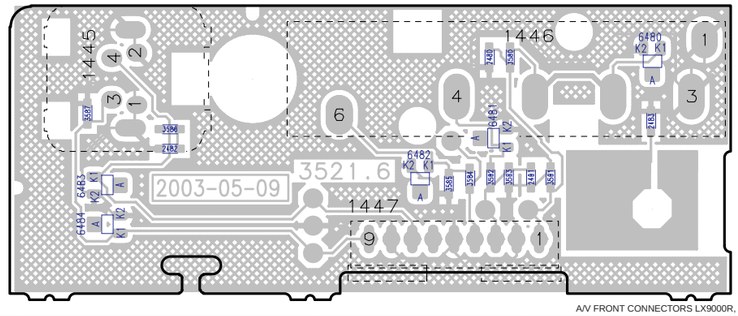
1445 A3
1446 A1
1447 A1

A/V FRONT CONNECTORS/ componentside view



2480 A2
2481 A3
2482 A1
2483 A3
3580 A2
3581 A3
3582 A2
3583 A2
3584 A2
3585 A2
3586 A1
3587 A1
6480 A3
6481 A3
6482 A2
6483 A1
6484 A1

A/V FRONT CONNECTORS/ copperside view



A/V FRONT CONNECTORS LX9000R, 110703

1445 A1
1446 A3
1447 A2

1411 D2 1412 D1 1413 D1 | 1414 E5 1415 E2 1416 A7 | 1417 A5 1418 C8 2430 B3 | 2431 C3 2432 C6 2433 B6 | 2434 B6 2435 B7 2436 D4 | 2437 D4 2438 C6 3520 B2 | 3521 B4 3522 B2 3523 B4 | 3524 B4 3525 C1 3526 C2 | 3527 C3 3528 D1 3529 B1 | 3530 C2 3533 B6 4321 D7 | 4322 D8 4323 B6 5430 B6 | 5431 A6 5432 A6 6401 A2 | 6402 C7 6420 B1 7401 B4 | 7420 B2 7421 C1 F530 C1 | F531 C1 F532 C2 F533 E2 | F534 E2 F535 E2 F536 E2 | F537 E3 F538 E3 F539 E3 | F540 E5 F541 E5 F542 E5 | F543 E5 F544 E5 F545 E5 | F546 E5 F547 E5 F548 E6 | F549 E6 F550 E6 F551 E6 | F552 E6 F553 B4

KEY BOARD right

RECORD LST770 6401 — 3520 180R — */0V — 7420 BC847B — 3522 10K LED_REC — 0/0,7V

INSTANT LST770 6420 — 3529 180R — */0V — 7421 BC847B — **3530 10K** LED_InstRec — 0/0,7V

INFRARED EYE 7401 TSOP4836YA1: VS 5V, OUT 5V, GND — 3521 100R — F553 — 2430 47u 35V — 3523 10K — 2431 2n2 — RC6 — 3524 1K0

3525 390R — 3526 270R — 3527 220R — Key1

F530 EVQ21 **OPEN/CLOSE** 1413 — F531 EVQ21 **Surround** 1412 — F532 EVQ21 **RECORD** 1411 — 3528 150R — GNDK1

2436 * 100n — 2437 * 100n

to from ASP BOARD 1611 **1**

1417 FFC: 1 HP_L 5432 2u2 — 2 GND 5431 — 3 HP_R 5430 2u2 — 4 HP_DET 2u2 — 4323 *

HEADPHONE 1416 LGM1619-0200: 8 7 2 3 1

3533 10K — 2432 100p — 2433 22n — 2434 22n — 2435 22n — C-PAD — 2438 1n0 — HP_DET

BACKLIGHT ROTARY ENCODER VOLUME — +12V_AM — LTL912TWKS 6402

ROTARY ENCODER VOLUME 1418 SRGP: B A C — 4321 4322

HP_DET — LED_REC — RC6 — Key1 — LED_InstRec — BL_ROT_V — BL_ROT_S — RotaryVA — RotaryVB — GNDK1

1415 FE-ST-VK-N: F533 D — F534 +5V 5V — F535 D — F536 +5V_stby — F537 D — F538 BL_ROT_S 9V — F539 +12V_AM

to Key LEFT 1421

1414 FE-ST-VK-N: F540 3,9/0V — F541 9V — F542 9V — F543 4,6/0V — F544 5V — F545 4,8V — F546 4,8V — F547 — F548 4,9V — F549 — F550 5V — F551 5V — F552 4,6/0V

from Front CONTROL 1407

V EVM ...V DC voltages measured with display closed (no movement)
.../...V on/off (a * means "floating, not defined")

* for provision only

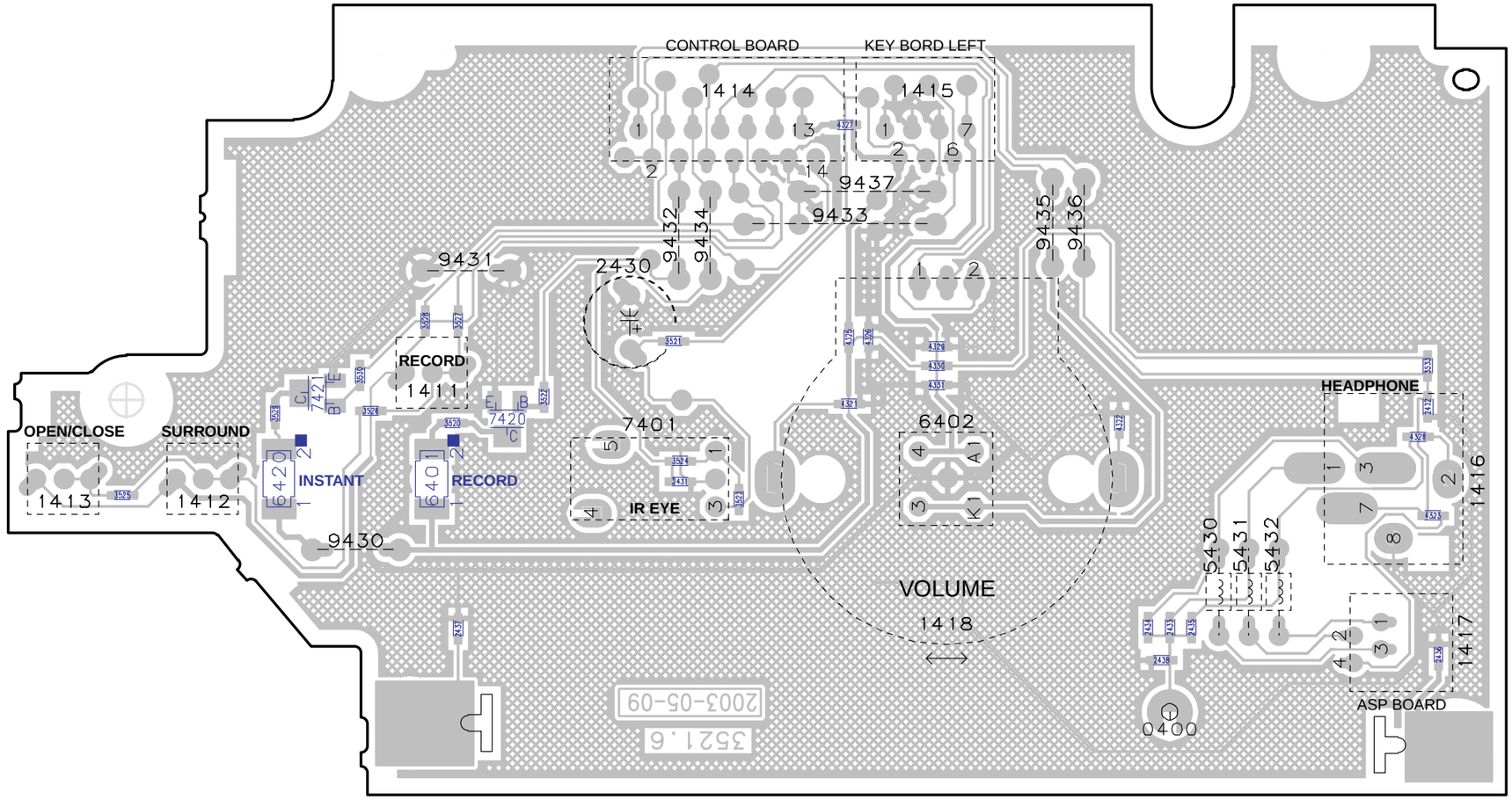
LX9000R Key Right, 130603

2431 B2
2432 B4
2433 B4
2434 B3
2435 B4
2436 B4
2437 B2
2438 B4
3520 B2
3521 A2
3522 B2
3523 B2
3524 B2
3525 B1
3526 B1
3527 A2
3528 A2
3529 B1
3530 A1
3533 A4
4321 B3
4322 B3
4323 B4
4325 A3
4326 A3
4327 A3
4328 B4
4329 A3
4330 A3
4331 A3
6401 B2
6420 B1
7420 B2
7421 B1

1 2 3 4

A B

KEY BOARD right/ coperside view

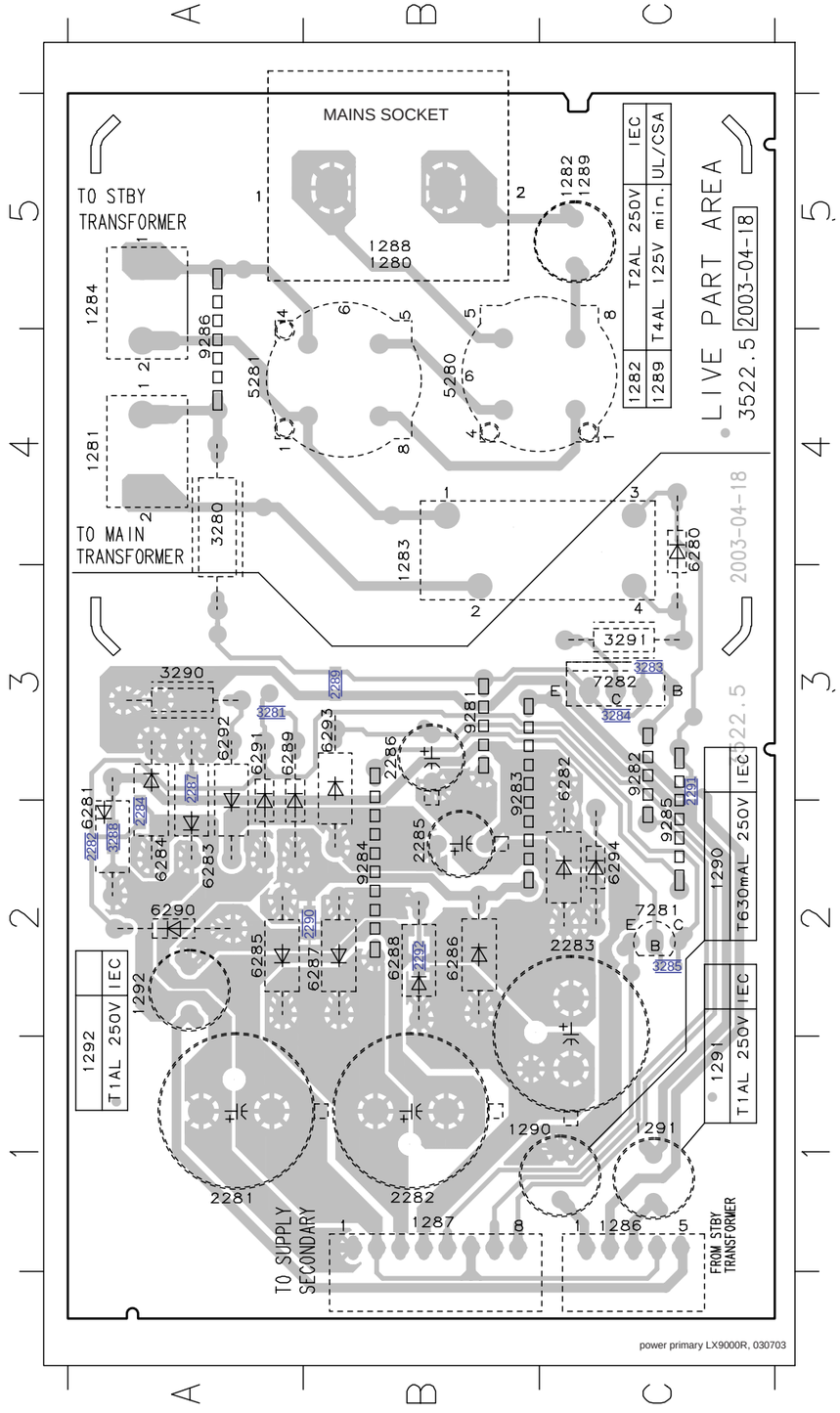


key right LX9000R, 010703

1 2 3 4

0400 B4
1411 B2
1412 B1
1413 B1
1414 A2
1415 A3
1416 B4
1417 B4
1418 B3
2430 A2
5430 B4
5431 B4
5432 B4
6402 B3
7401 B2
9430 B1
9431 A2
9432 A2
9433 A3
9434 A2
9435 A3
9436 A3
9437 A3

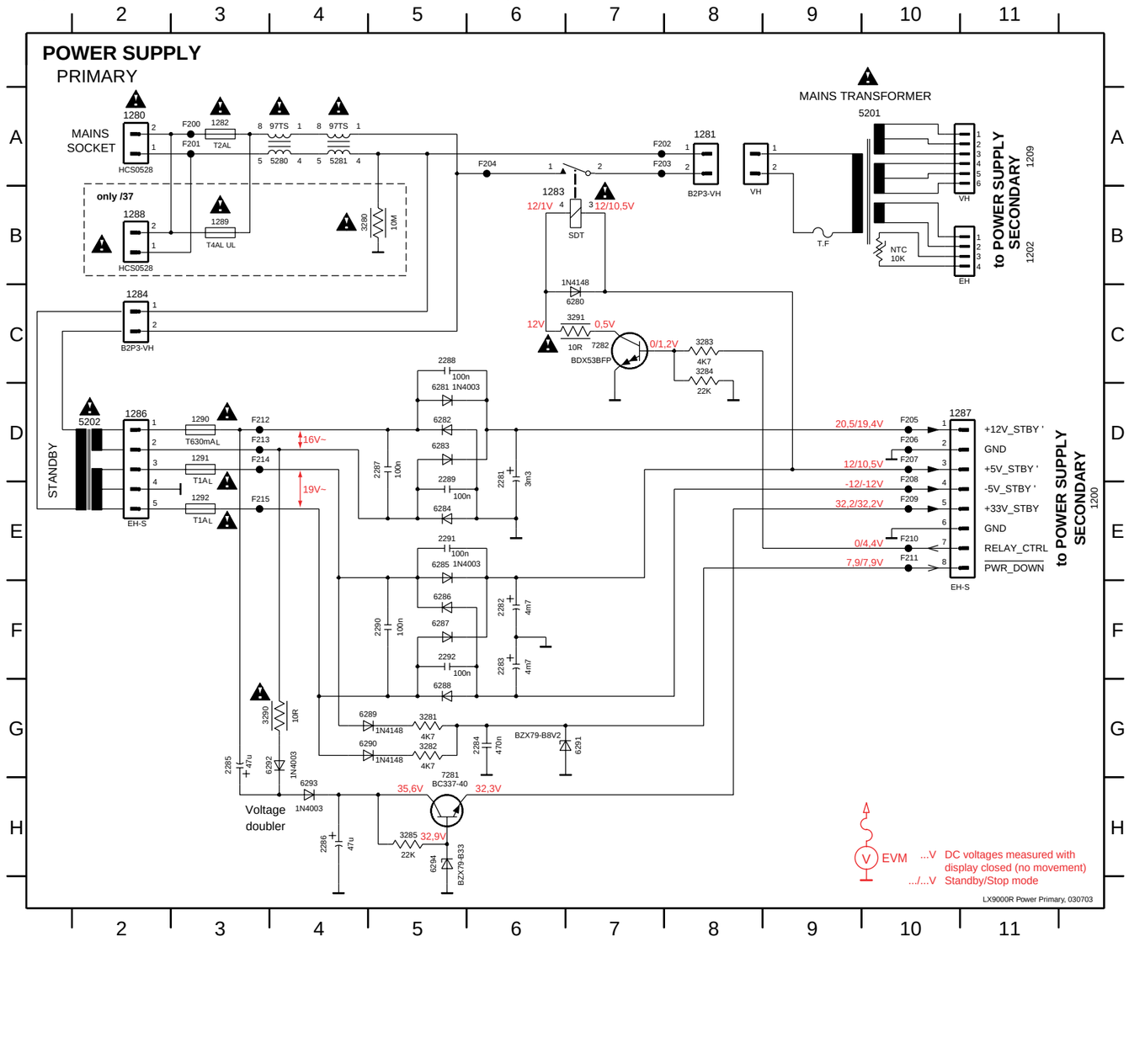
POWER SUPPLY primary BOARD/ copperside view



2284 A2
2287 A3
2288 A2
2289 B3
2290 B2
2291 C3
2292 B2
3281 A3
3282 A2
3283 C3
3284 C3
3285 C2

1280 B5
1281 A4
1282 B5
1283 B4
1284 A5
1286 C1
1287 B1
1288 B5
1289 B5
1290 B1
1291 C1
1292 A2
2281 A1
2282 B1
2283 B2
2285 B2
2286 B3
3280 A4
3290 A3
3291 C3
5280 B4
5281 B4
6280 C4
6281 A2
6282 C2
6283 A2
6284 A2
6285 A2
6286 B2
6287 B2
6288 B2
6289 B2
6290 A2
6291 A2
6292 A2
6293 B3
6294 C2
7281 C2
7282 C3
9281 B3
9282 C3
9283 B3
9284 B2
9285 C2
9286 A4

1280 A2 1287 D11 2281 D6 2287 D5 3280 B4 3290 G3 6280 C7 6286 F5 6292 G4 F201 A3 F207 D11 F213 D3
1281 A8 1288 B2 2282 F6 2288 C5 3281 G5 3291 C7 6281 D5 6287 F5 6293 H4 F202 A8 F208 D11 F214 D3
1282 A3 1289 B3 2283 F6 2289 D5 3282 G5 5201 A10 6282 D5 6288 G5 6294 H5 F203 A8 F209 E11 F215 E3
1283 B6 1290 D3 2284 G6 2290 F5 3283 C8 5202 D1 6283 D5 6289 G4 7281 G5 F204 A6 F210 E11
1284 C2 1291 D3 2285 G3 2291 E5 3284 C8 5280 A4 6284 E5 6290 G4 7282 C7 F205 D11 F211 E11
1286 D2 1292 E3 2286 H4 2292 F5 5281 A4 6285 E5 6291 G7 F200 A3 F206 D11 F212 D3



POWER SUPPLY/ SECONDARY

from MAIN TRANSFORMER

from POWERSUPPLY PRIMARY

to ASP BOARD 1623 **1**

to ASP BOARD 1622 **1**

to POWER AMPLIFIER BOARD 1309

to DIGITAL BOARD **9** 1900

to DVD module

to DVD module

to DVD module

provision for AV3 module only

TEMP. SENSOR POWER SUPPLY SECONDARY

OVERVOLTAGE PROTECTION

OVERCURRENT PROTECTION

VOLTAGE LIMITER

FAN CONTROL

all voltages measured in service mode / fan level 1

...V DC voltages measured in STOP mode. 230V mains supply

power supply secondary LX9000R, 030703

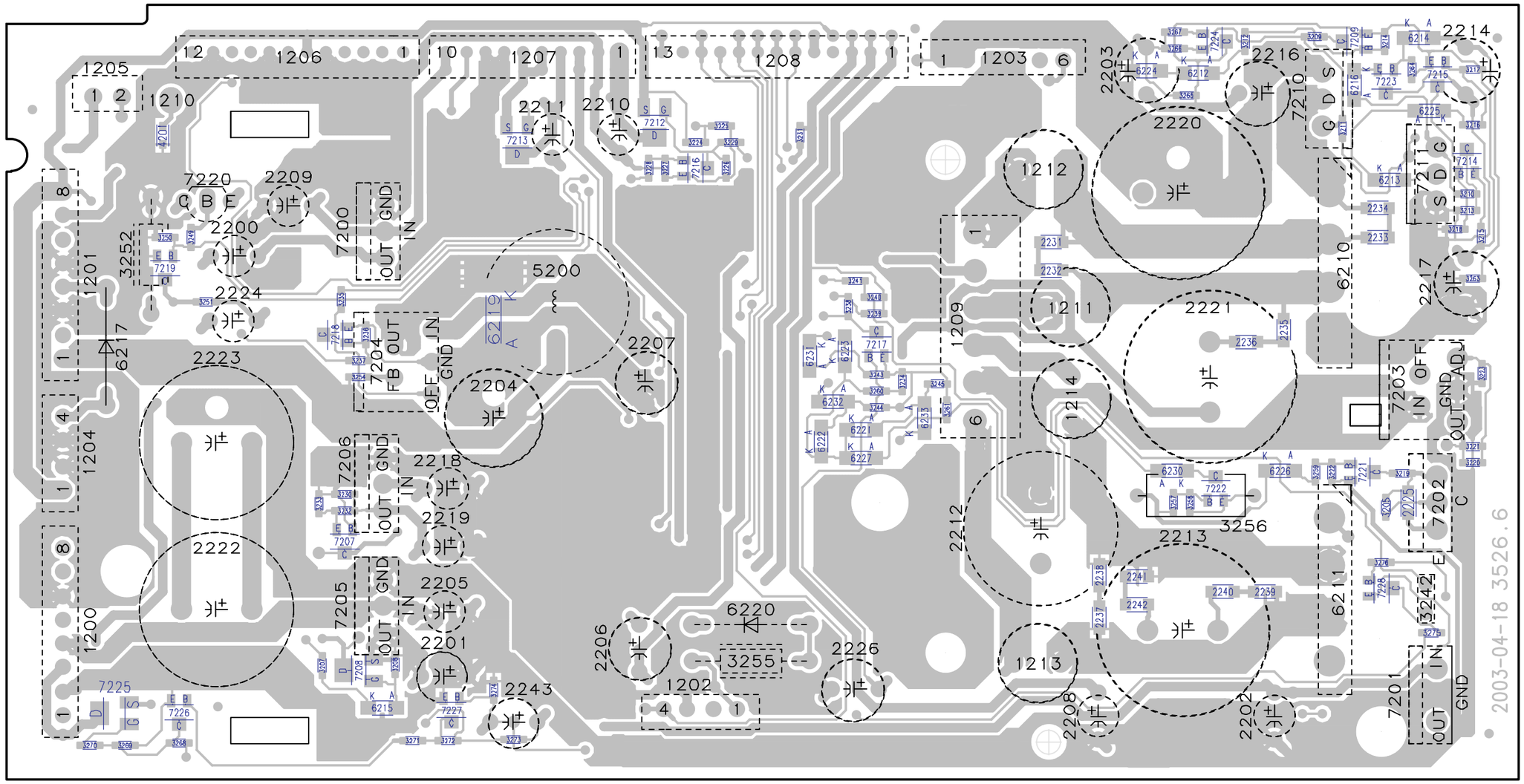
1200 B2 6233 E15
1201 F19 7200 A7
1202 D2 7201 B8
1203 B18 7202 J5
1204 H19 7203 L5
1205 L19 7204 J13
1206 C19 7205 C6
1207 B15 7206 I9
1208 B10 7207 F11
1209 F2 7208 C8
1210 M12 7209 G6
1211 G3 7210 G4
1212 E3 7211 H5
1213 J3 7212 K8
1214 K3 7213 M8
2200 A7 7214 H6
2201 C7 7215 H8
2202 B7 7216 K8
2203 F6 7217 F12
2204 J15 7218 L12
2205 C6 7219 M17
2206 E4 7220 M19
2207 J12 7221 L5
2208 B8 7222 K6
2209 A8 7223 I5
2210 L7 7224 E5
2211 M8 7225 A4
2212 M3 7226 B4
2213 K4 7227 B5
2214 I4 7228 B6
2216 G4 F300 B10
2217 H4 F301 B10
2218 J8 F302 B10
2219 J9 F303 K10
2220 G10 F304 B11
2221 G10 F305 B11
2222 M4 F306 B11
2223 M4 F307 B11
2224 L18 F308 B11
2225 K5 F309 B12
2226 F13 F310 B12
2231 F3 F311 B12
2232 F3 F312 B15
2233 F4 F313 B15
2234 F4 F314 B16
2235 G3 F315 B16
2236 G3 F316 B17
2237 J3 F317 B17
2238 K3 F318 B18
2239 J4 F319 B18
2240 J4 F320 B19
2241 K4 F321 B16
2242 K4 F322 G18
2243 B5 F323 B3
3205 K5 F324 C3
3207 D9 F325 B7
3208 D7 F326 C2
3209 G5 F327 G2
3210 H6 F328 F2
3211 E5 F329 E2
3212 G6 F330 I3
3213 H4 F331 K2
3214 G7 F332 L3
3215 H7 F333 D3
3216 H8 F334 E3
3217 G8 F335 C3
3218 H6 F336 F4
3219 L5 F337 H4
3220 M6 F338 K4
3221 M7 F339 E4
3222 L6 F340 L19
3223 M7 F341 C3
3224 M9 F342 B5
3225 M8
3226 L8
3227 L9
3228 K9
3229 K9
3230 J10
3231 K9
3232 G11
3233 G12
3234 F13
3235 K12
3236 L12
3237 L12
3238 D4
3239 D4
3240 C13
3241 C13
3242 C13
3243 G16
3244 G15
3245 G15
3249 L17
3250 M17
3251 L17
3252 M17
3254 K14
3255 E3
3256 K6
3257 K6
3258 K6
3259 K7
3260 F14
3261 G16
3263 I4
3264 I5
3266 E6
3267 E6
3268 B3
3269 B3
3270 B4
3271 B4
3272 A5
3273 A5
3274 B5
3275 B6
3276 B7
4201 M13
5200 J14
6210 G4
6211 K4
6212 G6
6213 I9
6214 I4
6215 D8
6216 H5
6217 M9
6219 K14
6220 E4
6221 F15
6222 F15
6223 F15
6224 G5
6225 H9
6226 K7
6227 F15
6230 E16
6231 E16
6232 E15

2225 C8	2236 B7	2242 D6	3211 A8	3217 A8	3223 B8	3229 A4	3235 B2	3241 B5	3251 B2	3261 C5	3268 D1	3274 D3	6214 A8	6223 B5	6231 B5	7212 A4	7218 B2	7225 D1
2231 B6	2237 D6	3205 C8	3212 A7	3218 B8	3224 A4	3230 C2	3236 B2	3243 B5	3254 B2	3263 B8	3269 D1	3275 D8	6215 D2	6224 A7	6232 B5	7213 A3	7219 B1	7226 D1
2232 B6	2238 C6	3207 D2	3213 A8	3219 C8	3225 A4	3231 A5	3237 B2	3244 C5	3257 C7	3264 A8	3270 D1	3276 C8	6216 A8	6225 A8	6233 C5	7214 A8	7221 C8	7227 D3
2233 B8	2239 C7	3208 D3	3214 A8	3220 C8	3226 A4	3232 C2	3238 B5	3245 B5	3258 C7	3265 A7	3271 D3	4201 A1	6219 B3	6226 C7	7207 C2	7215 A8	7222 C7	7228 C8
2234 A8	2240 C7	3209 A7	3215 B8	3221 C8	3227 A4	3233 C2	3239 B5	3249 B1	3259 C7	3266 A7	3272 D3	6212 A7	6221 C5	6227 C5	7208 D2	7216 A4	7223 A8	
2235 B7	2241 C6	3210 A8	3216 A8	3222 C8	3228 A4	3234 B5	3240 B5	3250 B1	3260 B5	3267 A7	3273 D3	6213 A8	6222 C5	6230 C7	7209 A8	7217 B5	7224 A7	

1 2 3 4 5 6 7 8

A B C D

POWER SUPPLY secondary/ copperside view



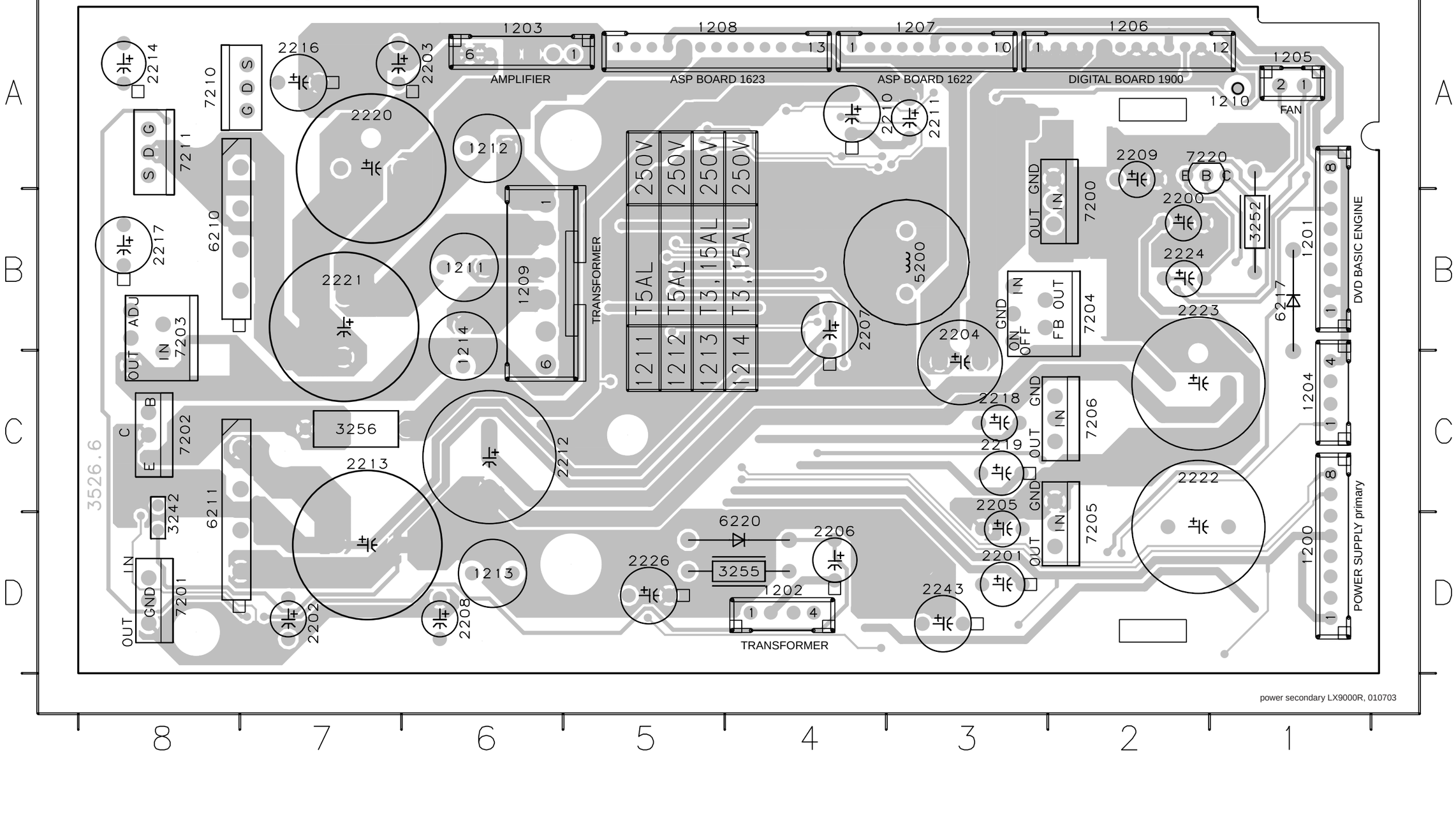
power secondary LX9000R, 240603

1 2 3 4 5 6 7 8

1200 D1	1203 A6	1206 A2	1209 B5	1212 A6	2200 B2	2203 A6	2206 D4	2209 A2	2212 C6	2216 A7	2219 C3	2222 C2	2226 D5	3252 B1	5200 B3	6217 B1	7201 D8	7204 B3	7210 A8
1201 B1	1204 C1	1207 A3	1210 A1	1213 D6	2201 D3	2204 B3	2207 B4	2210 A3	2213 C7	2217 B8	2220 A7	2223 B2	2243 D3	3255 D4	6210 B8	6220 D4	7202 C8	7205 D2	7211 A8
1202 D4	1205 A1	1208 A5	1211 B6	1214 B6	2202 D7	2205 C3	2208 D6	2211 A3	2214 A8	2218 C3	2221 B6	2224 B2	3242 D8	3256 C7	6211 C8	7200 B2	7203 B8	7206 C2	7220 A2

1200 D1 1201 B1 1202 D4 1203 A6 1204 C1 1205 A1 1206 A2 1207 A3 1208 A5 1209 B5 1210 A1 1211 B6 1212 A6 1213 D6 1214 B6 2200 B2 2201 D3 2202 D7 2203 A6 2204 B3 2205 C3 2206 D4 2207 B4 2208 D6 2209 A2 2210 A3 2211 A3 2212 C6 2213 C7 2214 A8 2216 A7 2217 B8 2218 C3 2219 C3 2220 A7 2221 B6 2222 C2 2223 B2 2224 B2 2226 D5 2243 D3 3242 D8 3252 B1 3255 D4 3256 C7 5200 B3 6210 B8 6211 C8 6217 B1 6220 D4 7200 B2 7201 D8 7202 C8 7203 B8 7204 B3 7205 D2 7206 C2 7210 A8 7211 A8 7220 A2

POWER SUPPLY secondary/ componentside view



AUXILIARY BOARD

SOURCE SELECTOR

LOGIC

SOURCE	AFMUX2	AFMUX1
LINE IN2	0	0
LINE IN1	0	1
ANALOG IN2	1	0
ANALOG IN1	1	1

LINE IN 1 — 1901-1 LPR6520-A530 — F901 F900 F902 — 3903 1K0 — 3902 1K0 — 2902 470p — 3904 470K — 2903 470p — 3905 470K — 3926 10R — 2926 10n — GND_A

LINE IN 2 — 1901-2 LPR6520-A530 — F904 F903 F905 — 3909 1K0 — 3908 1K0 — 2905 470p — 3910 470K — 2906 470p — 3912 470K — 3927 10R — 2927 10n — GND_A

from AV Board — Scart 1 1953 — 1904 EH-S — AIN2L F906 F907 — AIN2R F908 — 3916 1K0 — 3914 1K0 — 2908 470p — 3917 470K — 2909 470p — 3918 470K — 4902 — 4903 — D

Scart2 1950 — 1905 EH-S — AIN1L F909 F910 — AIN1R F911 — 3920 1K0 — 3919 1K0 — 2911 470p — 3921 470K — 2912 470p — 3922 470K

from MDM Board DIG OUT (coax) — 1907 EH-B — GND SPDIF GND GND GND GND — 0V — 0,1V — D

AF_MUX2 — AF_MUX1 — +5VA — 3915 100R — 2910 100n — GND_A — 5V — 7901 HEF4052B — VDD — 4X 0 3 — G4

MDX — LINE IN2 L — LINE IN1 L — ANALOG IN2 L — ANALOG IN1 L — LINE IN2 R — LINE IN1 R — ANALOG IN2 R — ANALOG IN1 R — 0V — 13 0V — 3 0V — VEE_VSS — 7 8 — -5V — GND_A

-5V_STBY — 3901 100R — 2901 100n — GND_A

3906 220R — 3907 470K — 2904 100p — 3911 220R — 3913 470K — 2907 100p — GND_A

-5V_STBY — -5V F912 — AF_MUX1 F913 — AF_MUX2 F914 — to 7901 — +5VA 5V F915 — HP_A — F916 MUX_LEFT — F917 MUX_RIGHT — F918 LINE_LEFT — F919 LINE_RIGHT — 1903 15FE-BT-VK-N — GND_A

3923 470R — 2913 470p — 2914 470p — 3924 470R — GND_A

1901-3 LPR6520-A530 — F921 F920 F922 — LINE OUT — 4908 — 2928 * 10n — GND_A

1901-4 GROUND LPR6520-A530 — 11 10 — F927 2917 10n — F923 2916 10n — GND_A

2915 * 100n — 4901 * — C-PAD 0900 — 9901 — F924 F925 F926 — GND_A D HP_A

2918 100p — D — 2919 100p — 1902 YKC21-3416 — DIGITAL OUT coax

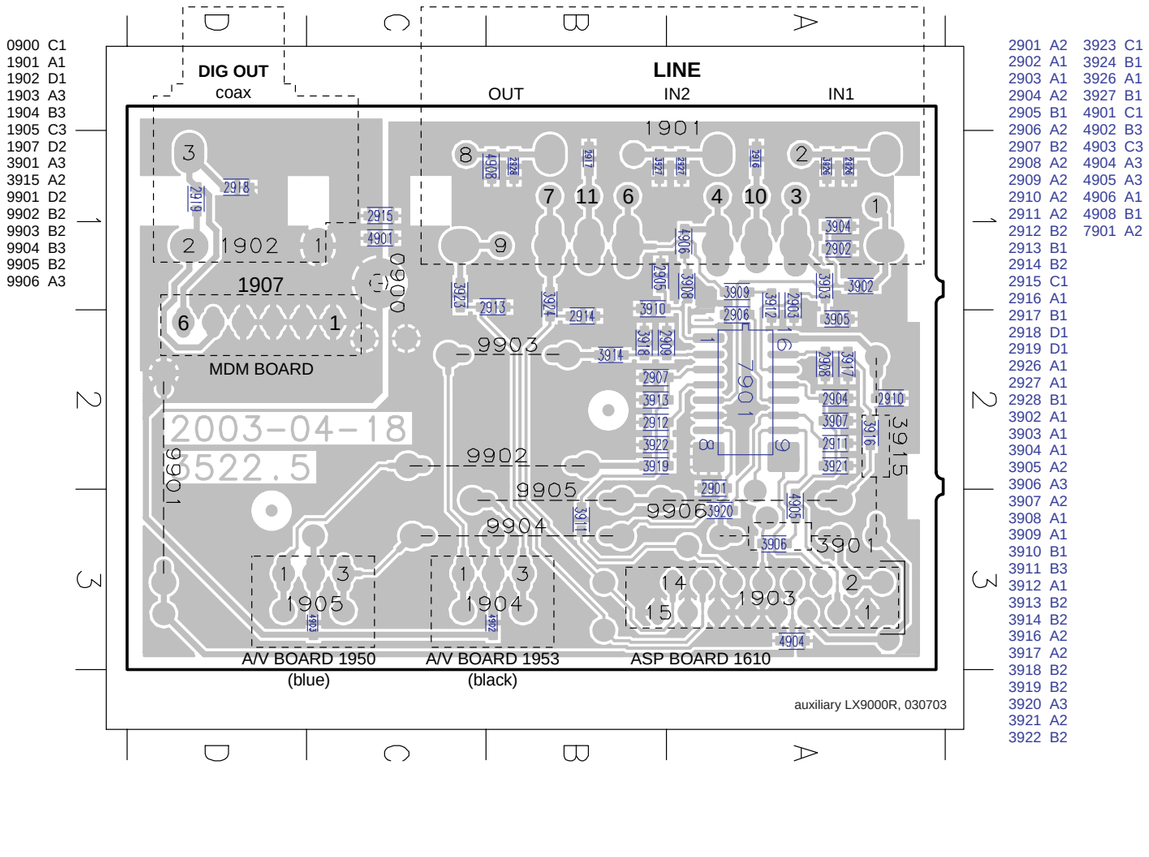
to / from ASP Board 1610 **1**

* ... provisional

Auxiliary board LX9000R, 070703

0900 E5	F911 E2	3907 B6
1901-1 A2	F912 B8	3908 C2
1901-2 B2	F913 B8	3909 B3
1901-3 C8	F914 B8	3910 C3
1901-4 D8	F915 B8	3911 C7
1902 F8	F916 B8	3912 C3
1903 B9	F917 C8	3913 C6
1904 C2	F918 C8	3914 D2
1905 D2	F919 C8	3915 A5
1907 E2	F920 D8	3916 C2
2901 C6	F921 D8	3917 D3
2902 A3	F922 D8	3918 D3
2903 A3	F923 E8	3919 E2
2904 B7	F924 E4	3920 D2
2905 C3	F925 E5	3921 E3
2906 C3	F926 E6	3922 E3
2907 C7	F927 E8	3923 C7
2908 D3		3924 C8
2909 D3		3926 B2
2910 A6		3927 C2
2911 E3		4901 E4
2912 E3		4902 D2
2913 C7		4903 D2
2914 C8		4908 D8
2915 E4		7901 A5
2916 E8		9901 E5
2917 E8		F900 A2
2918 E8		F901 A2
2919 F8		F902 A2
2926 B2		F903 C2
2927 C2		F904 B2
2928 D8		F905 C2
3901 C5		F906 C2
3902 A2		F907 C2
3903 A3		F908 D2
3904 A3		F909 D2
3905 A3		F910 D2
3906 B7		

AUXILIARY BOARD/ copperside view



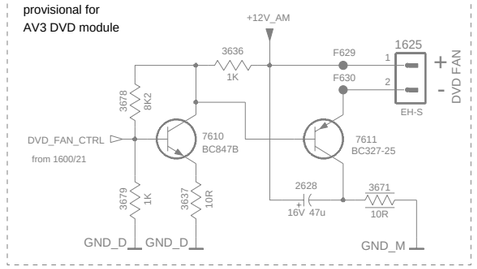
0900 C1
1901 A1
1902 D1
1903 A3
1904 B3
1905 C3
1907 D2
3901 A3
3915 A2
9901 D2
9902 B2
9903 B2
9904 B3
9905 B2
9906 A3

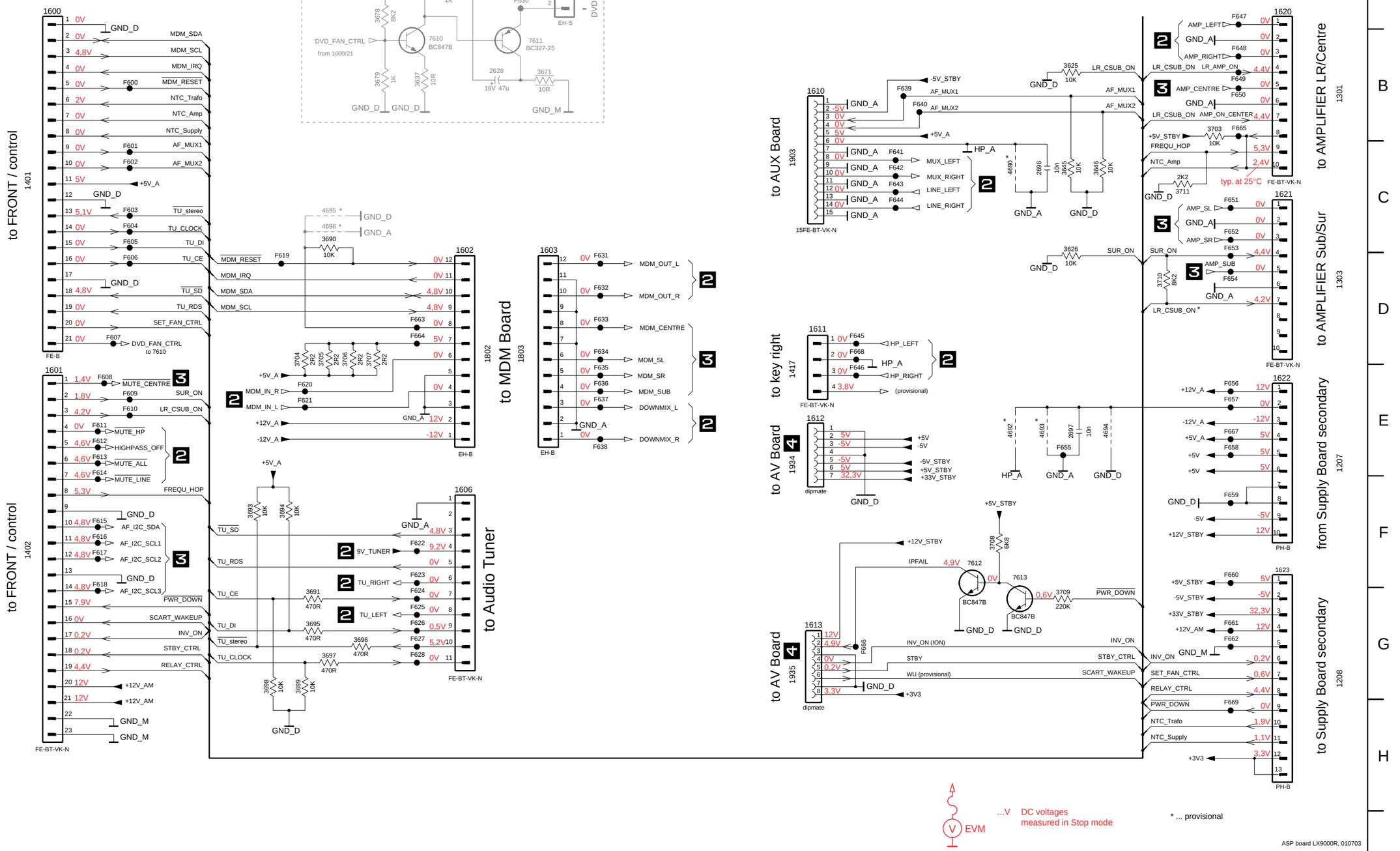
2901 A2
2902 A1
2903 A1
2904 A2
2905 B1
2906 A2
2907 B2
2908 A2
2909 A2
2910 A2
2911 A2
2912 B2
2913 B1
2914 B2
2915 C1
2916 A1
2917 B1
2918 D1
2919 D1
2926 A1
2927 A1
2928 B1
3902 A1
3903 A1
3904 A1
3905 A2
3906 A3
3907 A2
3908 A1
3909 A1
3910 B1
3911 B3
3912 A1
3913 B2
3914 B2
3916 A2
3917 A2
3918 B2
3919 B2
3920 A3
3921 A2
3922 B2
3923 C1
3924 B1
3926 A1
3927 B1
4901 C1
4902 B3
4903 C3
4904 A3
4905 A3
4906 A1
4908 B1
7901 A2

1 ASP BOARD

DVD Fan Control

provisional for
AV3 DVD module





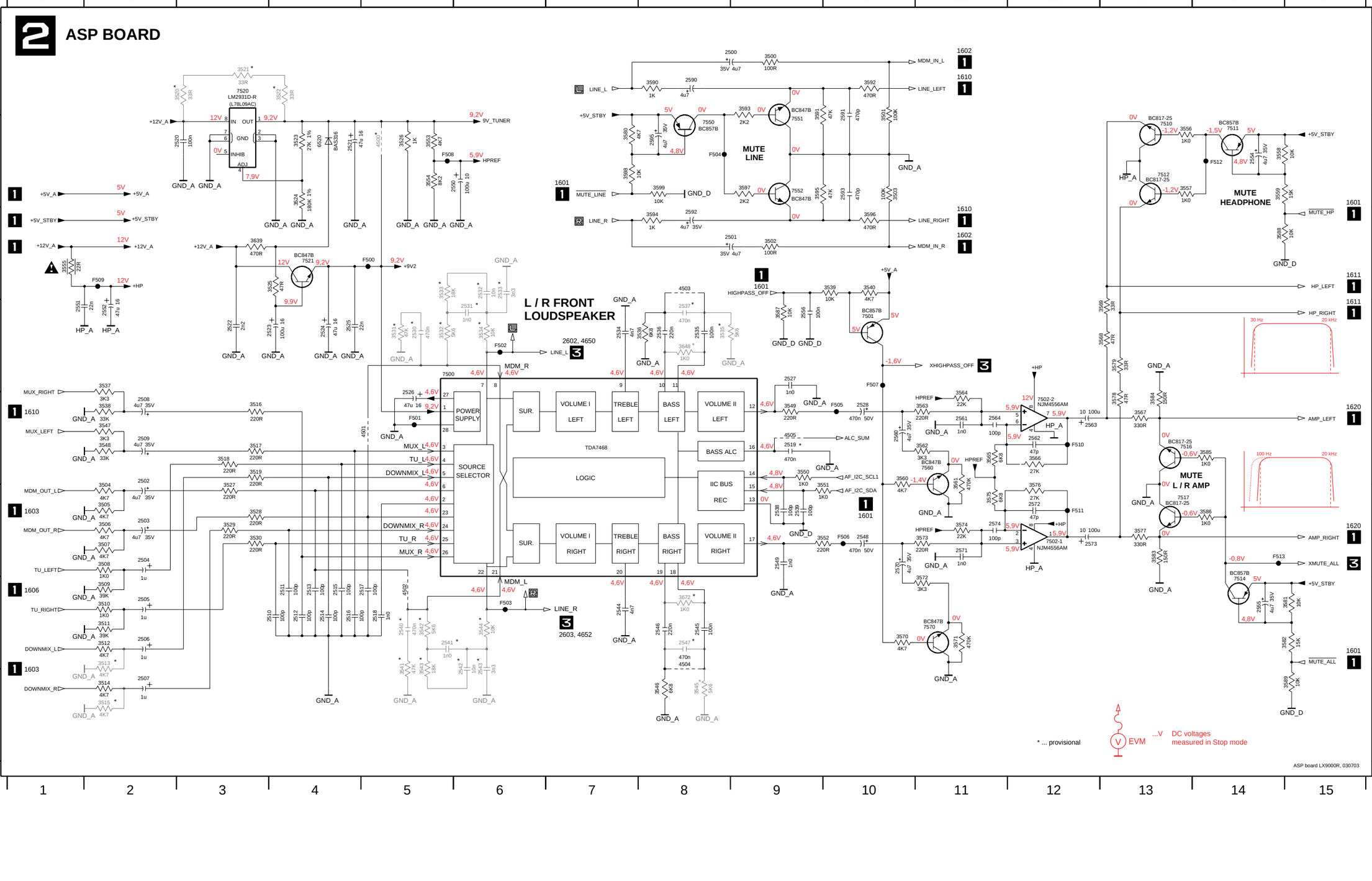
EVM ...V DC voltages measured in Stop mode

* ... provisional

ASP board LX9000R, 010703

2500 A9 2501 C9 2502 E2 2503 F2 2504 F2 2505 G2 2506 G2 2507 H2
2508 E2 2509 E2 2510 G4 2511 G4 2512 G4 2513 G4 2514 G4 2515 G4
2516 G4 2517 G5 2518 G5 2519 E9 2520 B3 2521 B4 2522 D3 2523 D4
2524 D4 2525 D4 2526 E5 2527 D9 2528 E10 2530 D5 2531 D6 2532 C6
2533 C6 2534 D7 2535 D8 2536 D8 2537 D8 2538 F9 2539 F9 2540 G5
2541 G5 2542 G6 2543 G6 2544 G7 2545 G8 2546 G8 2547 G8 2548 F10
2549 F9 2550 B6 2551 D1 2552 D2 2554 B14 2555 G14 2556 D9 2560 E10
2561 E11 2562 E12 2563 E12 2564 E11 2570 F10 2571 F11 2572 F12 2573 F12
2574 F11 2590 A8 2591 A10 2592 C8 2593 B10 2595 B8 3500 A9 3501 A10
3502 C9 3503 B10 3504 F2 3506 F2 3507 F2 3508 F2 3509 G2 3510 G2
3511 G2 3512 G2 3513 G2 3514 H2 3515 H2 3516 E3 3517 E3 3518 E3
3519 E3 3520 A3 3521 A3 3522 A4 3523 B4 3524 B4 3525 C4 3526 B5
3527 F3 3528 F3 3529 F3 3530 F3 3531 D5 3532 D5 3533 C5 3534 D6
3535 D8 3536 D7 3537 D2 3538 E2 3539 C10 3540 C10 3541 G5 3542 G5
3543 G5 3544 G6 3545 H8 3546 H8 3547 E2 3548 E2 3549 E9 3550 E9
3551 F10 3552 F10 3553 B5 3554 B5 3555 C1 3556 B13 3557 B13 3558 B14
3559 B14 3560 E10 3561 E11 3562 E11 3563 E11 3564 E11 3565 E11
3566 E12 3567 E13 3568 D13 3569 D13 3570 G10 3571 G11 3572 G11
3573 F11 3574 F11 3575 F12 3576 F12 3577 F13 3578 E13 3579 E13
3580 B7 3581 G15 3582 G14 3583 H15 3584 H15 3585 E14 3586 F14
3587 D9 3588 C14 3589 H15 3590 A8 3591 A9 3592 A10 3593 A9
3594 C8 3595 B9 3596 C10 3597 B9 3598 B7 3599 B8 3639 C3
3640 D8 3672 G8 4500 C8 4501 E8 4502 G5 4503 C8 4504 G8
4505 E9 4506 B4 4507 D10 4508 B5 4509 C2 4510 E12 4511 F12
4512 B14 4513 F14 4514 F14 4516 E13 4517 F13 4520 A3 4521 C4
4522 D6 4523 E12 4524 B13 4525 B9 4526 B9 4527 B9 4528 B8
4529 B8 4530 C3 4531 E9 4532 B9 4533 B9 4534 B9 4535 E10
4536 F10 4537 F10 4538 C5 4539 B5 4540 F10 4541 G11 4542 D10
4543 D10 4544 F13 4545 A3 4546 C4 4547 D12 4548 B12 4549 B12
4550 B8 4551 B9 4552 B9 4553 E10 4554 E10 4555 C1 4556 B13
4557 B13 4558 B14 4559 B14 4560 E10 4561 E11 4562 E11 4563 E11
4564 E11 4565 E11 4566 E12 4567 E13 4568 D13 4569 D13 4570 G10
4571 G11 4572 G11 4573 F11 4574 F11 4575 F12 4576 F12 4577 F13
4578 E13 4579 E13 4580 B7 4581 G15 4582 G14 4583 H15 4584 H15
4585 E14 4586 F14 4587 D9 4588 C14 4589 H15 4590 A8 4591 A9
4592 A10 4593 A9 4594 C8 4595 B9 4596 C10 4597 B9 4598 B7
4599 B8 4639 C3 4640 D8 4672 G8

2 ASP BOARD



3 ASP BOARD

SURROUND

TDA7468

POWER SUPPLY
SOURCE SELECTOR
LOGIC
SUR.
VOLUME I LEFT
TREBLE LEFT
BASS LEFT
VOLUME II LEFT
BASS ALC
IIC BUS REC
SUR.
VOLUME I RIGHT
TREBLE RIGHT
BASS RIGHT
VOLUME II RIGHT

MDM_SL
MDM_SR
LINE_L
LINE_R
for test reasons only

F676 XLINE_L
F677 XLINE_R
F675
F678
F679
F680
F681
F682
F683 12V +C_OPAMP
F684 5,9V C_REF
F686 5,9V S_REF

ALC_SUM
AF_I2C_SCL3
AF_I2C_SDA

7600-1 NJM4556AM HP_A
7600-2 NJM4556AM HP_A

AMP_SL
AMP_SR

SUBWOOFER / CENTRE

MDM_CENTRE
MDM_SUB
LINE_L
LINE_R

ALC_SUM
AF_I2C_SCL2
AF_I2C_SDA

7650-2 NJM4556AM HP_A

AMP_CENTRE
+5V_STBY
MUTE_CENTRE
AMP_SUB

MUTE SURROUND

BC817-25 7601
BC817-25 7602
XMUTE_ALL

MUTE SUBWOOFER

BC817-25 7653
XMUTE_ALL

MUTE CENTRE

BC817-25 7651
BC857B 7652

MUTE

BC847B 7603

XHIGHPASS_OFF
BC847B 7655
Low pass on/off

SWPRE
GND_A

for test reasons only

* ... provisional

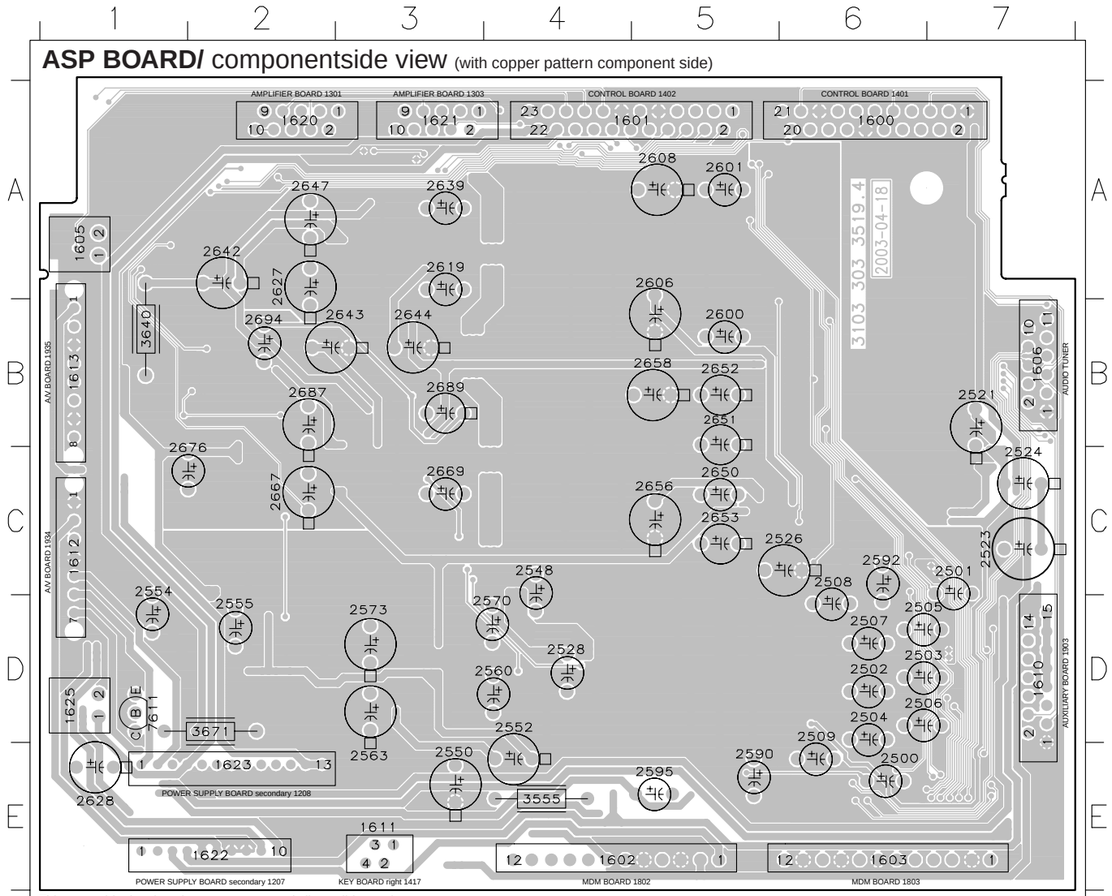
EVM ...V DC voltages measured in Stop mode

ASP board LX9000R, 020703

1605 H13
2600 B2
2601 B2
2602 C2
2603 C2
2604 B8
2606 A3
2607 A3
2608 A4
2609 A5
2610 D3
2611 D4
2612 D4
2613 D4
2614 D4
2615 A6
2616 A7
2617 A7
2618 A8
2619 A9
2620 A10
2621 B9
2622 B10
2623 B8
2624 B8
2625 G6
2627 A11
2630 C6
2631 C7
2632 D7
2633 C10
2637 G8
2638 C8
2639 C9
2640 C10
2641 C9
2642 H2
2643 I2
2644 I2
2647 C11
2650 E2
2651 F2
2652 F2
2653 G2
2654 F3
2655 G3
2656 E3
2657 E3
2658 E4
2659 D5
2660 G3
2661 G4
2662 G4
2663 G4
2664 G4
2665 D6
2666 D7
2667 E11
2668 E8
2669 E9
2670 E10
2671 E9
2672 E10
2673 E8
2674 F8
2675 F8
2676 E12
2677 D7
2680 G6
2681 G6
2682 G7
2683 H7
2684 G9
2685 G9
2686 G9
2687 F11
2688 G8
2689 F8
2690 G9
2691 H8
2692 G10
2693 G11
2694 H10
2695 H11
3600 B2
3601 B2
3602 B2
3603 C2
3604 B3
3605 B3
3606 B3
3607 C3
3608 C3
3609 C3
3610 B2
3611 A3
3612 A9
3613 A8
3614 A9
3615 B9
3616 A7
3617 A7
3618 B10
3619 B8
3620 B12
3621 B12
3622 B8
3623 F12
3624 H11
3627 A11
3628 G11
3629 B11
3630 C7
3631 C7
3632 C9

1605 H13
3633 C8
3634 C9
3635 C9
3638 C10
3640 H2
3641 I2
3642 I2
3643 I2
3644 I2
3647 C11
3649 C11
3650 E2
3651 F2
3652 F2
3653 F2
3654 E3
3655 F3
3656 F3
3657 F3
3658 G3
3659 D5
3660 D7
3661 D7
3662 E9
3663 E8
3664 E9
3666 G8
3668 C8
3669 C9
3670 G12
3673 F8
3674 F8
3675 E12
3676 E12
3677 F12
3680 G7
3681 H6
3682 H7
3683 F8
3684 F8
3685 F9
3686 G9
3687 H12
3688 G3
3689 G3
3691 H12
3692 B12
3694 B8
3700 B12
3701 H12
3702 F9
4610 A10
4620 B8
4625 G7
4630 B10
4640 E8
4650 F2
4660 E10
4685 F9
7600-1 B10
7600-2 C10
7601 B12
7602 B12
7603 H12
7604 A4
7650-1 E10
7650-2 F10
7651 E12
7652 E12
7653 G12
7654 E4
7655 G8
F674 H12
F675 A4
F676 A5
F677 C5
F678 E4
F679 A8
F680 C8
F681 E8
F682 F8
F683 H2
F684 I2
F685 F12
F686 I2

ASP BOARD/ componentside view (with copper pattern component side)

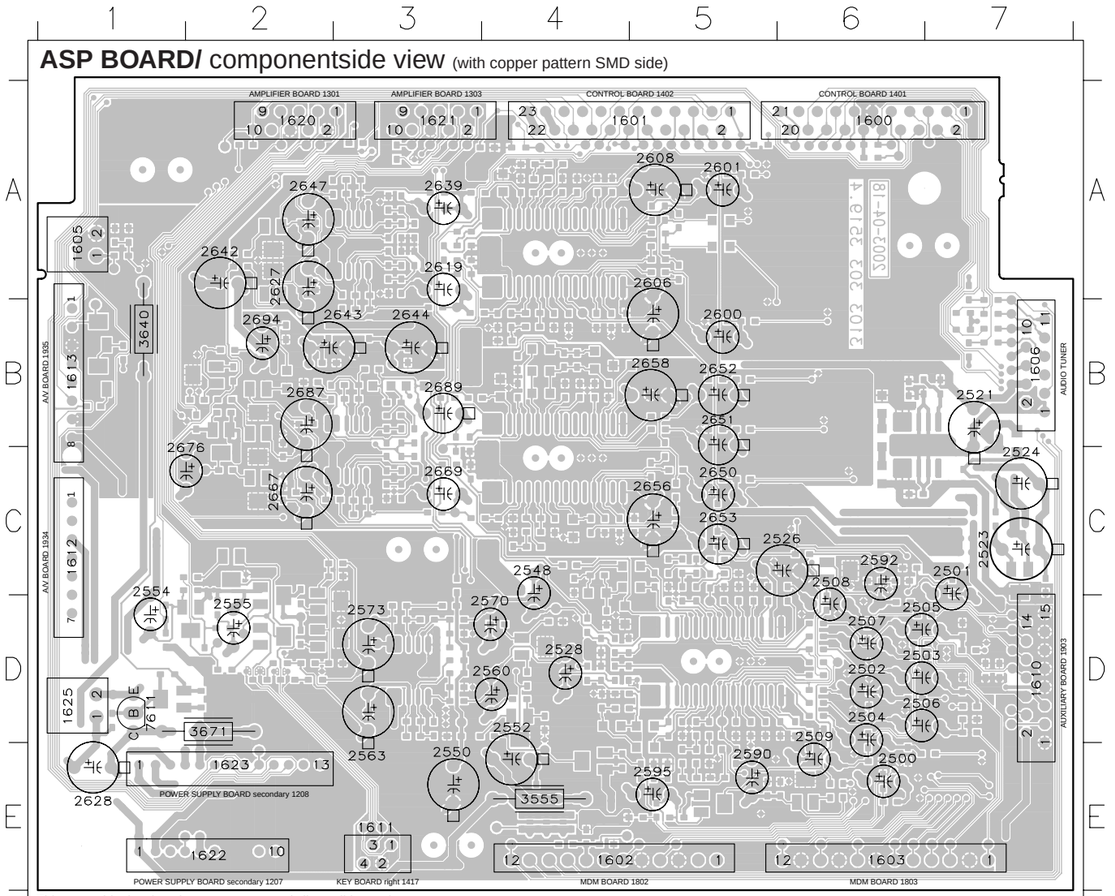


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

ASP board LX9000R, 020703

1600 A6
1601 A5
1602 E4
1603 E6
1605 A1
1606 B7
1610 D7
1611 E2
1612 C1
1613 B1
1620 A2
1621 A3
1622 E2
1623 E2
1625 D1
2500 E6
2501 C7
2502 D6
2503 D6
2504 D6
2505 D6
2506 E6
2507 D6
2508 C6
2509 D6
2521 B7
2523 C7
2524 C7
2526 C6
2528 D4
2548 C4
2550 E3
2552 D4
2554 D1
2555 D2
2560 D3
2563 D3
2570 D3
2573 D3
2590 E5
2592 C6
2595 E5
2600 B5
2601 A5
2606 B5
2608 A5
2619 A3
2627 A2
2628 E1
2639 A3
2642 A2
2643 B3
2644 B3
2647 A2
2650 C5
2651 B5
2652 B5
2653 C5
2656 C5
2658 B5
2667 C2
2669 C3
2676 C1
2687 B2
2689 B3
2694 B2
3555 E4
3640 B1
3671 D2
7611 D1

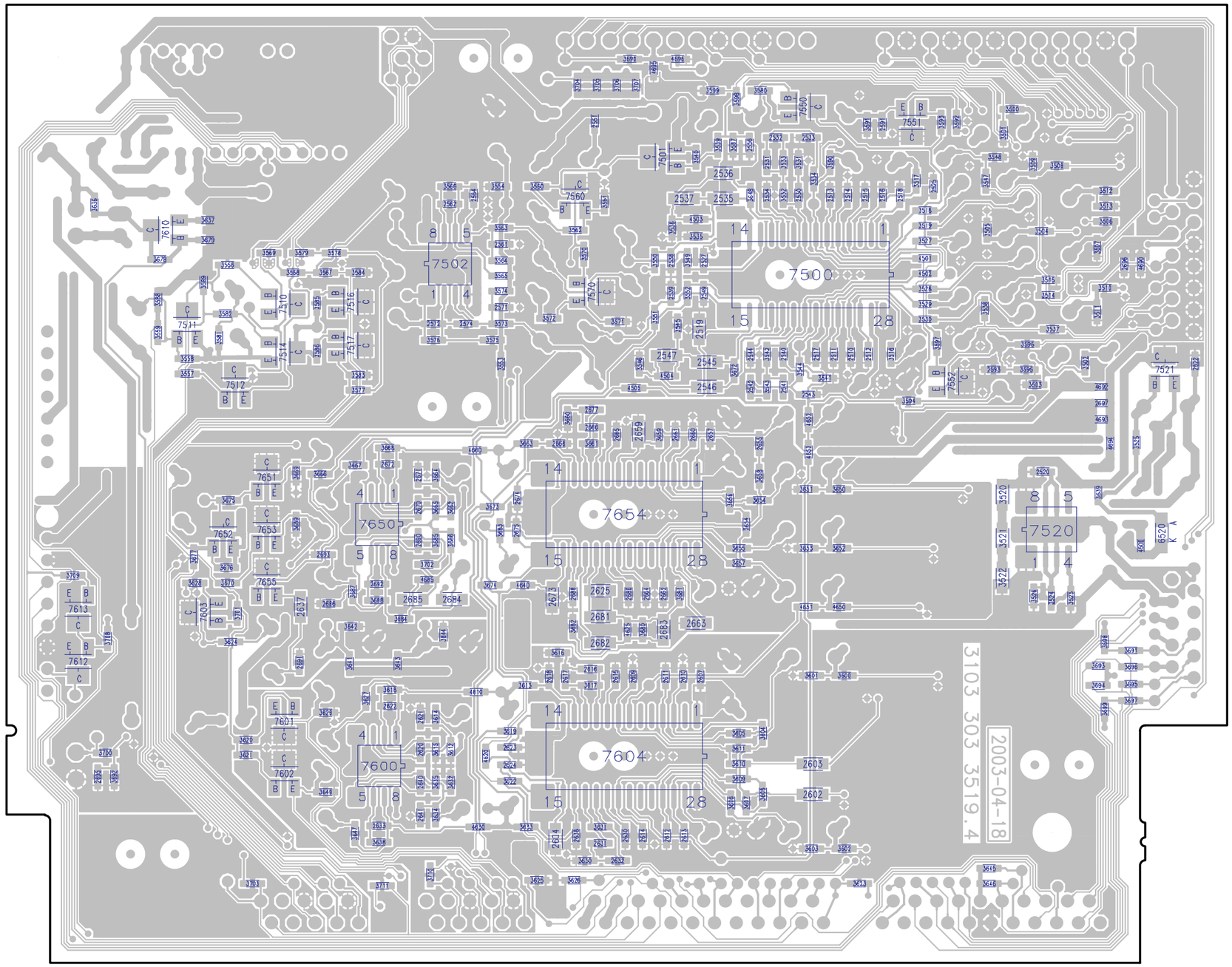
ASP BOARD/ componentside view (with copper pattern SMD side)



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

ASP board LX9000R, 020703

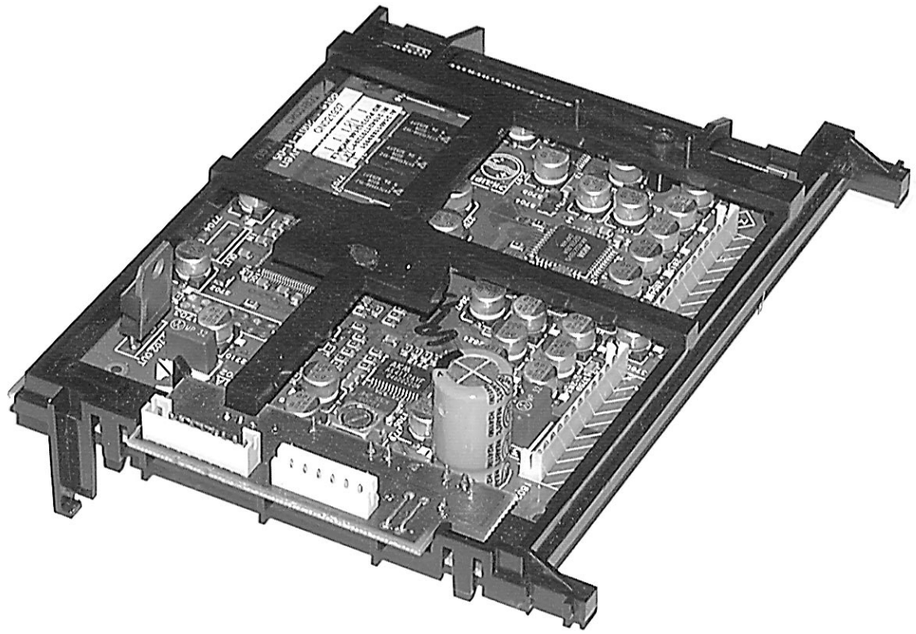
ASP BOARD/ SMD side view



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

ASP board LX9000R, 020703

2510	C5	2672	C3	3566	B3	3652	D5	7502	B3						
2511	C5	2673	D4	3567	B2	3653	D5	7510	B2						
2512	C5	2674	C3	3568	B2	3654	C5	7511	B2						
2513	B5	2675	D3	3569	B2	3655	D5	7512	C2						
2514	B5	2677	C4	3570	B4	3656	C5	7514	B2						
2515	B5	2680	D4	3571	B4	3657	D5	7516	B2						
2516	B6	2681	D4	3572	B4	3658	C5	7517	B2						
2517	C5	2682	D4	3573	B3	3659	C4	7520	D6						
2518	B6	2683	D4	3574	B3	3660	C4	7521	C7						
2519	B4	2684	D3	3575	B3	3661	C4	7550	A5						
2520	C6	2685	D3	3576	B3	3662	C3	7551	A6						
2522	C7	2686	D2	3577	C3	3663	C3	7552	C6						
2525	B6	2688	D4	3578	B2	3664	C3	7560	B4						
2527	B4	2690	D3	3579	B2	3665	C3	7570	B4						
2530	B5	2691	D2	3580	A5	3666	C2	7600	E3						
2531	A5	2692	D3	3581	B2	3667	C2	7601	E2						
2532	A5	2693	D2	3582	B2	3668	C3	7602	E2						
2533	A5	2695	E1	3583	C3	3669	C2	7603	D2						
2534	B5	2696	B7	3584	B3	3670	D2	7604	E4						
2535	B5	2697	C7	3585	B2	3672	C5	7610	B1						
2536	A5	3500	A6	3586	B2	3673	C3	7612	D1						
2537	B4	3501	A6	3587	A5	3674	D3	7613	D1						
2538	B4	3502	C7	3588	B1	3675	C2	7650	C3						
2539	B4	3503	C6	3589	B2	3676	D2	7651	C2						
2540	C5	3504	B6	3590	A5	3677	D2	7652	D2						
2541	C5	3505	B6	3591	A5	3678	B1	7653	D2						
2542	C5	3506	B7	3592	A6	3679	B2	7654	C4						
2543	C5	3507	B7	3593	A6	3680	D4	7655	D2						
2544	C5	3508	A7	3594	C6	3681	D4								
2545	C5	3509	A6	3595	C6	3682	D4								
2546	C5	3510	B7	3596	B6	3683	D3								
2547	C4	3511	B7	3597	B6	3684	D3								
2549	B4	3512	B7	3598	A5	3685	D3								
2551	A4	3513	B7	3599	A5	3686	D3								
2556	A5	3514	B6	3600	D5	3687	D2								
2561	B3	3515	B6	3601	D5	3688	D3								
2562	B3	3516	C6	3602	E5	3689	C2								
2564	B3	3517	B6	3603	E5	3690	A4								
2571	B3	3518	B6	3604	E5	3691	D7								
2572	B3	3519	B6	3605	E5	3692	E1								
2574	B3	3520	C6	3606	E5	3693	D7								
2591	A6	3521	D6	3607	E5	3694	D7								
2593	C6	3522	D6	3608	E5	3695	D7								
2602	E5	3523	D7	3609	E5	3696	D7								
2603	E5	3524	D6	3610	E5	3697	D7								
2604	E4	3525	C7	3611	E5	3698	D7								
2607	D4	3526	D6	3612	E3	3699	E7								
2609	D4	3527	B6	3613	D3	3700	E1								
2610	D4	3528	B6	3614	E3	3701	D2								
2611	D4	3529	B6	3615	E3	3702	D3								
2612	E4	3530	B6	3616	D4	3703	E2								
2613	E4	3531	A5	3617	D4	3704	A4								
2614	E4	3532	B5	3618	D3	3705	A4								
2615	D4	3533	A5	3619	E3	3706	A4								
2616	D4	3534	A5	3620	E2	3707	A4								
2617	D4	3535	B4	3621	E2	3708	D1								
2618	D4	3536	B4	3622	E3	3709	D1								
2620	E3	3537	B6	3623	E5	3710	E3								
2621	E3	3538	B6	3624	D2	3711	E3								
2622	E3	3539	A5	3625	E4	4500	D7								
2623	E3	3540	A4	3626	E4	4501	B6								
2624	E3	3541	C5	3627	D3	4502	B6								
2625	D4	3542	C5	3628	D2	4503	B4								
2630	E4	3543	C5	3629	E2	4504	C4								
2631	E4	3544	C5	3630	E4	4505	C4								
2632	E4	3545	B4	3631	E4	4610	D3								
2633	E3	3546	C4	3632	E3	4620	E3								
2637	D2	3547	B6	3633	E3	4625	D4								
2638	E4	3548	A6	3634	E3	4630	E3								
2640	E3	3549	B4	3635	E3	4640	D3								
2641	E3	3550	B4	3636	B1	4650	D5								
2654	C5	3551	B4	3637	B2	4651	D5								
2655	C5	3552	B4	3638	E3	4652	C5								
2657	C5	3553	C3	3639	C7	4653	C5								
2659	C4	3554	B3	3641	D2	4660	C3								
2660	C4	3556	B2	3642	D2	4685	D3								
2661	C4	3557	C2	3643	D3	4690	B7								
2662	D4	3558	C2	3644	D3	4692	C7								
2663	D4	3559	B1	3645	E6	4693	C7								
2664	D4	3560	B4	3646	E6	4694	C7								
2665	C4	3561	B4	3647	E2	4695	A4								
2666	C4	3562	B4	3648	B5	4696	A4								
2668	C4	3563	B3	3649	E2	6520	C7								
2670	C3	3564	B3	3650	C5	7500	B5								
2671	C3	3565	B3	3651	C5	7501	A4								



MULTI-CHANNEL DECODING MODULE
MDM 2000 derivation for *LX9000R*

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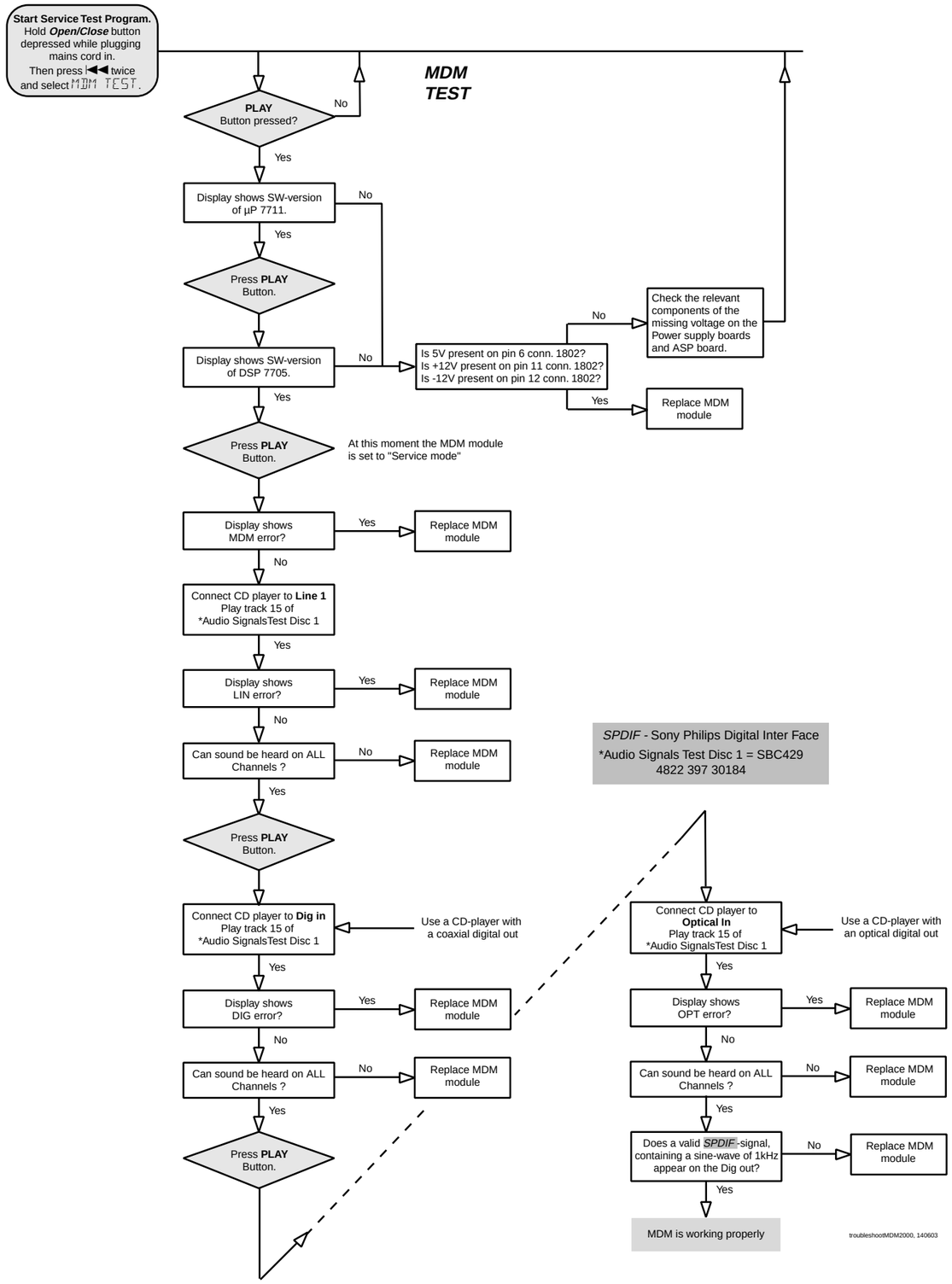
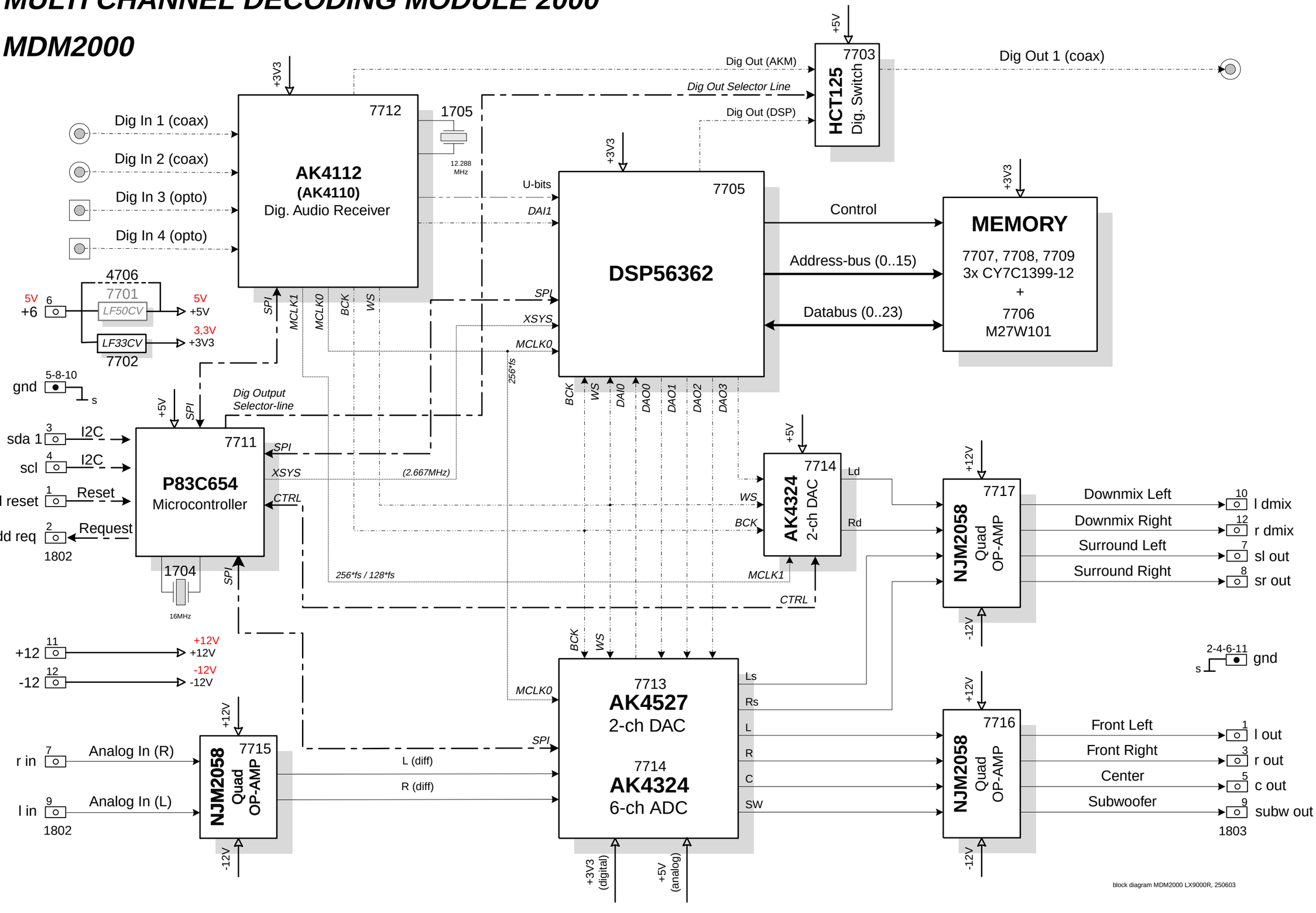
Assembly drawing 82
Partslist 82

MULTI-CHANNEL DECODING MODULE - Troubleshooting

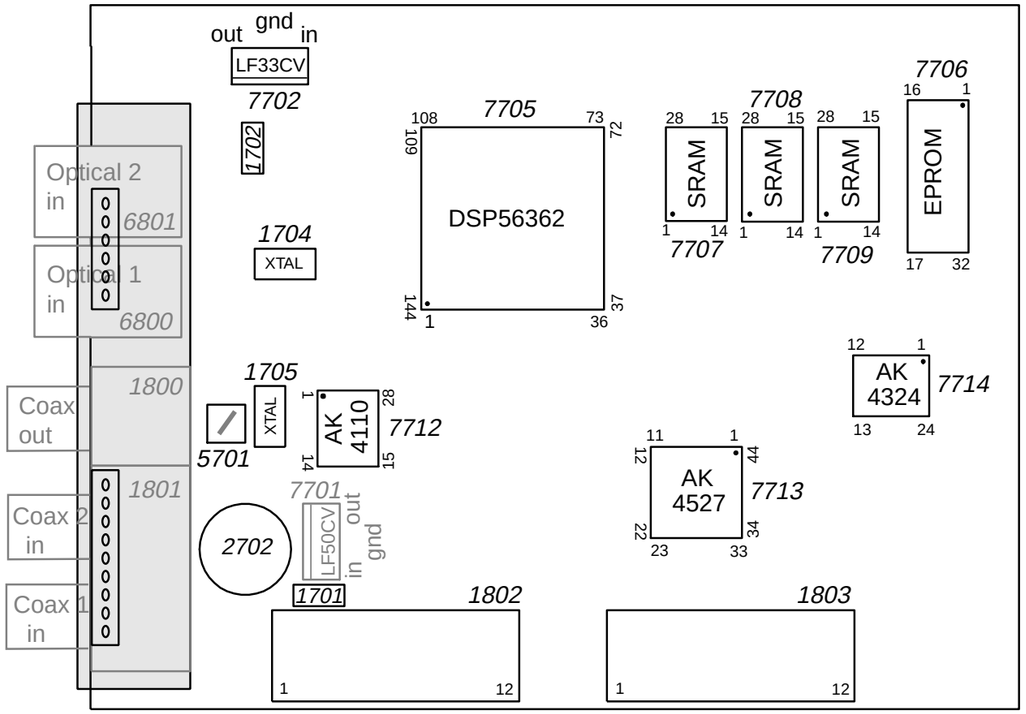


MULTI CHANNEL DECODING MODULE 2000

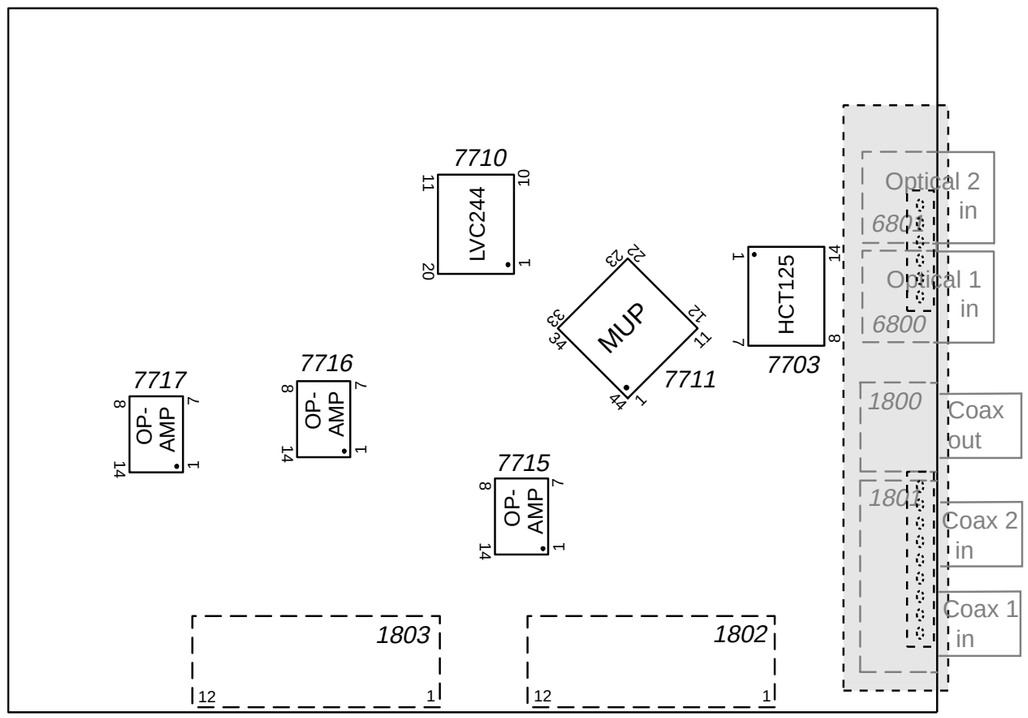
MDM2000



Component side view



Copper side view



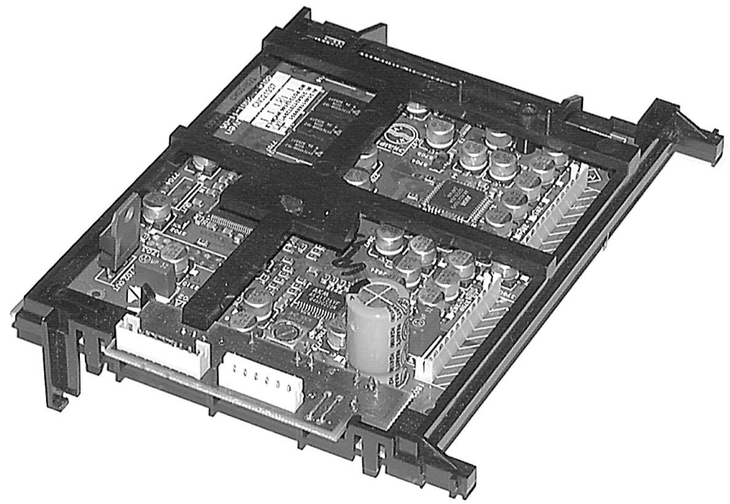
assembly drawing MDM2000 LX9000R, 140603

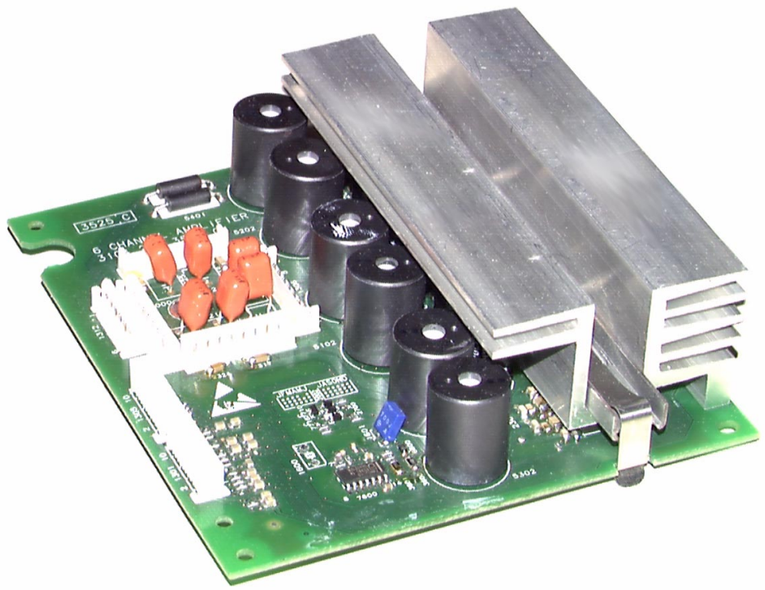
ELECTRICAL PARTSLIST

MISCELLANEOUS

1201	3103 308 55111	COMPLETE MDM MODULE LX9000R
1701	4822 252 51172	FUSE, 315mA
1702	4822 252 51172	FUSE, 315mA
1704	2422 543 01118	RESONATOR, 16MHz
1705	2422 543 01132	RESONATOR, 12,288MHz
2702	4822 123 14025	2200µF 16V 20%
7702	4822 209 16978	LF33CV, VOLTAGE REGULATOR

pos. 1201





6 - channel AMPLIFIER BOARD

(6x 75W)

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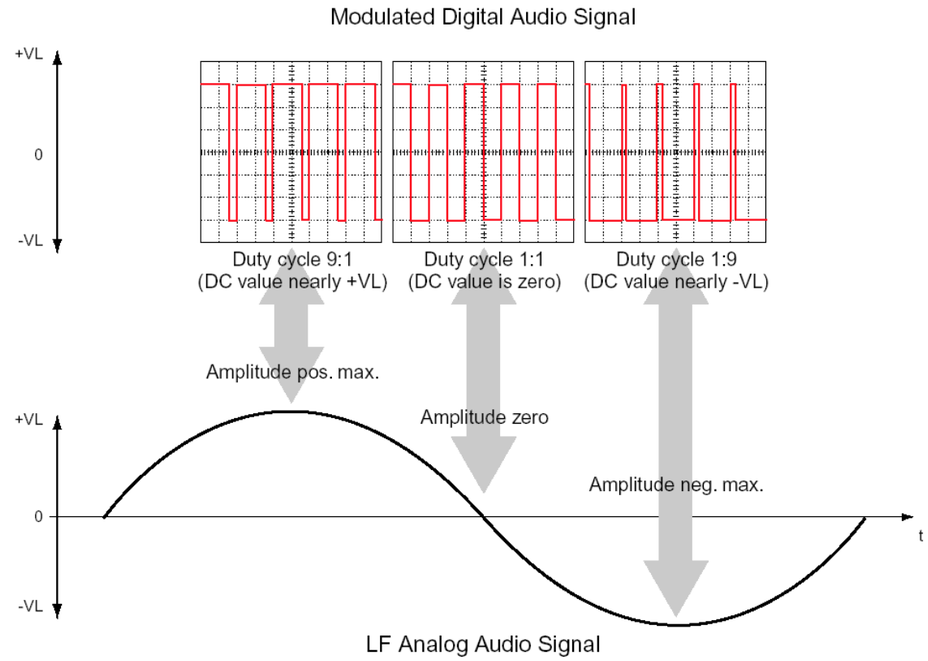
6-channel class-D amplifier

Basic operation of a class-D amplifier

Basically, the output stage of a class-D amplifier outputs a continuous square wave swinging between positive and negative power supplies with a fixed frequency (“clock” frequency) far beyond the audible range. The duty cycle of this square wave is modulated with the audio signal. The output is followed by a low-pass filter which eliminates the clock frequency and allows only the audio signal going to the speaker. See simplified drawing below.



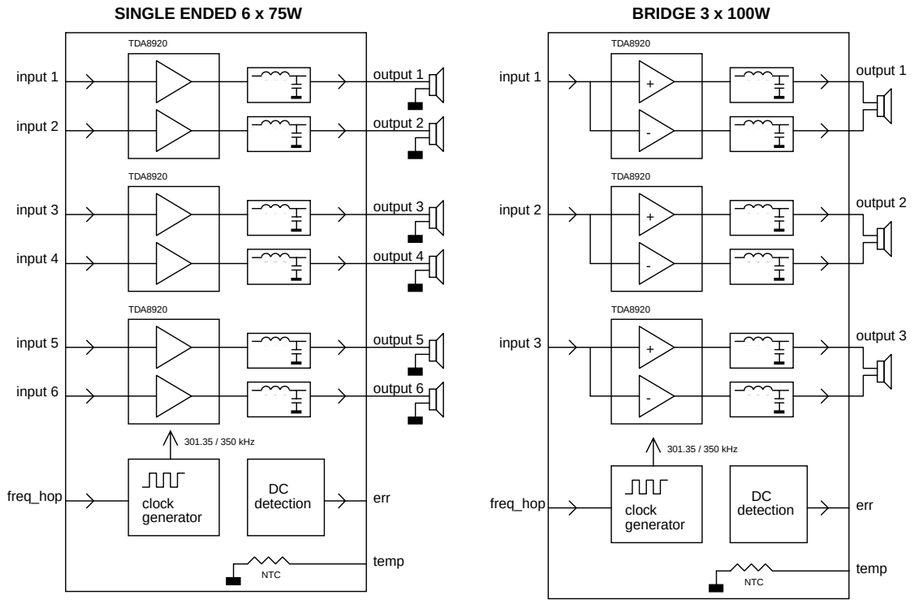
Compared to a conventional power amplifier the benefits of the Class-D amplifier are:

- higher effiency
- lower power dissipation
- smaller heatsink required
- smaller mains transformer required

The main disadvantage of this concept is:

- The amplifier is operating with a high-frequency square wave at high amplitude and currents. This requires special precautions to prevent excessive electromagnetic ratiation (EMC).

Block diagram and operation



• clock oscillator

The clock frequency is generated around IC7600. Using 2 extra transistors (7602 and 7608) and 2 ceramic resonators it can be operated at 2 frequencies: 602.7kHz and 700kHz. The frequency is selected by the signal “FREQ_HOP” coming from connector 1302 pin 9.
When FREQ_HOP is low, the output of 7600-1 will be high. This switches transistor 7602 on, and connects resonator 1600 (602.7kHz) to inverter 7600-3. Similarly, when FREQ_HOP is high, resonator 1601 is connected to 7600-3.
The output frequency is divided by two by IC7607, resulting in 301.35kHz or 350kHz.
The purpose of a selectable clock frequency is related to the disturbance of the tuner which is built-in together with this amplifier. In MW, the software of the set microprocessor will select the other clock frequency in case the amplifier clock interfers with the tuned station.

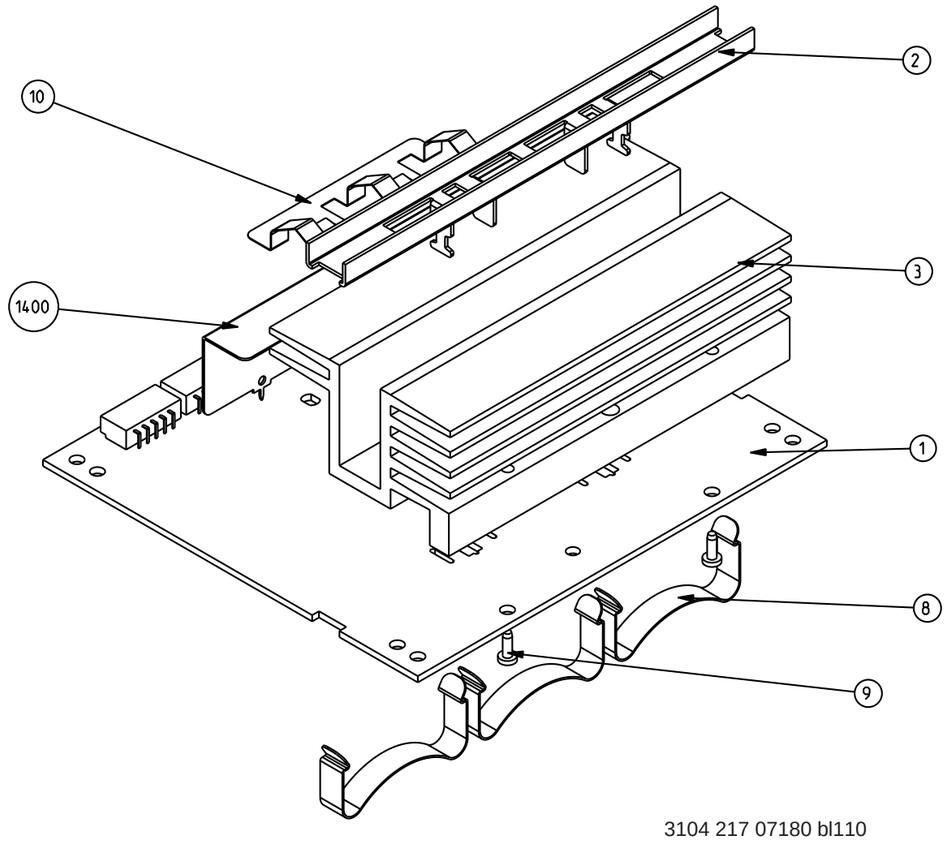
• Class-D amplifier TDA8920 and low-pass filter

The TDA8920 is a two channel audio power amplifier using class-D technology. The audio input signal is converted into a digital Pulse Width Modulated (PWM) signal via an analog input stage and PWM modulator. It is then fed to the power stage which outputs a high power PWM signal which switches between the main supply lines.
The TDA8920 is followed by a 2nd-order low-pass filter. It has a cut-off frequency around 50kHz and converts the PWM signal into analog audio signal across the loudspeaker.
The TDA8920 has a temperature protection and a current limiter built-in.
Furthermore, via the mode input, the IC can be put in active-, mute- and standby mode.
- Active mode (amplifier fully operational) with output signal.
- Mute mode; the amplifiers are operational, but the audio signal is muted.
- Standby mode; with a very low supply current, the output stage is switched off.

• DC-detection

The DC-detection circuit monitors all 6 outputs for DC. Whenever one or more outputs contain DC for more than 1 second, the circuit will be activated. A positive voltage will activate transistor 7710 and pin 10 of connector 1302 will be pulled down. In case of a negative voltage, transistor 7716 will be activated, which in turn activates 7710. The set microprocessor will take further action.

MECHANICAL EXPLODED VIEW



3104 217 07180 bl110

MECHANICAL PARTS LIST & SCREWS

8	4822 492 11735	SPRING, TRANSISTOR
9	-	D2.3 x 8

Note: Only the parts mentioned in this list are normal service spare parts.

AMPLIFIER BOARD

from ASP board 1620 [1]

1302 ✱ AMP_LEFT F100, GND F102, AMP_RIGHT F103, L/R_ON 4.4V F105, AMP_CENTRE F106, GND F140, AMP_ON_CENTRE 4.4V F108, 2.4V F111, 5.3V F114, NTC_AMP 2.4V

FE-ST-VK-NA — FE-BT-VK-N

typ. 2.4V at 25°C (measured via Service Testprogram - Temp. Test)

TEMP from 3422, FREQ_HOP, ERROR from 7710

0V — 100mV/div 500us/div

from Power Supply sec. 1203

POWER SUPPLY

1312(Δ) SXXB-EH-A — B10B-EH-A — EH-S

+A F124 5400 +28,5V Vdd

GND

-A F127 5401 -28,5V Vss

F132 TEMP to 1302

3422 100R — 3420 10K NTC — Temperature sensor heatsink

1400 SCREENCOVER

F143

1320 RT-01T

FRONT L/R SPEAKERS

AMPLIFIER 1

INPUT_1N LEFT INPUT_1 — MODE_12 — INPUT_2 RIGHT INPUT_2N

TDA8920 (7100): IN1-, IN1+, PROT, SGND1, OSC, MODE, SGND2, STABI, IN2+, IN2-, VDDA1, VDDA2, VSSA1, VSSA2, VSSD, SUBM/SSD, VDDP1, VDDP2, BOOT1, OUT1, BOOT2, OUT2, VSSP1, VSSP2

INP STAGE, PWM MOD, MUTE, REL1, SW1, EN1, SW2, REL2, CTRL & HAND-SHAKE, DRIVER HIGH, DRIVER LOW, MANAGER, TEMP SENSOR CURRENT PROT, VSSP1 VDDP2

CLOCK from 7607 — 4,2V

to LS socket 1306 — F139 F104 F109 F112 F134 — 1316 EH-B

10V/div 1us/div

OVER-VOLTAGE PROTECTION

PROT_1 PROT_2 — BAS316 — F101 BZX384-C5V6 — MODE_12 BC847B

PROT_3 PROT_4 — BAS316 — F113 BZX384-C5V6 — MODE_34 BC847B

PROT_5 PROT_6 — BAS316 — F115 BZX384-C5V6 — MODE_56 BC847B

OPTIONAL

CENTER SPEAKER + SUBWOOFER

AMPLIFIER 2

INPUT_3N CENTER INPUT_3 — MODE_34 — INPUT_4 SUB WOOFER INPUT_4N

TDA8920 (7200) — to LS socket 1308 ✱ — F120 F121 F122 F133 — 1318 EH-B

2V/div 1us/div

SURROUND SPEAKERS

AMPLIFIER 3

from ASP board 1621 [1]

1303 ✱ AMP_SL F117, GND F141, AMP_SR F119, SUR_ON 4.4V F118, AMP_SUB F116, GND F142

1305 ✱ — FE-BT-VK-N — FE-ST-VK-NA

INPUT_5N L INPUT_5 — MODE_56 — INPUT_6 R INPUT_6N

TDA8920 (7300) — to LS socket 1307 ✱ — F128 F129 F130 F135 — 1317 EH-B

CLOCK GENERATOR

HEF4013BT (7607) — 74HCU04 (7600-1 … 7600-6) — BZX384-C5V6 (6600) — BC847B (7602) — BC857B (7608)

CLOCK F123 — FREQ_HOP from 1302

DC DETECTION

OUT_1 … OUT_6 — F131 3721 10K — 2,3V — ERROR to 1620 — -19,8V

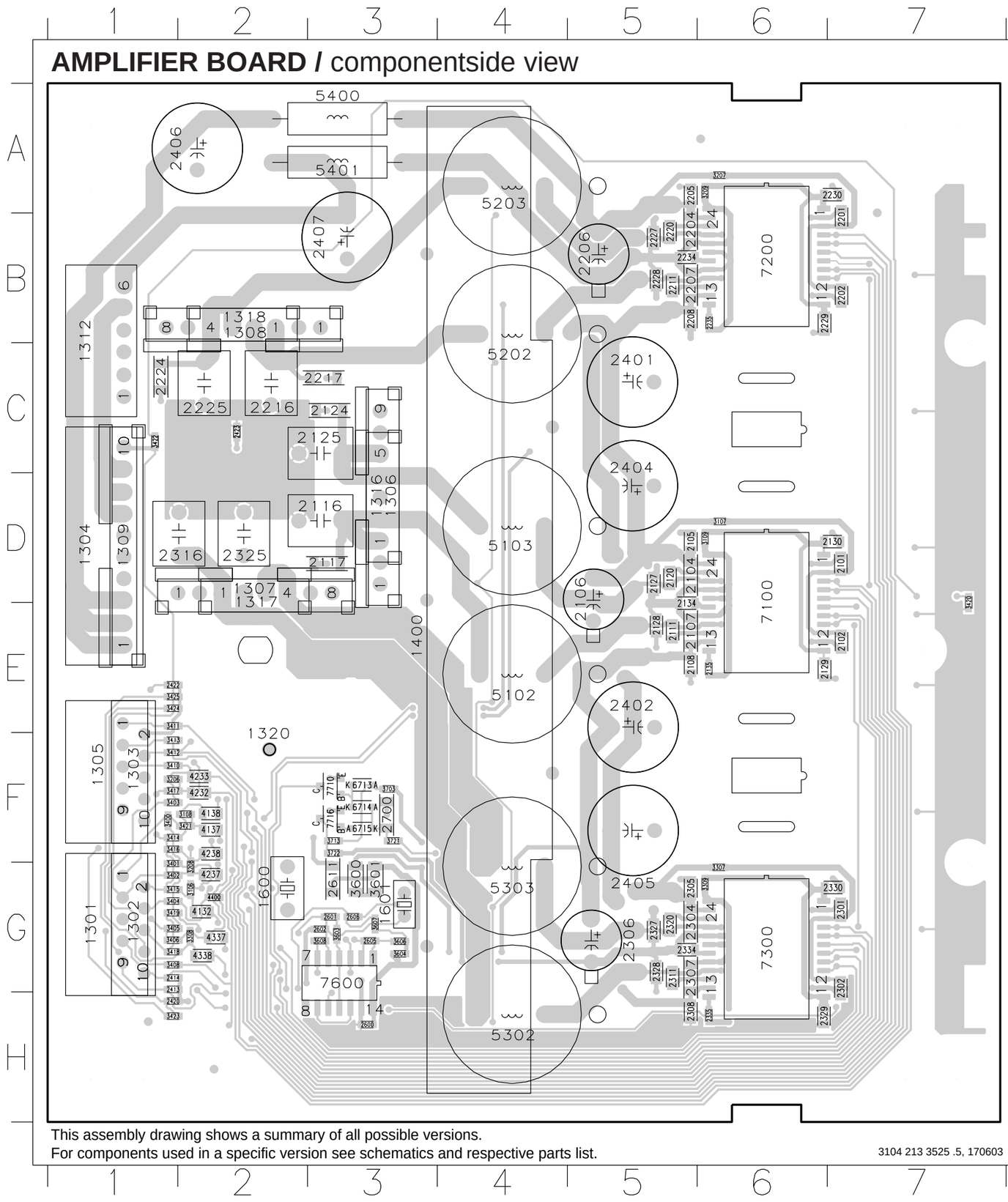
✱ not for bridge version
Δ not for single-ended version

EVM ...V DC voltages measured in Stop mode with no audio output.

6x75W amplifier LX9000R, 300603

1301 C1	3301 K10	2101 B8	3408 D4
1302 B2	3302 K10	2102 B8	3409 D4
1303 K2	3303 K11	2104 B9	3410 K4
1304 G2	3304 L11	2105 B9	3411 J4
1305 K1	3305 L10	2106 A10	3412 K4
1306 B12	3306 L6	2107 B10	3413 K4
1307 K12	3307 J8	2108 B10	3414 A4
1308 F12	3308 J6	2111 B10	3415 A4
1309 G1	3309 M8	2114 B10	3416 A4
1312 G2	3400 B4	2115 C10	3417 B4
1316 C12	3401 B4	2116 C11	3418 B4
1317 K12	3402 C4	2117 C11	3419 B4
1318 G12	3403 C4	2120 C10	3420 H2
1320 I 4	3404 C4	2122 C10	3421 B4
1400 H3	3405 C4	2124 D11	3422 H2
1600 I13	3406 C4	2125 D11	3423 B4
1601 J13	3407 C4	2126 D10	3424 J4
		2127 D10	3425 K4
		2128 D9	3426 K4
		2129 D8	3500 C15
		2130 D8	3501 C15
		2131 D7	3502 D15
		2134 C6	3503 D15
		2135 C6	3504 E15
		2136 B7	3505 E15
		2201 F8	3600 I12
		2202 F8	3601 I12
		2204 F9	3602 I13
		2205 F9	3603 H17
		2206 E10	3604 I12
		2207 F10	3605 I14
		2208 F10	3606 I15
		2211 F10	3607 J12
		2214 F10	3608 J13
		2215 G10	3609 J13
		2216 G11	3610 J16
		2217 G11	3700 K14
		2220 G10	3701 K14
		2222 G10	3703 K15
		2224 H11	3709 L14
		2225 H11	3712 L14
		2226 H10	3713 K15
		2227 H10	3716 L14
		2228 H9	3718 L14
		2229 H8	3721 L14
		2230 H8	3722 L15
		2231 H7	4132 D7
		2234 G6	4133 C7
		2235 G6	4137 B7
		2236 F7	4138 B7
		2301 J8	4232 H7
		2302 J8	4233 G7
		2304 J9	4237 F7
		2305 J9	4238 F7
		2306 I10	4332 L7
		2307 J10	4333 K7
		2308 J10	4337 J7
		2311 J10	4338 K7
		2314 J10	4400 C4
		2315 K10	5102 B11
		2316 K11	5103 C11
		2317 K11	5202 F11
		2320 K10	5203 G11
		2322 K10	5302 K11
		2324 L11	5303 L11
		2325 L11	5400 G3
		2326 L10	5401 G3
		2327 L10	6500 B14
		2328 L9	6501 B15
		2329 L8	6502 B14
		2330 L8	6503 C14
		2331 L7	6504 C15
		2334 K6	6505 D14
		2335 K6	6506 E14
		2336 J7	6507 E15
		2400 I3	6508 E14
		2401 G4	6600 I12
		2402 G4	6713 K15
		2403 G3	6714 K15
		2404 G4	6715 L15
		2405 G4	7100 B7
		2406 G3	7200 F7
		2407 G3	7300 J7
		2408 B2	7500 C16
		2409 B3	7501 D16
		2410 B3	7502 E16
		2411 D3	7600-1 I12
		2412 D2	7600-2 I14
		2413 D2	7600-3 I13
		2414 D2	7600-4 H14
		2415 L3	7600-5 I15
		2416 L3	7600-6 H13
		2417 L3	7602 I14
		2418 L2	7607 J16
		2419 H2	7608 J14
		2420 D3	7710 K16
		2421 L2	7716 L16
		2422 L3	F100 B2
		2423 I 4	F101 B15
		2425 B3	F102 B2
		2500 C15	F103 B2
		2501 D15	F104 B12
		2502 E15	F105 C2
		2503 C15	F106 C2
		2504 D15	F108 C2
		2505 E15	F109 C12
		2600 H14	F111 C2
		2601 H14	F112 C12
		2602 I13	F113 C15
		2603 I14	F114 C2
		2604 I16	F115 E15
		2605 I12	F116 F2
		2606 J12	F117 F3
		2607 J14	F118 F2
		2608 I16	F119 F3
		2611 I11	F120 F12
		2700 L15	F121 G12
		3100 B10	F122 G12
		3101 C10	F123 H19
		3102 C10	F124 H3
		3103 C11	F125 I18
		3104 D11	F126 I3
		3105 D10	F127 I3
		3106 D6	F128 K12
		3107 B8	F129 K12
		3108 B6	F130 K12
		3109 E8	F131 L15
		3200 F10	F132 I2
		3201 G10	F133 H12
		3202 G10	F134 D12
		3203 G11	F135 L12
		3204 H11	F139 B12
		3205 H10	F140 C2
		3206 H6	F141 F3
		3207 F8	F142 F2
		3208 F6	F143 K3
		3209 I8	
		3300 J10	

AMPLIFIER BOARD / componentside view

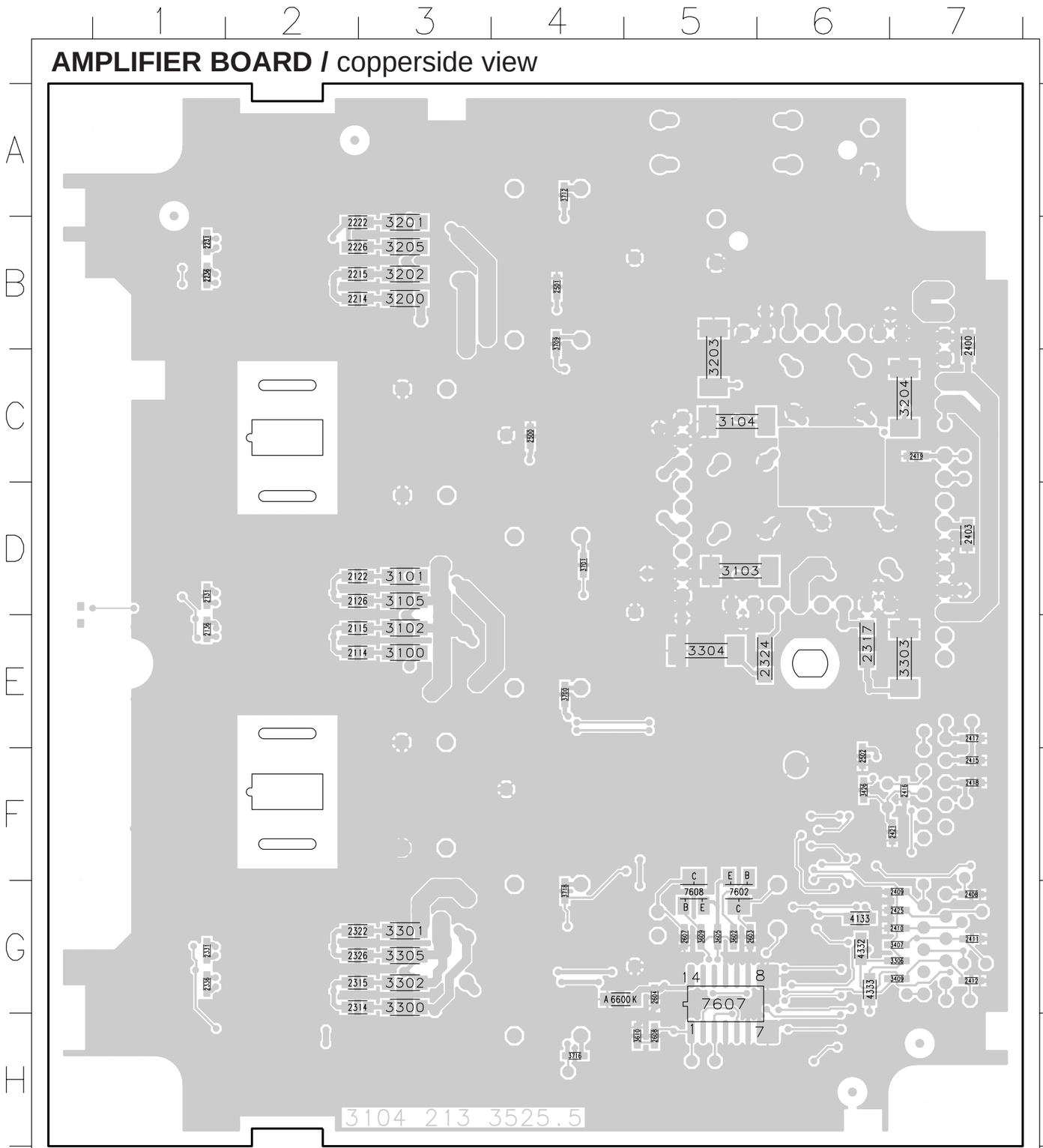


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematics and respective parts list.

3104 213 3525 .5, 170603

1301	G1	3208	G2
1302	G1	3209	A6
1303	F1	3307	G6
1304	D1	3308	G2
1305	F1	3309	G6
1306	D3	3400	F1
1307	D2	3401	G1
1308	B2	3402	G1
1309	D1	3403	F1
1312	B1	3404	G1
1316	D3	3405	G1
1317	D2	3406	G1
1318	B2	3408	G1
1320	F2	3410	F1
1400	D4	3411	E1
1600	G2	3412	F1
1601	G3	3413	F1
2101	D7	3414	F1
2102	E7	3415	G1
2104	D5	3416	F1
2105	D5	3417	F1
2106	D5	3418	G1
2107	E5	3419	G1
2108	E5	3420	D7
2111	E5	3421	F2
2116	D3	3422	C1
2117	D3	3423	H1
2120	D5	3424	E1
2124	C3	3425	E1
2125	C3	3600	G3
2127	D5	3601	G3
2128	E5	3603	G3
2129	E6	3604	G3
2130	D7	3606	G3
2134	E5	3607	G3
2135	E6	3608	G3
2201	B7	3703	F3
2202	B7	3713	F3
2204	B5	3721	F3
2205	A5	3722	F3
2206	B5	4132	G2
2207	B5	4137	F2
2208	B5	4138	F2
2211	B5	4232	F2
2216	C2	4233	F2
2217	C3	4237	G2
2220	B5	4238	F2
2224	C1	4337	G2
2225	C2	4338	G2
2227	B5	4400	G2
2228	B5	5102	E4
2229	B6	5103	D4
2230	A7	5202	B4
2234	B5	5203	A4
2235	B6	5302	H4
2301	G7	5303	G4
2302	G7	5400	A3
2304	G5	5401	A3
2305	G5	6713	F3
2306	G5	6714	F3
2307	G5	6715	F3
2308	H5	7100	D6
2311	G5	7200	B6
2316	D2	7300	G6
2320	G5	7600	G3
2325	D2	7710	F3
2327	G5	7716	F3
2328	G5		
2329	H6		
2330	G7		
2334	G5		
2335	H6		
2401	C5		
2402	E5		
2404	D5		
2405	F5		
2406	A2		
2407	B3		
2413	G1		
2414	G1		
2420	H1		
2422	E1		
2423	C2		
2600	H3		
2601	G3		
2602	G3		
2605	G3		
2606	G3		
2611	G3		
2700	F3		
3106	G2		
3107	D6		
3108	F2		
3109	D6		
3206	F1		
3207	A6		

AMPLIFIER BOARD / copperside view

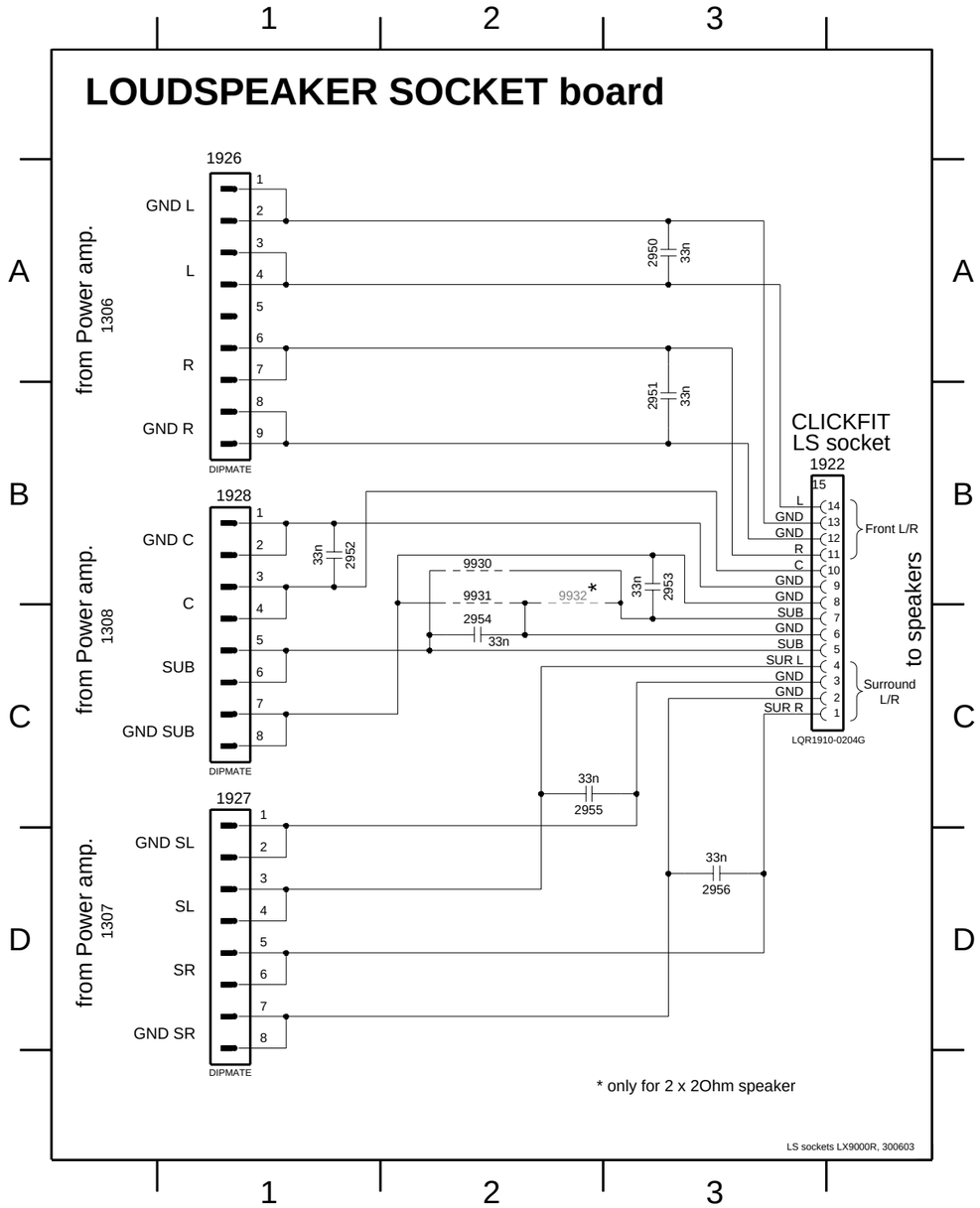


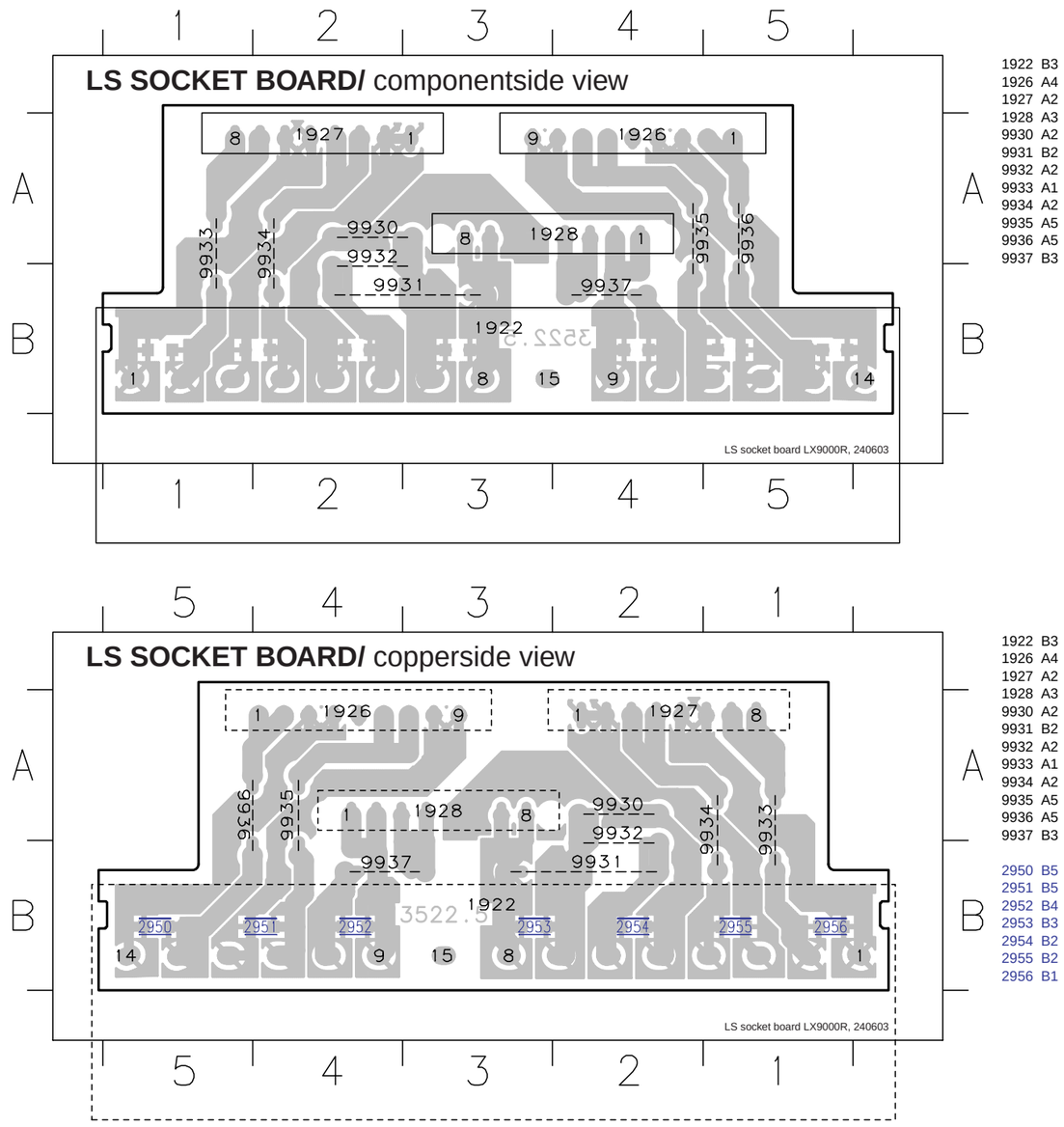
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematics and respective parts list.

3104 213 3525 .5, 170603

2114	E2	F122	B6
2115	E2	F123	H5
2122	D2	F124	C7
2126	D2	F125	H5
2131	D1	F126	D7
2136	E1	F127	C7
2214	B2	F128	D6
2215	B2	F129	E6
2222	B2	F130	D6
2226	B2	F131	H4
2231	B1	F132	C7
2236	B1	F133	B7
2314	G2	F134	C5
2315	G2	F135	E5
2317	E6	F139	D5
2322	G2	F140	G7
2324	E6	F141	E7
2326	G2	F142	F6
2331	G1	F143	C6
2336	G1		
2400	B7		
2403	D7		
2408	G7		
2409	G7		
2410	G7		
2411	G7		
2412	G7		
2415	F7		
2416	F7		
2417	E7		
2418	F7		
2419	C7		
2421	F7		
2425	G7		
2500	C4		
2501	B4		
2502	F6		
2603	G5		
2604	G5		
2607	G5		
2608	H5		
3100	E3		
3101	D3		
3102	E3		
3103	D5		
3104	C5		
3105	D3		
3200	B3		
3201	B3		
3202	B3		
3203	C5		
3204	C7		
3205	B3		
3300	G3		
3301	G3		
3302	G3		
3303	E7		
3304	E5		
3305	G3		
3306	G7		
3407	G7		
3409	G7		
3426	F5		
3602	G5		
3605	G5		
3609	G5		
3610	H5		
3700	E4		
3701	D4		
3709	B4		
3712	A4		
3716	H4		
3718	G4		
4133	G6		
4332	G6		
4333	G6		
6600	G4		
7602	G5		
7607	G5		
7608	G5		
F100	F7		
F102	G7		
F103	G7		
F104	E5		
F105	G7		
F106	G7		
F108	G7		
F109	D5		
F111	G7		
F112	C5		
F114	G7		
F115	F7		
F117	E7		
F118	E6		
F119	E7		
F120	B6		
F121	B6		

1922 B3 1927 C1 2950 A3 2952 B1 2954 C2 2956 D3 9931 B2
1926 A1 1928 B1 2951 B3 2953 B3 2955 C3 9930 B2 9932 B2

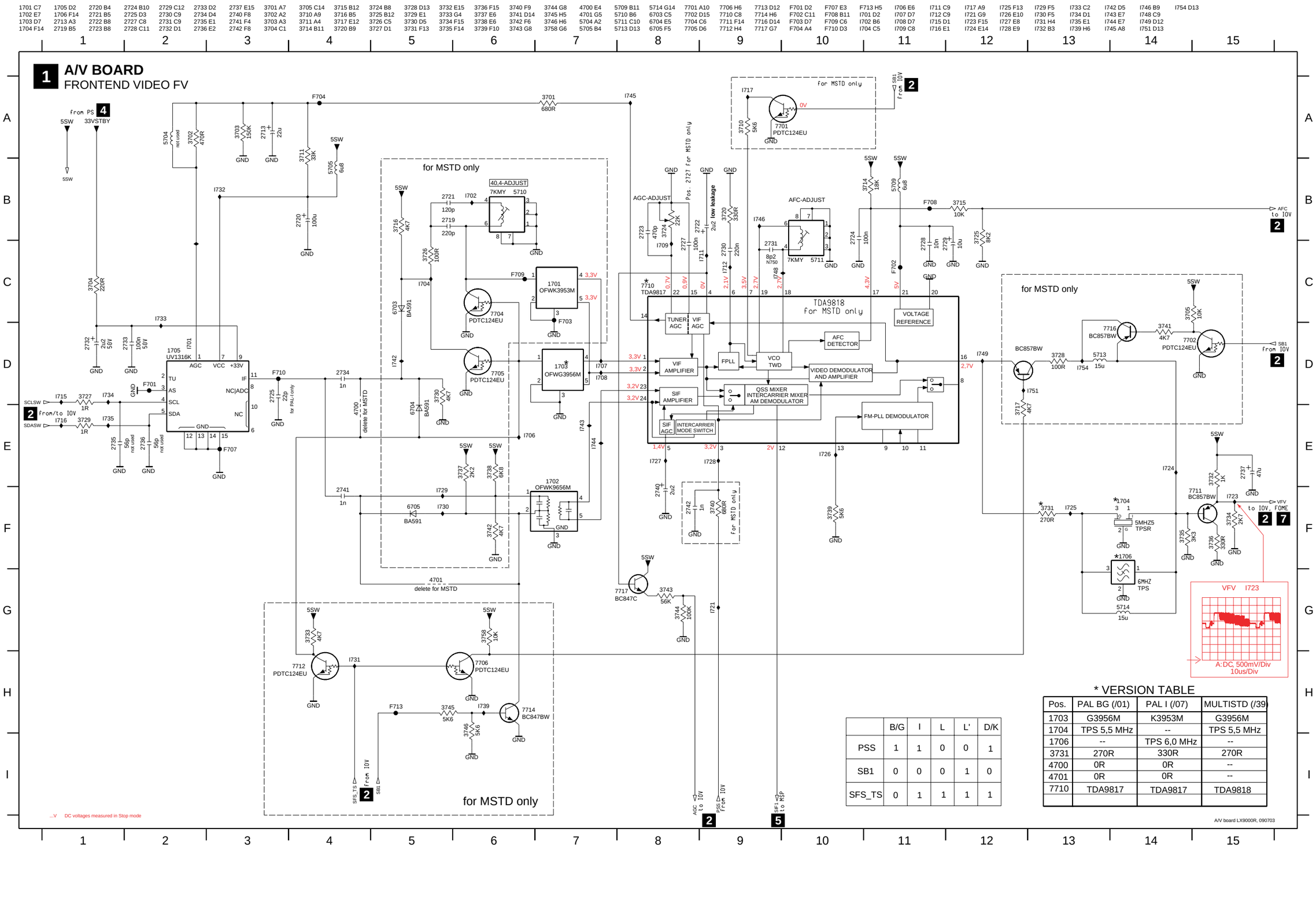




1922 B3
1926 A4
1927 A2
1928 A3
9930 A2
9931 B2
9932 A2
9933 A1
9934 A2
9935 A5
9936 A5
9937 B3

2950 B5
2951 B5
2952 B4
2953 B3
2954 B2
2955 B2
2956 B1

1 A/V BOARD
FRONTEND VIDEO FV



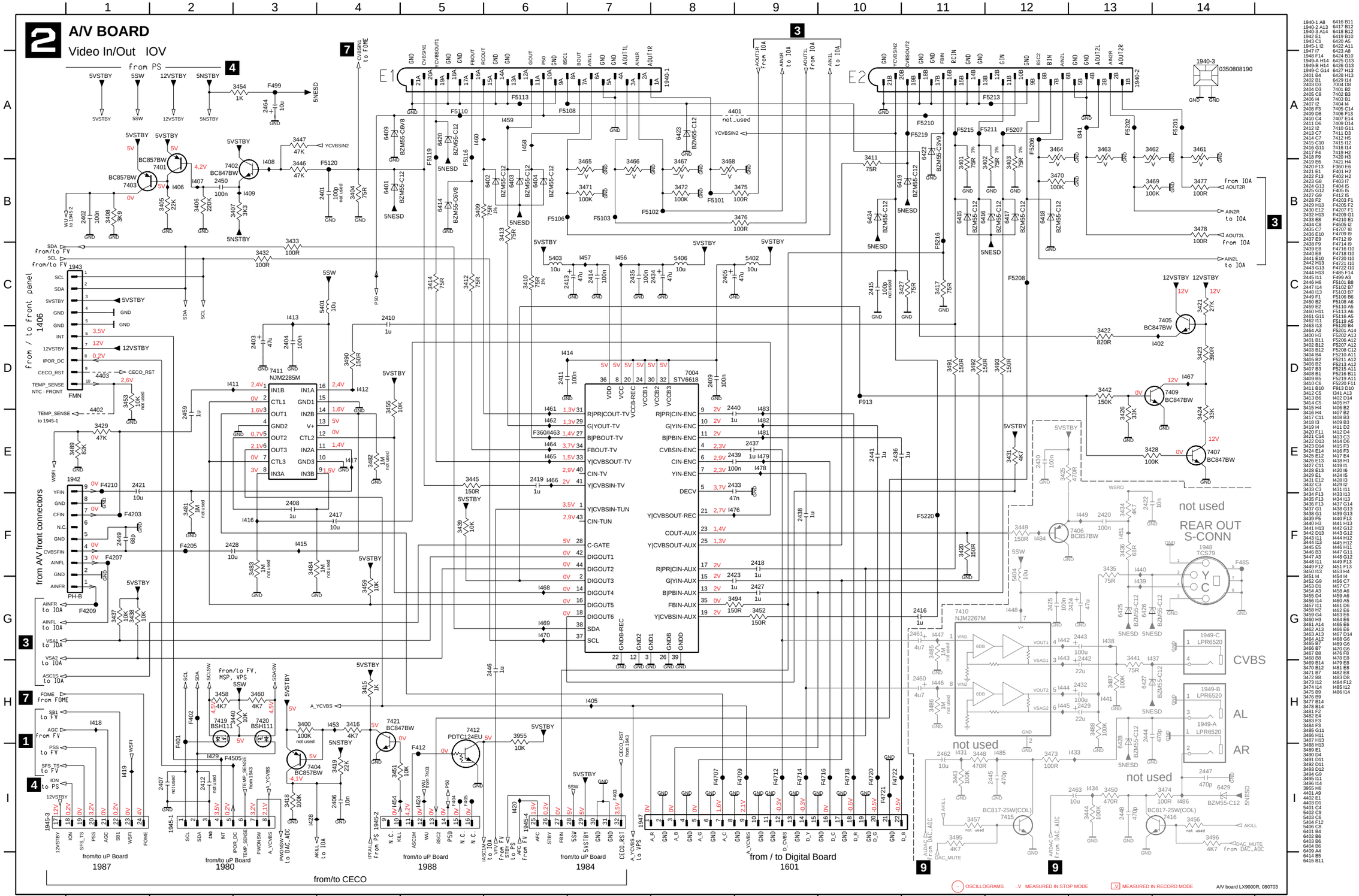
	B/G	I	L	L'	D/K
PSS	1	1	0	0	1
SB1	0	0	0	1	0
SFS_TS	0	1	1	1	1

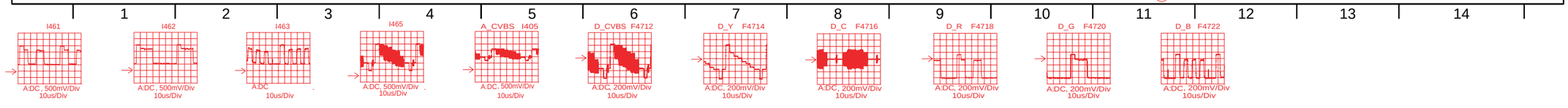
* VERSION TABLE

Pos.	PAL BG (/01)	PAL I (/07)	MULTISTD (/39)
1703	G3956M	K3953M	G3956M
1704	TPS 5,5 MHz	--	TPS 5,5 MHz
1706	--	TPS 6,0 MHz	--
3731	270R	330R	270R
4700	0R	0R	--
4701	0R	0R	--
7710	TDA9817	TDA9817	TDA9818

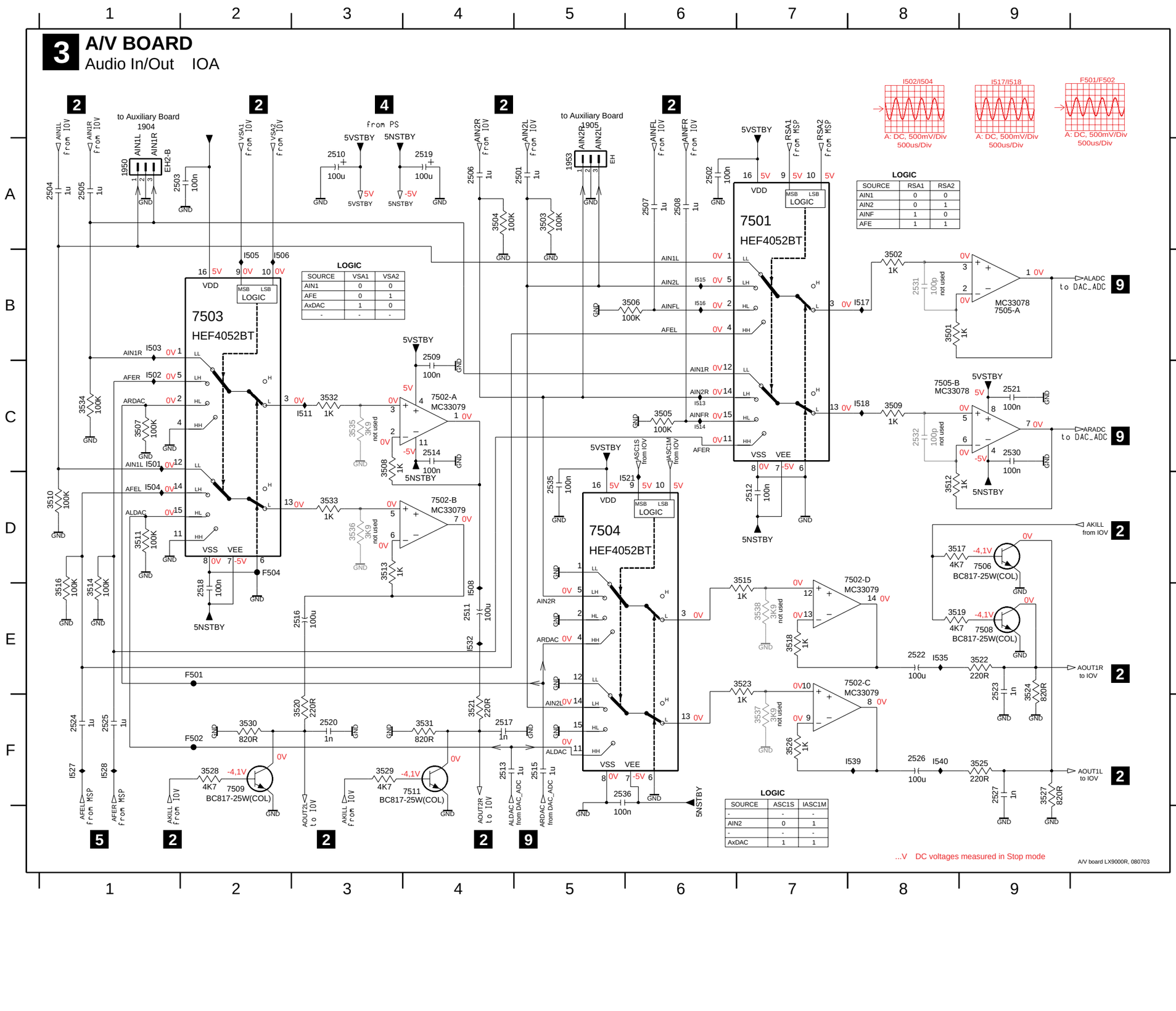
2 A/V BOARD

Video In/Out IOV





3 A/V BOARD
Audio In/Out IOA



1950 A1 2504 A1 2519 A4 3507 C1 3532 A5 3547 E7 7502-A C4 I501 C1
1953 A5 2505 A1 2520 F3 3508 C3 3533 A5 3548 E7 7502-B D4 I502 C1
2501 A5 2506 A4 2521 C9 3509 C8 3534 A4 3549 E7 7502-C E7 I503 B1
2502 A6 2507 A6 2522 E8 3510 D1 3535 C6 3550 E7 7502-D D7 I504 D1
2503 A1 2508 A6 2523 E9 3511 D1 3536 D3 3551 E7 7503 B2 I505 B2
2504 A1 2509 B4 2524 F1 3512 D8 3537 F7 3552 E7 7504 D5 I506 B2
2505 A1 2510 A3 2525 F1 3513 D3 3538 E7 3553 E7 7505-A B9 I508 E4
2506 A4 2511 E4 2526 F8 3514 E1 7501 A7 7505-B C8 I511 C3
2507 A6 2512 D7 2527 F9 3515 D7 7502-A C4 7506 D9 I513 C6
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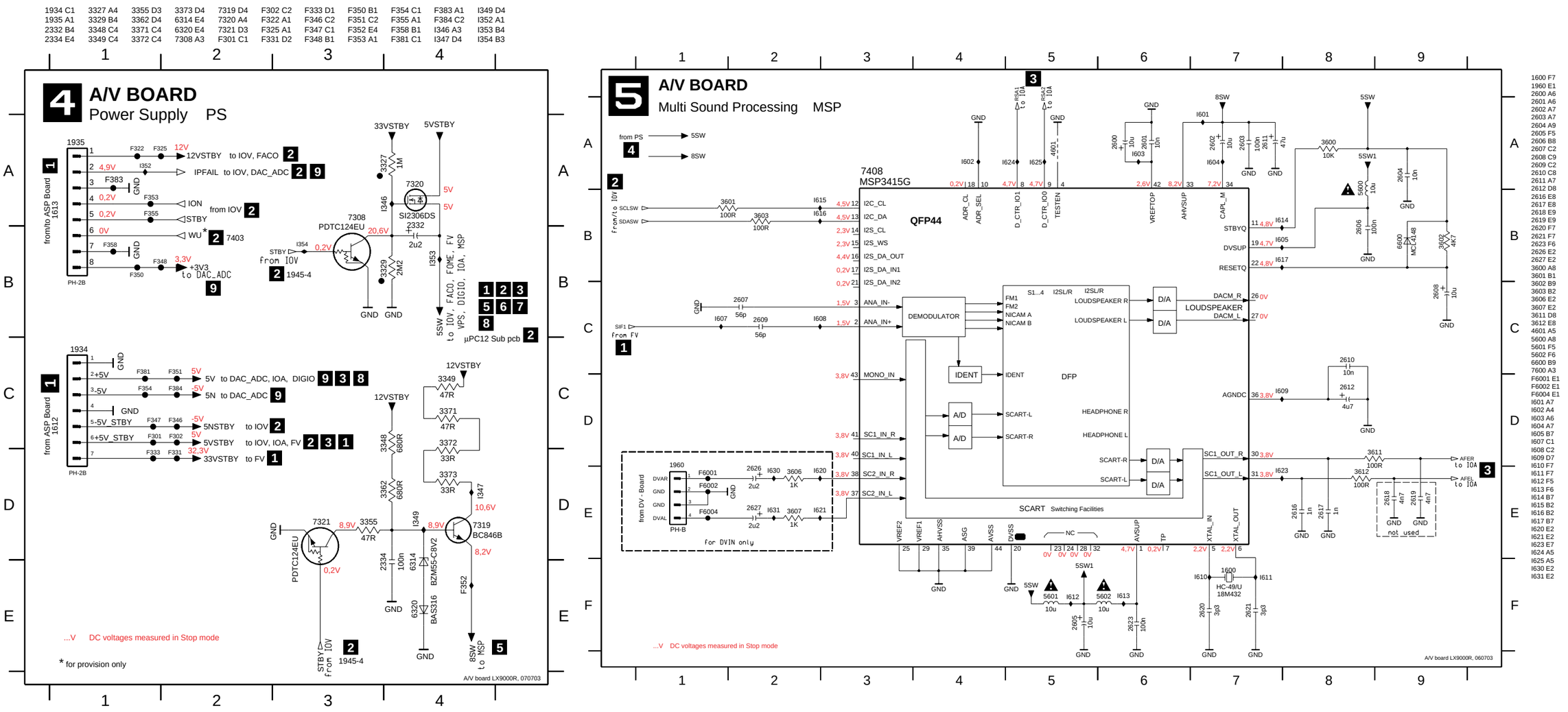
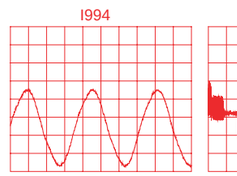
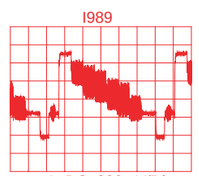

4 A/V BOARD
Power Supply PS
5 A/V BOARD
Multi Sound Processing MSP
7408 MSP3415G
QFP44
DEMODULATOR
IDENT
DFP
SCART Switching Facilities
D/A
A/D
LOUDSPEAKER
HEADPHONE R
HEADPHONE L
SCART-R
SCART-L
12VSTBY
33VSTBY
5VSTBY
7308 PDTC124EU
SI2306DS
7320
7321 PDTC124EU
7319 BC846B
BZM55-C8V2
BAS316
from/to ASP Board 1613
from/to ASP Board 1612
from DV - Board
from PS
from FV
from/to IOV
PH-2B
for DVIN only
not used
...V DC voltages measured in Stop mode
* for provision only
A/V board LX9000R, 070703
A/V board LX9000R, 060703

1990 D1 2932 B4 2933 B4 2934 B1 2935 C1 2936 D1 2937 D1 2938 B3 3931 B2 3932 C4 3933 C4 3934 E1 3935 E1 3936 E3 5931 A4 5932 A3 7931 B2 I987 B4 I988 B2 I989 C1 I990 C4 I991 C1 I992 C4 I993 C1 I994 D1 I995 D1 I996 D1 I997 E1 I998 E1 I999 E3

6 A/V BOARD

VPS





4 from PS 5V → 5SW

A_YCVBS from IOV 2

7931 STV5348 4,7V

CLAMPING SYNCHRONIZING DATA EXTRACTION

DATA DECODING DATA PROCESSING

8 PAGES MEMORY

DISPLAY INTERFACE

I2C BUS INTERFACE

OSCILLATOR FREQUENCY SYNTHETIZER TIME BASE

SCLSW 3934 100R I997 16 SCL to/from IOV 2

SDASW 3935 100R I998 17 SDA

1V 1 CVBS · 3,2V 28 CBLK · 4,8V 21 VCR_ITV · 2,4V 24 XTI · 2,4V 23 XTO · 0V 25 VSSO

DV_ 19 · TEST1 20 · TEST2 27 · BLAN 12 · R 8 · G 9 · B 10 · Y 15

5V 22 VDDD · 5V 3 VDDA · 7 VSSD · 26 VSSA · 11 2,3V · 14 0V · 13 RGBREF

...V DC voltages measured in Stop mode

A/V board LX9000R, 080703

2940 A2 2941 B3 2942 D2 2943 D4 2944 D4 2945 D2 2946 E1 2947 E3 3937 C1 3938 C1 3939 C3 3940 D1 3941 D3 3942 E1 3943 E2 3944 E3 3945 E3 3946 E2 3947 E4 3948 A1 3950 A3 3951 B2 3952 B3 3953 B2 3954 C2 7932 B2 7933 B3 7934-A A2 7934-B B4 7934-C C2 7934-D D3 F950 A2 I952 B3 I955 C1 I956 D2 I957 D2 I958 D3 I959 D3

7 A/V BOARD

Follow Me FOME

4 from PS 5V → 5SW

CVBSIN1 from IOV 2

VFV from FV 1

7934-C LM339D · 7934-D LM339D · 7934-A LM339D · 7934-B LM339D

BC847BW 7932 · BC847BW 7933

FOME to IOV 2 · F950

...V DC voltages measured in Stop mode

A/V board LX9000R, 060703

1951 B1 1952 A3 2581 A1 2582 B2 2583 B2 2584 C3 3584 A2 3585 A2 3586 A1 3587 A1 4582 B3 4583 C2 4584 C1 7581 A1 F551 B1 F552 C1 F553 A2 F554 A1 F555 A3 F556 A3 F557 A3

8 A/V BOARD

Digital In/Out (DIGIO)

from Digital board via DAC_ADC 9

5V_Opt · 5V

OPTICAL IN · GP1FA550RZ 7581 · 4,4V · 3,3V

DAOUT · 5V · 5V_Opt · OPT. IN · DIG IN

DIGITAL IN · YKC21-34161

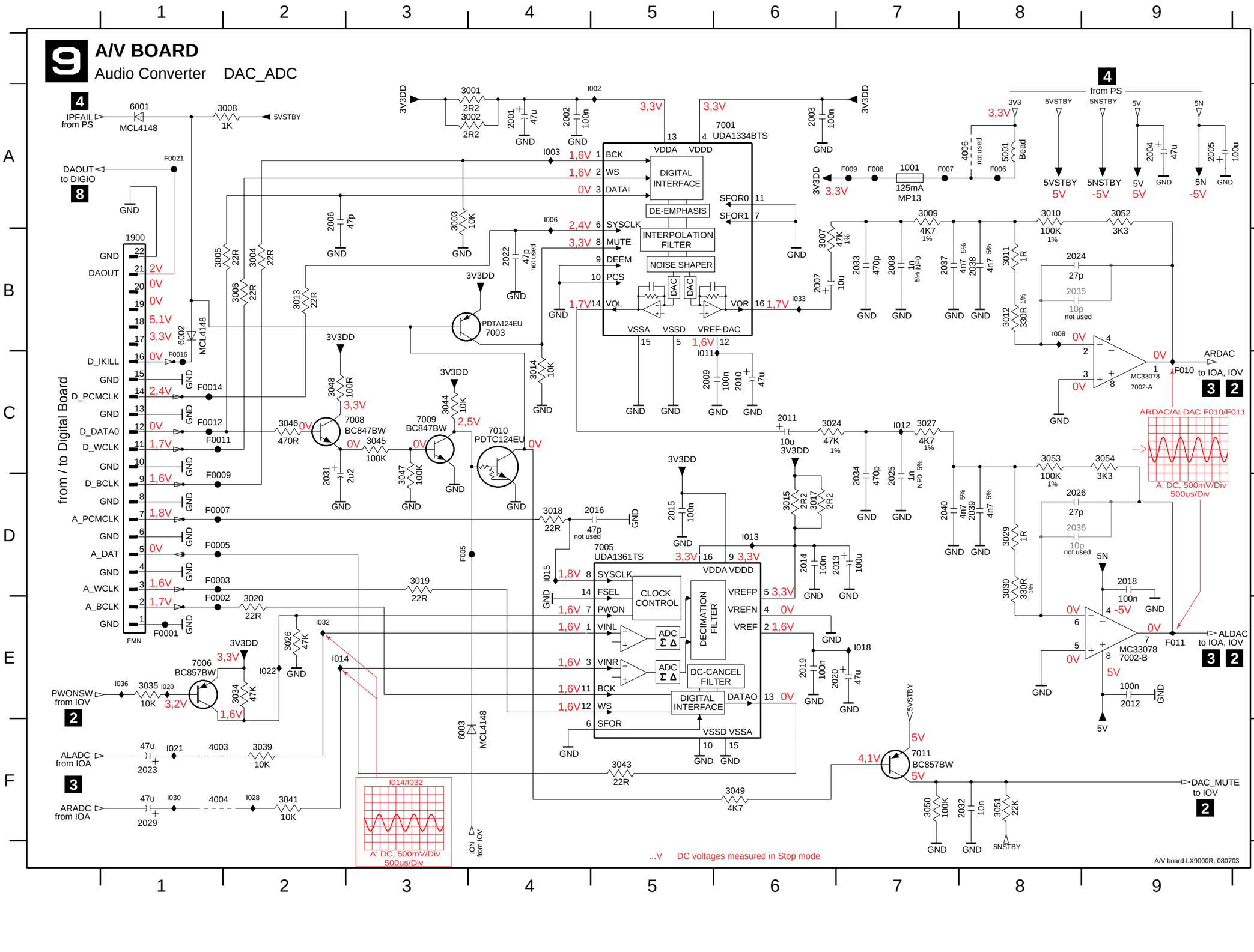
1952 PH-2B to/from MDM board

...V DC voltages measured in Stop mode

A/V board LX9000R, 060703

9 A/V BOARD

Audio Converter DAC_ADC



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1900	A1	4004	F1
2001	A4	4006	A8
2002	A4	5001	A8
2003	A6	6001	A1
2004	A9	6002	B1
2005	A9	6003	F3
2006	A2	7001	A6
2007	B6	7002-A	C9
2008	B7	7002-B	E9
2009	C5	7003	B4
2010	C6	7005	D5
2011	C6	7006	E1
2012	E9	7008	C2
2013	D7	7009	C3
2014	D6	7010	C4
2015	D5	7011	F7
2016	D5	F0001	E1
2018	D9	F0002	E1
2019	E6	F0003	D1
2020	E7	F0005	D1
2022	B4	F0007	D1
2023	F1	F0009	D1
2024	B8	F0011	C1
2025	D7	F0012	C1
2026	D8	F0014	C1
2029	F1	F0016	C1
2031	D2	F0021	A1
2032	F8	F005	D3
2033	B7	F006	A8
2034	D7	F007	A7
2035	B8	F008	A7
2036	D8	F009	A7
2037	B7	F010	C9
2038	B8	F011	E9
2039	D8	I002	A5
2040	B8	I003	A4
3001	A4	I006	A4
3002	A4	I008	B8
3003	A3	I011	C5
3004	B2	I012	C7
3005	B1	I013	D6
3006	B2	I014	E2
3007	B6	I015	D4
3008	A2	I018	E7
3009	A7	I020	E2
3010	A8	I021	F1
3011	B8	I022	E2
3012	B8	I028	F2
3013	B2	I030	F1
3014	C4	I032	E2
3015	D6	I033	B6
3017	D6	I036	E1
3018	D4		
3019	D3		
3020	E2		
3024	C6		
3026	E2		
3027	C7		
3029	D8		
3030	D8		
3034	E2		
3035	E1		
3039	F2		
3041	F2		
3043	F5		
3044	C3		
3045	C3		
3046	C2		
3047	D3		
3048	C2		
3049	F6		
3050	F7		
3051	F8		
3052	A9		
3053	C8		
3054	C9		

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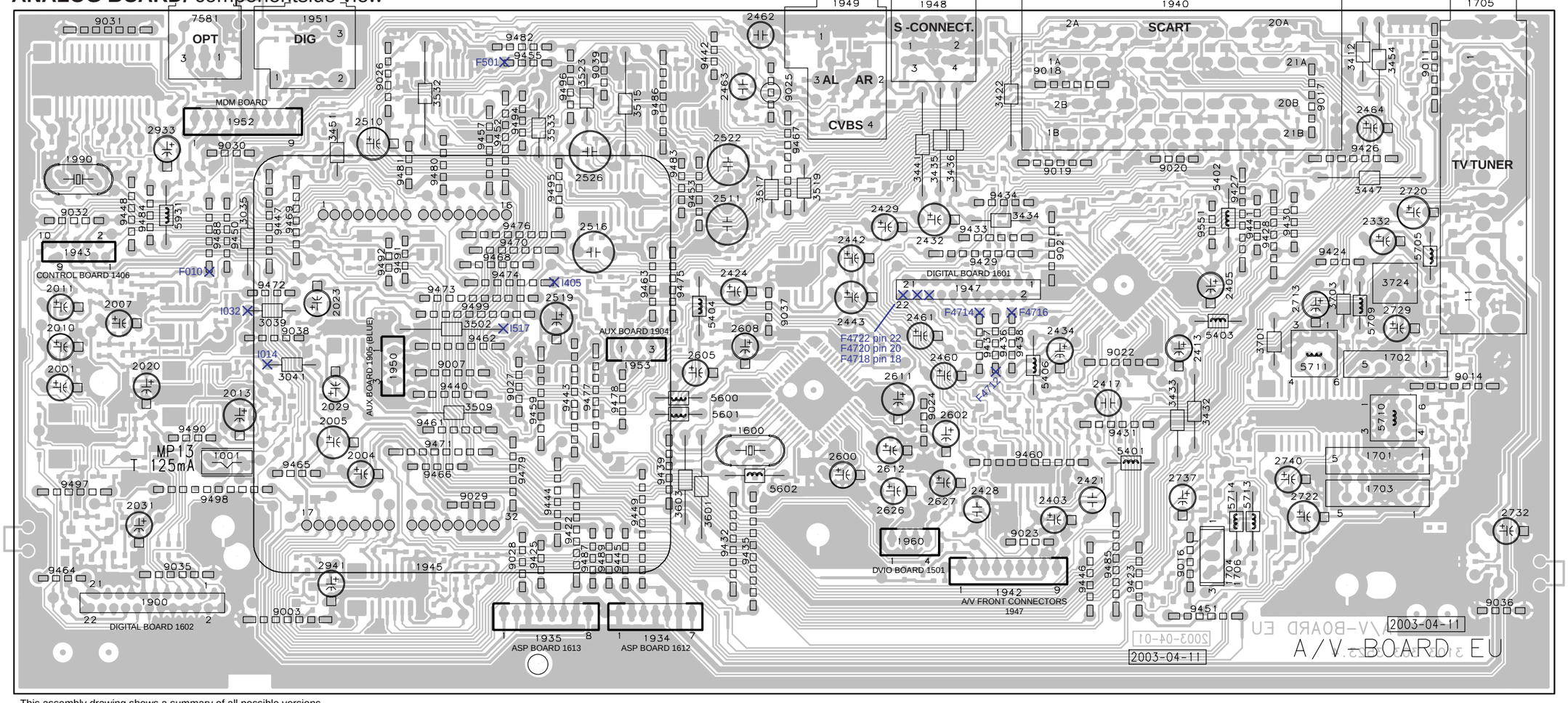
ANALOG BOARD/ componentside view



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Analog board LX9000R, 090703

TEST POINTS

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7671 B5 7672 B5 7673 B5 7674 B5 7675 B5 7676 B5 7677 B5 7678 B5 7679 B5 7680 B5 7681 B5 7682 B5 7683 B5 7684 B5 7685 B5 7686 B5 7687 B5
7688 B5 7689 B5 7690 B5 7691 B5 7692 B5 7693 B5 7694 B5 7695 B5 7696 B5 7697 B5 7698 B5 7699 B5 7700 B5 7701 B5 7702 B5 7703 B5 7704 B5
7705 B5 7706 B5 7707 B5 7708 B5 7709 B5 7710 B5 7711 B5 7712 B5 7713 B5 7714 B5 7715 B5 7716 B5 7717 B5 7718 B5 7719 B5 7720 B5 7721 B5
7722 B5 7723 B5 7724 B5 7725 B5 7726 B5 7727 B5 7728 B5 7729 B5 7730 B5 7731 B5 7732 B5 7733 B5 7734 B5 7735 B5 7736 B5 7737 B5 7738 B5
7739 B5 7740 B5 7741 B5 7742 B5 7743 B5 7744 B5 7745 B5 7746 B5 7747 B5 7748 B5 7749 B5 7750 B5 7751 B5 7752 B5 7753 B5 7754 B5 7755 B5
7756 B5 7757 B5 7758 B5 7759 B5 7760 B5 7761 B5 7762 B5 7763 B5 7764 B5 7765 B5 7766 B5 7767 B5 7768 B5 7769 B5 7770 B5 7771 B5 7772 B5
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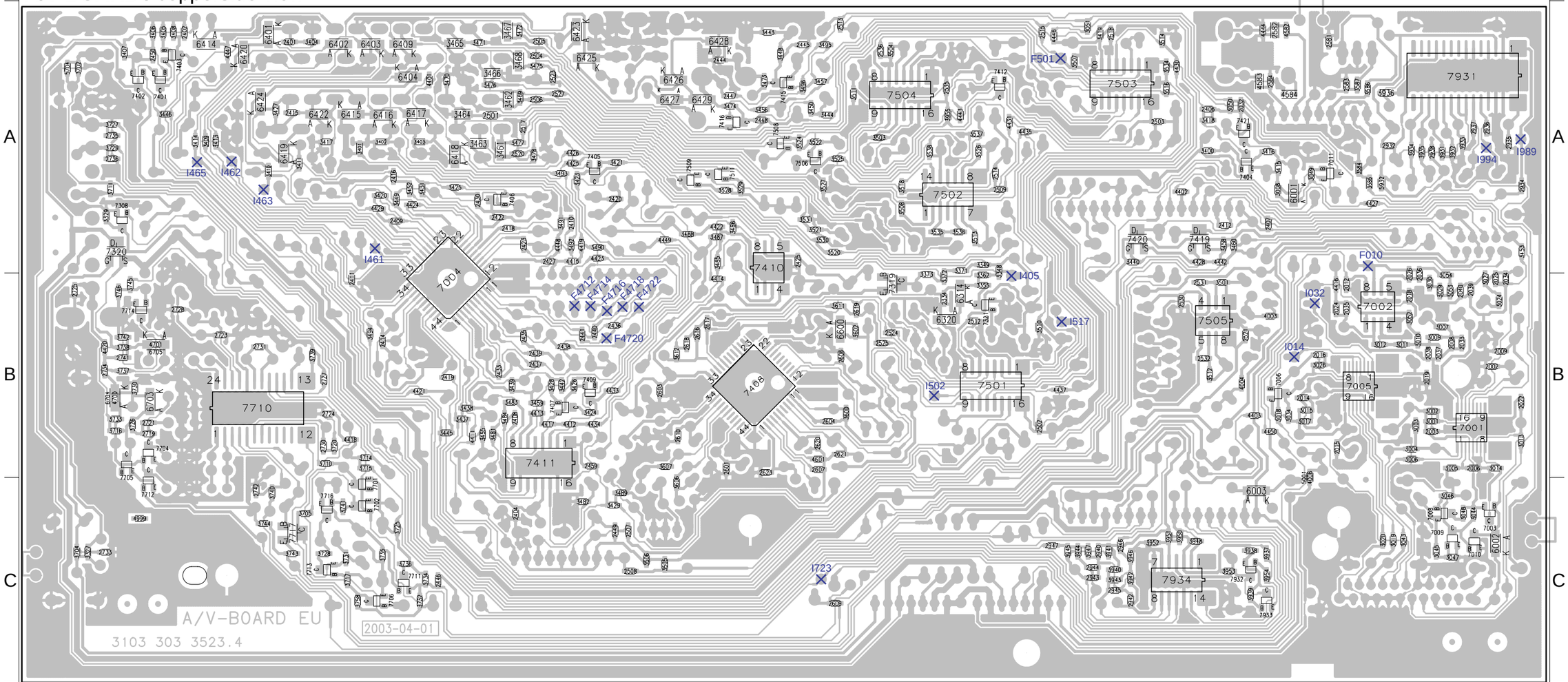
7807 B5 7808 B5 7809 B5 7810 B5 7811 B5 7812 B5 7813 B5 7814 B5 7815 B5 7816 B5 7817 B5 7818 B5 7819 B5 7820 B5 7821 B5 7822 B5 7823 B5
7824 B5 7825 B5 7826 B5 7827 B5 7828 B5 7829 B5 7830 B5 7831 B5 7832 B5 7833 B5 7834 B5 7835 B5 7836 B5 7837 B5 7838 B5 7839 B5 7840 B5
7841 B5 7842 B5 7843 B5 7844 B5 7845 B5 7846 B5 7847 B5 7848 B5 7849 B5 7850 B5 7851 B5 7852 B5 7853 B5 7854 B5 7855 B5 7856 B5 7857 B5
7858 B5 7859 B5 7860 B5 7861 B5 7862 B5 7863 B5 7864 B5 7865 B5 7866 B5 7867 B5 7868 B5 7869 B5 7870 B5 7871 B5 7872 B5 7873 B5 7874 B5
7875 B5 7876 B5 7877 B5 7878 B5 7879 B5 7880 B5 7881 B5 7882 B5 7883 B5 7884 B5 7885 B5 7886 B5 7887 B5 7888 B5 7889 B5 7890 B5 7891 B5
7892 B5 7893 B5 7894 B5 7895 B5 7896 B5 7897 B5 7898 B5 7899 B5 7900 B5 7901 B5 7902 B5 7903 B5 7904 B5 7905 B5 7906 B5 7907 B5 7908 B5
7909 B5 7910 B5 7911 B5 7912 B5 7913 B5 7914 B5 7915 B5 7916 B5 7917 B5 7918 B5 7919 B5 7920 B5 7921 B5 7922 B5 7923 B5 7924 B5 7925 B5
7926 B5 7927 B5 7928 B5 7929 B5 7930 B5 7931 B5 7932 B5 7933 B5 7934 B5

A/V BOARD / copperside view



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

A/V board LX9000R EU, 090703

TEST POINTS

F 010 A7 F 501 A5 F4712 B3 F4714 B3 F4716 B3 F4718 B3 F4720 B3 F4722 B3 I 014 B6 I 032 B6 I 405 A5 I 461 A2 I 462 A1 I 463 A1 I 465 A1 I 502 B5 I 517 B5 I 723 C4 I 989 A7 I 994 A7

uP Sub Board: Central Controller (CECO)

0606 B15 1801 B8 1805 B9 1980 B1 1984 I11 1986 E1 1987 I9 1988 I8 2800 A9
2801 B8 2802 B8 2803 B6 2804 B6 2805 B6 2806 B11 2807 A8 2808 B13 2809 B14
2810 B3 2811 C3 2812 E14 2813 B8 2814 B9 2815 H1 2816 A5 2817 G9 2818 H2
2819 A5 2820 A6 2821 A3 2822 A2 2823 I4 2824 I4 2825 I6 2826 I14 2827 I15
2828 H13 2829 H5 2830 H4 2831 H9 2832 G8 2833 G14 2834 H14 2835 H15 3800 E2
3801 A8 3802 E1 3803 E2 3804 B2 3805 C3 3806 B3 3807 D10 3808 D10 3809 E10
3810 E10 3811 C3 3812 C2 3813 G15 3814 H10 3815 G10 3816 C2 3817 F10 3818 F11
3819 G15 3820 H5 3821 E14 3822 E15 3823 E14 3824 I7 3825 E8 3826 H8 3827 B2
3828 F13 3829 A4 3830 G12 3831 H11 3832 G1 3833 G11 3834 G9 3835 G9 3836 H10
3837 B4 3838 H5 3839 H1 3840 H3 3841 H2 3842 H2 3843 I1 3844 I1 3845 A4
3846 A4 3847 B7 3848 C9 3849 H2 3850 B4 3851 E9 3852 G5 3853 A1 3854 A1 3855 A2
3856 F3 3857 G2 3858 G9 3859 G10 3861 H2 3862 A6 3863 A1 3864 A1 3865 A2
3866 A2 3867 A2 3868 F3 3869 I3 3870 I4 3871 I6 3872 I6 3873 I7 3874 C4
3875 C4 3876 F12 3878 H8 3879 E2 3881 D2 3882 D2 3884 I14 3885 I15 3886 I15
3887 I14 3888 F2 3889 G8 4801 F4 4802 C4 5801 B12 5802 B14 5804 A6
6800 H1 6801 A2 6802 A5 6803 G11 6804 G8 6805 F8 7801 B11 7802 A7 7803 B12
7804 B4 7805 B14 7806 A9 7807 E15 7808 H13 7810 G14 7811 H13 7813 H1 F8001 C1 F8002 C1
7815 H3 7816 A3 7817 F2 7818 H6 7821 C2 7822 B2 7825 H5
F8003 B1 F8004 B1 F8005 B1 F8006 B1 F8007 B1 F8008 B1 F8009 B1 F8010 B1 F8011 B1 F8012 B1
F804 B14 F805 C14 F806 C14 F807 C14 F808 C14 F809 C14 F810 C14 F811 C14 F812 C14
F813 C14 F814 C14 F815 C14 F816 C14 F817 C14 F818 C14 F819 D14 F820 B15 F821 B15
F822 C15 F823 C15 F824 C15 F825 C15 F826 C15 F827 C15 F828 C15 F829 C15 F830 C15
F831 C15 F832 C15 F833 C15 F834 C15 F835 C15 F836 D15 F837 D15 F838 D15 F839 D15
F840 E8 F8401 H11 F8402 H11 F8403 H11 F8405 H11 F8406 H12 F8407 H12 F841 F8 F842 F8
F843 F4 F844 D15 F845 D15 F846 E1 F847 A3 F848 E8 F849 B6 F850 C4 F851 C4
F852 E8 F8603 E1 F8604 E1 F8606 E1 F8607 E2 F8608 E1 F8609 E2 F8610 F1 F8701 H9
F8702 H9 F8703 H9 F8704 H10 F8705 H10 F8706 I10 F8707 H10 F8708 H10 F8802 I8 F8803 I8
F8804 I8 F8805 I8 F8806 I8 F8807 I8 F8808 I9 F8809 A8 I810 B1 I810 B10 I811 E7 I812 E7 I813 A2
I805 F10 I806 G5 I807 H4 I808 H6 I809 A8 I810 B10 I811 E7 I812 E7 I813 A2
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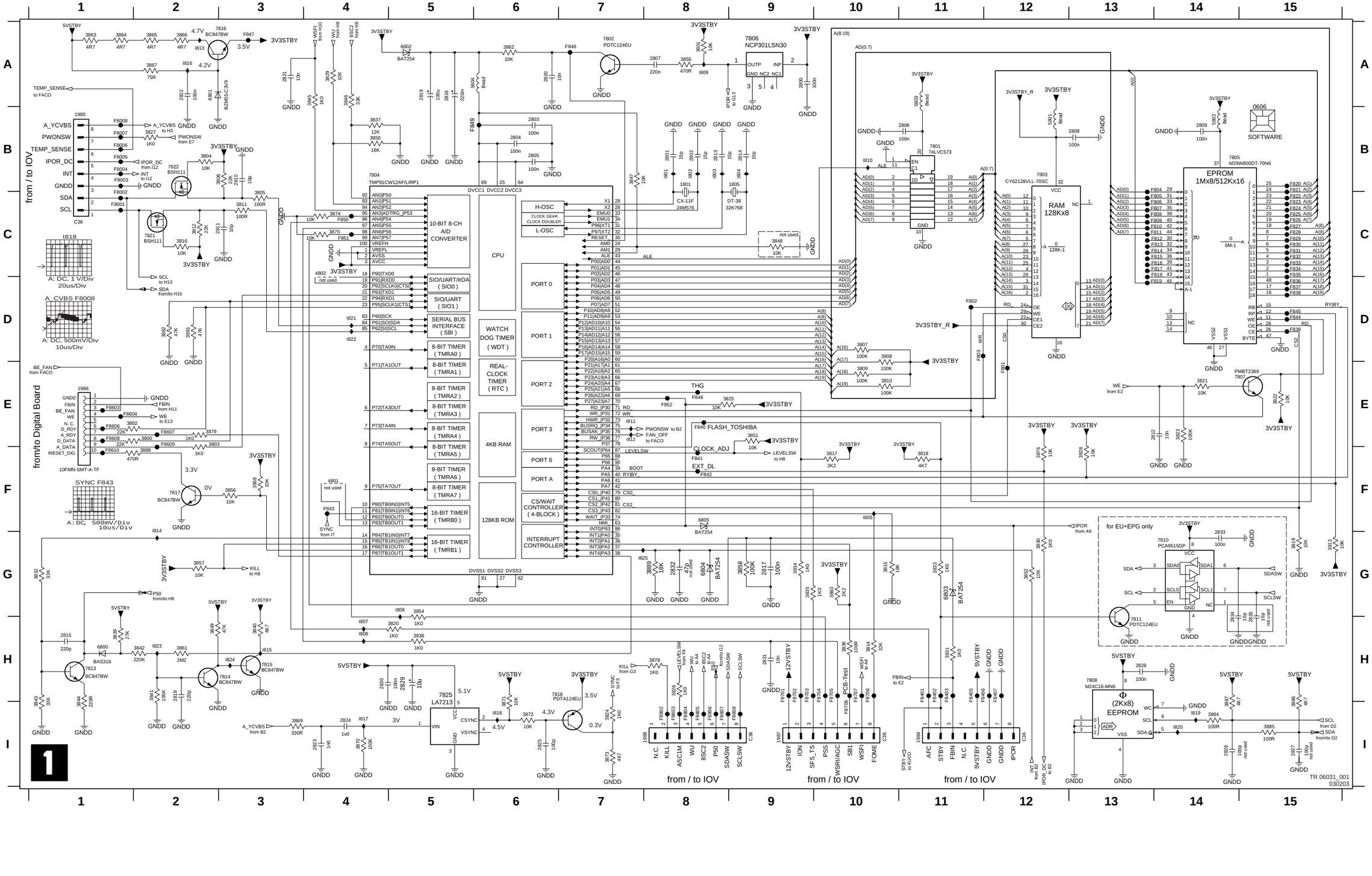
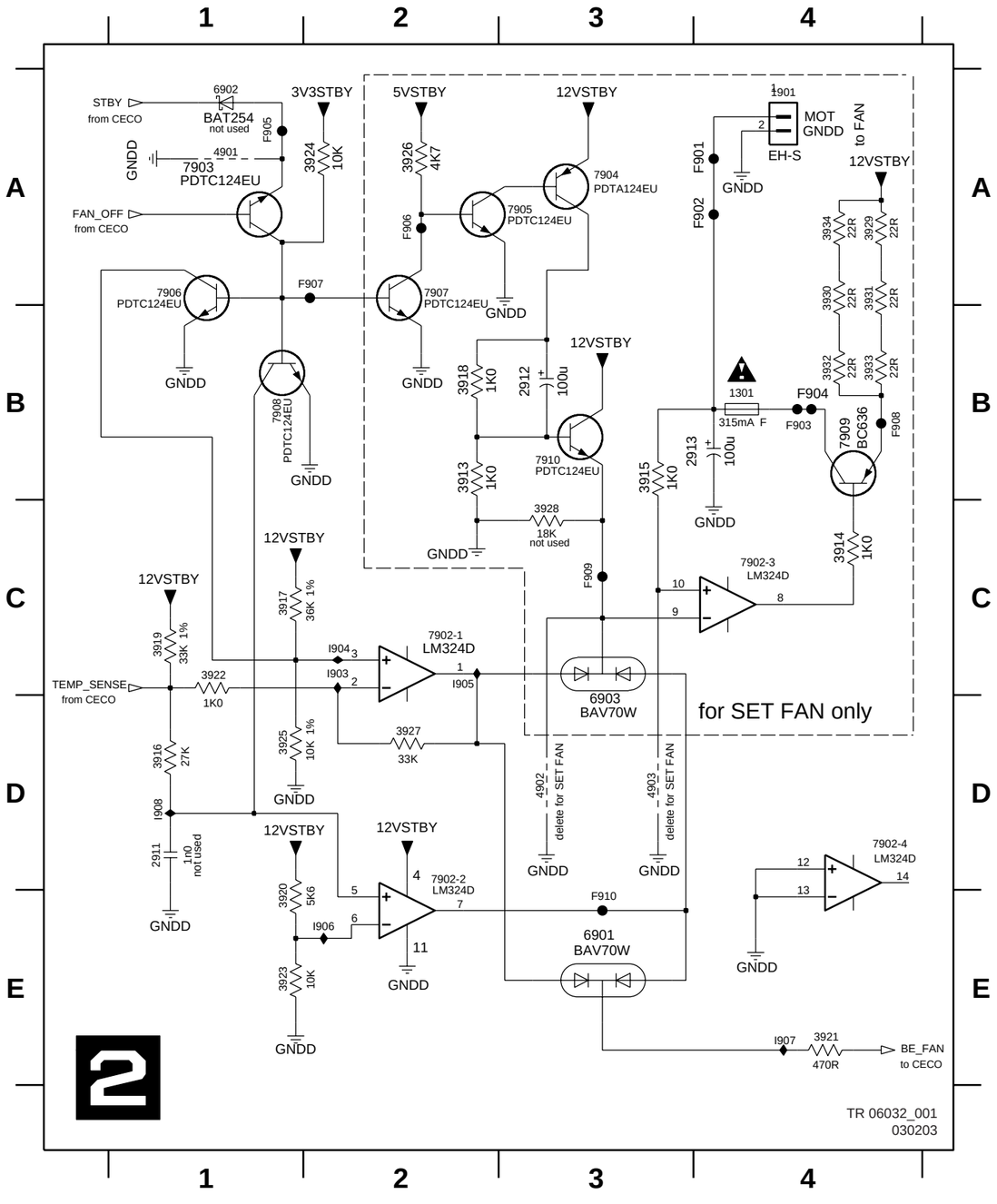
I823 H2 I824 H3 I825 G7

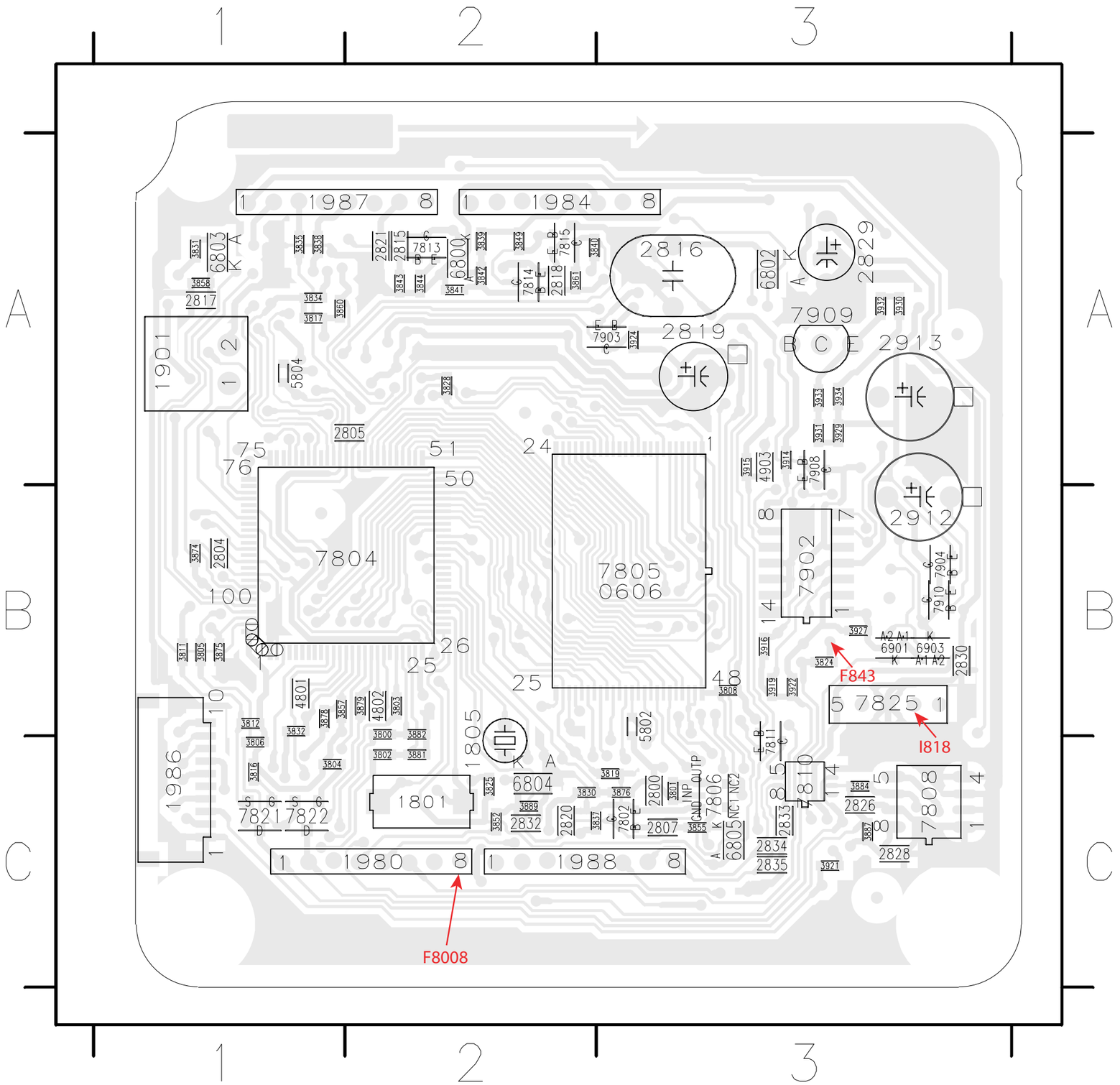


uP Sub Board: Fan Control (FACO)

1301 B4	**3915 B3**	**3922 C1**	**3929 A4**	**4902 D3**	**7902-3 C4**	**7908 B1**	**F905 A1**	**I904 C2**
1901 A4	**3916 D1**	**3923 E1**	**3930 A4**	**4903 D3**	**7902-4 D4**	**7909 B4**	**F906 A2**	**I905 C2**
2911 D1	**3917 C1**	**3924 A2**	**3931 A4**	**6901 E3**	**7903 A1**	**7910 B3**	**F907 A2**	**I906 E2**
2912 B3	**3918 B2**	**3925 D1**	**3932 B4**	**6902 A1**	**7904 A3**	**F901 A4**	**F908 B4**	**I907 E4**
2913 B4	**3919 C1**	**3926 A2**	**3933 B4**	**6903 C3**	**7905 A3**	**F902 A4**	**F909 C3**	**I908 D1**
3913 B2	**3920 E1**	**3927 D2**	**3934 A4**	**7902-1 C2**	**7906 A1**	**F903 B4**	**F910 E3**	
3914 C4	**3921 E4**	**3928 C3**	**4901 A1**	**7902-2 D2**	**7907 A2**	**F904 B4**	**I903 C2**	



uP Sub Board: (top view)

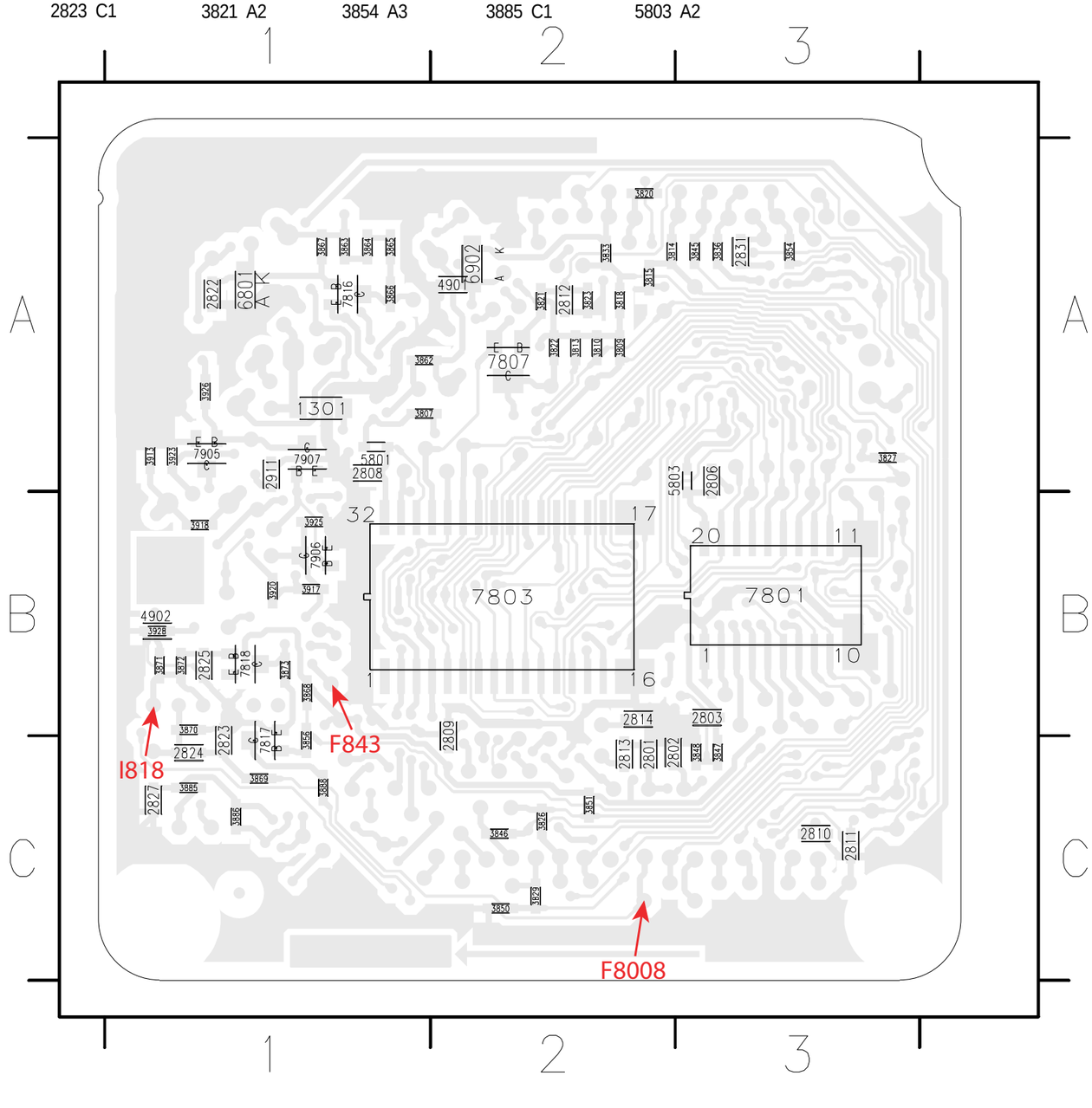


0606	B3	3819	C3	3929	A3
1801	C2	3824	B3	3930	A3
1805	C2	3825	C2	3931	A3
1901	A1	3828	A2	3932	A3
1980	C2	3830	C2	3933	A3
1984	A2	3831	A1	3934	A3
1986	C1	3832	B1	4801	B1
1987	A1	3834	A1	4802	B2
1988	C2	3835	A1	4903	A3
2800	C3	3837	C2	5802	B3
2804	B1	3838	C1	5804	A1
2805	A2	3839	A2	6800	A2
2807	C3	3840	A2	6802	A3
2815	A2	3841	A2	6803	A1
2816	A3	3842	A2	6804	C2
2817	A1	3843	A2	6805	C3
2818	A2	3844	A2	6901	B3
2819	A3	3849	A2	6903	B3
2820	C2	3852	C2	7802	C3
2821	A2	3855	C3	7804	B2
2826	C3	3857	B1	7805	B3
2828	C3	3858	A1	7806	C3
2829	A3	3860	A1	7808	C3
2830	B3	3861	A2	7810	C3
2832	C2	3874	B1	7811	A2
2833	C3	3876	B1	7813	A2
2834	B3	3878	C3	7814	A2
2835	C3	3879	B2	7815	A2
3800	B2	3881	B2	7821	B3
3801	B3	3882	B2	7822	B3
3802	C3	3884	C3	7825	A3
3803	C2	3887	C2	7902	B3
3804	B2	3889	C3	7903	A3
3806	C1	3907	C3	7904	B3
3807	B1	3908	C3	7907	B3
3808	C1	3911	C3	7908	B3
3811	B1	3914	C3	7909	B3
3812	B1	3915	C3	7910	B3
3816	C1	3916	C3		
3817	A1	3919	C3		
		3921	C3		
		3922	C3		
		3924	C3		
		3927	B3		

TR 06012_001
040203

uP Sub Board: (bottom view)

1301 A1
2801 C2
2802 C2
2803 B3
2806 A3
2808 A1
2809 B2
2810 C3
2811 C3
2812 A2
2813 C2
2814 B2
2822 A1
2823 C1
2824 A2
2825 B1
2827 C1
2831 A3
2911 A1
3807 A1
3809 A2
3810 A2
3813 A2
3814 A2
3815 A2
3818 A2
3820 A2
3821 A2
3822 A2
3823 A2
3826 C2
3827 A3
3829 C2
3833 A2
3836 A3
3845 A3
3846 C2
3847 C3
3848 C3
3850 C2
3851 C2
3854 A3
3856 C1
3862 A1
3863 A1
3864 A1
3865 A1
3866 A1
3867 A1
3868 B1
3869 C1
3870 B1
3871 B1
3872 B1
3873 B1
3885 C1
3886 C1
3888 C1
3913 A1
3917 B1
3918 B1
3920 B1
3923 A1
3925 B1
3926 A1
3928 B1
4901 A2
4902 B1
5801 A1
5803 A2
6801 A1
6902 A2
7801 B3
7803 B2
7807 A2
7816 A1
7817 C1
7818 B1
7905 A1
7906 B1
7907 A1



TR 06013_001
040203

1 DVIO BOARD
1394 INTERFACE

FROM FRONT DV INPUT PCB

F0106 GND 1901 8 7 6 5 4 3 2 1

F0104 F0103 F0102 F0101

3404 56R 1% 3405 56R 1% F402 2402 270p 3406 5K1 GND

3402 56R 1% 3401 56R 1% F122 2401 1u GND

7400 UPD72852

3V3_D 60 56 20 10 4 DVDD

3V3_A 54 47 40 31 25 AVDD

3V3_A 3407 10K F421

39 TPA0P 38 TPA0N CABLE PORT0

37 TPB0P 36 TPB0N

46 TPA1P 45 TPA1N CABLE PORT1

44 TPB1P 43 TPB1N GND

41 TPBIAS0 48 TPBIAS1 VOLTAGE AND CURRENT GENERATOR

34 RI1

23 XI 22 XO CRYSTAL OSCILLATOR PLL SYSTEM AND TRANSMIT CLOCK GENERATOR

ARBITRATION AND CONTROL STATE MACHINE LOGIC

RECEIVE DATA DECODER AND RETIMER

TRANSMIT DATA ENCODER

LINK INTERFACE I/O

CABLE POWER STATUS

CMC 30 PC0 26 PC1 27 PC2 28 GND

SUS|RES 19 4401 3V3_D

SPD 61 3V3_D

TEST 62 GND

LREQ 63 F416 3403 LREQ

LPS 59 F417 22R 3410 LPS

DIRECT 50 F424 3400 22R 3V3_A

SCLK 2 F415 10K 3413 SCLK

LKON 58 F418 3414 22R LKON

CTL0 5 F419 22R 3415 CTL0

CTL1 6 F420 3416 22R CTL1

D0 8 F400 22R 3417 PHY_D(0)

D1 9 F401 3418 22R PHY_D(1)

D2 11 F403 22R 3419 PHY_D(2)

D3 12 F404 3420 22R PHY_D(3)

D4 14 F405 22R 3421 PHY_D(4)

D5 15 F406 3422 22R PHY_D(5)

D6 17 F407 22R 3423 PHY_D(6)

D7 18 F408 3424 22R PHY_D(7)

IC(AL)1 29 IC(AL)2 51 IC(DL) 3 GND

RESETB 55 F425

CPS 32 F422 3408 100K GND 2400 100n GND

DGND 64 57 21 16 13 7 1 GND

AGND 53 52 49 42 35 33 24 F412 GND

{CTL0,CTL1,SCLK,LKON,LPS,LREQ} 2

3411 10K GND only for development

PHY_D(0:7) 2

F400/F401 A: DC, 1 V/Div 20us/Div

F411 A: DC, 1 V/Div 20ns/Div

F410 A: DC, 1 V/Div 20ns/Div

3V3 5400 100MHZ F409

2403 47u 2404 100n 2405 100n 2406 100n 2407 100n 2408 100n GND

3V3_A 3V3_D 5401 100MHZ F414

2415 47u 2416 100n 2417 100n 2418 100n 2419 100n 2420 100n GND

F423 F411 F413 4402 F410

to be 9K1 0.5% 3409 8K2 GND

1400 CX-11F 24M576 2413 10p 2412 10p GND

3V3_D 3V3_D 3412 330R 6401 TLMH3100

7401 74LVC1GU04

only for development

1400 F3
1901 B1
2400 F8
2401 C2
2402 C2
2403 E1
2404 E1
2405 E2
2406 E2
2407 E2
2408 E2
2412 F4
2413 F3
2415 F1
2416 F1
2417 F2
2418 F2
2419 F2
2420 F2
3400 C8
3401 C2
3402 C2
3403 B8
3404 C2
3405 C2
3406 C2
3407 A8
3408 F7
3409 F3
3410 C8
3411 C9
3412 E9
3413 C8
3414 C8
3415 C8
3416 C8
3417 C8
3418 D8
3419 D8
3420 D8
3421 D8
3422 D8
3423 D8
3424 D8
4401 B7
4402 E4
5400 E1
5401 F1
6401 F9
7400 A4
7401 E8
F0101 B2
F0102 B2
F0103 B2
F0104 B2
F0106 A1
F122 C2
F400 C7
F401 D7
F402 C2
F403 D7
F404 D7
F405 D7
F406 D7
F407 D7
F408 D7
F409 E2
F410 E4
F411 E3
F412 F7
F413 E4
F414 F2
F415 C7
F416 B7
F417 C7
F418 C7
F419 C7
F420 C7
F421 A7
F422 E7
F423 E4
F424 C7
F425 E7

TR03014_002
220703

2 DVIO BOARD LINK + CODEC

IEEE 1394 LINK CORE
SELECTOR
SELECTOR
DV CODEC CORE
HOST INTERFACE
BLOCK TEST
CONTROL SYSTEM
PORT3
PORT4
<SCI> INTERF SERIAL
<UART?> INTERF SERIAL
<TMR0> <TMR1> 16 BIT TIMER
INTC
CTRL MEMORY
CORE CPU
60K BYTE INTERNAL ROM (HIGH SPEED)
16K BYTE INTERNAL RAM (HIGH SPEED)
35/2K BYTE INTERNAL ROM (HIGH SPEED)
7430 MT48LC1M16A1TG
7431 UPD72893
7432 M29W800AT
7433 LF25C
BANK SELECT
DATA INPUT REGISTER
I/O CONTROL
SENSE AMP
512Kx16
512Kx16
ROW DECODER
REFRESH COUNTER ROW BUFFER
ADDRESS REGISTER
OUTPUT BUFFER
COLUMN DECODER
LATENCY & BURST LENGTH
PROGRAMMING REGISTER
COL. BUFFER
TIMING REGISTER
only for development
not used
DV_STATUS
RESTB
3V3_LINK
3V3_RAM
3V3_F
3V3
2V5
GND

1902 B14
1905 A6
2431 D11
2432 D12
2433 D12
2434 D12
2435 D12
2436 E12
2437 D13
2438 D13
2439 E12
2440 D13
2441 E12
2442 D14
2443 D14
2444 E12
2445 D14
2446 E13
2447 E13
2448 E14
2449 C11
2450 C12
2451 C12
2452 C13
2453 C13
2454 C13
2455 C13
2456 C14
3425 A8
3426 H2
3427 H2
3428 H2
3429 H3
3430 I3
3431 I2
3432 I2
3433 I2
3434 I2
3435 I2
3436 I2
3437 I2
3438 I1
3439 I1
3440 I1
3441 I1
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3443 I1
3444 I1
3445 I1
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3454 G1
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3456 E1
3457 F1
3458 F1
3459 F1
3460 G1
3461 A5
3462 G1
3463 E1
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3465 F1
3466 F1
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3561 I7
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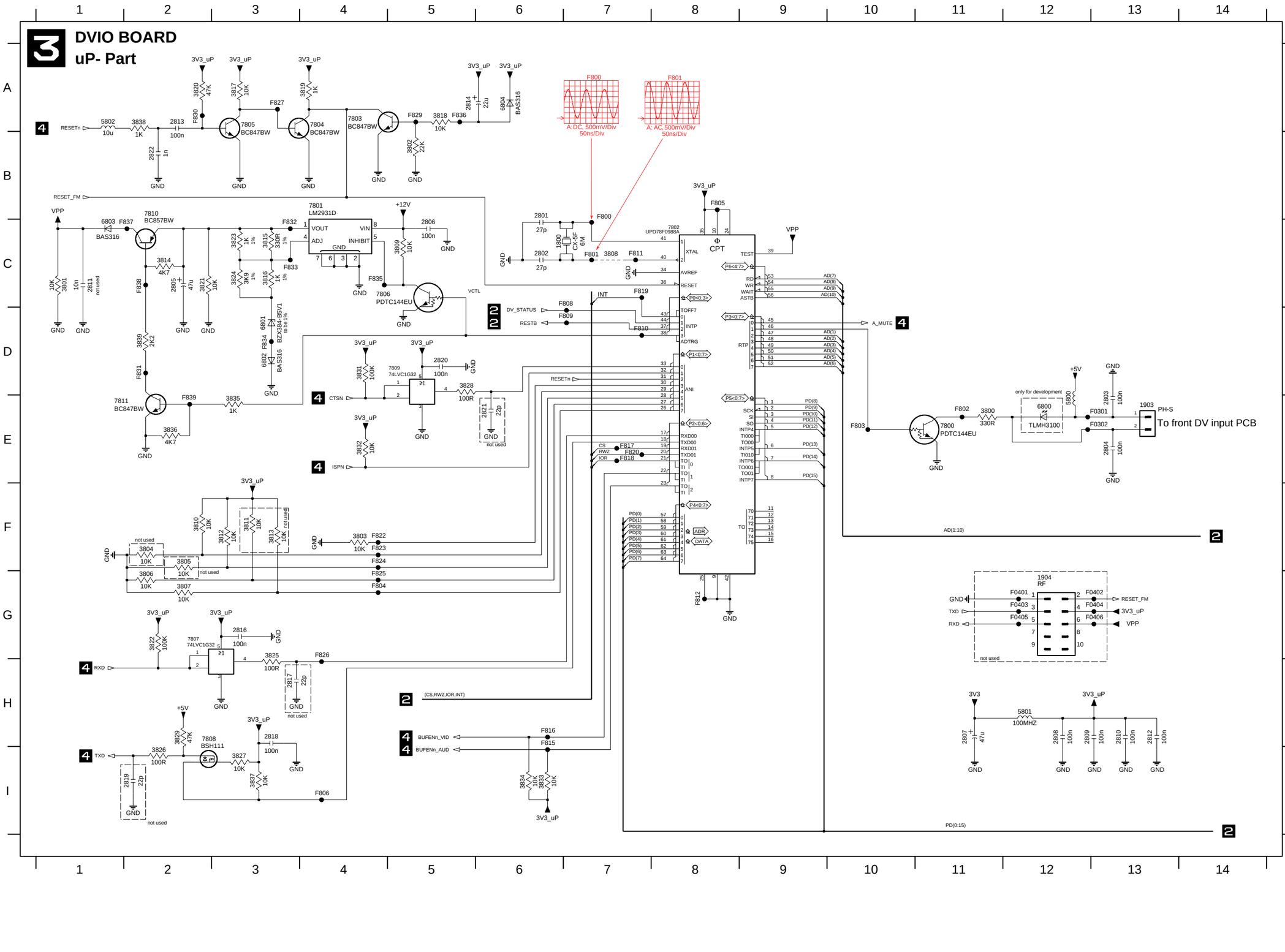
3564 E4
5431 C12
5432 D11
5433 E11
5434 E14
7430 F6
7431 B10
7432 H9
7433 C11
F0201 B14
F0202 B14
F0203 B14
F0204 B14
F0205 B14
F430 C12
F431 F3
F432 F2
F433 G9
F434 G9
F435 D12
F436 E14
F437 E12
F438 B5
F439 B9
F440 B4
F441 B5
F442 B8
F443 B5

3 DVIO BOARD uP- Part



1800 C6
1903 E13
1904 G12
2801 B6
2802 C6
2803 E13
2804 E13
2805 C2
2806 C5
2807 H11
2808 H12
2809 H12
2810 H13
2811 C1
2812 H13
2813 A2
2814 A5
2816 G3
2817 H3
2818 H3
2819 I2
2820 D5
2821 E6
2822 B2
3800 E11
3801 C1
3802 B5
3803 F4
3804 F2
3805 F2
3806 G2
3807 G2
3808 C7
3809 C5
3810 F2
3811 F3
3812 F3
3813 F3
3814 C2
3815 C3
3816 C3
3817 A3
3818 A5
3819 A4
3820 A2
3821 C2
3822 G2
3823 C3
3824 C3
3825 G3
3826 I2
3827 I3
3828 D5
3829 H2
3831 D4
3832 E4
3833 I6
3834 I6
3835 E3
3836 E2
3837 I3
3838 A2
3839 D2
5800 E12
5801 H12
5802 A1
6800 E12
6801 D3
6802 D3
6803 C1
6804 A6
7800 E11
7801 B4
7802 C8
7803 A4
7804 A4
7805 A3
7806 C4
7807 G2
7808 H2
7809 D5
7810 B2
7811 E1
F0301 E13
F0302 E13
F0401 G12
F0402 G13
F0403 G12
F0404 G13
F0405 G12
F0406 G13
F800 B7
F801 C7
F802 E11
F803 E10
F804 G4
F805 B8
F806 I4
F808 C7
F809 D7
F810 D7
F811 C7
F812 G8
F815 H6
F816 H6
F817 E7
F818 E7
F819 C7
F820 E7
F822 F4
F823 F4
F824 F4
F825 G4
F826 G4
F827 A3
F829 A5
F830 A2
F831 D2
F832 C3
F833 C3
F834 D3
F835 C4
F836 A5
F837 C2
F838 C2
F839 E2

4 DVIO BOARD
Interface + DAC

Clock delay

Buffer

To digital PCB

To analog PCB - Sound Processing

DAC

Shielding connection on mounting holes

Hole 4.9mm

Hole 3.6 mm

0003 I4
0004 I5
0005 I5
0006 I6
0007 I7
1500 C7
1501 H14
1502 E9
1503 F9
1906 I8
1907 I9
1908 I9
1909 I9
2500 A6
2501 C3
2502 C3
2503 C3
2504 C3
2505 C3
2506 E12
2507 E12
2508 E12
2509 C5
2510 C6
2511 C6
2512 E12
2513 E7
2514 G11
2515 C6
2516 D5
2517 D6
2518 D6
2519 D6
2520 F9
2521 F9
2522 G13
2523 G10
2524 G14
2525 H12
2526 H13
2527 A11
2528 C12
2529 F9
2530 F5
2531 F5
2532 F6
2533 F6
2534 E10
3500 B5
3501 B3
3502 B5
3503 B5
3504 C5
3505 C5
3506 D5
3507 D5
3508 D5
3509 D5
3510 E5
3511 B3
3512 B2
3514 E5
3515 F5
3516 F5
3517 G10
3518 G13
3519 G11
3520 G13
4500 A3
4501 B2
4502 F9
4503 G9
4504 G10
4507 A12
5500 A5
5501 C4
5503 E12
5504 E12
5505 A10
7500-A A1
7500-B A2
7500-C A2
7500-D A4
7500-E A3
7500-F I1
7501 F10
7505 D4
7506 E11
7507-A B11
7507-B B13
7508 C11
F501 A5
F502 A3
F503 C7
F504 C5
F505 C7
F506 C5
F507 B7
F508 B5
F509 B7
F510 B5
F511 D7
F512 D7
F513 D7
F514 D7
F515 E7
F516 E6
F517 F10
F518 D7
F519 D5
F520 D5
F521 E7
F522 D5
F523 F8
F524 D5
F525 E12
F526 E12
F527 E3
F528 F8
F529 E5
F530 E7
F531 E7
F532 E9
F533 E9
F534 F7
F535 F7
F536 F11
F537 F9
F538 G7
F539 G9
F540 G11
F541 G13
F542 G14
F543 G14
F544 G13
F545 G11
F547 G9
F548 G13
F549 H7
F550 G7
F551 F11
F552 F11
F553 G10
F554 E5
F555 F5
F556 F5
F557 F6
F558 F6
F559 E6
F560 G10
F561 F11
F562 F7
F563 A10
F564 B12
F565 B10
F566 B12
F567 A10

5 DVIO BOARD CLOCK

Host CLOCK

F603 — A: DC, 1 V/Div, 20ns/Div

HS_CLK — F603 — 3601 1R — 7600 74LVC1GU04 — 3V3_LINK — 2616 100n — GND — not used 2619 18p — not used — 4606

7601 FXO-31FL — VDD — OUT — OSC — TS — GND — 27MHz — 2600 100n — 5602 100MHZ — 4604 not used — 4605 — 2617 100n

+5V — 3V3_LINK

Audio CLOCK

F609 — A: DC, 1 V/Div, 200us/Div

F610 — A: DC, 1 V/Div, 20ns/Div

AMCLK44 — 4608 — F610 — 3603 1R

AMCLK48 — 4609

5V_PLL — 2612 100n — GND

7602 74HCT1G04 — APWM — F609 — F611 — 3600 220K — F601 — 2602 470n — 2614 470n — 3608 220K — NC

F614 — 3602 10K — +5V — 5600 100MHZ — 5V_PLL — 2601 10u — 2603 100n — GND

7604 BA7082F — VCC — IN2 — IN1 — BW — BWB — FB — CT1 — CT2 — VCTL — VCO — SW — 1/2 — VO — SW1 — SW2 — SW3 — FOUT — FADJ — GND

5V_PLL — F605 — 3606 10K 1% — 3612 10K 1% — not used 2604 3-10p — 2618 22p 1% — 2605 100n — GND

F624 — 3607 180K — 4602 — not used 2615 100n — F604

F615 — 4603 — 3609 560K not used — 3610 18K 1% — 3605 33K not used — 3604 1R — F616 — 3613 5K1 — 2606 1n — F617

3614 100K — 3V3_AC — 2613 100n — GND — 7608 74LVC1GU04 — F606

7606-A 74LV74 14 — 3V3_AC — 3617 10K — 2608 100n — 2611 100n — F621 — F622 — F619

7606-B 74LV74 14 — 3V3_AC — 3618 10K

3V3_AC — 5603 100MHZ 2607 100n — 5601 2609 100n — 3V3

7605 BU2288FV — DVDD — VDD2 — AVDD — CLK27M — CLK33M — CLK512FS — CLK16M — CLKA — FSEL — PLL1 — PLL2 — XTAL — XTALO — XTALI — TEST — OE — FSEL1 — DVSS — VSS2 — AVSS

F620 — A: DC, 1 V/Div, 10ns/Div — F620 — 2610 100n — F623 — F618 — 10K 3616 not used — AFS1 — 3V3_AC

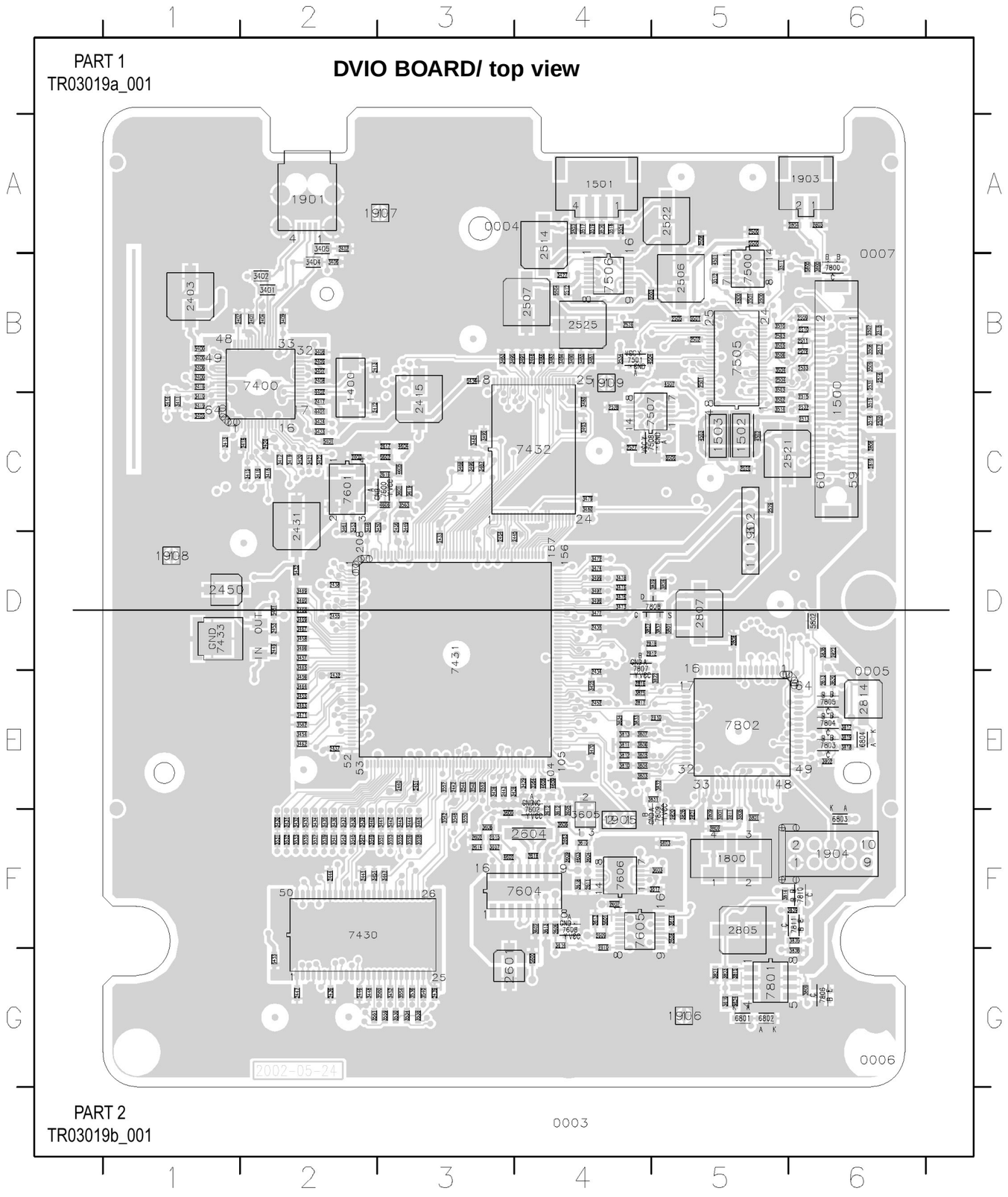
{APWM,AMCLK44,AMCLK48}

TR03018_002
220703

2600 B4
2601 C5
2602 D3
2603 D5
2604 E3
2605 E2
2606 F8
2607 A8
2608 B7
2609 A8
2610 B9
2611 A5
2612 C3
2613 E9
2614 D3
2615 F3
2616 A2
2617 B4
2618 E3
2619 B1
3600 D3
3601 A1
3602 D5
3603 B3
3604 F8
3605 F7
3606 E2
3607 F3
3608 D4
3609 F6
3610 F7
3612 E2
3613 F8
3614 E9
3616 C9
3617 A6
3618 E1
4602 F3
4603 F7
4604 A4
4605 A5
4606 B2
4608 B2
4609 C2
5600 C5
5601 A8
5602 A4
5603 A8
7600 A2
7601 A3
7602 C2
7604 D4
7605 B8
7606-A B5
7606-B D1
7608 F8
F601 D4
F603 A1
F604 F3
F605 D2
F606 F9
F609 D2
F610 B3
F611 D3
F614 D4
F615 F6
F616 F8
F617 F8
F618 B9
F619 B7
F620 B9
F621 B6
F622 C6
F623 B9
F624 F2

PART 1
TR03019a_001

DVIO BOARD/ top view



PART 2
TR03019b_001

1400 B2	2503 B5	2810 E5	3450 C3	3511 B5	3800 B6	5501 B5	
1500 C6	2504 B5	2811 F5	3451 F2	3512 B5	3801 F5	5503 B4	
1501 A4	2505 B5	2812 D4	3452 G3	3514 C5	3802 E6	5504 B4	
1502 C5	2506 B5	2813 E6	3453 C2	3515 C6	3803 E4	5505 C5	
1503 C5	2507 B4	2814 E6	3454 E2	3516 C6	3804 E4	5600 G4	
1800 F5	2508 A5	2816 E4	3455 E2	3517 A4	3805 E4	5601 F4	
1901 A2	2509 B6	2817 E4	3456 E2	3518 A4	3806 E4	5602 C3	
1902 C5	2510 B6	2818 D4	3457 D2	3519 A4	3807 E4	5603 F5	
1903 A6	2511 B6	2819 C6	3458 D2	3520 A4	3808 F5	5800 B6	
1904 F6	2512 B4	2820 F5	3459 D2	3530 G3	3809 G6	5801 D5	
1905 F4	2513 C6	2821 F5	3460 D2	3531 F2	3810 E4	5802 D6	
1906 G5	2514 A4	2822 D6	3461 C2	3532 F2	3811 E4	6801 G5	
1907 A3	2515 C6	3400 B1	3462 E2	3533 F2	3812 E4	6802 G5	
1908 D1	2516 B6	3401 B2	3463 E2	3534 G3	3813 E4	6803 F6	
1909 B4	2517 B6	3402 B2	3464 E2	3535 F2	3814 F5	6804 E6	
2400 B1	2518 B6	3403 C1	3465 D2	3536 G3	3815 G5	7400 B2	
2401 B2	2519 B6	3404 B2	3466 D2	3537 F2	3816 G5	7430 F2	
2402 A2	2520 C5	3405 A2	3467 D2	3538 G3	3817 E6	7431 D3	
2403 B1	2521 C5	3406 B2	3468 D2	3539 F2	3818 E6	7432 C4	
2404 B2	2522 A5	3407 B2	3469 D2	3540 G3	3819 E6	7433 D1	
2405 B2	2523 A4	3408 B2	3470 E4	3541 F2	3820 E6	7500 B5	
2406 B1	2524 A4	3409 B2	3471 E2	3542 F3	3821 G5	7501 B4	
2407 B1	2525 B4	3410 C1	3472 D4	3543 F2	3822 E5	7505 B5	
2408 B2	2526 B4	3411 C1	3473 D4	3544 E3	3823 G5	7506 B4	
2412 C2	2527 C4	3413 C1	3474 D4	3545 F2	3824 G5	7507 C4	
2413 B2	2528 C4	3414 C1	3475 D4	3546 F3	3825 E4	7508 C4	
2415 C3	2529 C5	3415 C2	3476 D4	3547 F2	3826 D5	7600 C3	
2416 B1	2530 C6	3416 C2	3477 D4	3548 E3	3827 D4	7601 C2	
2417 C2	2531 B6	3417 C2	3478 D4	3549 F2	3828 F5	7602 F4	
2418 C2	2532 C6	3418 C2	3479 C4	3550 F3	3829 D5	7604 F4	
2419 C1	2533 B6	3419 C2	3480 C4	3551 F3	3831 E5	7605 F4	
2420 C2	2534 B4	3420 C2	3481 B4	3552 E3	3832 E5	7606 F4	
2431 C2	2600 C2	3421 C2	3482 B4	3553 F3	3833 E4	7608 F4	
2432 E2	2601 G3	3422 C2	3483 B3	3554 G3	3834 E4	7800 B6	
2433 D3	2602 F3	3423 C2	3484 C3	3555 F3	3835 F6	7801 G5	
2434 E4	2603 F4	3424 C2	3485 B4	3556 F3	3836 G6	7802 E5	
2435 D4	2604 F4	3425 E4	3486 B4	3557 E3	3837 D5	7803 E6	
2436 G2	2605 F4	3426 E3	3487 C3	3558 F3	3838 D6	7804 E6	
2437 E2	2606 F4	3427 B4	3488 C3	3559 G3	3839 F6	7805 E6	
2438 D2	2607 F4	3428 E3	3489 C4	3560 G3	4401 C2	7806 G6	
2439 G3	2608 F5	3429 E4	3490 B4	3561 G2	4402 B2	7807 D4	
2440 E3	2609 F4	3430 F2	3491 B4	3562 E2	4500 B5	7808 D5	
2441 F2	2610 F4	3431 F2	3492 C3	3563 C3	4501 B5	7809 F5	
2442 E3	2611 F4	3432 F2	3493 C4	3564 E4	4502 C5	7810 F6	
2443 E3	2612 F4	3433 F2	3494 B4	3600 F3	4503 C5	7811 F6	
2444 F2	2613 F4	3434 F2	3495 B3	3601 C3	4504 B4		
2445 D3	2614 F3	3435 F2	3496 C3	3602 F4	4507 B5		
2446 G2	2615 F3	3436 F2	3497 D4	3603 F5	4602 F3		
2447 G2	2616 C3	3437 F2	3498 D4	3604 F4	4603 F4		
2448 B4	2617 C3	3438 F2	3499 D4	3605 F4	4604 C3		
2449 D2	2618 F4	3439 F2	3500 B5	3606 F4	4605 C3		
2450 D1	2619 C3	3440 F2	3501 B5	3607 F3	4606 C3		
2451 E3	2801 F5	3441 F3	3502 C5	3608 F3	4608 E4		
2452 E4	2802 F5	3442 F3	3503 B5	3609 F4	4609 E4		
2453 D2	2803 A6	3443 F3	3504 B5	3610 F4	5400 B1		
2454 D3	2804 A6	3444 F3	3505 B5	3612 F4	5401 C2		
2455 D2	2805 F5	3445 F3	3506 B5	3613 F4	5431 D2		
2456 C3	2806 C6	3446 C2	3507 B6	3614 F4	5432 D2		
2500 A5	2807 D5	3447 F3	3508 B6	3616 F5	5433 G2		
2501 B5	2808 D5	3448 G2	3509 B6	3617 F5	5434 B3		
2502 B5	2809 F5	3449 C3	3510 B5	3618 F4	5500 A5		

TR03019_001
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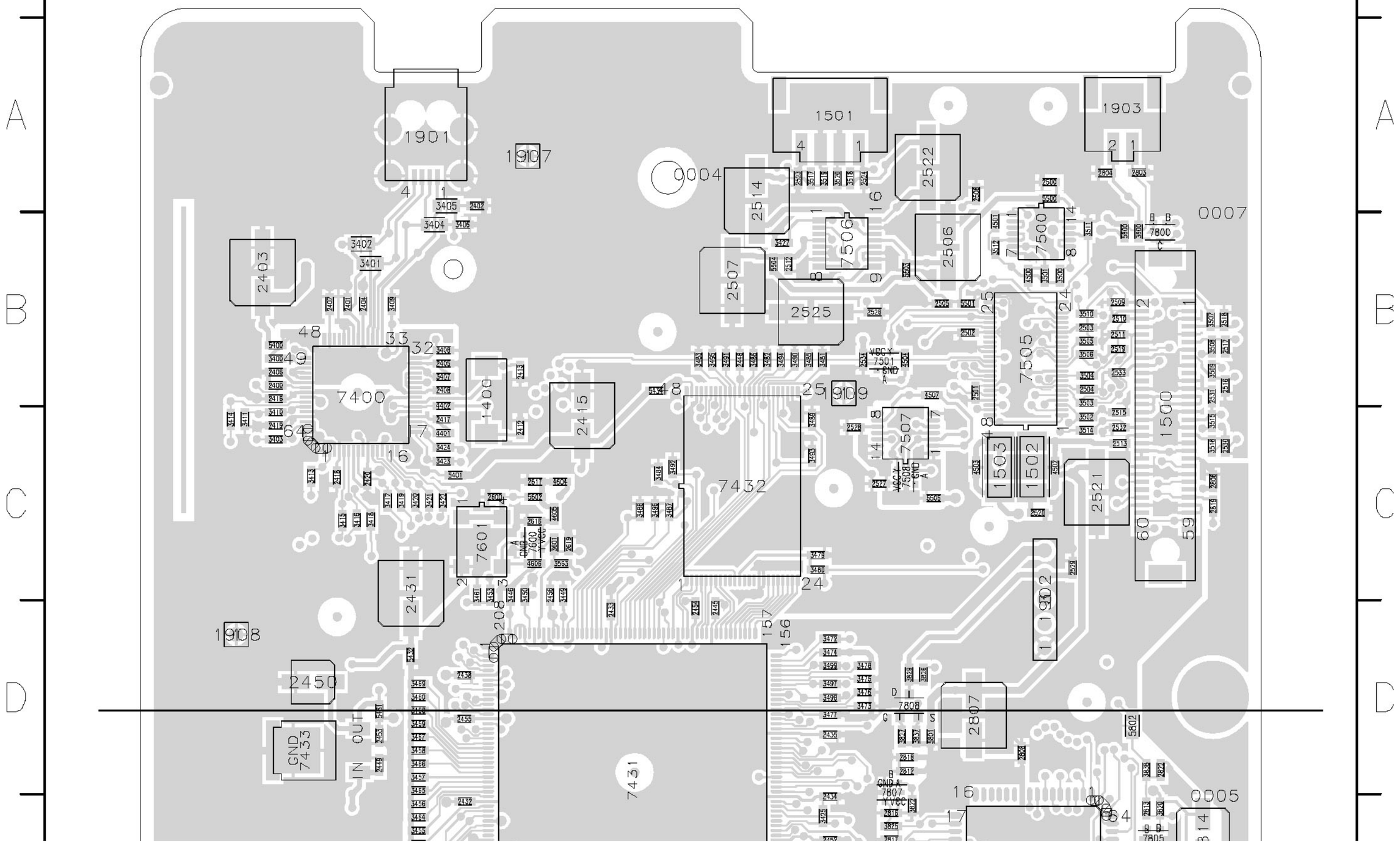
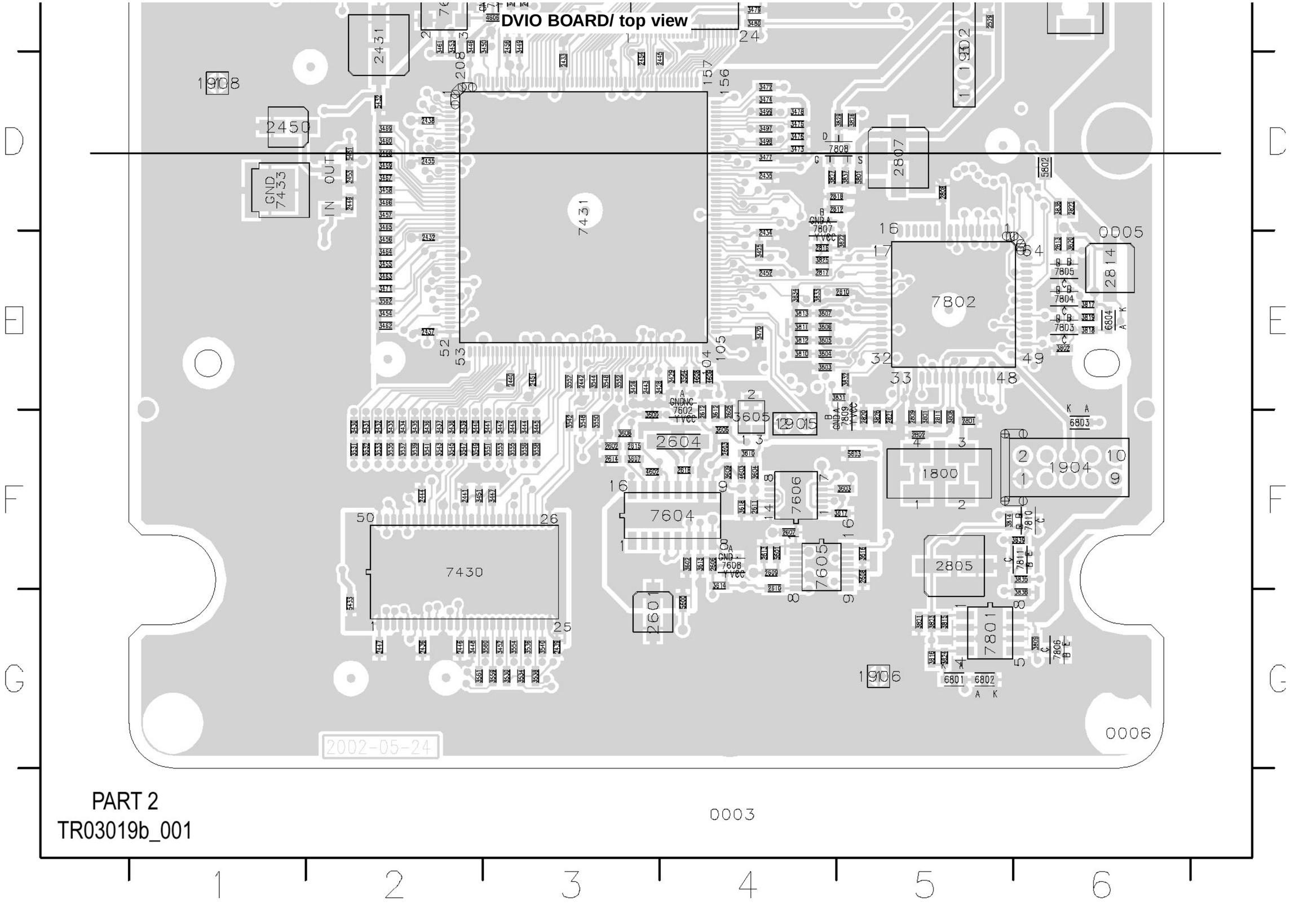
PART 1
TR03019a_001

DVIO BOARD/ top view

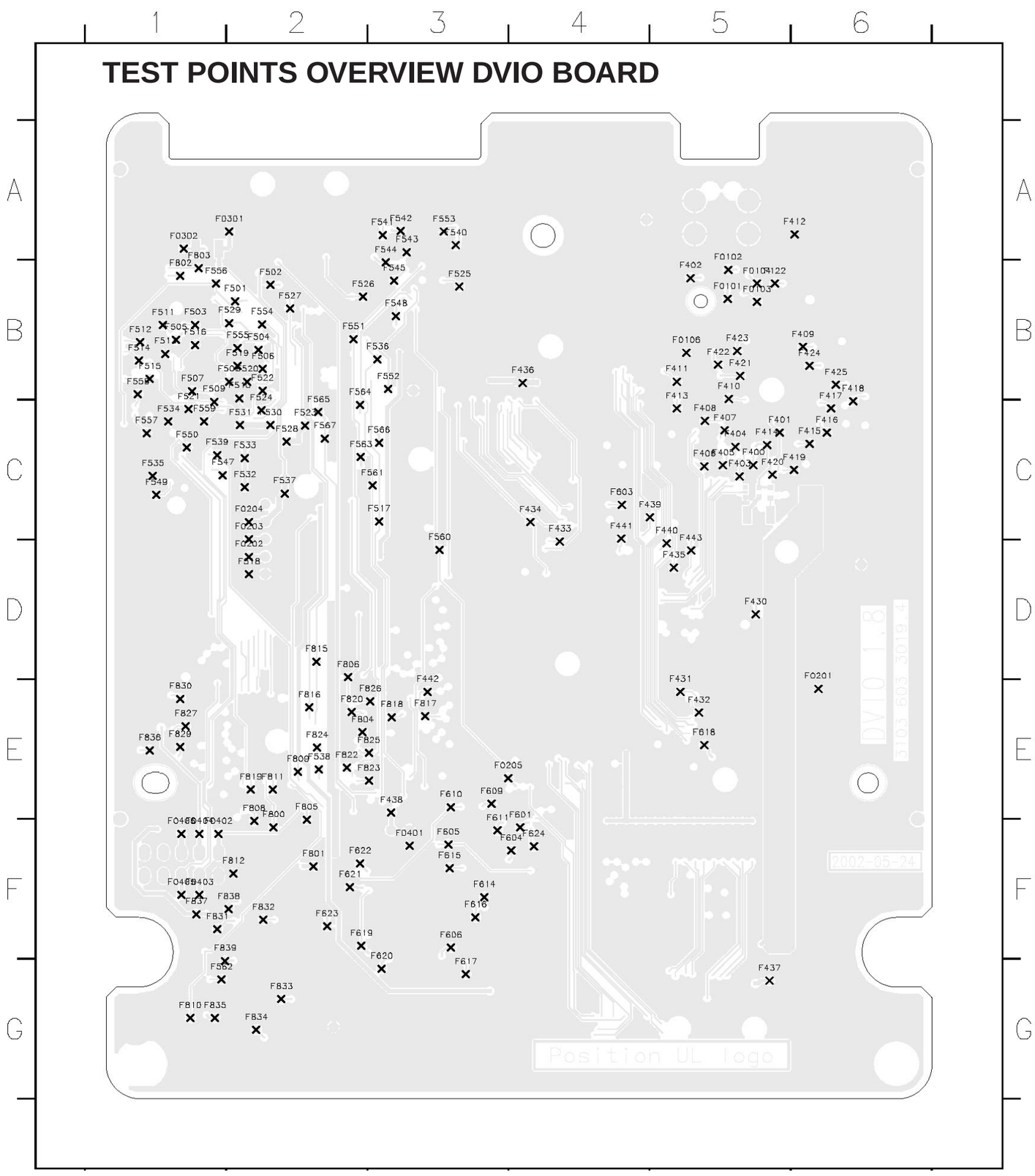


DVIO BOARD/ top view



PART 2
TR03019b_001

TEST POINTS OVERVIEW DVIO BOARD



F0101 B5	F503 B1	F565 C2
F0102 B5	F504 B2	F566 C3
F0103 B5	F505 B1	F567 C2
F0104 B5	F506 B2	F601 F4
F0106 B5	F507 B1	F603 C4
F0201 E6	F508 B2	F604 F4
F0202 D2	F509 C1	F605 F3
F0203 C2	F510 B2	F606 F3
F0204 C2	F511 B1	F609 E3
F0205 E3	F512 B1	F610 E3
F0301 A2	F513 B1	F611 F3
F0302 A1	F514 B1	F614 F3
F0401 F3	F515 B1	F615 F3
F0402 F1	F516 B1	F616 F3
F0403 F1	F517 C3	F617 G3
F0404 F1	F518 D2	F618 E5
F0405 F1	F519 B2	F619 F2
F0406 F1	F520 B2	F620 G3
F122 B5	F521 C1	F621 F2
F400 C5	F522 B2	F622 F2
F401 C5	F523 C2	F623 F2
F402 B5	F524 C2	F624 F4
F403 C5	F525 B3	F800 F2
F404 C5	F526 B2	F801 F2
F405 C5	F527 B2	F802 B1
F406 C5	F528 C2	F803 B1
F407 C5	F529 B2	F804 E2
F408 C5	F530 C2	F805 F2
F409 B6	F531 C2	F806 D2
F410 B5	F532 C2	F808 F2
F411 B5	F533 C2	F809 E2
F412 A6	F534 C1	F810 G1
F413 C5	F535 C1	F811 E2
F414 C5	F536 B3	F812 F2
F415 C6	F537 C2	F815 D2
F416 C6	F538 E2	F816 E2
F417 C6	F539 C1	F817 E3
F418 C6	F540 A3	F818 E3
F419 C6	F541 A3	F819 E2
F420 C5	F542 A3	F820 E2
F421 B5	F543 A3	F822 E2
F422 B5	F544 B3	F823 E3
F423 B5	F545 B3	F824 E2
F424 B6	F547 C1	F825 E3
F425 B6	F548 B3	F826 E3
F430 D5	F549 C1	F827 E1
F431 E5	F550 C1	F829 E1
F432 E5	F551 B2	F830 E1
F433 D4	F552 B3	F831 F1
F434 C4	F553 A3	F832 F2
F435 D5	F554 B2	F833 G2
F436 B4	F555 B2	F834 G2
F437 G5	F556 B1	F835 G1
F438 E3	F557 C1	F836 E1
F439 C5	F558 B1	F837 F1
F440 D5	F559 C1	F838 F2
F441 C4	F560 D3	F839 G1
F442 E3	F561 C3	
F443 D5	F562 G1	
F501 B2	F563 C2	
F502 B2	F564 C2	

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I100 C1	I104 A5	I110 A5	I116 A6	I122 B14	I128 B3	I135 G14	I141 G2	I147 D1	I153 H15	I159 F2	I103 D11	I109 F2	I115 E3	I121 H12	I127 G2	I133 E2	I139 H4	I105 G7	I111 G13	I100 B4	I106 G15	I112 B3	I118 C3	I124 H15	I130 F14	I137 E2	I145 F6	I155 E10	I161 E3	I167 B15	I173 C15	I179 F1	I186 E3
I101 H1	I105 A5	I111 A5	I117 A6	I123 B14	I129 G13	I136 F1	I142 G2	I148 E1	I154 H15	I160 E3	I104 C2	I110 F2	I116 E3	I122 H13	I128 G2	I134 E2	I140 G3	I106 G12	I112 G12	I100 A4	I101 B14	I102 G13	I107 G13	I113 B3	I119 C3	I125 C3	I131 C3	I138 F4	I147 D10	I156 E3	I162 E10	I168 F6	I174 C15	I180 G1	I187 E3
I100 A4	I106 A5	I112 A5	I118 A6	I124 B14	I130 G15	I137 G4	I143 H1	I149 E1	I160 H15	I161 E2	I105 D2	I111 B3	I117 D11	I123 H12	I129 H2	I135 E2	I100 C15	I107 G12	I113 G12	I101 A12	I102 G13	I103 C10	I108 G13	I114 B3	I120 C3	I126 G1	I132 G4	I140 C15	I149 G13	I157 E3	I163 E3	I169 B12	I175 C15	I181 G1	I188 H3
I101 A4	I107 A5	I113 A5	I119 A4	I125 B13	I131 H15	I138 G1	I144 H1	I150 E1	I100 D11	I106 F2	I112 B3	I118 D11	I124 H13	I130 H12	I136 G1	I102 E3	I108 G12	I102 B1	I103 C1	I103 C10	I109 H13	I115 B3	I121 C3	I127 C3	I133 F4	I141 A12	I152 E10	I158 E10	I164 E10	I170 F6	I176 F1	I182 H13	
I102 A5	I108 A5	I114 A5	I120 B15	I126 B12	I132 B1	I139 G14	I145 H1	I151 F1	I101 F10	I107 C3	I113 B3	I119 F10	I125 F13	I131 D2	I137 E2	I103 E3	I109 F2	I103 G15	I110 H13	I116 C3	I122 H13	I128 C3	I134 F4	I142 D10	I153 E10	I159 E3	I165 E3	I171 B15	I177 F1	I183 B1			
I103 A5	I109 A5	I115 A6	I121 B15	I127 B12	I134 D1	I140 G2	I146 A4	I152 G1	I102 E3	I108 F2	I114 B2	I120 G15	I126 H13	I132 E2	I138 B2	I104 G6	I110 D11	I105 G15	I111 D1	I117 C3	I123 C3	I129 C3	I136 F4	I143 D10	I154 E10	I160 E10	I166 E10	I172 B12	I178 F1	I184 D10			

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

A B C D E F G H

1 DIGITAL BOARD 1.5

VSM, Buffer Memory and Bit Engine Interface

acc_aclk_pll — 2V / div DC 50ns / div

VSM_M_CLK — 2V / div DC 20ns / div

DIGITAL VIDEO(CCIR656) 5

MPEG2 VIDEO 4

DVDR VERSATILE STREAM MANAGER

VSM

SDRAM

Encoding Audio PLL

SYSTEM DATA BUS 2 3

SYSTEM ADDRESS BUS 2 3

SYSTEM_CONTROL 2 3

AUDIO ENCODER DATA STREAM BUS 4

JTAG_CHAIN3 4 5

TO BITENGINE

BE_SERIAL 2

UART1 6

UART2 6

BE_LOADN 2

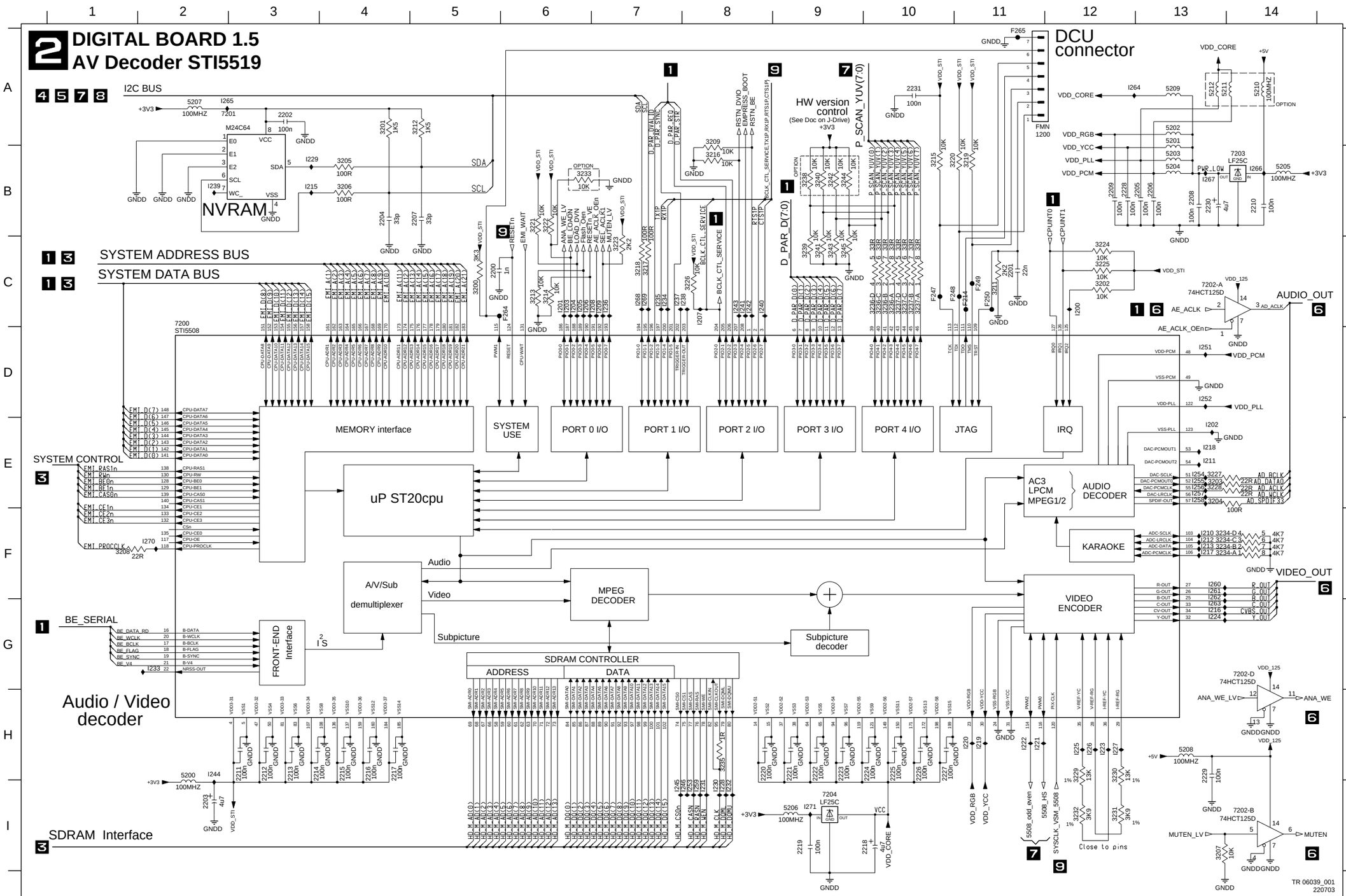
RESETn_BE 9

BE_FAN 6

VIP_FID_FF 4 5

TR 06038_001 220703

2 DIGITAL BOARD 1.5
AV Decoder STI5519



1200 A11 I201 C6
2200 C5 I202 E13
2201 C11 I203 C6
2202 A3 I204 C6
2203 I2 I205 C6
2204 B4 I206 C6
2205 B13 I207 C8
2206 B13 I208 C7
2207 B5 I209 C7
2208 B13 I210 F13
2209 B12 I211 E13
2210 B14 I212 F13
2211 H3 I213 F13
2212 H3 I215 B3
2213 H3 I216 G13
2214 H3 I217 F13
2215 H4 I218 E13
2216 H4 I219 H11
2217 H4 I220 H11
2218 I10 I221 H11
2219 I9 I222 H11
2220 H8 I223 H12
2221 H9 I224 G13
2222 H9 I225 H12
2223 H9 I226 H12
2224 H10 I227 H12
2225 H10 I228 I8
2226 H10 I229 B3
2227 H10 I230 I8
2228 B12 I231 I8
2229 H13 I232 I8
2230 B13 I233 G2
2231 A10 I234 C7
3200 C5 I235 C7
3201 A4 I236 C7
3202 C12 I237 C7
3203 E13 I238 C8
3204 E13 I239 B2
3205 B4 I240 C8
3206 B4 I241 C8
3207 I13 I242 C8
3208 F1 I243 C8
3209 A8 I244 H2
3211 C11 I245 I7
3212 A5 I246 I8
3213 C6 I251 D13
3214 C6 I252 D13
3215 B10 I253 I8
3216 B8 I254 E13
3217 C7 I255 E13
3218 C7 I256 E13
3219 B11 I257 E13
3220 B11 I258 E13
3221 B6 I259 I8
3222 B6 I260 F13
3223 C7 I261 F13
3224 C12 I262 F13
3225 C12 I263 G13
3226 C8 I264 A12
3227 E13 I265 A2
3228 E13 I266 B14
3229 H12 I267 B13
3230 H12 I268 C7
3231 I12 I269 C7
3232 I12 I270 F2
3233 B6 I271 I9
3234-A F13
3234-B F13
3234-C F13
3234-D F13
3235 H8
3236-A C10
3236-B C10
3236-C C10
3236-D C10
3237-A C10
3237-B C10
3237-C C10
3237-D C10
3238 B9
3239 C9
3240 B9
3241 C9
3242 B9
3243 C9
3244 B9
3245 C9
5200 H2
5201 A13
5202 A13
5203 B13
5204 B13
5205 B14
5206 I9
5207 A2
5208 H13
5209 A13
5210 A14
5211 A14
5212 A13
7200 C2
7201 A2
7202-A C13
7202-B I14
7202-D G14
7203 B14
7204 I9
F214 C11
F247 C10
F248 C10
F249 C11
F250 C11
F264 C6
F265 A11
I200 C12

3 DIGITAL BOARD 1.5
AV Decoder Memory

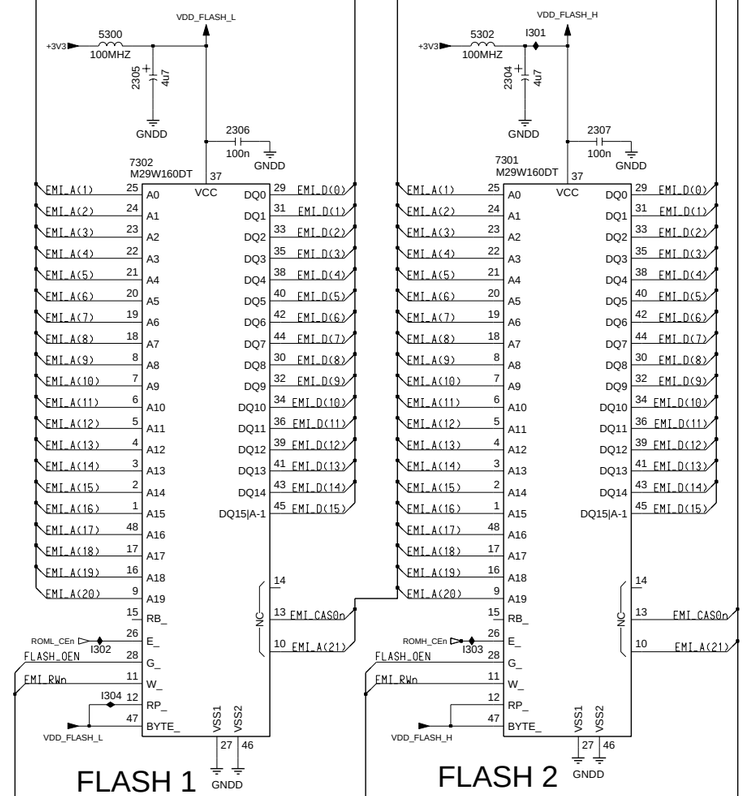
2 SDRAM Interface

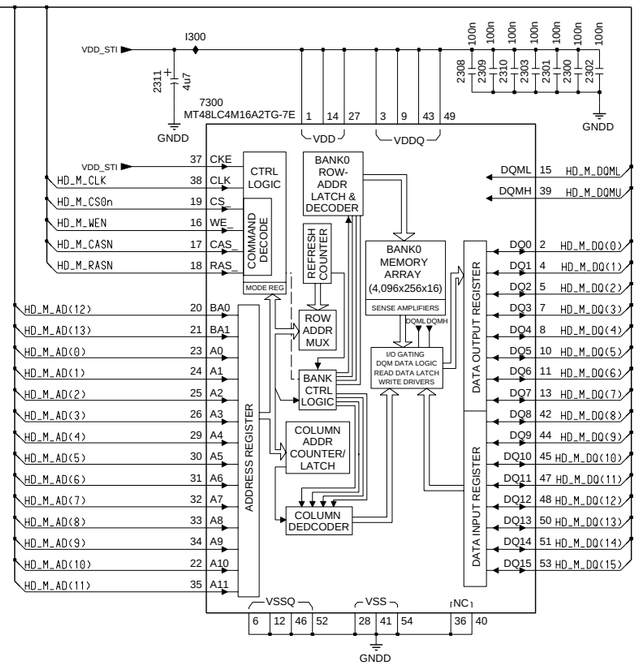
1 2 SYSTEM DATA BUS

1 2 SYSTEM ADDRESS BUS

1 2 SYSTEM CONTROL
{EMI_RWn,FLASH_OEN,EMI_RAS1n,EMI_CE3n}

2300 A14
2301 A14
2302 A14
2303 A13
2304 B8
2305 B6
2306 B6
2307 B9
2308 A13
2309 A13
2310 A13
2311 A11
2312 H7
3300 H8
3301 I8
4300 H9
4301 I9
5300 B5
5302 B8
7300 A11
7301 B8
7302 B6
7303-A H6
7303-B H7
7303-C I6
7303-D I7
I300 A11
I301 B8
I302 F5
I303 F8
I304 F5
I305 H7
I306 H9
I307 H8
I308 H9
I309 I8





SDRAM

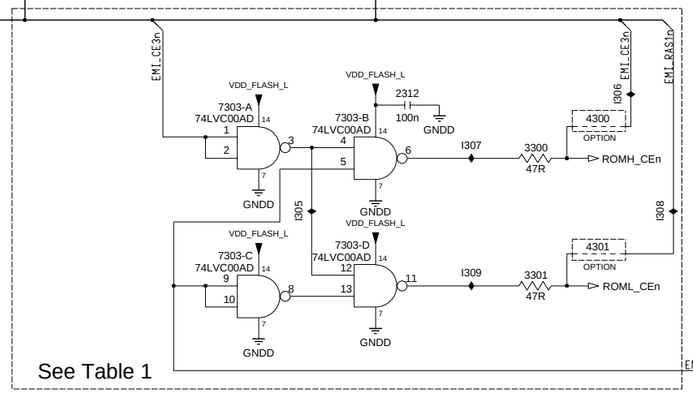


Table 1

	Flash Memory Configuration	
	4MB	6MB
7301	M29W160	M29W320
7302	M29W160	M29W160
7303	Present	-------
2312/3300/3301	Present	-------
4300/4301	-------	Present

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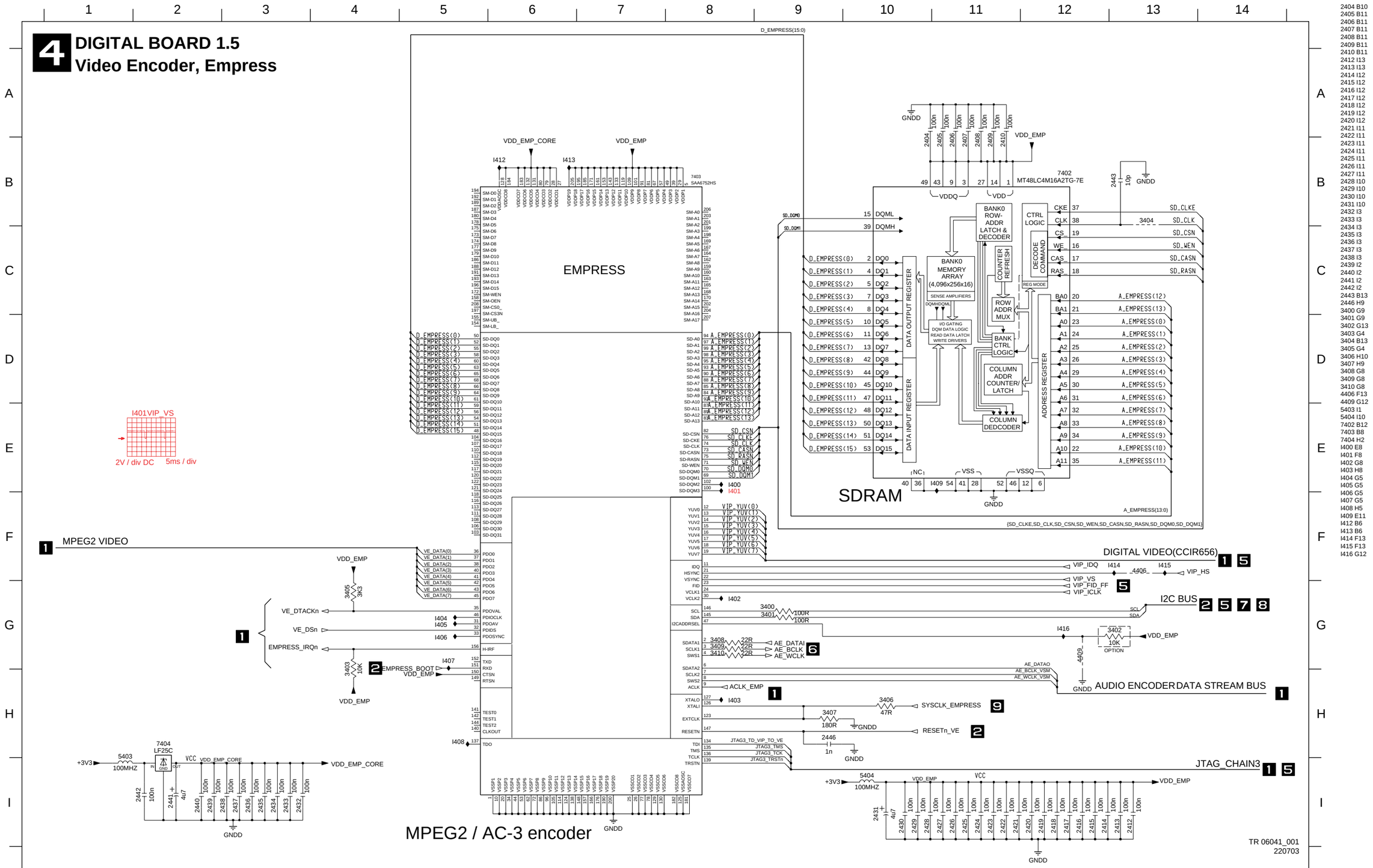
4 DIGITAL BOARD 1.5
Video Encoder, Empress



2404 B10
2405 B11
2406 B11
2407 B11
2408 B11
2409 B11
2410 B11
2412 I13
2413 I13
2414 I12
2415 I12
2416 I12
2417 I12
2418 I12
2419 I12
2420 I12
2421 I11
2422 I11
2423 I11
2424 I11
2425 I11
2426 I11
2427 I11
2428 I10
2429 I10
2430 I10
2431 I10
2432 I3
2433 I3
2434 I3
2435 I3
2436 I3
2437 I3
2438 I3
2439 I2
2440 I2
2441 I2
2442 I2
2443 B13
2446 H9
3400 G9
3401 G9
3402 G13
3403 G4
3404 B13
3405 G4
3406 H10
3407 H9
3408 G8
3409 G8
3410 G8
4406 F13
4409 G12
5403 I1
5404 I10
7402 B12
7403 B8
7404 H2
I400 E8
I401 F8
I402 G8
I403 H8
I404 G5
I405 G5
I406 G5
I407 G5
I408 H5
I409 E11
I412 B6
I413 B6
I414 F13
I415 F13
I416 G12

1500 H4 2504 E2 2509 E2 2514 A5 2519 B3 2524 B7 2529 B7 2534 A6 2539 A7 2544 C11 3502 C3 3507 F4 4500 C2 5503 B3 5508 C5 7501-B B2 7503 H2 I503 C7 I508 A5 I513 A5 I518 C5 I523 E3 I528 E3 I533 F4 I540 B1 I555 H4
2500 C4 2505 E2 2510 H3 2515 C4 2520 B5 2525 C8 2530 C5 2535 C7 2540 B8 2545 G3 3503 C2 3508 G5 4501 C8 5504 F11 5509 G2 7501-C H7 7504 B2 I504 C7 I509 A6 I514 B4 I519 E3 I524 E3 I529 H7 I534 F4 I536 F4 I537 F4 I538 G5
2501 D2 2506 E2 2511 H4 2516 B5 2521 C8 2526 B7 2531 A6 2536 B7 2541 C8 2565 C2 3504 A2 3509 G4 4500 A5 5505 B8 6500 B1 7501-D H6 7500 C8 I501 C8 I506 C2 I511 A7 I516 D3 I521 E3 I526 E11 I531 E8 I536 F4 I537 F4 I552 G4
2502 D2 2507 E2 2512 F11 2517 A5 2522 B7 2527 A6 2532 C8 2537 B7 2542 C5 3500 C7 3505 E9 3513 C2 4500 C2 5502 B5 5507 A7 7501-A F11 7502-A C10 I501 C8 I502 C3 I507 C7 I512 D2 I517 D3 I522 E3 I527 E8 I532 F2 I538 G5 I553 H3
2503 E2 2508 E2 2513 B4 2518 B3 2523 C8 2528 C8 2533 B7 2538 A6 2543 A6 3501 C7 3506 H7 3515 H3 4500 C5 5501 A3 5506 A8 5507 A7 7501-A F11 7502-B D11 I502 C3 I507 C7 I512 D2 I517 D3 I522 E3

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

5 DIGITAL BOARD 1.5
VIP CVBS Y/C Video Input

+3V3 5500 100MHZ I508 PWR_LOW VDDA1A_7118 2517 4u7 2514 100n GNDD
+3V3 5501 100MHZ I510 PWR_LOW VDDA2A_7118 2518 4u7 2513 100n GNDD
+3V3 5502 100MHZ I513 PWR_LOW VDDA3A_7118 2520 4u7 2516 100n GNDD
+3V3 5503 100MHZ I514 PWR_LOW VDDA4A_7118 2519 4u7 2515 100n GNDD
+3V3 5508 100MHZ I518 PWR_LOW VDDX_7118 2542 4u7 2530 100n GNDD

VDDA_7118: I509 VCC 5507 100MHZ +3V3; 2531 2534 2537 2538 100n; 4u7; GNDD
VDDI_7118: I511 VCC 5506 100MHZ +3V3; 2536 2539 2540 100n; 4u7; GNDD
VDDE_7118: I515 VCC 5505 100MHZ +3V3; 2535 2541 100n; 4u7; GNDD

VDD_LVC32
3504 680R
I540
7501-B 74LVC32AD 14 4 5 6 7 GNDD
VIP_IGP1
7504 BC847B
6500 BAT54 COL
I543
2565 150p
3513 680R OPTION 4500
6 VIP_FB I506
3503 1K GNDD

9 RESETn 2500 1n GNDD
I502 3502 2K2 GNDD
7500 SAA7118E

I503 3500 100R I500 SDA
I504 3501 100R SCL I501
I507 4501 VIP_INT 1
I2C BUS 2 4 7 8

AD-PORT
CONTROL
IIC REGISTER MAP
1ST TASK IIC REG MAP SCALER
2ST TASK IIC REG MAP SCALER
SCALER EVENT CONTROLLER
OUTPUT FORMATTER+PORT
VIP_IGP1 VIP_VS VIP_HS
VIP_YUV(0) VIP_YUV(1) VIP_YUV(2) VIP_YUV(3) VIP_YUV(4) VIP_YUV(5) VIP_YUV(6) VIP_YUV(7)
I551 3505 22R VIP_ICLK 1 4
VIP_IDQ
5 DIGITAL VIDEO(CCIR656) 1

I512
CVBS_Y_IN_A
CVBS_OUT_B_VIP
CVBS_Y_IN_B
CVBS_Y_IN_C
C_IN_VIP
G_IN_VIP
Y_IN_VIP
B_IN_VIP
U_IN_VIP
R_IN_VIP
V_IN_VIP
2501 2502 2503 2504 2505 2506 2507 2508 2509 100n I516 I517 I519 I520 I521 I522 I523 I524 I528
ANALOG1 + ADC1
ANALOG2 + ADC1
ANALOG3 + ADC1
ANALOG INPUT CONTROL
FAST SWITCH DELAY
COMP PROC
CHROM PROC
COMB FIL
LUM PROC
SYNC
VIDEO CLK
GPO
XTAL
DECODER OUTPUT CONTROL
FIR-PREFILTER PRESCALER BCS-SCALER
LINE FIFO BUFFER
VERTICAL SCALING HORIZONTAL FINE-(PHASE) SCALING
VIDEO FIFO
TEXT FIFO
VBI DATA SLICER
VIDEO/TEXT ARBITER
AUDIO CLK
ASCLK ALRCLK AMCLK AMXCLK I525 I527 I530 I531
X-PORT
H-PORT
BOUNDARY SCAN
I532 AOUT
VSSA VSSE VSSI GNDD
I535 I537 I536 I533 I505 3507 4K7
DV_IN_DATA(0:7)
DV_IN_HS DV_IN_VS
DV_IN_CLK
I538 3508 10K
VIP_ISTRM VIP_RTS1 GNDD I552
JTAG_TDI_VIP_TO_VE
JTAG_TDO_VIP_TO_VSM_TO_VIP
JTAG_TCK JTAG_TMS
JTAG_CHAIN3 1 4

Video Input processor
VIP ANALOG VIDEO INPUT 6

OPTION
+3V3 5509 2545 100n GNDD
7503 FXO-31FT 4 VDD TS OSC OUT GND 1 2 3
I553 1500 CX-11F 24M576 I555
2510 22p 2511 10p GNDD
VIP_ICLK 2V / div DC 20ns / div

VDD_LVC32
7501-D 74LVC32AD 12 13 11 7 GNDD
VIP_IGP1 VIP_RTS1 DV_IN_HS
I529
7501-C 74LVC32AD 9 10 8 7 GNDD
3506 2K2 GNDD

+3V3 2544 100n GNDD
7502-A 74HC74D 14 4 3 2 1 5 6 7 GNDD
VIP_VS
7502-B 74HC74D 14 10 11 12 13 9 8 7 GNDD
VIP_FID_FF 1 4

VDD_LVC32
I526 5504 100MHZ +3V3
2512 100n GNDD
7501-A 74LVC32AD 14 3 1 2 7 GNDD GNDD

TR 06042_001
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6 DIGITAL BOARD 1.5
Analog Board Cons. Video In / Output

VIP ANALOG VIDEO INPUT

AUDIO ENCODER DATA STREAM BUS

AUDIO OUT

VIDEO_OUT

DV_IN_DATA(0:7)

DIVIO

UART2

UART1

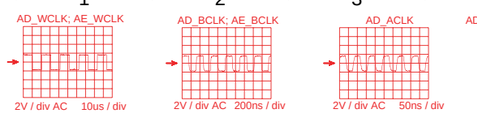
ANALOG BOARD INTERFACE AUDIO IN/OUT

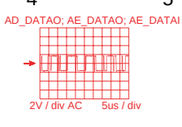
ANALOG BOARD INTERFACE VIDEO IN/OUT

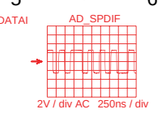
ANALOG BOARD INTERFACE CONTROL

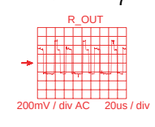
TR 06043_001
220703

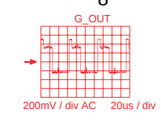
1600 H15
1601 D15
1602 C15
1603 E2
1604 C14
2600 E6
2601 E5
2602 E5
2603 C12
2604 C13
2605 E10
2606 E9
2607 E9
2608 A6
2609 A6
2610 G6
2611 G5
2612 G5
2613 A9
2614 B9
2615 F10
2616 G9
2617 G9
2618 A9
2619 C9
2620 H6
2621 I5
2622 I5
2623 C12
2624 C12
2625 H10
2626 I9
2627 I9
2628 B6
2629 A6
2630 A2
2631 C12
2632 A2
2633 B9
2634 B2
2635 C9
2636 H9
3600 D13
3601 E5
3602 E6
3603 F6
3604 B12
3605 A10
3606 E8
3607 E9
3608 F10
3609 A9
3610 C10
3611 G5
3612 G6
3613 H6
3614 C9
3615 B4
3616 G8
3617 G9
3618 G10
3619 B2
3620 F1
3621 I5
3622 I6
3623 A12
3624 I6
3625 A12
3626 I8
3627 I9
3628 I10
3629 A6
3630 B6
3631 B10
3632 B6
3633 C6
3634 B9
3635 B12
3636 B2
3637 B12
3638 B3
3639 C14
4600 G3
4601 G1
4602 G3
5600 E5
5601 G9
5602 I5
5603 G5
5604 I9
5605 E9
5606 A2
5607 H9
7202-C D12
7600 E6
7601 G10
7602 B3
7603 G6
7604 I10
7605 I6
7606 E10

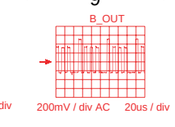


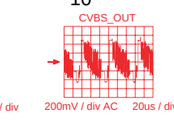


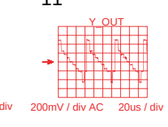


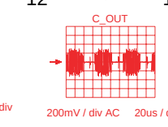












7 DIGITAL BOARD 1.5
VSM, Buffer Memory and Bit Engine Interface

DEINTERLACER
LINE DOUBLER

INPUT SIGNALS

OUTPUT SIGNALS

SDRAM
INTERFACE
SIGNALS

CONTROL
SIGNALS

POWER
SUPPLY

TEST
INPUT

TEST
OUTPUT

POWER GND

I2C BUS

P_SCAN_YUV(7:0)

CONTROL BUS

ADDRESS_BUS

DATA BUS

Y_OUT; Cr_OUT; Cb_OUT
2V / div DC 20us /div

HS_IN
2V / div DC 20us / div

VS_IN
2V / div DC 10ms / div

TR 06044_001
220703

2700 B9
2701 B8
2702 B9
2703 B9
2704 B8
2705 B8
2706 B8
2707 G3
2708 B8
2709 B8
2710 B8
2711 B8
2712 B8
2713 B8
2714 F13
2715 B6
2716 B7
2717 B8
2718 B7
2719 B8
2720 B11
2721 E2
2722 D3
2723 B3
2724 B2
2725 B2
2726 B3
2727 B8
3700 G11
3701-A F11
3701-B F11
3701-C F11
3701-D F11
3702-A G11
3702-B F11
3702-C F11
3702-D F11
3703-A F6
3703-B F6
3703-C F6
3703-D F6
3704-A F6
3704-B F6
3704-C F6
3704-D F6
3705 F11
3706 G11
3707 H11
3708 H11
3709-A E6
3709-B E6
3709-C E6
3709-D F6
3710-A G6
3710-B F6
3710-C E6
3710-D E6
3711-A G6
3711-B G6
3711-C G6
3711-D G6
3712 F3
3713-A G6
3713-B G6
3713-C G6
3713-D G6
3714 G11
3715-A H7
3715-B H7
3715-C H7
3715-D H7
3716-A H8
3716-B H8
3716-C H7
3716-D H7
3717-A H8
3717-B H8
3717-C H8
3717-D H8
3718-A H8
3718-B H8
3718-C H8
3718-D H8
3719-A H8
3719-B H8
3719-C H8
3719-D H8
3720 F6
4700 A1
4701 B1
4702 E2
5700 B11
5701 A3
5702 B6
7700 B7
7701-A E1
7701-B C1
7702-A E3
7702-D C3
7703 A2
I700 B10
I701 E3
I702 E2
I703 E11
I704 B9
I705 B9
I706 B9
I707 F11
I708 E11
I709 A2
I710 B6
I711 A4
I712 A3
I713 G10
I714 F4
I715 F3
I716 G11
I717 F11
I718 F11
I719 F11
I720 F11
I721 F11
I722 F11
I723 F11
I724 G11
I725 F11
I726 H11
I727 H11
I728 C6
I729 D6
I730 D6
I731 D6
I732 D6
I733 D6
I734 D6
I735 D6

1800 D15	2806 B3	2812 B3	2818 C7	2824 C14	2832 E12	3800 G4	3806 B8	3812 D14	3818 E14	3824 F14	5801 B12	5807 E12	7802 B14	I803 F6	I810 E13	I816 F6	I822 D15	I828 D6	I834 E6	I840 G7	I846 E6	I852 G4	I873 C8	I879 D13
2800 B14	2807 B3	2813 B3	2819 C8	2826 D11	2833 E12	3801 C14	3807 C14	3813 D13	3819 E14	3825 F14	5802 B13	5808 E13	7803-A D14	I805 F6	I811 E14	I817 F6	I823 E15	I829 D6	I835 E6	I841 G7	I847 F6	I868 C2	I874 C8	I880 E12
2802 B2	2808 B2	2814 C11	2820 C9	2827 D12	2834 F14	3802 B8	3808 C14	3814 D13	3820 E11	3826 F11	5803 D12	5809 F12	7803-B E14	I806 D13	I812 E10	I818 F12	I824 C6	I830 E6	I836 D2	I842 G7	I848 F6	I869 C2	I875 C8	I881 E12
2803 B2	2809 B3	2815 C12	2821 C14	2828 D12	2835 F11	3803 C13	3809 D11	3815 E11	3821 E13	3827 F11	5804 D12	5810 B8	I800 B13	I807 D14	I813 F10	I819 B9	I825 C6	I831 E6	I837 G7	I843 G7	I849 G6	I870 C2	I876 C13	I882 F13
2804 B2	2810 B3	2816 C12	2822 C9	2829 D14	2836 G11	3804 C13	3810 D6	3816 D14	3822 E13	3828 G4	5805 D13	7800 B1	I801 B13	I808 E10	I814 D2	I820 G6	I826 D6	I832 E6	I838 G7	I844 G8	I850 G6	I871 B12	I877 C12	I883 F10
2805 B2	2811 B3	2817 F12	2823 C9	2831 E11	2837 B8	3805 C8	3811 D11	3817 E11	3823 F11	5800 B12	5806 E12	7801 C6	I802 C14	I809 E10	I815 F6	I821 C15	I827 D6	I833 E6	I839 G7	I845 G8	I851 G4	I872 B12	I878 C12	I884 G10

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

8 DIGITAL BOARD 1.5
Progressive Scan

DAC-B: 500mV / div AC 10us / div
DAC-A/Y: 500mV / div AC 10us / div
DAC-C: 500mV / div AC 10us / div
HSOUT: 2V / div DC 10us / div
VSOUT: 2V / div DC 10ms / div

7 DATA BUS

7 CONTROL BUS

7 ADDRESS BUS

7800 MT48LC2M32B2TG

SDRAM

2 4 5 7 I2C BUS

9 RESETn

7801 ADV7196A

I²C MPU PORT

TIMING GENERATOR

SYNC GEN

7 Yy_OUT(9:0)

7 Cr_OUT(9:0)

7 Cb_OUT(9:0)

TEST-PATTERN GENERATOR & DELAY & GAMMA CORRECTION

SHARPNESS FILTER CTRL & ADAPTIVE FILTER CTRL

CGMS MACRO-VISION

CHROMA 4:2:2 TO 4:4:4 (99AF)

CHROMA 4:2:2 TO 4:4:4 (99AF)

LUMA 99 AF

2X INTER-POLATION

11-BIT SYNC DAC

11-BIT DAC

11-BIT DAC

DAC CTRL BLOCK

DENC

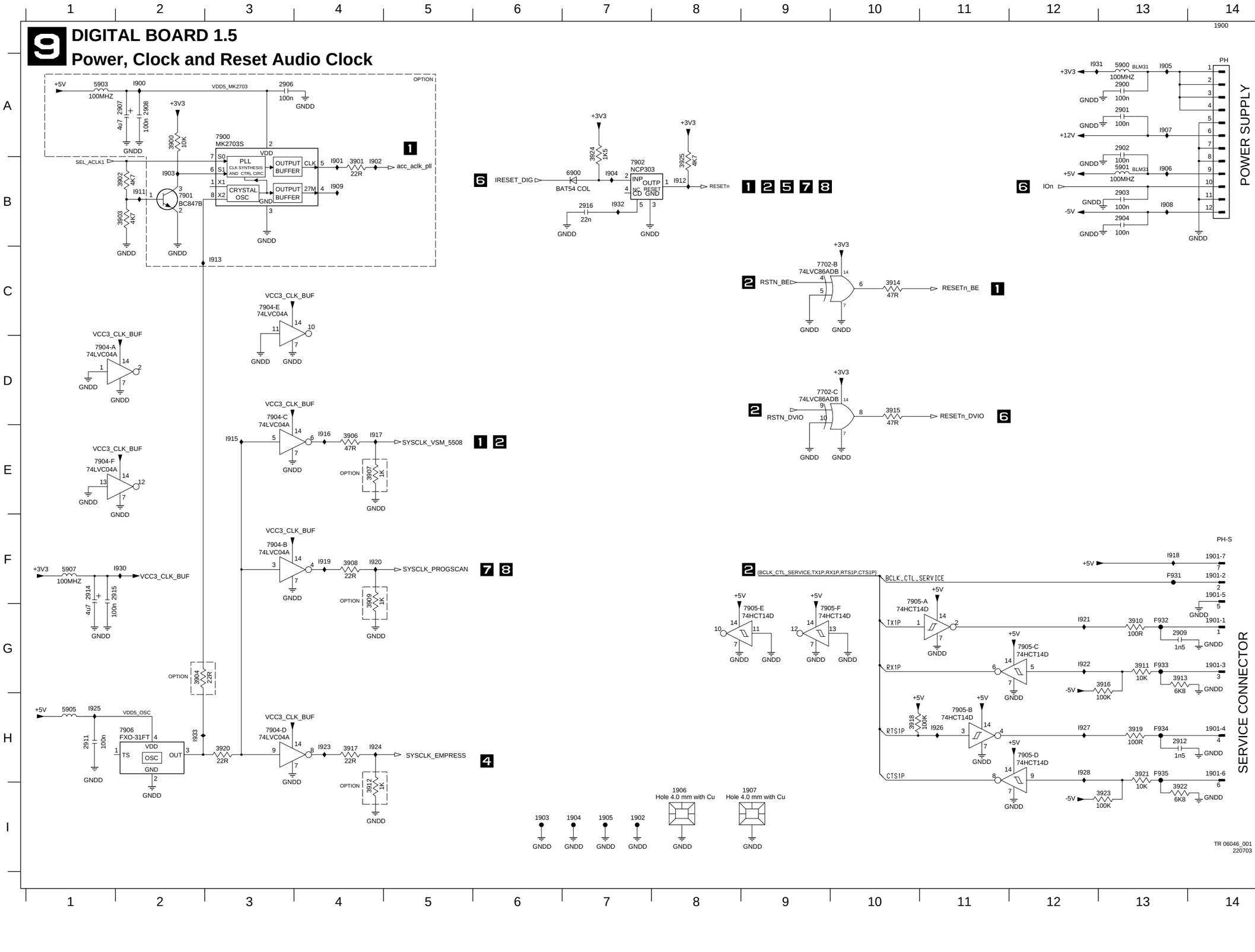
7803-A AD8062

7803-B AD8062

ANALOG BOARD

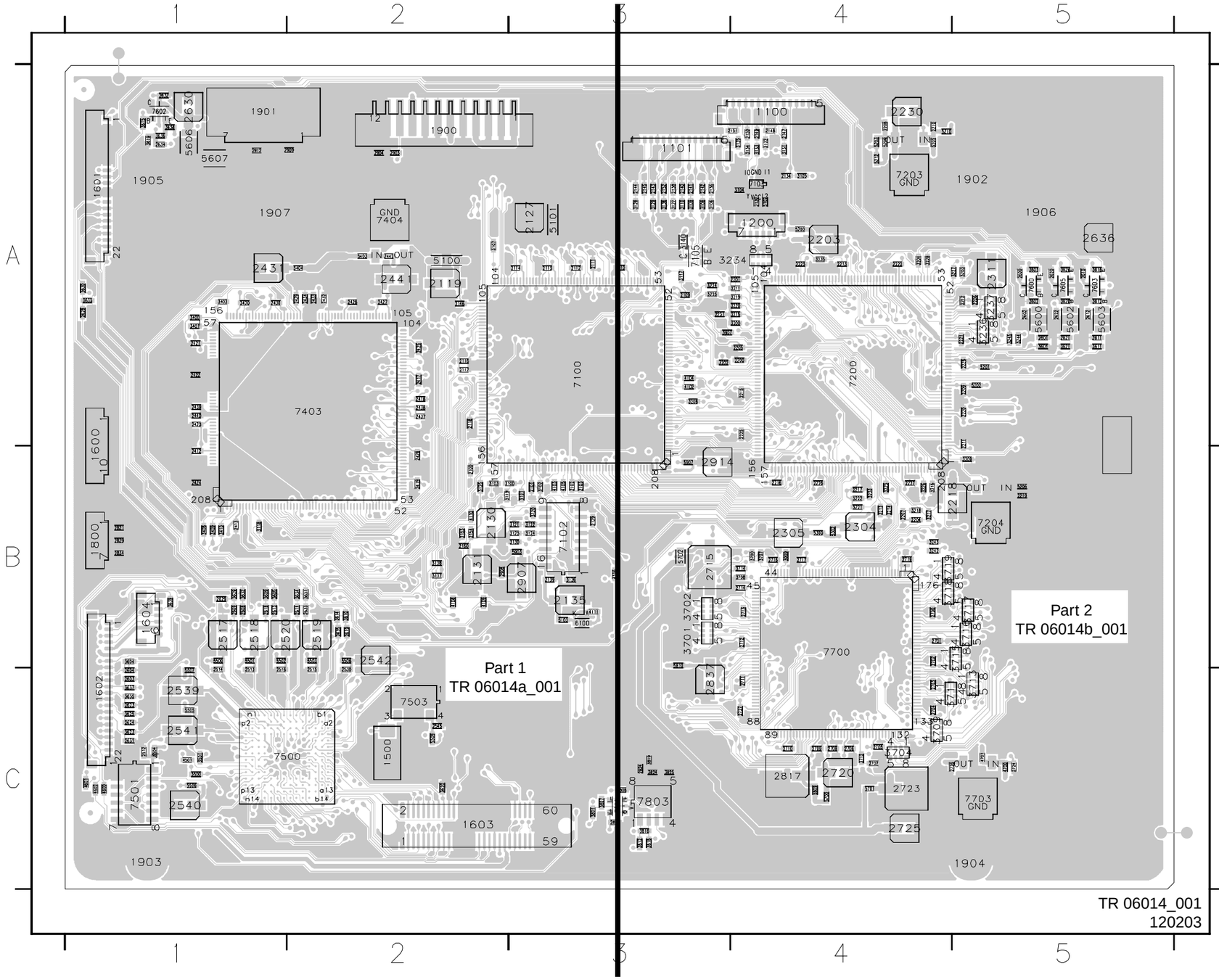
TR 06045_001
220703

9 DIGITAL BOARD 1.5
Power, Clock and Reset Audio Clock



1900 A14
1901-1 G14
1901-2 F14
1901-3 G14
1901-4 H14
1901-5 F14
1901-6 H14
1901-7 F14
1902 I7
1903 I6
1904 I7
1905 I7
1906 I8
1907 I9
2900 A13
2901 A13
2902 A13
2903 B13
2904 B13
2906 A3
2907 A2
2908 A2
2909 G13
2911 H1
2912 H13
2914 F1
2915 F2
2916 B7
3900 A2
3901 B4
3902 B2
3903 B2
3904 G2
3906 E4
3907 E4
3908 F4
3909 F4
3910 G13
3911 G13
3912 I4
3913 G13
3914 C10
3915 D10
3916 G13
3917 H4
3918 H10
3919 H13
3920 H3
3921 H13
3922 I13
3923 I13
3924 A7
3925 B8
5900 A13
5901 B13
5903 A1
5905 H1
5907 F1
6900 B7
7702-B C9
7702-C D9
7900 A3
7901 B2
7902 B7
7904-A D1
7904-B F3
7904-C D3
7904-D H3
7904-E C3
7904-F E1
7905-A F10
7905-B H11
7905-C G12
7905-D H12
7905-E G9
7905-F G10
7906 H2
F931 F13
F932 G13
F933 G13
F934 H13
F935 H13
I900 A2
I901 B4
I902 B4
I903 B2
I904 B7
I905 A13
I906 B13
I907 A13
I908 B13
I909 B4
I911 B2
I912 B8
I913 C3
I915 E3
I916 E4
I917 E4
I918 F13
I919 F4
I920 F4
I921 G12
I922 G12
I923 H4
I924 H4
I925 H1
I926 H11
I927 H12
I928 H12
I930 F2
I931 A12
I932 B7
I933 H2

DIGITAL BOARD 1.5 / top view



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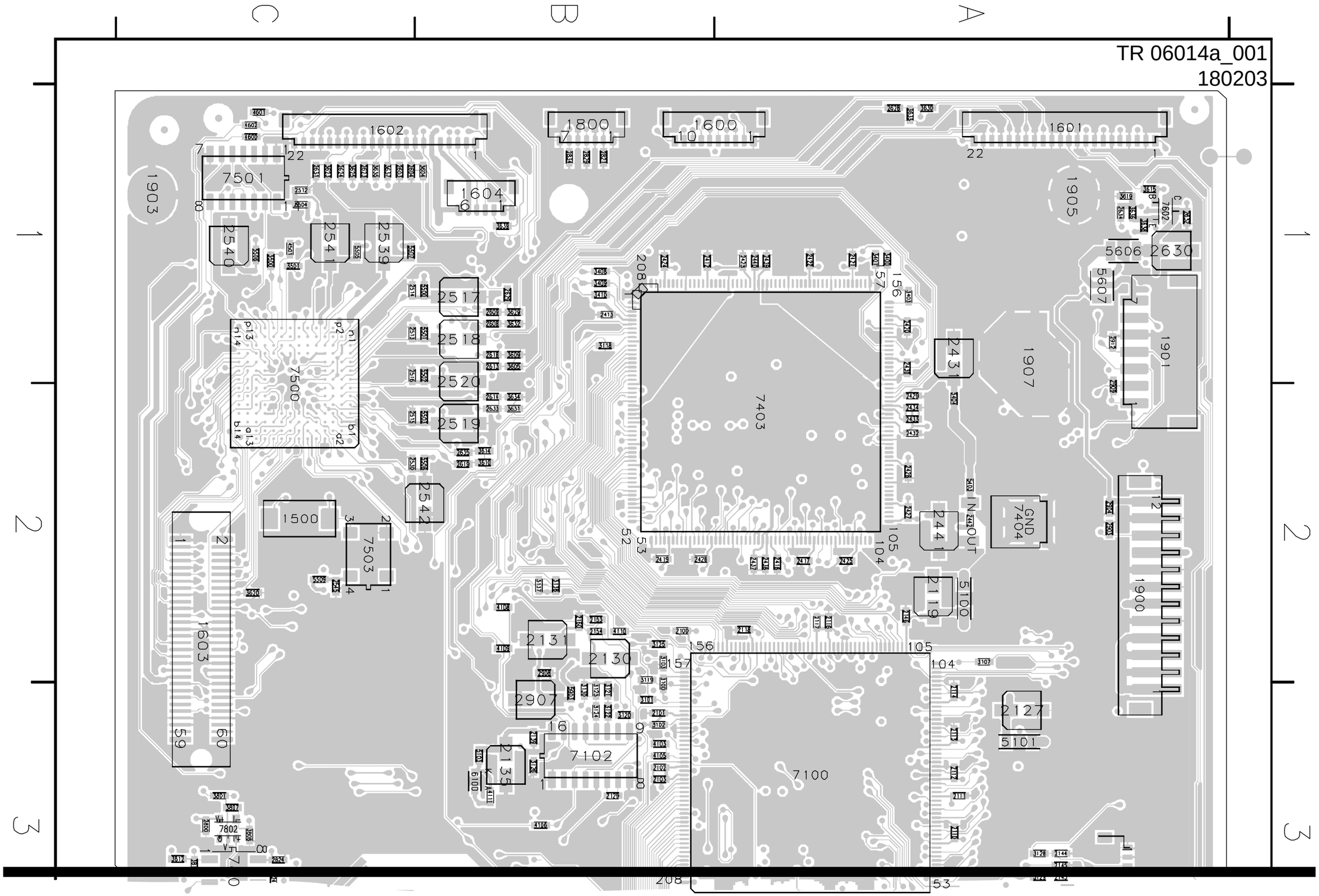
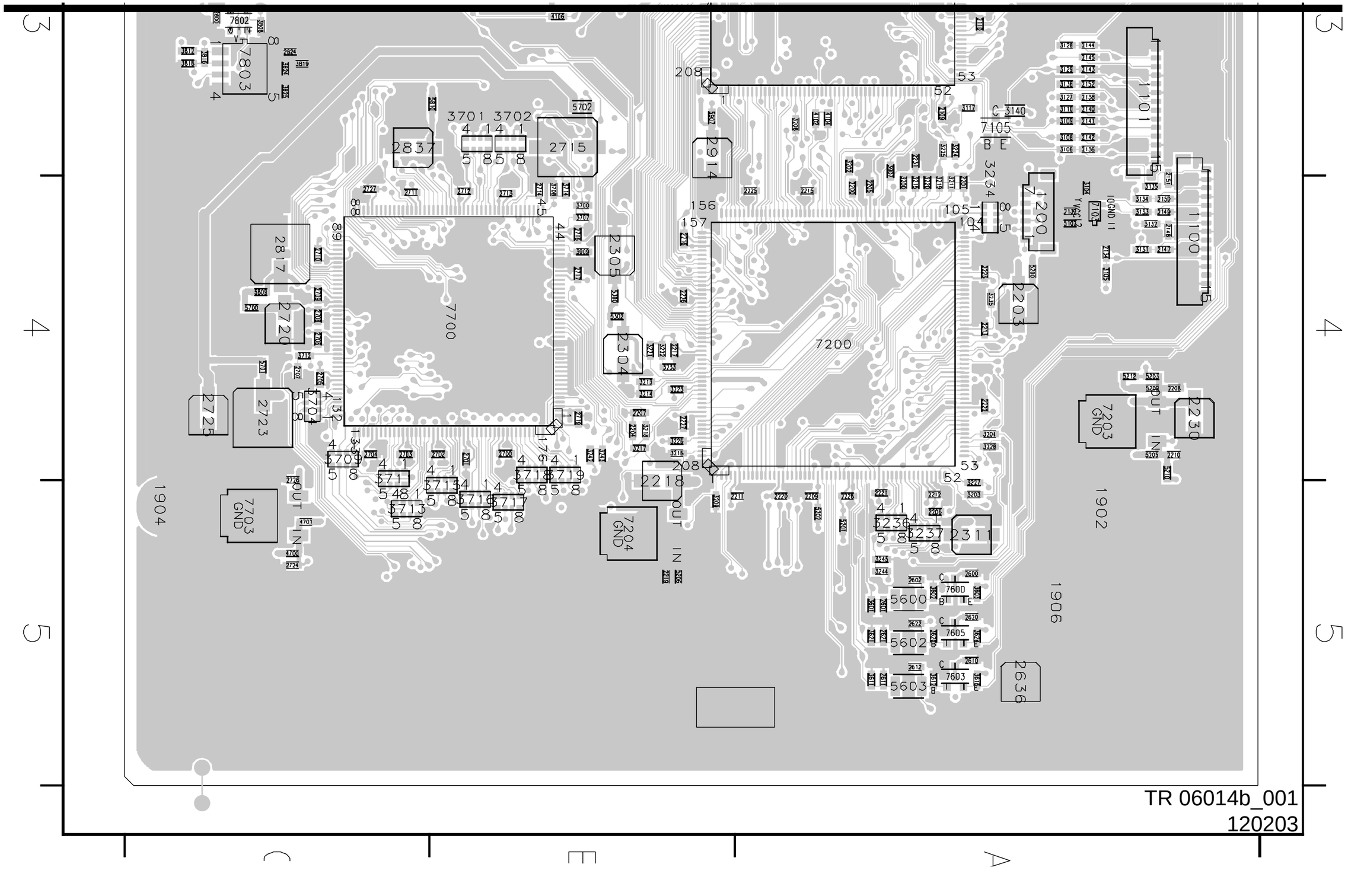
1101	A3	2311	A5	2711	C4	3225	A3	4105	B3						
1200	A4	2412	B1	2712	B4	3226	B4	4106	B3						
1500	C2	2413	B1	2713	B4	3227	A5	4108	B2						
1600	A1	2417	A2	2714	B4	3228	A4	4109	B2						
1601	A1	2418	A2	2715	B3	3233	B4	4110	B2						
1602	C1	2419	B2	2716	B4	3234	A4	4111	B3						
1603	C2	2420	A1	2717	B4	3235	A4	4501	C1						
1604	B1	2421	A1	2719	B4	3236	A5	4600	C1						
1800	B1	2422	A1	2720	C4	3237	A5	4601	C1						
1900	A2	2423	A1	2723	C4	3242	B4	4602	C1						
1901	A1	2424	B1	2724	C5	3243	B4	4700	C5						
2100	B2	2425	A2	2725	C4	3244	A5	4701	C5						
2101	B3	2426	B2	2726	C4	3245	A5	5100	A2						
2102	B3	2427	A2	2727	C4	3400	A1	5101	A3						
2103	B3	2428	A2	2800	C3	3401	A1	5102	A4						
2109	A3	2429	A2	2817	C4	3403	A1	5103	B3						
2110	A3	2430	A1	2821	B1	3408	B1	5200	A4						
2111	A3	2431	A1	2824	C3	3409	B1	5201	A5						
2112	A3	2432	A2	2829	B1	3410	B1	5202	A5						
2113	A3	2433	A2	2834	B1	3500	C1	5203	A4						
2114	A3	2434	A2	2837	C3	3501	C1	5205	A4						
2116	A2	2437	A2	2903	A2	3601	A5	5206	B5						
2117	A2	2438	A2	2904	A2	3602	A5	5209	A4						
2118	A2	2439	A1	2907	B3	3603	A5	5210	A4						
2119	A2	2440	A1	2908	B2	3604	B1	5212	A4						
2127	A3	2441	A2	2909	A2	3605	B1	5300	B4						
2129	B3	2442	A2	2912	A1	3609	B1	5302	B4						
2130	B2	2512	C1	2914	B3	3610	B2	5403	A2						
2131	B2	2513	C1	3100	B3	3611	A5	5404	A2						
2132	A4	2514	C1	3101	B3	3612	A5	5500	B1						
2134	A4	2515	C2	3102	B3	3613	A5	5501	B1						
2135	B3	2516	C1	3103	B2	3614	B2	5502	B1						
2136	A3	2517	B1	3104	A4	3615	A1	5503	B2						
2138	A3	2518	B1	3105	A4	3619	A1	5504	C1						
2139	B3	2519	B2	3106	A3	3620	C2	5505	C1						
2140	A3	2520	B1	3107	A2	3621	A5	5506	C1						
2141	A3	2530	C2	3108	A3	3622	A5	5507	C1						
2142	A3	2539	C1	3109	A3	3623	C1	5508	B2						
2143	A3	2540	C1	3110	A3	3624	A5	5509	C2						
2144	A3	2541	C1	3117	A3	3625	C1	5600	A5						
2145	A3	2542	B2	3118	B1	3629	B1	5602	A5						
2146	A2	2545	C2	3119	B2	3630	A1	5603	A5						
2147	A4	2600	A5	3120	B3	3631	B2	5606	A1						
2148	A4	2601	A5	3121	B3	3632	B1	5607	A1						
2149	A4	2602	A5	3122	B3	3633	A1	5700	C4						
2150	A4	2603	C1	3123	B3	3634	B2	5701	C4						
2151	A4	2604	C1	3124	B3	3635	C1	5702	B3						
2152	A3	2608	B1	3125	B2	3636	A1	5809	C4						
2153	B2	2609	B1	3126	B3	3637	C1	5810	B3						
2154	B2	2610	A5	3127	A3	3638	A1	5903	B3						
2160	B2	2611	A5	3128	A3	3639	B1	5907	B3						
2200	A4	2612	A5	3129	A3	3700	B4	6100	B3						
2201	A4	2613	B1	3130	B3	3701	B3	7100	A3						
2203	A4	2614	B2	3131	A4	3702	B3	7102	B3						
2204	B4	2618	B1	3132	A4	3704	C4	7103	A4						
2205	A4	2619	B2	3133	A4	3707	B4	7105	A3						
2206	A5	2620	A5	3134	A4	3708	B4	7200	A4						
2207	B4	2621	A5	3135	A4	3709	C4	7203	A4						
2208	A4	2622	A5	3136	A3	3711	C4	7204	B5						
2209	A5	2623	C1	3137	B2	3712	C4	7403	A2						
2210	A4	2624	C1	3138	B2	3713	C5	7404	A2						
2211	A5	2628	A1	3140	A3	3714	B4	7500	C2						
2212	A5	2629	B1	3200	A4	3715	B5	7501	C1						
2213	A4	2630	A1	3202	A3	3716	B5	7503	C2						
2215	A4	2631	C1	3203	A5	3717	B5	7600	A5						
2216	B4	2632	A1	3204	A4	3718	B4	7602	A1						
2217	B4	2633	B2	3208	A3	3719	B4	7603	A5						
2218	B5	2634	A1	3209	B5	3801	C3	7605	A5						
2219	B5	2635	B2	3211	A4	3807	C3	7700	B4						
2220	A5	2636	A5	3213	B4	3808	C3	7703	C5						
2221	A5	2700	B4	3214	B4	3812	C3	7802	C3						
2222	A4	2701	B4	3215	A4	3816	C3	7803	C3						
2223	A4	2702	B4	3216	B4	3818	C3								
2225	A4	2703	C4	3217	B4	3819	C3								
2226	B4	2704	C4	3218	B4	3824	C3								
2227	B4	2705	C4	3219	A4	3825	C3								
2228	A5	2706	C4	3220	A4	3907	A3								
2230	A4	2707	C4	3221	B4	3909	B4								
2231	A3	2708	C4	3222	B4	4102	A3								
2304	B4	2709	C4	3223	B4	4103	B3								

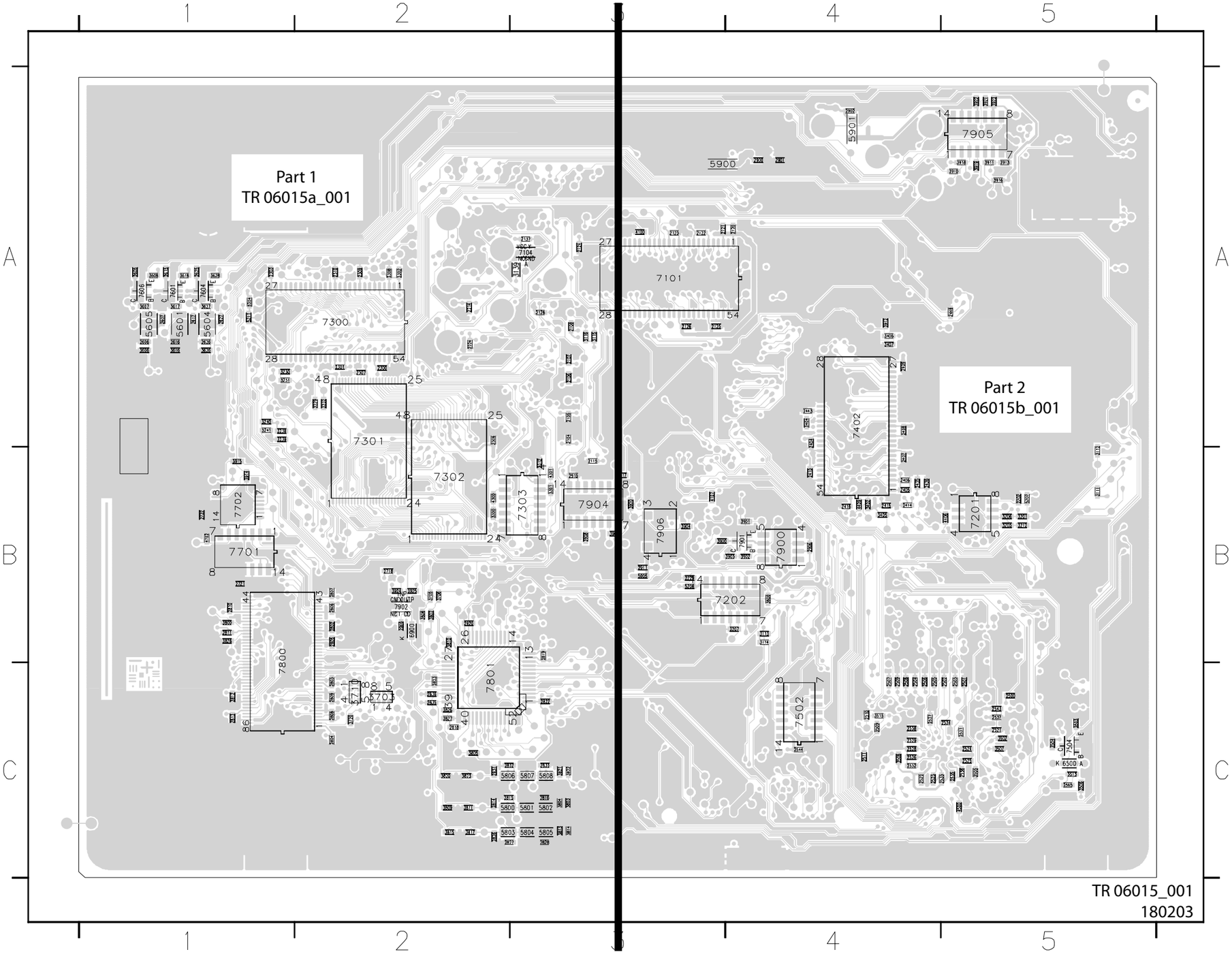
DIGITAL BOARD 1.5 / top view



DIGITAL BOARD 1.5 / top view



DIGITAL BOARD 1.5 / bottom view



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2105	A3	2627	A1	3618	A1	7104	
2106	A3	2718	B2	3626	A1	7201	
2107	A3	2721	B1	3627	A1	7202	
2108	A3	2722	B1	3628	A1	7300	
2115	B3	2802	B2	3703	C2	7301	
2120	A4	2803	C2	3705	B2	7302	
2121	A3	2804	C2	3706	B2	7303	
2122	A3	2805	B2	3710	C2	7402	
2123	A3	2806	B2	3720	C2	7502	
2124	A3	2807	B2	3800	B1	7504	
2125	A3	2808	C2	3802	B2	7601	
2126	A3	2809	C2	3803	C3	7604	
2128	A3	2810	B1	3804	C3	7606	
2137	A3	2811	B1	3805	C2	7701	
2202	B5	2812	C1	3806	B2	7702	
2214	A2	2813	C1	3809	C2	7800	
2224	A2	2814	C2	3810	B2	7801	
2229	B3	2815	C2	3811	C2	7900	
2300	A2	2816	C3	3813	C3	7901	
2301	A2	2818	C2	3814	C3	7902	
2302	A2	2819	B3	3815	C2	7904	
2303	A1	2820	B2	3817	C2	7905	
2306	A2	2822	C3	3820	C2	7906	
2307	A2	2823	C2	3821	C3		
2308	A2	2826	C2	3822	C3		
2309	A2	2827	C2	3823	C2		
2310	A2	2828	C3	3826	C2		
2312	B3	2831	C2	3827	C2		
2404	A4	2832	C2	3828	B1		
2405	B4	2833	C3	3900	B3		
2406	B4	2835	C2	3901	B4		
2407	B4	2836	C2	3902	B4		
2408	A4	2900	A4	3903	B4		
2409	A4	2901	A4	3904	B3		
2410	B4	2902	A4	3906	B3		
2414	B4	2906	B4	3908	B3		
2415	B4	2911	B3	3910	A5		
2416	B4	2915	B3	3911	A5		
2435	B4	2916	B2	3912	A4		
2436	B4	3111	B5	3913	A5		
2443	A4	3112	B5	3914	B1		
2446	A5	3113	B4	3915	B1		
2500	C5	3114	B4	3916	A5		
2501	C5	3115	A3	3917	B3		
2502	C5	3116	A3	3918	A5		
2503	C5	3139	A3	3919	A5		
2504	C4	3201	B5	3920	B5		
2505	C4	3205	B5	3921	A5		
2506	C4	3206	B5	3922	A5		
2507	C4	3207	B4	3923	A5		
2508	C4	3212	B5	3924	B2		
2509	C4	3229	A2	3925	B2		
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2511	C4	3231	A1	4107	B3		
2521	C5	3232	A2	4300	B2		
2522	C4	3238	A1	4301	B3		
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2524	C5	3240	A1	4409	B4		
2525	C5	3241	A1	4500	C5		
2526	C4	3300	B2	4702	B1		
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2528	C4	3402	B4	5207	B5		
2529	C4	3404	A4	5208	B3		
2531	C5	3405	B4	5211	A1		
2532	C4	3406	A4	5601	A1		
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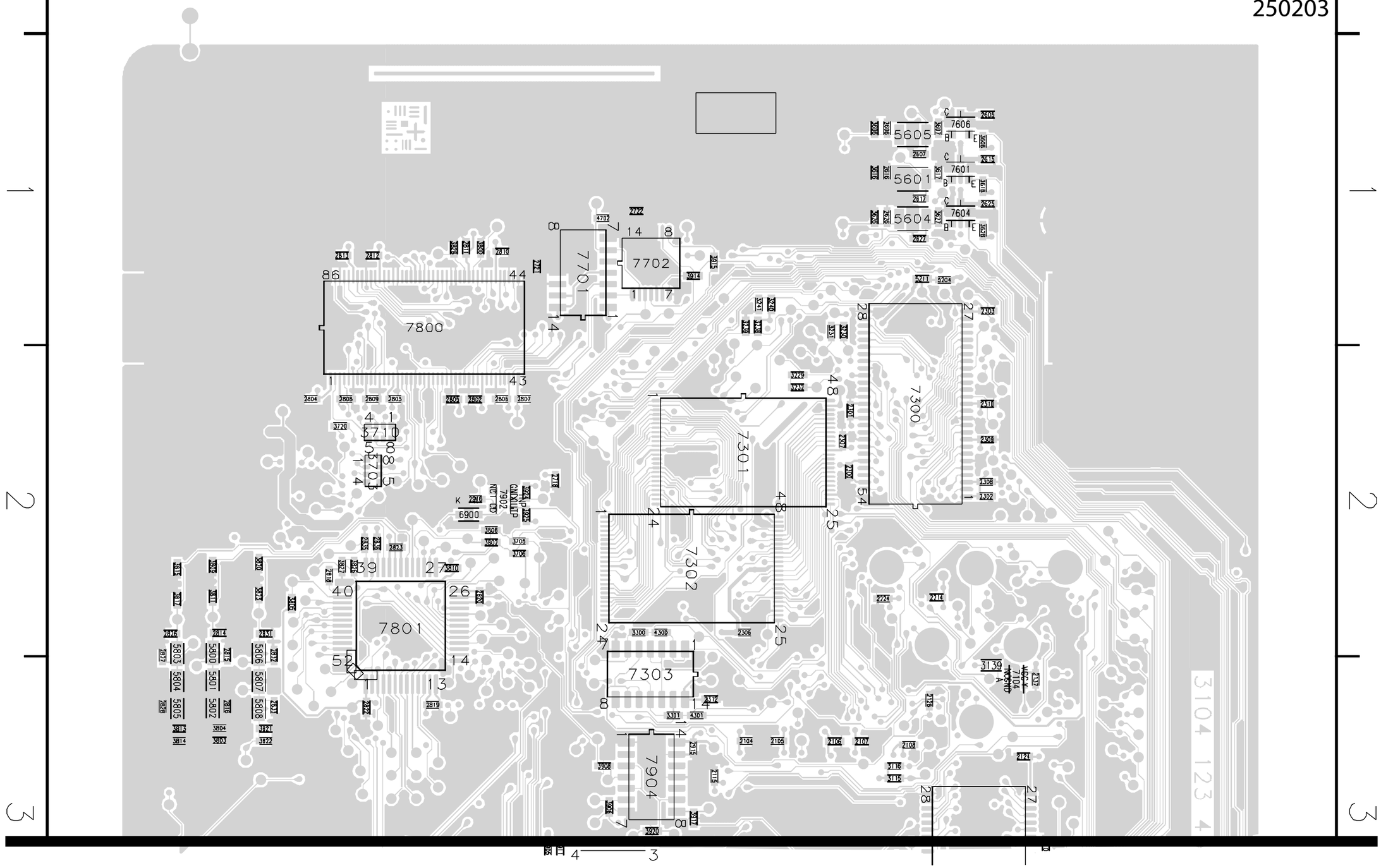
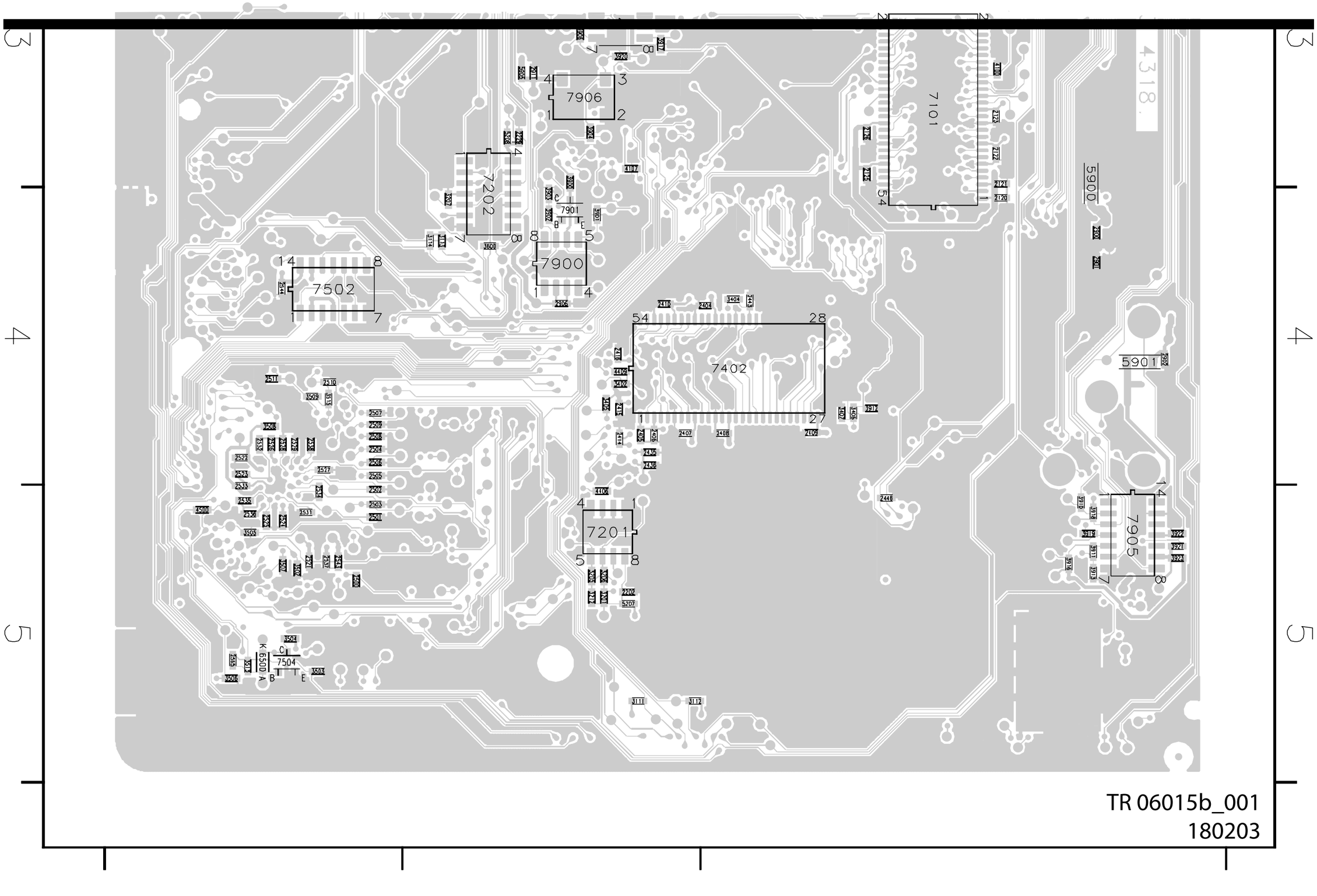
2534	C5	3502	C5	5605	A1		
2535	C5	3503	C5	5800	C2		
2536	C5	3504	C5	5801	C3		
2537	C5	3505	C5	5802	C3		
2538	C4	3506	C5	5803	C2		
2543	C5	3507	C5	5804	C3		
2544	C4	3508	C4	5805	C3		
2565	C5	3509	C4	5806	C2		
2605	A1	3513	C5	5807	C3		
2606	A1	3515	C4	5808	C3		
2607	A1	3600	B4	5900	A3		
2615	A1	3606	A1	5901	A4		
2616	A1	3607	A1	5905	B3		
2617	A1	3608	A1	6500	C5		
2625	A1	3616	A1	6900	B2		

DIGITAL BOARD 1.5 / bottom view

TR 06015a_001
250203



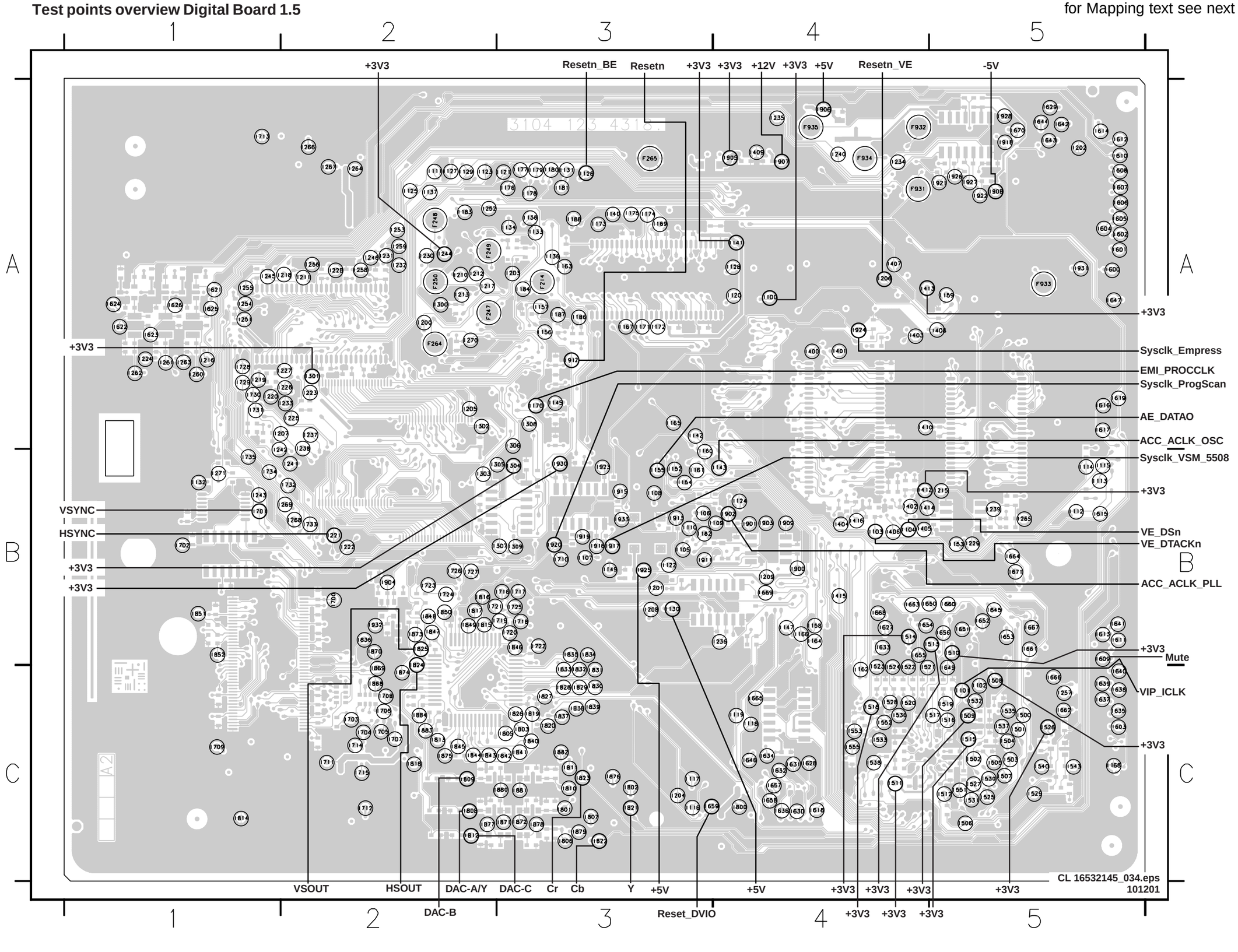
DIGITAL BOARD 1.5 / bottom view



TR 06015b_001
180203

Test points overview Digital Board 1.5

for Mapping text see next page



Layout Digital Board (Mapping Testlands)

F214	A3	I175	A3	I300	A2	I610	A5	I720	B3	I880	C3				
F247	A2	I176	A3	I301	A2	I611	B5	I721	B2	I881	C3				
F248	A2	I177	A3	I302	A2	I612	A5	I722	B3	I882	C3				
F249	A2	I178	A3	I303	B2	I613	B5	I723	B2	I883	C2				
F250	A2	I179	A3	I304	B3	I614	A5	I724	B2	I884	C2				
F264	A2	I180	A3	I305	B3	I615	B5	I725	B3	I900	B4				
F265	A3	I181	A3	I306	A3	I616	A5	I726	B2	I901	B4				
F931	A4	I182	B3	I307	B3	I617	A5	I727	B2	I902	B4				
F932	A4	I183	A2	I308	A3	I618	C4	I728	A1	I903	B4				
F933	A5	I184	A3	I309	B3	I619	A5	I729	A1	I904	B2				
F934	A4	I186	A3	I400	A4	I621	A1	I730	A1	I905	A4				
F935	A4	I187	A3	I401	A4	I622	A1	I731	A1	I906	A4				
I100	A4	I188	A3	I402	B4	I623	A1	I732	B2	I907	A4				
I101	C5	I200	A2	I403	A4	I624	A1	I733	B2	I908	A5				
I102	C5	I201	B3	I404	B4	I625	A1	I734	B1	I909	B4				
I103	B4	I202	A5	I405	B4	I626	A1	I735	B1	I911	B3				
I104	B4	I203	A3	I406	B4	I627	B4	I800	C4	I912	A3				
I105	B3	I204	C3	I407	A4	I628	C4	I801	C3	I913	B3				
I106	B3	I205	A2	I408	A5	I629	A5	I802	C3	I915	B3				
I107	B3	I206	A4	I409	A4	I630	C4	I803	C3	I916	B3				
I108	B3	I207	A2	I410	A4	I631	C4	I805	C3	I917	B3				
I109	B4	I208	B3	I412	B4	I632	C4	I806	C3	I918	A5				
I110	B3	I209	B4	I413	A4	I633	B4	I807	C3	I919	B3				
I111	A2	I210	A2	I414	B4	I634	C4	I808	C2	I920	B3				
I112	B5	I211	A2	I415	B4	I635	C5	I809	C2	I921	A5				
I113	B5	I212	A2	I416	B4	I636	C4	I810	C3	I922	A5				
I114	B5	I213	A2	I500	C5	I637	C5	I811	C3	I923	B3				
I115	B5	I215	B5	I501	C5	I638	C5	I812	C2	I924	A4				
I116	C3	I216	A1	I502	C5	I639	C5	I813	C2	I925	B3				
I117	C3	I217	A2	I503	C5	I640	C5	I814	C1	I926	A5				
I118	C4	I218	A2	I504	C5	I641	B5	I815	B2	I927	A5				
I119	C4	I219	A1	I505	C5	I642	A5	I816	B2	I928	A5				
I120	A4	I220	A1	I506	C5	I643	A5	I817	B2	I930	B3				
I121	A3	I221	B2	I507	C5	I644	A5	I818	C2	I931	A5				
I122	B3	I222	B2	I508	C5	I645	B5	I819	C3	I932	B2				
I123	A2	I223	A2	I509	C5	I646	C4	I820	C3	I933	B3				
I124	B4	I224	A1	I510	B5	I647	A5	I821	C3						
I125	A2	I225	A2	I511	C4	I649	C5	I822	C3						
I126	A3	I226	A2	I512	C5	I650	B4	I823	C3						
I127	A2	I227	A2	I513	B5	I651	B5	I824	B2						
I128	A4	I228	A2	I514	B4	I652	B5	I825	B2						
I129	A2	I229	B5	I515	C5	I653	B5	I826	C3						
I130	B3	I230	A2	I516	C5	I654	B4	I827	C3						
I131	A3	I231	A2	I517	C5	I655	B4	I828	C3						
I132	B1	I232	A2	I518	C4	I656	B5	I829	C3						
I133	A3	I233	A2	I519	C5	I657	C4	I830	C3						
I134	A3	I234	A4	I520	C4	I658	C4	I831	C3						
I136	A3	I235	A4	I521	C4	I659	C3	I832	C3						
I137	A2	I236	B4	I522	C4	I660	B5	I833	C3						
I138	A3	I237	A2	I523	C4	I661	B5	I834	B3						
I140	A3	I238	A2	I524	C4	I662	C5	I835	B3						
I141	A4	I239	B5	I525	C5	I663	B4	I836	B2						
I142	A3	I240	A4	I526	C5	I664	B5	I837	C3						
I143	B4	I241	B2	I527	C5	I665	C4	I838	C3						
I145	A3	I242	B1	I528	C4	I666	C5	I839	C3						
I147	B4	I243	B1	I529	C5	I667	B5	I840	C3						
I149	B3	I244	A2	I530	C5	I668	B4	I841	C3						
I152	B3	I245	A1	I531	C5	I669	B4	I842	C3						
I153	B5	I246	A2	I532	C5	I670	A5	I843	C2						
I154	B3	I251	A1	I533	C4	I671	B5	I844	C2						
I155	B3	I252	A2	I535	C5	I700	B2	I845	C2						
I156	A3	I253	A2	I536	C4	I701	B1	I846	B3						
I157	A3	I254	A1	I537	C5	I702	B1	I847	B2						
I158	B4	I255	A1	I538	C4	I703	C2	I848	B2						
I159	A5	I256	A2	I540	C5	I704	C2	I849	B2						
I160	B3	I257	C5	I543	C5	I705	C2	I850	B2						
I161	B3	I258	A2	I551	C5	I706	C2	I851	B1						
I162	C4	I259	A2	I552	C4	I707	C2	I852	B1						
I163	A3	I260	A1	I553	C4	I708	C2	I868	C2						
I164	B4	I261	A1	I555	C4	I709	C1	I869	C2						
I165	A3	I262	A1	I600	A5	I710	B3	I870	B2						
I166	B4	I263	A1	I601	A5	I711	C2	I871	C3						
I167	A3	I264	A2	I602	A5	I712	C2	I872	C3						
I168	C5	I265	B5	I603	C5	I713	A1	I873	B2						
I169	A3	I266	A2	I604	A5	I714	C2	I874	C2						
I170	A3	I267	A2	I605	A5	I715	C2	I875	C2						
I171	A3	I268	B2	I606	A5	I716	B3	I876	C3						
I172	A3	I269	B2	I607	A5	I717	B3	I877	C2						
I173	A3	I270	A2	I608	A5	I718	B3	I878	C3						
I174	A3	I271	B1	I609	B5	I719	B3	I879	C3						

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8. Alignments

8.1 Alignment Instructions Analog Board

Test equipment:

1. Dual-trace oscilloscope
   Voltage range : 0.001 ~ 50 V/div
   Frequency : DC ~ 50 MHz
   Probe : 10:1, 1:1

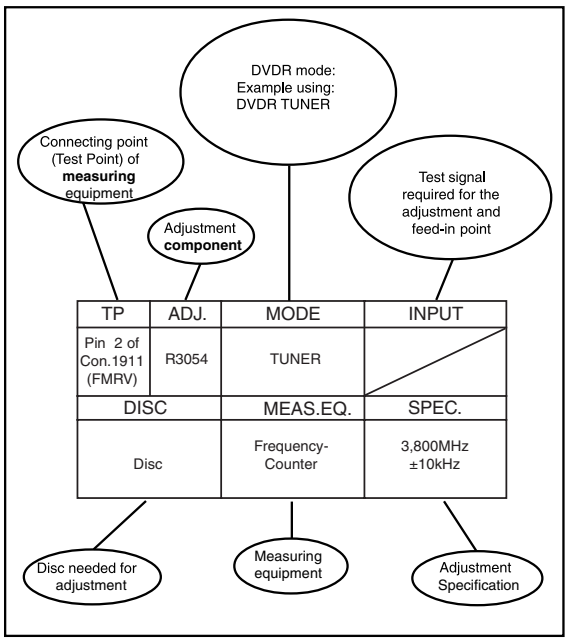
2. DVM (Digital voltmeter)

3. Frequency counter

4. Sinus generator
   Sinus : 0 ~ 50 MHz

5. Test pattern generator

How to read the adjustment procedures:



Front End (FV)

Service tasks after replacement of IC 7710, coil L5710 and L5711:

1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit

Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

PAL - AFC adjustment [5711]:

TP	ADJ.	MODE	INPUT
IC 7710 Pin 17 (F708)	L5711	TUNER	38,9MHz 500mV$_{pp}$ at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,1V

Storage in NVRAM via command mode interface of DSW:
After adjustment, the AFC reference value has to be stored in the NVRAM.
This reference value is 256 * measured voltage/Ucc. Ucc is 5.0V.
Store the reference value via command 732 , followed by the ref. value.
Example: DD:> 732 128

2 HF - AGC adjustment [3724]:

Service tasks after replacement of IC 7710:

Purpose: Set amplifier control.

Symptom, if incorrectly set:
Picture jitter if input level is too low and picture distortion if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1705 Pin 11 (F710, IF-out)	R3707	Set tuned to channel 25 503.25 MHz	5mV(74dBµV) on aerial input PAL white picture, audio IF on, no modulation
DISC		MEAS.EQ.	SPEC.
		Oscilloscope Video Pattern Generator	500mV$_{pp}$ +/-0.5dB (use a 10:1 probe)

3 Attenuating the 40.4 MHz [5710]: (SECAM only)

Service tasks after replacement of coil 5710:

Purpose: To attenuate the band I carrier rests.

Symptom, if incorrectly set:
Bad picture quality when the filter attenuates the picture carrier (38.9MHz).

TP	ADJ.	MODE	INPUT
OFW 1701 Pin 1 (F709)	L5710	TUNER	40.4 MHz, 200mV$_{rms}$ at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	adjust minimum amplitude

If the adjustment is correct the signal at pin 1 of OFW [1701] must be smaller than the input signal amplitude by at least 6 dB.

Figure 8-1

8.2 Reprogramming Procedure of NVM on the Microprocessor Sub PCB

The NVM, item 7808, on the Microprocessor Sub board contains the following factory settings:
1. Clock correction factor
2. AFC reference value
3. Slash version

The settings 1,2 and 3 are stored in the NVM during the production of the analogue board.
The slash version is stored at the end of the production line of the set.
In case of failure, the NVM must be replaced by an empty device. By way of commands via the Diagnostic Software or via ComPair, the factory settings must be restored in the NVM.

8.2.1 Clock Correction Adjustment

To guarantee an exact function of the real time clock, an adjustment of the clock frequency is possibe. The adjustment value is stored in the NVM.
Procedure:
- put the set in service command mode
- execute command 722 to initiate that a signal with 32768 Hz is available on pin 3 of connector 1988
  DD:>722
- measure the frequency f_{meas} of the Clock Crystal with an accuracy of ± 0.1 Hz.
- Calculate the parameter to be entered: $32768/f_{meas} * 10^6$
- Normally the parameter must be between 999902 and 1000097. If the parameter and therefore the frequency of the crystal is outside this range, the crystal must be replaced.
- Execute command 721 with the parameter as input
  example:
  DD:>721 1000023

8.2.2 AFC Reference Voltage Tuner

This function stores the reference voltage for the tuner in the NVM. Before this value can be stored, the AFC adjustment, described in the adjustment instructions of the analogue board, must be carried out.
Procedure:
- Adjust AFC circuit
- Calculate the reference value
- Execute command 732 and use the calculated reference value as parameter
  example:
  DD:>732 128

8.2.3 Slash Version

The slash version is stored with command 715 followed by the slash version as parameter.
The slash versions used are the following:
- LX9000R/22S: SV 79
- LX9000R/25S: SV 87
- LX9000R/29S: SV 79
- LX9000R/37S: SV 179

Example:
DD:>715 79

Reset of Slash Version
Use command 729 to reset the analogue board to the default setting.
Procedure:
- Put the set in DSW command mode
- Execute command 729 with the following parameters:
  DD:> 729 w 0xAE 2 0xD0 0x00
- Leave the DSW command mode and start up the set in application mode

  No background is visible on the TV screen. The analogue board is ready to accept the appropriate slash version

8.3 Rework Procedure IEEE Unique Number

8.3.1 Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7201) of the digital board at the end of the production line.
This procedure is only valid or necessary when:
- The digital board is replaced
- NVRAM on the digital board is replaced
- NVRAM is cleared

In all other cases the repaired set retains its unique number.
The procedure defines several means to re-assure the unique number depending on the possibilities of repair or the state the faulty set is in.

8.3.2 Handling:

State of original (defective) board:
1. The digital board starts up in Diagnostics Mode: follow procedure A to retrieve the valid unique number
2. The digital board does NOT start up in Diagnostics Mode: follow procedure B.

8.3.3 Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017)
2. start up hyper terminal or any other serial terminal via the correct settings (DSW command mode interface)
3. read out existing unique number via nucleus 403
   example:
   DD:> 403
   40300: DV Unique ID = 00D7A1FC6C
   Test OK @
4. note read out
5. program new digital board via nucleus 410
   example: DD:> 410 00D7A1FC6C
   41000:
   Test OK @

The set has now the original unique number

8.3.4 Procedure B

1. Note the serial number of the set example:
   KY050136130156
   - KY = production centre (KY....China).
     According to UAW-500: K=11 and Y=25
   - 05 = change code (this is not used for this calculation)
   - 01 = YEAR
   - 36 = Production WEEK
   - 130156 = Lot and SERIAL number
2. Calculate the unique number: this number always exists out of 10 hexadecimal numbers.
3. First 5 numbers: First we calculate a decimal number according to the formula below:**35828***YEAR + **676*** WEEK + **26***K + Y + **8788**
   The figures are fixed, YEAR + WEEK + factory code (K + Y) are variable
   Example:
   35828*01+**676***36+**26***11+25+**8788** = 69263 (decimal)
   Then we translate the decimal number to a hexadecimal number.
   example:
   69263 (decimal)= 10E8F (hex)
4. Last 5 numbers: The last 5 numbers exist out of the Lot and SERIAL number.

We have to translate the decimal number to the next 5 hexadecimal numbers:
Example: 130156 (decimal) = 1FC6C (hex)

5. Program new digital board via nucleus 410 Therefore we use the 10 hexadecimal numbers we calculated above:
   example:
   DD:> 410 10D7A1FC6C
   41000:
   Test OK @

The set has now its original unique number

8.4 Adjustment DVIO 1.8 PCB

This adjustment sets the free running frequency of the VCO of the audio PLL. It should be carried out after replacement of IC 7604.

1. Disconnect DVD+RW set from the mains.
2. Plug DVIO1.8 board via edge-connector onto Digital Board (DVIO board is vertically oriented, so that both sides of the PCB are accessible for measurements).
3. Connect DVD+RW set to the mains.
4. Turn DVD+RW set on and select any video input source except the DV input.
5. Check the signal at test point F611 with an oscilloscope. The signal should be 5V digital with 50% duty-cycle.
6. Measure the frequency of the signal at test point F610 and adjust the potentiometer 3605 to get a frequency of 12.288MHz ±50kHz (after removing the screwdriver from the potentiometer).
   6a. In case the frequency can not be increased sufficiently, replace capacitor 2618 by NP0-type capacitor with 18pF. Adjust afterwards again the frequency with the potentiometer.
   6b. In case the frequency can not be decreased sufficiently, add (3pF-10pF) trim-capacitor in parallel to capacitor 2618 or replace capacitor 2618 by NP0-type capacitor with 27pF.Adjust afterwards again the frequency with the potentiometer (and/or trim-capacitor).
7. Switch DVD+RW set to Stand-by mode.
8. Disconnect the DVD+RW set from the mains.
9. Plug DVIO1.8 board directly (without edge connector) onto Digital Board.
10. Connect DVD+RW set to the mains.
11. Connect a DV-source that transmits DV-video data with audio to the DVD+RW set.
12. Turn DVD+RW set on, select DV input, and switch DVD+RW set appropriately to output the decoded signal. Audio should be output without distortion.

9. Circuit-, IC descriptions and list of abbreviations

9.1 Front Boards

9.1.1 Microcontroller

The core element of the Display Control unit is the microcontroller TMP88W74F [7406]. The TMP88W74F is an 8 bit microcontroller fitted with 96kB ROM and 2kB RAM. It requires 5V supply and is responsible for the following functions:

– Interface to Central Controller-P
– Evaluation of the keyboard matrix
– Decoding the remote control commands from the infra-red receiver
– Activation and control of the local display

The 12 MHz resonator (Pos. 1409) generates the system clock. The reset is generated by transistor 7409.

9.1.2 Interface to the Central Control µP

The communication to the main microcontroller (CC) on the P-Sub-PCB is done via I2C-Interface, where the TMP88W74F acts in slave-mode.
An additional wire ("INT"-line) is used to signal the Central controller that data are ready, e.g. when a key has been pressed.

9.1.3 Evaluation of the keyboard matrix

There are 8 different keys on the Front boards. A resistor network is used to generate a specific direct voltage value, depending on the pressed key. Via the resistors 3439 and 3440 on the analog/digital (A/D) ports (7406 pin 36 and 37) the evaluation is done.

9.1.4 IR receiver and signal evaluation

The IR receiver [7401] contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infra red transmission (approx. 940nm) to electrical pulses, which are then amplified and demodulated. On the output of the IR receiver, a pulse sequence with TTL-level, which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is fed into the controller for further processing via port TC1 [7406, pin20].

9.1.5 LCD

The LCD is a complete module containing the display and its driver circuitry. The module is controlled by the front µP via I^2C-interface.

9.2 Microcontroller Sub Board (UP SUB Board)

9.2.1 General

This small PCB is directly soldered in on top of the Analogue-Board.
It is used with no diversity in all three different basic versions (Europe, NAFTA and APAC-Pal). Only the software being loaded into the external Flash-memory is not the same.

9.2.2 Microcontroller

The main part of the Sub-PCB is the central controller (CC) µP [7804] TMP91CW12AF, which is a 16-bit CPU with 128kBROM and 4kB RAM.
It works with a 3V3 supply and a system clock of 24,576MHz [1801].
The 3V3-supply is made out of the "5VSTBY" by the circuit around [7816].
After connecting the set to the mains (power-up) the IC [7806] generates a reset pulse. This signal ("IPOR") is directly fed to first priority interrupt input (pin 63) for power fail detection and also to the Reset-Input of the CC (Pin30) via [7802], which is necessary to generate a reset only during power-up. In case of power fail pin 30 of the CC must be kept high (3V3).
The internal memory of the CC is too small for all necessary demands. Therefore an external Flash-ROM [7805] with 1MByte in size and a RAM [7803] with 128kByte are necessary. Both parts are connected to the µP via a parallel address-/data-bus. The lower eight bus-lines (AD0 to AD7) are multiplexed by [7801] and the "ALE"-signal of the CC.
For updating of the software the external Flash-ROM can be reprogrammed by the µP. During this process [7807] is switched on by the "WE"-signal.
When no mains is connected, the CC is supplied via Gold-Cap [2816] during the power backup period. The diode [6802] prevents unwanted current consumption of other components.
The internal ROM of the µP holds the program code for the Real-Time-Clock. Only the microprocessor is supplied by the backup cell, not the external memories and the µP operates in a low frequency mode with the clock crystal [1805] only (32.768 kHz). To adjust the clock the frequency can be measured at pin 87 of the µP in a special test-mode.

9.2.3 Control-Interfaces

The CC is communicating with the digital board via a serial connection, which operates at a speed of 19,4 kbit/s ("D_DATA"-, "A_DATA", "D_RDY"- and "A_RDY"-signal on [1986]). By generating a high level on pin 16 of the CC the digital PCB can be reset (inverter [7817] in between).
Most of the other parts are controlled by the µP via I2C-bus ("SDA"- and "SCL"-signal). The FETs [7821] and [7822] are used for adaptation of the 3V3-level on CC-side to the components supplied with 5V.
The CC can also reset the display-board-µP by pulling pin 39 to high.
The transistor [7819] acts as a level shifter for the "INT"-signal.
In the European sets a bi-directional interface is established between the recording unit and the TV device at pin 10 of the Scart ("P50"-line/Easy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].

9.2.4 EEPROM

The EEPROM M24C16 [7808] is an electrical erasable and programmable, non-volatile memory. The EEPROM stores data specific to the device, such as the AFC-reference value of the Europe IF-part, the clock-correction-factor, etc. It is accessed by the µP via the I2C-bus.

9.2.5 Sync Separator

To detect whether a video signal is available or not a separate IC [7825] is used to extract the sync information out of the video signal that is also routed to the digital board for recording.
While on the input a low-pass-filter ([2823] and [3869]) limits the bandwidth an additional filter (circuit around [7818]) on the output avoids distortions. Afterwards the sync-signal is routed to pin11 of the CC.

9.2.6 Fan Control

To avoid unwanted temperatures inside the set (especially the Laser on the OPU of the drive is very sensitive) a fan is located on top of the basic engine. The speed control is dependent on the ambient temp. A NTC resistor [3134] located on the display board measures the temperature. An operational amplifier [7902-B] generates a proper voltage, which is then fed to the engine ("BE_FAN"-line). Below 28°C ambient temp. the fan-voltage is approx. 5V and is increased to 10V when the ambient temperature goes up to approx. 38°C. The second part of the Op-Amp. [7902-A] prevents damage of any temperature-sensitive part in case the NTC or the wire in between is damaged. It acts as a comparator and pulls the "BE_FAN"-signal to 10V. As the fan has to be stopped in case the tray of the drive is open this voltage is "killed" by the CC ("FAN_OFF"-signal). The double-diode [6901] acts for both Op.-Amp.-circuits. The circuit is also prepared for a set-fan (circuit around the Op-Amp. [7902-C]).

9.3 Analog board Europe

9.3.1 General

This PCB consists out of the following parts:
- Power-Supply-Unit
- Frontend (Audio & Video)
- Input-/Output-switching
- Audio ADC- & DAC-processing
- VPS/PDC- and Text-Data slicer
- Analog Follow-Me Circuit

All functional groups are either controlled via I2C-bus or via separate signal lines by the Central-Controller on the µP-Sub-Board. This sub board is directly soldered in onto the analog PCB. During Stand-By mode of the set, several parts are not supplied (Tuner, MSP, ...). The microprocessor is running and maintains the clock of the set.
To avoid bus blockades the I2C-bus ("SCLSW" & "SDASW") to/from these units is decoupled via transistors [7419], [7420] from the general bus ("SCL" & "SDA").

9.3.2 Frontend

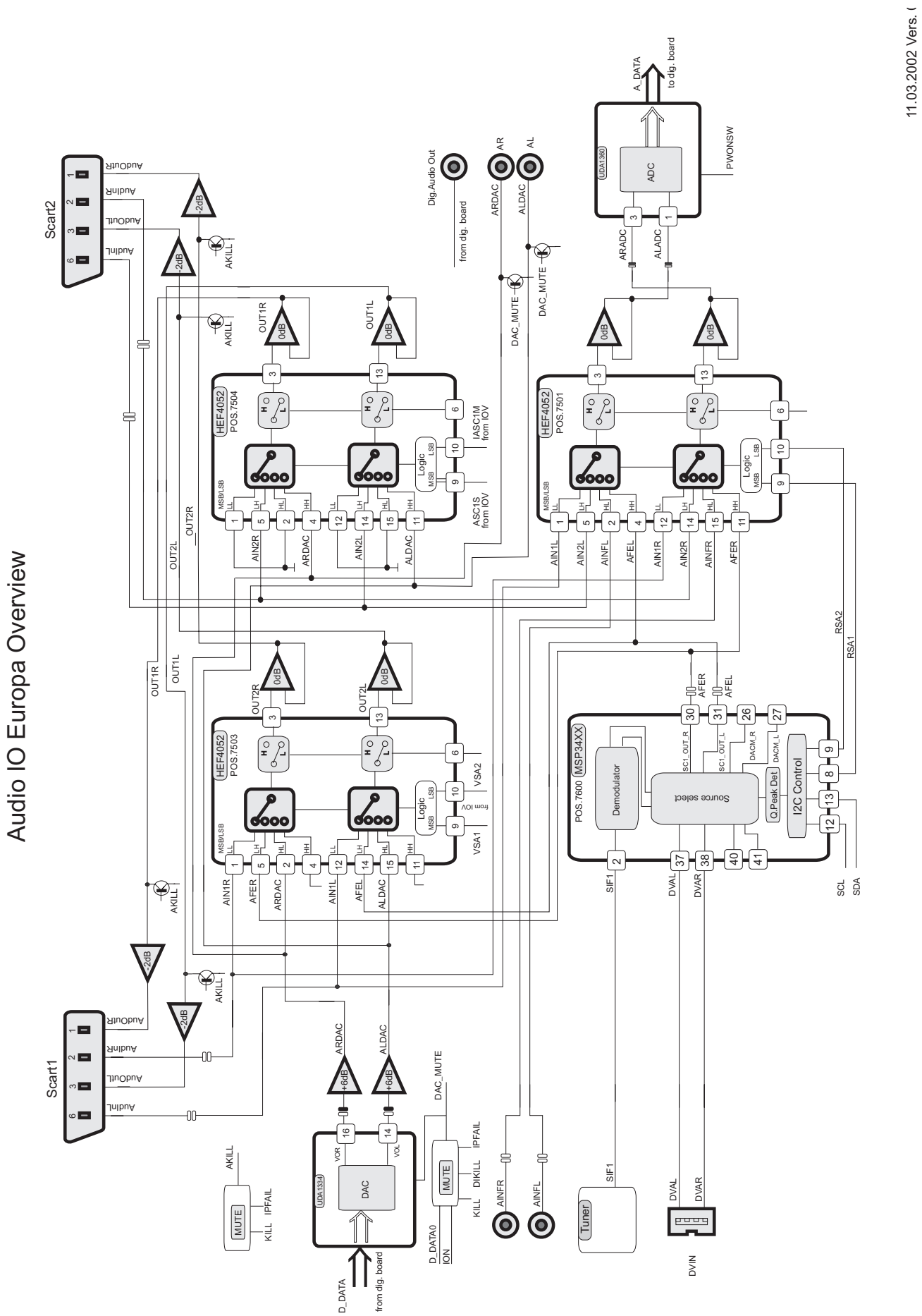
This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pal-I only) and comprises the following parts:
- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection
The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I^2C-bus of the CC-µP. [1705] is also equipped with a "passive-loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34,0 MHz).
A quasi-split audio system is used. Separate surface-wave filters (SAW) are required. [1701], [1703] for video, [1702] for audio. [1701] is switched into the signal path for DK/I-SECAM L/L' reception, if the signal "SFS_TS" is "high". In this case the switches [7704], [7705] are open and the diode [6703] is conducting. [1703] is switched into the signal path for BG reception ("SFS_TS" is "low"). Then the switch [7712] is open and the diode [6704] is conducting. For DK/I-SECAM L/L' reception, an additional circuit for suppressing the audio carrier of the adjacent channel is used. This circuitry is adjusted by coil [5710] for maximum suppression at 40.4MHz.

IF demodulator
The signal from the tuner and IF-selection circuit is processed by the demodulator IC TDA 9818/9817 [7710]. The signal "PSS" to pin 3 switches between demodulation of positive (SECAM only) or negative modulated video carriers. A QSS-audio-IF signal SIF1 is generated for demodulation in the sound processor [7600]. The audio-IF carrier is selected in the audio SAW filter [1702]. This filter is switched for SECAM L'. If the signal "SB1" is "high", the switch [7714] is closed and the diode [6705] is not conducting. For all other standards the diode [6705] is conducting and the switch [7714] is open. The output signal of this SAW filter is firstly processed in the TDA 9818. Audio carriers are converted from the tuner IF level to the audio IF position and further processed in the audio demodulator [7600]. The AFC coil [5711] on the TDA 9818/9817 is adjusted so that when a frequency of 38.90 MHz is supplied to the IF output of the tuner, the AFC voltage on pin 17 of [7710] is 2.5V. The setting of the picture carrier frequency for SECAM L in the TDA 9818 is achieved by connecting pin 7 of the IC via a resistor [3710] to ground. The switch [7701] and the signal "SB1" do this. The HF-AGC is set using the potentiometer [3724] so that, with a sufficiently large antenna input signal (74 dBµV), the voltage at the IF output of the tuner [1705] pin 11 is 500 mVpp. This setting must be carried out when the audio carrier is switched off. The demodulated video signal appears on pin 16 of [7710]. The AGC voltage at pin 4 is used to determine the antenna signal strength after a buffer [7717] with the signal "AGC" and an analog input port of the CC-P. The trap [1704] reduces the sound carrier remainders in the video for BG standards. The trap [1706] works in the same way for the Pal-I standard only. For all other standards the switch [7713] is closed via [7706] and "SFS_TS"-line set "high" to bypass this trap. In these cases the selectivity of the SAW filter [1701] is sufficient. The coil [5713] for non-BG standards realizes a frequency response correction. This correction is not desired for SECAM L' and therefore short-circuited by [7716] (signal SB1 is "high" and [7702] has on-status). The demodulated video signal "VFV" is available after the buffer and limiting stage for noise peaks [7711]. The FM-PLL demodulator function of TDA 9818 is not necessary and therefore deactivated by the resistor [3739].

Audio demodulator
The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I^2C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...).The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing.

9.3.3 Audio routing



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The processing of audio is always done in stereo (e.g. separate left- and right-channel) and the complete switching is realized by using HEF4052, which is a dual four-to-one multiplexer. In principle there are three independent selectors:

a) Scart 1-Output-Path:
Pos [7504] is used to select either Scart 2-Input ("AIN2L"/"AIN2R") or the signal directly from the audio DAC [7004] ("ALDAC"/"ARDAC") as the output source for Scart 1 ("AOUT1L"/"AOUT1R").
The control is done by means of the lines "ASC1S" coming from [7408] (IC [7408] acts as a port expander for the CC-P) and "IASC1M", which is directly coming from the CC. Pos [7412] is used for level adaptation (3V3 to 5V) for the "IASC1M"-signal.

b) Scart 2-Output-Path:
Pos [7503] selects between Scart 1-Input ("AIN1L"/"AIN1R"), signals from the internal frontend ("AFEL"/"AFER") via MSP [7600] or audio directly from the DAC [7004] ("ALDAC"/"ARDAC"). The outputs of this switch are routed to Scart 2 ("AOUT2L"/AOUT2R"). This switch is controlled via "VSA1"- and "VSA2"-line. These lines come from [7408] that is acting as a port expander for the CC-P.

c) Record-Path:
Pos [7501] selects either signals from Scart 1 ("AIN1L"/"AIN1R") or Scart 2 ("AIN2L"/"AIN2R") or Cinch-Front ("AINFL"/"AINFR") or the MSP [7600] ("AFEL"/"AFER") and routes to the audio ADC [7007] ("ALADC"/"ARADC") for record purposes. The switch is controlled via "RSA1"- and "RSA2"-signals. These signals come from the MSP [7600], which acts as a port expander of the CC-P. As there can also exist a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP. The MSP acts as a preselector between audio from internal frontend or the DV-Input.
Each of these three selectors ([7501], [7503] & [7504]) has a separate Op-Amp on the output for level-adaptation-, performance- and line-driving-reasons. [7505-A & -B] for record, [7502-C & -D] for Scart 1-Output and [7502-A & -B] respectively for Scart 2. Every audio output line on the two Scart connectors can be "killed" (muted) by an extra transistors ([7506], [7508], [7509] &[7511]), which can be activated by the "AKILL"-line. This signal is generated by the circuit around [7404]/[7421] and is a combination of the "KILL"- from the CC-P and the "IPFAIL" of the power-supply-unit.

d) Line-Out-Path:
see chapter 9.3.5

e) Digital Audio Output-Path without IOE-Print:
Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitor [2580] performs an AC-coupling between connector- and set-ground.

f) Digital Audio Output-Path with IOE-Print:
In case of usage of the IOE-print the digital audio signals (input and output) are directly routed from digital board via interface cable to plug [1920] on the IOE-print. The "DAOUT"-line is splitted into two signals, one for cinch out and one for optical out. The signal to cinch out first passes a 5-fold inverter [7250] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5250] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3259] to the cinch plug [1925] (or [1926-B] in case of option "DIGITAL IN"). The capacitors [2256] and [2266] perform an AC-coupling between connector- and set-ground. The second "DAOUT"-signal is fed directly via [3264] to the optical out transmitter [6255].

g) Digital Audio Input-Path with IOE-Print:
There are two possibilities for a digital audio input signal in case of option "DIGITAL IN". One is the signal from the optical receiver [6259], which is routed via [3269] directly to plug [1920]. The second is the signal from the cinch plug [1926-A]. This signal then passes an inverting amplifier [7250-6] and is then routed via [2253] to the plug [1920].

9.3.4 Audio ADC/DAC

a) PCBs with AD1852 [7004]:
The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7007]. This IC can process input signals up to 2Vrms by using external resistors [3047], [3053] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7007] to 3,3V via [7008] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back into the analog domain is done by AD1852 [7004]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 17/16 and pin 12/13 of [7004] as symmetrical signals. Afterwards an Op-Amp. [7003] (line driver & converting to unsymmetrical signal, gain = 1), which is also working as low-pass-filter to increase signal performance (noise, distortions,...), is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output and also used in the audio-I/O for further processing. The DAC has also a mute possibility, which can be activated by setting pin 23 to 5V via [7001]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL"). If the DAC is muted externally via pin 23 or if there are no audio data available (e.g. "D_DATA0"-line zero), the output pins 8 and 22 of the DAC change to high (+ 5V). These two signals are then combined with diode pos. 6006. After decoupling via [7009] the signal "DAC_MUTE" is used as mute signal for the mute transistors [7415], [7416] for cinch rear out.

b) PCBs with UDA1334BTS [7001]:
The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using external resistors [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back into the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation, gain = 2) which is also working as low-pass-filter to increase signal performance (noise, distortions,...), is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output and also used in the audio-I/O for further processing. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board

("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL"). In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero).
This function can be also activated via the "ION"-line (set to high during any stand-by mode). To avoid signal distortions (clipping) the mute transistors for cinch rear out [7415], [7416] are decoupled via [7011].

9.3.5 Video-routing

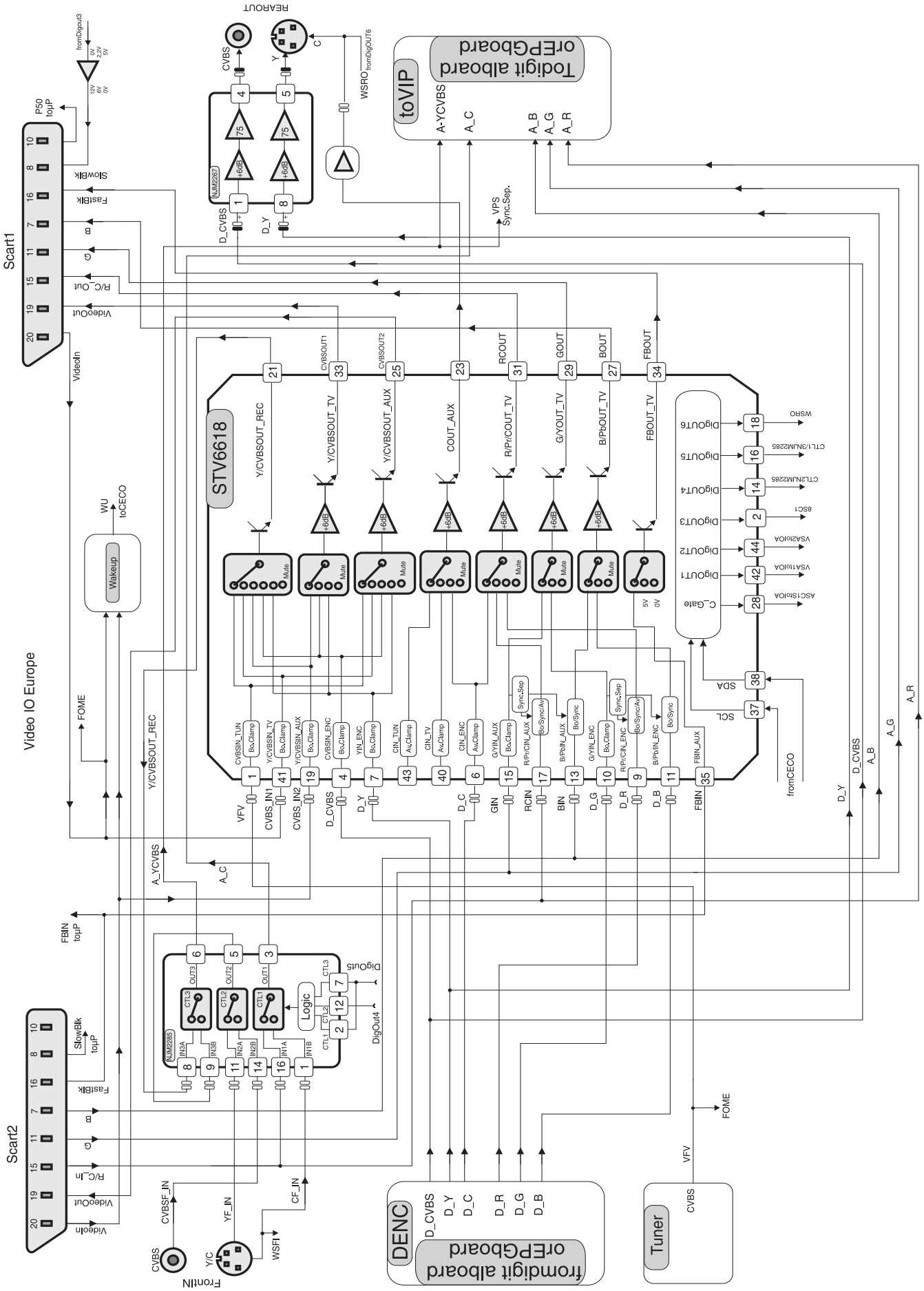


Figure 9-1

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I^2C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6 dB-amplification and a 75 Ohms driver-stage inside. This IC includes also several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend ("VFV"), the input from Scart 1 ("YCVBSIN1") or the signal from Scart 2 ("YCVBSIN2"). Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones are done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.
To reduce the number of external presets there exists only one preset for CVBS- and Y/C-front. The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on µP-sub-board) where Y/C has higher priority.
The R/G/B-inputs and the Fast-Blanking-line from Scart 2 are routed over the optional EPG board to the digital PCB. Also all other video signal from the analog board are routed through the EPG board if present. These signals are also available on the corresponding input-pins of the STV6618 to enable a loop-through in AV-Standby. In this mode the set has to behave like a cable between the two Scart-connectors. AV-Standby is activated either by a "high" level on pin 8 of Scart 2 ("active device is present") or by the "WU"-line (wake up). This signal is generated out of the circuit around [7401], [7402] & [7403] and will become "high" if there is a signal on pin 20 of Scart 1- or Scart 2. The detection of the input level on pin 8 of Scart 2 ("8SC2") is done via an analog input of the CC-P (less than 2V means inactive; 4,5V to 7V determines a source with 16:9 picture-ratio and greater than 9,5V is an active 4:3 source).
All signals from the digital board ("D_R", "D_G", "D_B", D_C", "D_Y" and "D_CVBS" are routed to the proper inputs of the STV6618 for amplification and driving purpose before they can be seen on the appropriate Scart outputs. In case of EPG the signals from the digital board are routed through the EPG board where the selection between digital board video or EPG OSD is taken.
The "D_CVBS"- and the "D_Y"-line are passing a 6 dB-amplifier and driver-IC [7410] and are then routed to the CVBS-Cinch and Y/C-out rear. The chroma signal for this Y/C out is coming from the STV6618 - which makes the 6 dB-amplification - and a driver [7406] in between.
The detection of the picture ratio information on the Y/C-input front is made by measuring the DC-level on the Chroma signal via analog input of the CC-P ("WSFI"-line). In case the level is higher than 3,5V the input signal is a 16:9 source. If the level is lower than 2,4V the picture ratio is 4:3.
For generation of the appropriate DC-voltage on the Y/C-out rear the "WSRO"-line is controlled via pin 18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).
The control of the switching voltage (Pin 8 of Scart 1) is done via 3-level-pin (nr.2) of the STV6618 [7408] and the transistors [7405], [7407] & [7409]. A "low" on pin 2 of [7408] causes around 11V on pin 8-Scart 1 (e.g. source with 4:3 picture-ratio active). Medium level (2,5V) on pin 2 of the STV6618 generates medium level (approx. 6V) on pin 8-Scart 1 (e.g. active source with 16:9) and a "high" on pin 2 of the STV6618 pushes pin 8-Scart 1 to "low" (e.g. inactive).

9.3.6 VPS/PDC- and Text-Dataslicer

For extraction of relevant information out of the video signal (time controlled recording, net-name-identification, time- & date- download) the STV5348 [7931] is used. Data transfer to/ from the CC is fully done via I^2C-bus and the input signal for decoding is the same as the one being routed to the digital board for recording purposes ("A_YCVBS"-line).

9.3.7 Analog Follow-Me

This circuit compares the video signal from the internal frontend ("VFV") of the recorder with that one of the connected TV-set ("CVBS1"). The TV set delivers the signal via Scart-cable. A comparator [7934] and several additional parts ([7932], [7933], ...) are used to compare the two video signals. In case of both input signals are equal the output-line of this circuit ("FOME") is set to low. Detection is made via an input port of the CC-P.

9.4 Analog board NAFTA- & APAC-Pal- version

9.4.1 Frontend NAFTA

[1701] demodulates the video signal from the antenna input. Tuner and IF-demodulator are in one unit. Also a modulator is included in that part. The audio- and video-signal to the modulator are the ones from the selected input or the playback path of the set ("AMCO"- and "D_CVBS"-line). The control of the tuner is fully done via I^2C-bus by the CC-P. Via the "MSW"-signal and [7701] the modulator is switched on and off. In opposite to this the antenna loop-through is opened or closed.
In the APAC-Pal version POS [1700] is used with the difference that it demodulates only PAL- instead of NTSC-signals and has also no modulator. The "CSW_SSW" line switches the modulator between CH3 or CH4 in the NTSC-version.
To achieve optimal tuning the "AFC"-signal is detected by the CC via an analog input; [3701], [3702] and [3703] are used for level adaptation (5V to 3V3). Pos [7700] is a driver for the video signal.
The sound demodulation is realized by the MSP34x5 [7600], which is also fully controlled via I^2C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing. As this PCB is used for different regions (NAFTA and APAC) either MSP3425 or MSP3415 are assembled.

9.4.2 Audio routing

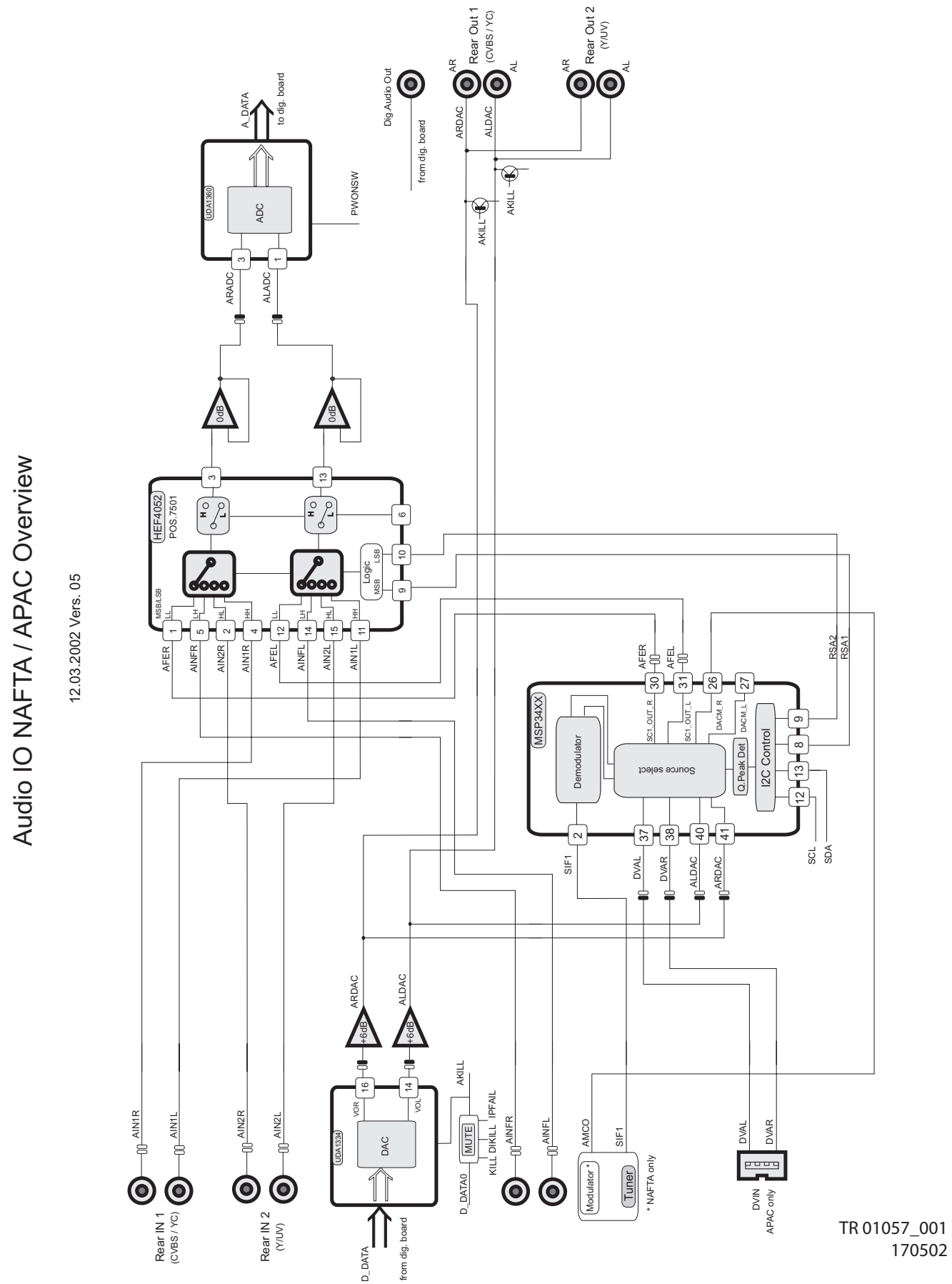


Figure 9-2

The sound processing is always done in stereo (that means separate left- and right-channel).

a) Record-Path:
The complete selection of the audio signal for recording is done by a HEF4052 [7501], which is a dual four-to-one multiplexer. The input lines for the selector [7501] are coming either from MSP [7600] (“AFEL”/”AFER”) or cinch rear in 1 (“AIN1L”/ ”AIN1R”) or cinch rear in 2 (“AIN2L”/”AIN2R”) or the cinch in front (“AINFL”/AINFR”). The [7501] is controlled via “RSA1”- and “RSA2”-signals coming from the MSP [7600]. The MSP acts as a port expander of the CC-P. The Op-Amp on the output [7504] is necessary for performance reasons and acts also as a driver. The selected signals “ARADC” and “ALADC” are directly fed to the Audio-ADC.
As there can exist also a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP, which acts as a preselector between audio from internal frontend or the DV-Input.

b) Line-Out-Path:
see chapter 9.4.3

c) Digital Audio Output-Path without IOE-Print:
Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the “DAOUT”-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitors [2580], [2582] and [2583] perform an AC-coupling between connector- and set-ground.

d) Digital Audio Output-Path with IOE-Print:
see chapter 9.3.4.f

e) Digital Audio Input-Path with IOE-Print:
see chapter 9.3.4.g

9.4.3 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the I/O (“ALADC”- & “ARADC”) is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using an external resistor [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and “PWONSW”-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data (“A_DAT”-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back to the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data (“D_DATA0”-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation) which also works as a low-pass-filter to increase signal performance (noise, distortions,...) is passed. Then both signals (“ALDAC” & “ARDAC”) are directly routed to the rear cinch output. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board (“D_IKLL”-line) or the “IPFAIL”-signal from power-supply-unit. In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of “digital silence” by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. “D_DATA0”-line zero).
The signals from the audio DAC part (“ARDAC”/”ALDAC”) are directly routed to both cinch rear outputs, which are connected in parallel. To avoid plops and any other audible noise on the output there is a mute-stage implemented [7509], [7511] for each channel. The activation is done via “AKILL”-line, which is a combination of the “KILL” from CC-P, “DAC_MUTE” from DAC-part and “IPFAIL” from the power-supply-unit. The circuit around [6430], [6431], [7430] and [7404] generates this signal.

9.4.4 Video-routing

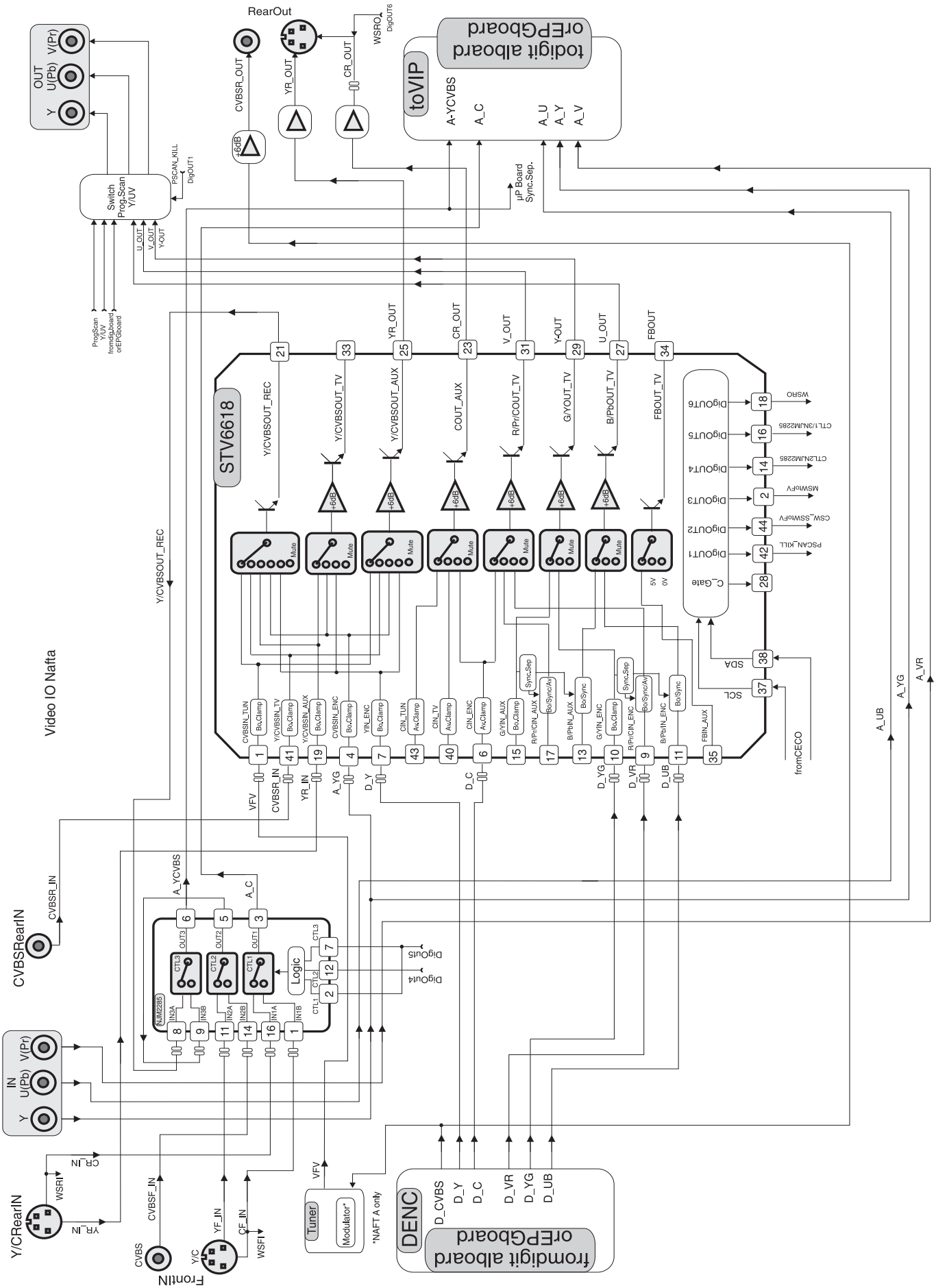


Figure 9-3

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I^2C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6dB-amplification and a 75 Ohms-driver-stage inside. This IC also includes several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend, the CVBS from Cinch-Rear or Y from the S-Video-input rear. Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones is done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.
To reduce the number of external presets there is only one station for CVBS or Y/C (front and rear). The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on µP-sub-board) where Y/C has higher priority.
The Y/U/V-inputs are routed over the optional EPG board to the digital PCB. Only the Y-line has to be present additionally on pin 4 of [7408] for video recognition. Also all other video signal from the analog board are routed through the EPG board if present.
The signals "D_C" and "D_Y" are fed through [7408] (6dB amplification) and via [7406], [7409] used as driver to the S-Video output connector. The "D_CVBS" line is directly routed to the modulator and via the circuit around [7431] and [7432] amplified by 6dB before it is fed to the CVBS output plug. In case of EPG the signals from the digital board are routet through the EPG board where the selection between digital board video or EPG OSD is taken.
The Y/U/V signals from the digital board are also passing [7408] for 6dB amplification and driving purpose.
To achieve optimal picture quality the set is equipped with a simple progressive scan function based on a so-called line doubler. The complete generation of the signal is done on the digital board and via a separate cable and connector [1946] the corresponding Y/U/V lines are routed to the analog PCB. Also the YUVprogressive signals are switchable to EPG OSD on the EPG board if implemented. As there is only one Y/U/V output available a switching between interlaced and progressive output is necessary. While the transistors [7421], [7422], [7424], [7425], [7427] and [7428] are used as driver for Y/U/V progressive, [7423], [7426] and [7429] together with [7405] are necessary for killing these signals via pin 42 of [7408] in case the interlaced is selected ("PSCAN_KILL"-line set to low). If progressive output is active the pins 27, 29 and 31 of [7408] are set to high impedance and "PSCAN_KILL" is also high (e.g. 5V).
The detection of the picture ratio information on the Y/C inputs (rear or front) is done by measuring the DC-level on the Chroma signal via an analog input of the CC-P ("WSRI"- and "WSFI"-line). In case the level is higher than 3,5V the input signal is a 16:9 source, if the level is lower than 2,4V the picture ratio is 4:3.
For generation of the appropriate DC-voltage on the Y/C output the "WSRO"-line is controlled via pin18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).
During Stand-By there is also no loop-through of any input to any output performed.

9.5 Digital Board

9.5.1 Record Mode

Video Part
Analog Video input signals CVBS, YC and UV(RGB for EURO and YUV for USA) are routed via the analog board to connector 1601 and sent to IC7500 SAA7118 (Video Input Processor). Digital video input signals (DV_IN_DATA(7:0)) are sent from the DIVIO board through the connector 1603 and further also to IC7500.
IC7500 (VIP) encodes the analog video to digital video and processes the digital video to a digital video stream (CCIR656 format). This output stream (VIP_YUV[7:0]) goes to IC7403 SAA6752H (EMPRESS) and to IC7100 Versatile Stream Manager. The latter uses the data for VBI (vertical blanking interval) extraction.
IC7403 (EMPRESS) encodes the digital video stream into a MPEG2 video stream that is fed to IC7100 (VSM).

Audio Part
I2S audio are sent from the analog board to IC7403 EMPRESS via connector 1602. The EMPRESS compresses I2S audio data into an AC3 audio stream which is fed to IC7100 (VSM).

Front-End I2S
IC7100 (VSM) interfaces directly to the different hardware modules such as Basic Engine, EMPRESS IC7403, MPEG decoder IC7200 (Sti5508) and buffers the data streams that are coming from or going to these hardware modules.
In IC7100 (VSM), the video MPEG2 stream and the audio AC3 stream are multiplexed into a I2S packetized stream. The serial data are sent to the Basic Engine to be recorded.

Loop-Through
The multiplexed audio and video stream in the VSM is fed back via the parallel front-end interface to IC7200 (Sti5508). This IC decodes the MPEG stream into analog video and I2S audio. The video and audio signals are routed to the analog board via connectors 1601 and 1602. During recording, the recorded signal is present at the outputs of the analog board.

9.5.2 Playback Mode

During playback, the serial data from the Basic Engine is going directly to the Sti5505 via the serial front-end I2S interface. The Sti5508 is a MPEG & Audio/video decoder and has the following outputs:
- To the analog board:
  - analog video RGB, YC, CVBS
  - I2S audio (PCM format)
  - SPDIF audio (digital audio output)
- To the Progressive scan board:
  - digital video YC(7:0).

9.5.3 S2B Interface

The S2B interface between the VSM (IC7100) and the Servo processor MACE3 controls the Basic Engine during record and playback mode.

9.5.4 System Clock

System clocks(27MHz) of VSM, Sti5508, EMPRESS and Progressive Scan are generated by oscillator 7906

9.5.5 Audio Clock

During record mode, the audio clock ACC_ACLK_OSC is generated by IC7102 (PLL) because then, the audio clock must be sychronized with the incoming video (VIP_FID) from the VIP.
During playback mode, the audio clock ACC_ACLK_PLL is generated by the clock synthesizer IC7900 (MK2703S).
Both ACC_ACLK_OSC(also goes to the EMPRESS as ACLK_EMP) and ACC_ACLK_PLL are fed to the VSM. This IC selects the appropriate clock to the STI5508. The EMPRESS IC derives from the incoming ACLK_EMP the I2S audio encoder clocks AE_BCLK and AE_WCLK which are sent to the VSM.

9.5.6 On/Off

The digital board is not powered in standby mode. Control signal ION, coming from the analog board, will enable the PSU and power the digital board.

- ION = High: the digital board is in powered down standby mode
- ION = Low: the power supply to the digital board is enabled

9.5.7 Reset

Control signal IRESET_DIG, controlled by the microprocessor on the analog board is sent to the RESET LOGIC circuit.

- IRESET_DIG = Low in standby mode
- IRESET_DIG = High: the whole system is reset and the Digital board is waked up.

9.5.8 I2C Bus

Sti5508 is master of the I2C bus. The following IC's are controlled by the I2C bus:

- IC7201 NVRAM
- IC7403 EMPRESS
- IC7500 VIP
- IC7700 FLI2200 Video Deinterlacer Line Doubler
- IC7801 ADV7196 Video Denc

9.5.9 EMI Bus

The following IC's are connected to the External Memory Interface bus (EMI) which functions as system bus:

- IC7301 and 7302: Flash memories which contain the application and diagnostic software
- IC7100: VSM
- IC7200: MPEG AV Decoder

Block Diagram Digital Board

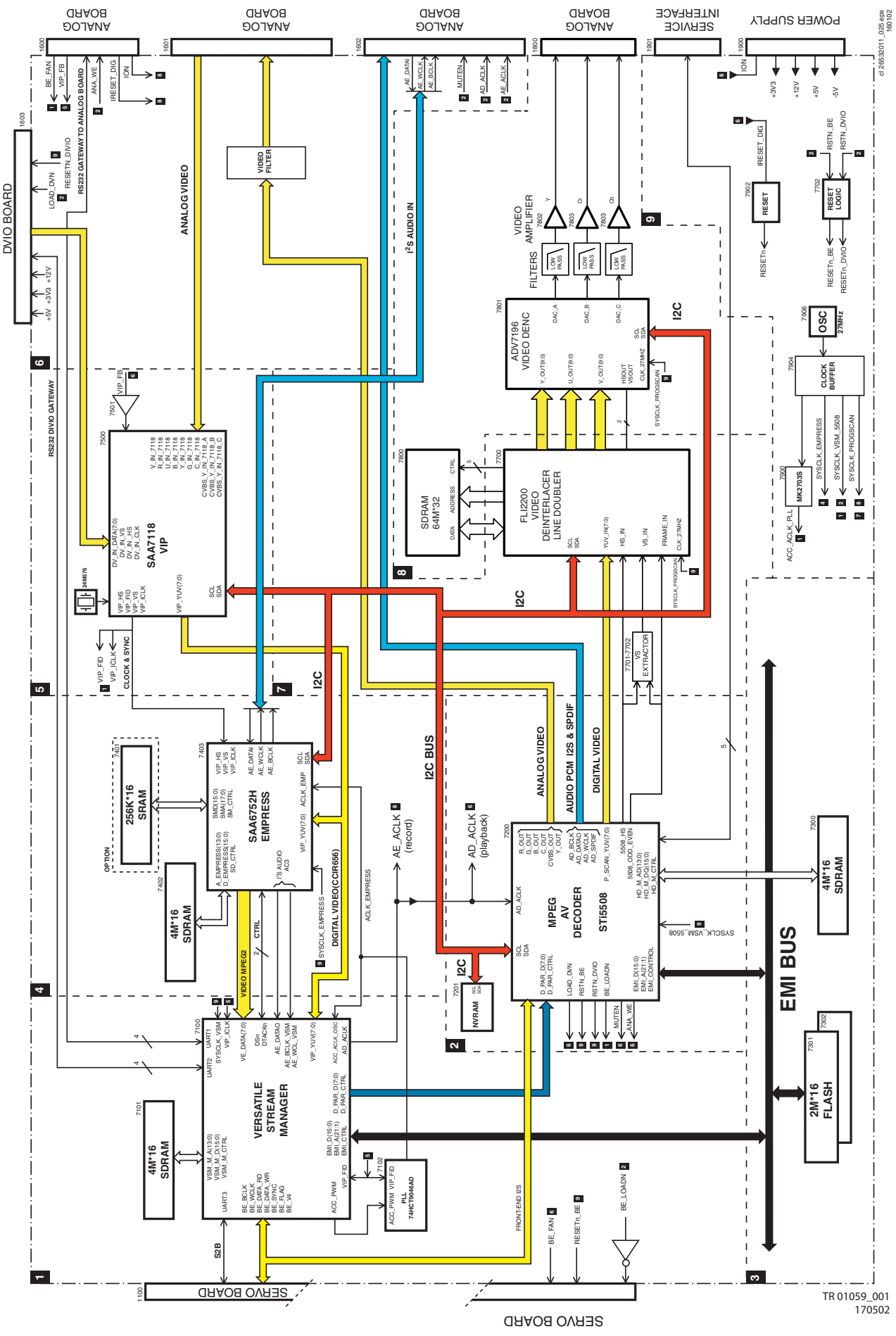


Figure 9-4

9.5.10 Progressive Scan

Description
The progressive scan part is integrated in the Digital Board and built around the SAGE Fli2200 de-interlacer / line doubler (7701). This I2C controlled de-interlacer uses a 64Mbit SDRAM (32bit x 2M) to perform high quality deinterlacing (meshing). The de-interlacer gets his digital YUV input data from the STi5508 (7200). The format of the digital YUV input to the SAGE is CCIR656 with separated Hsync, Vsync and odd/even signal running on 27Mhz.
Because the STi5508 doesn't have a Vsync output the odd/even output of this IC has to be translated to a Vsync signal. Some glue logic has been added to extract the vertical sync. The glue logic circuit consists of Flip-Flop IC 74HC74D (7701) and EXOR 74LVC86 (7702). The next diagram shows how the vertical sync is extracted.

Vertical Sync

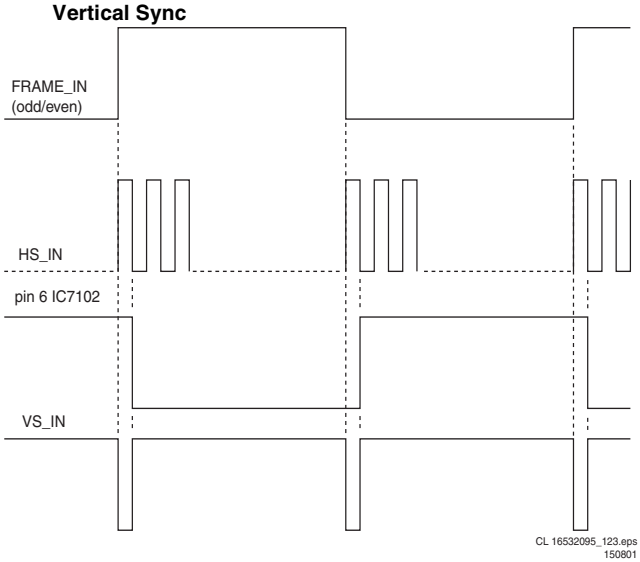


Figure 9-5

The output of the de-interlacer (4:4:4 progressive video) is fed to the Analog Devices ADV71967 MacroVision compliant DENC (7801).
The YUV current output of the DENC is fed via a low pass filter to the single supply output opamps AD8061/8062 (7802-7803). The analog video is fed via a 7 poled flex to the analog board where the YUV 2FH cinch connectors are located.

9.6 Divio 1.8 Board

9.6.1 Short Description of the Module:

The DVIO Module is a decoder for DV streams. Input is a stream from a DV-camcorder via IEEE1394. Outputs are CCIR656 Video and Analog audio (L+R). A serial control interface is present.
The following picture shows the location of the DVIO Module inside the DVDR set.

Description DIVIO Module

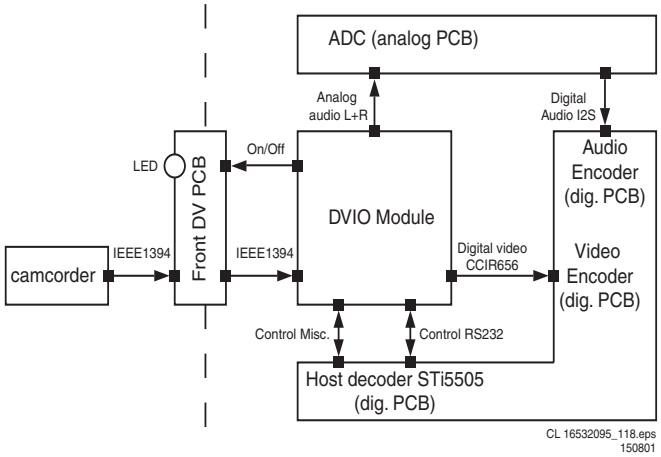


Figure 9-6

9.6.2 Block Diagram

Block Diagram DVIO1.8

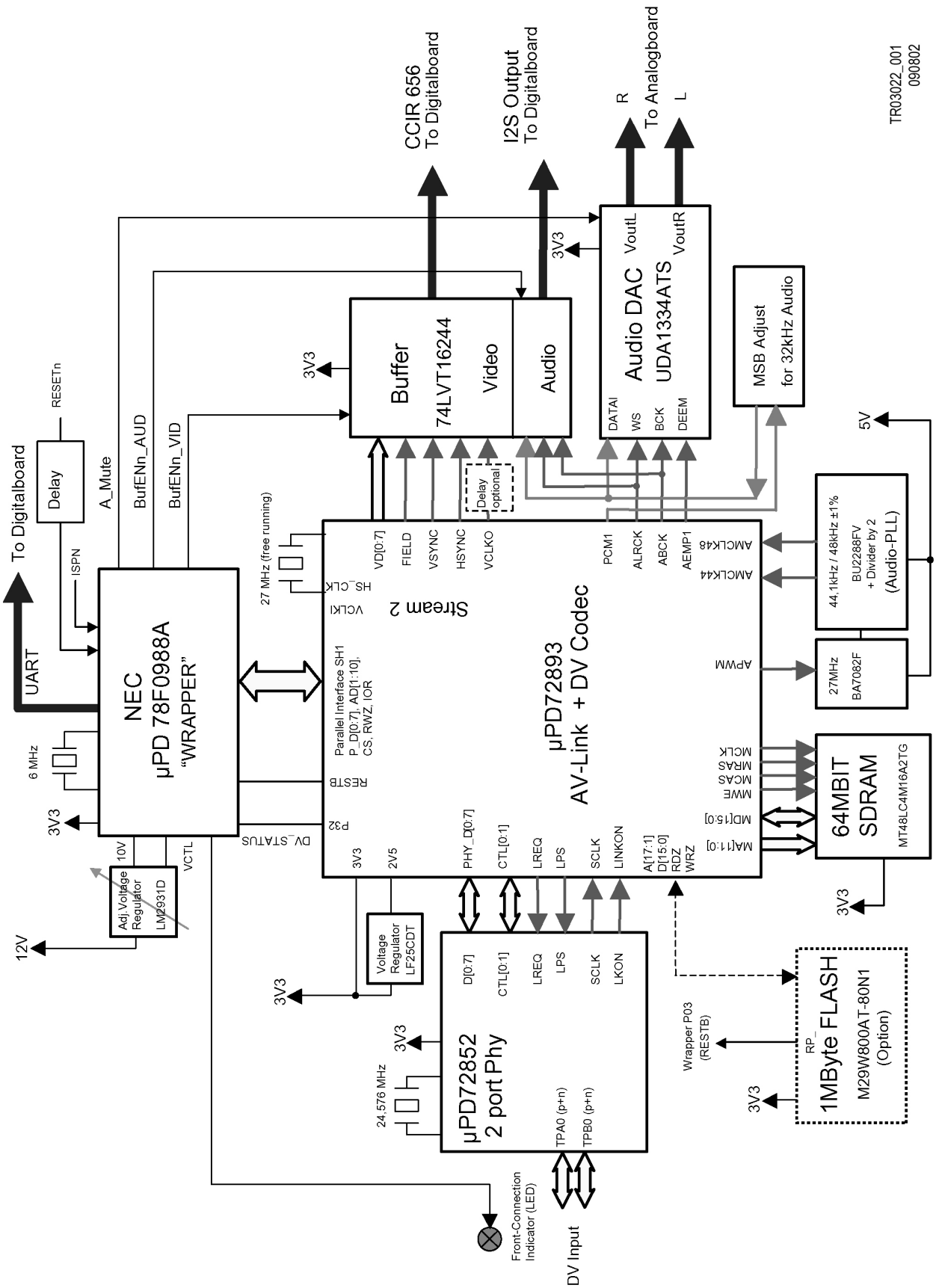


Figure 9-7

9.6.3 Functional Description

The DVIO module consists of the following blocks (see blockdiagram):

1. IEEE1394 Interface
   - uPD72852 (7400) (Phy)
   - uPD72893 (7431) (Link part)
2. Micro-controller
   - uPD78F0988 (7802)
   - Voltage regulator LM2931 for generation of 10V programming voltage (7801)
3. Reset-circuitry
   - Power-on reset
   - Reset pulse-shortener
4. DV-Decoder
   - uPD72893 (7431) (Codec part)
   - 16MBit SDRAM (7430)
   - optional Flah-Memory M29W800AT for Firmware-Update of uPD72893 (7432)
5. Clocking & Audio PLL
   - Clock oscillator FXO-31FT (7601)
   - Audio-PLL: Voltage controlled oscillator BA7082F (7604), clock generator BU2288FV (7605), and clock divider 74LV74 (7606-A)
6. Audio Format adaption (MSB justified -> I2S), option
   - 74LV74 (7507-A, -B)
7. Audio & Video output
   - Audio DAC UDA1334ATS(7602)
   - Clock delay(7500)
   - Tristate buffer(7505)

IEEE1394 Interface
The 1394 interface consists of a uPD72852 physical layer and a uPD72893 link layer IC (uPD72893 integrated also DV-Decoder).
It has the following features:
- S400 operation (400 megabit per second)
- Two i.Link ports (4 pin), only one used
- AV link port

Micro-Controller
The uPD78F0988 processor has following extra features:
- 60 kilobyte of flash memory as program memory
- 2 kilobyte of internal data memory
- watchdog timer
- On board ISP(In-System-Programming) functionality

ISP
By use of In-System-Programming, it is possible to update the software of the DVIO board that is in the uPD78F0988. ISP can be made active by resetting the processor and keeping the ISPN pin low during reset. During ISP, the ISPN signal on the board has to be kept low. A programming voltage of 10V is activeted by the uPD78F0988 itself at the Vpp pin before programming procedure starts. When the ISP mode is active, the new program can be sent to the microprocessor through the serial port.

Reset-circuitry
The reset-circuitry consists of two parts.
First part (around transistor 7803) generates a reset pulse when the board is powered up.
Second part (around transistors 7804 & 7805) acts as a reset-pulse shortener, i.e. a short reset pulse (4ms) is generated from the input signal RESETn which is much longer (usually 100ms). This is required to ensure correct operation of the Micro-controller after booting-up when RESETn is again deactivated

DV-Decoder
The uPD72893 decodes the stream into video data in 656 format and audio data in I2S format.
The microprocessor has the ability to read the status registers of the uPD72893. By reading these registers, extra data from the DV stream, that is not decoded into audio or video, can be sent to the digital board using pin TXD of the serial interface. This data includes time stamp and some more.

Clocking and Audio PLL
The FXO-31FT generates the free-running 27MHz system clock. Video part of input DV-stream is in the uPD72893 adapted to the local 27MHz clock domain (skip, repeat frame). Because audio clock (11.2896Mz [fs=44.1kHz] or 12.288MHz [fs=32kHz, 48kHz]).
The uPD72893 integrates the phase comparator that drives the VCO BA7082F to a nominal frequency of 27MHz which in turn is converted by BU2288FV and 74LV74 to 11.2896MHz or 12.288Mhz, respectively.
The uPD72893 controls directly the frequency ratio of the BU2288FV.

Audio Format adaptation (MSB justified -> I2S), option
Due to a bug in 1st version of uPD72893 digital audio output is not correct in I2S mode when in 32kHz operation. As a workaround uPD72893 is generally configured in MSB justified mode and conversion to I2S mode is done externally via a 74LV74 device.
Can be disabled with later versions of uPD72893.

Audio & Video Output
The audio I2S data are sent to audio DAC UDA1334. Analog audio left and right signals are connected to the analog board. The tri-state buffer enables the digital video stream to the Video Input Processor on the digital board when the DV source is selected.
The clock delay synchronizes the AV clock with the AV data at the output.

9.7 EPG Nafta Board

9.7.1 General

Two ASICs from Gemstar, GS501 (item 7100) and GS502 (item 7201), generate the EPG OSD. The host P controls both ICs via the I2C bus (pins 45 and 48). A RAM memory (item 7102) and a Flash memory with the firmware (item 7101) belong also to the periphery of these ASICs.
A PIC processor (item 7303) generates the POR_N reset for this system. The POR_DC reset comes from the set, and is active after AC power 'on'. A port expander from the host, controls the EXT_RESET signal. This port expander (item 7200) is also used for switching the video paths on the EPG board.

Either the board works in 'Loop Trough' mode, or (for EPG) the output path is switched to the 'EPG RGB' video.

Blockdiagramm EPG-Modul Nafta

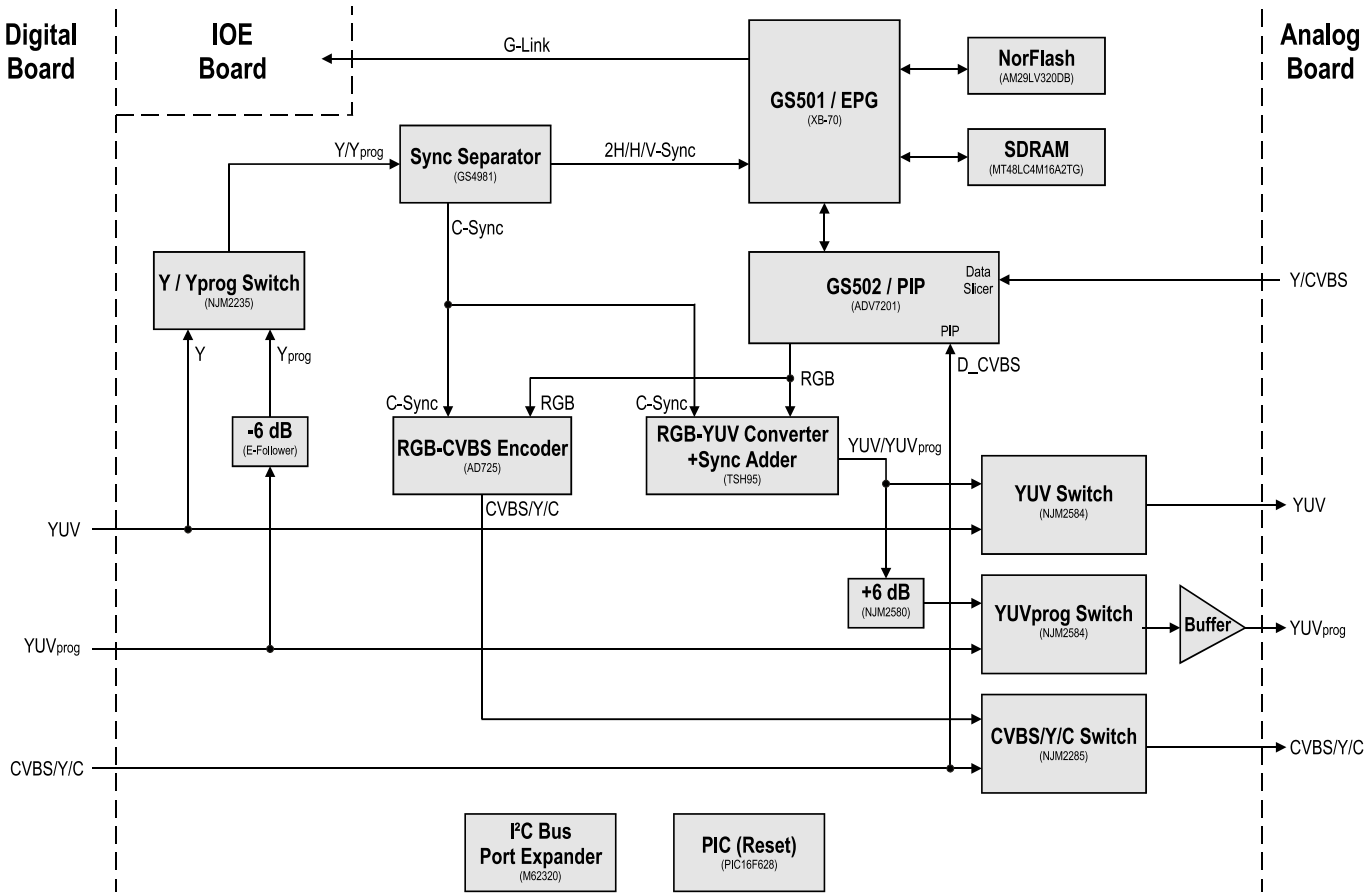


Figure 9-8

9.7.2 Loop trough

For 'Loop Trough' the input video signals (CVBS, YC, YUV, and YUV-progressive) from the Digital board are passing three video switches before going to the Analog board.

- Item 7503 for CVBS and Y/C.
- Item 7502 for YUV-interlaced.
- Item 7501 for YUV-progressive.

9.7.3 EPG RGB Video

A V-sync and H-sync (for progressive = 2H-sync) are necessary for outputting an RGB video. A sync separator (item 7703) generates these syncs. Input for the sync separator is either the 1fh or the 2fh luminance signal from the Digital board. A video switch (item 7700) makes the selection. For progressive video, the signal must be attenuated (item 7701).

The RGB signal goes via emitter followers (items 7202, 7203, and 7204) to an RGB-to-YUV converter and to an RGB-to-CVBS, Y/C converter.
The RGB-to-YUV converter consists of four OpAmp's, which are necessary for RGB/YUV conversion (item 7600-B, -C, and -D) and for adding the C-sync to the Y signal (item 7600-A).
The RGB-to-CVBS, Y/C conversion is realized by IC7602. The oscillator (item 7601) is necessary for generating the chroma carrier.
With transistor 7603 the conversion stages can be switched 'off' for power saving.

For the PIP (Picture in Picture) feature, the D_CVBS video signal from the Digital board is used. This signal is fed to Pin 10 of IC7201. For scanning the EPG data, the A_YCVBS signal from the Analogue board is fed to pin 8 of IC7201.

9.7.4 Power supply

The supply for the video stages and the EPG digital part, are generated via DC-DC converters (items 7400, 7401, and 7403) out of the 12STBY.

9.8 EPG Europe Board

9.8.1 General

The ARM7 based microprocessor (item U1) and an ASIC (Gemstar GSA03, item U2) generates the EPG OSD data (RGB or YUV-interl./progr.). The host P on the Digital board, controls both ICs via the I2C bus. A RAM memory (item U7) and two Flash memories (items U8 and U9) with the firmware and EPG data, belong also to the periphery of the ASIC.
A resistor and capacitor (items R1 and C6) generate the reset for this system. The IPOR reset comes from the set and is active after main power 'on'. A port expander from the host, controls the nGCLR reset signal. This port expander (item U31) is also used for switching the video paths on the EPG board.

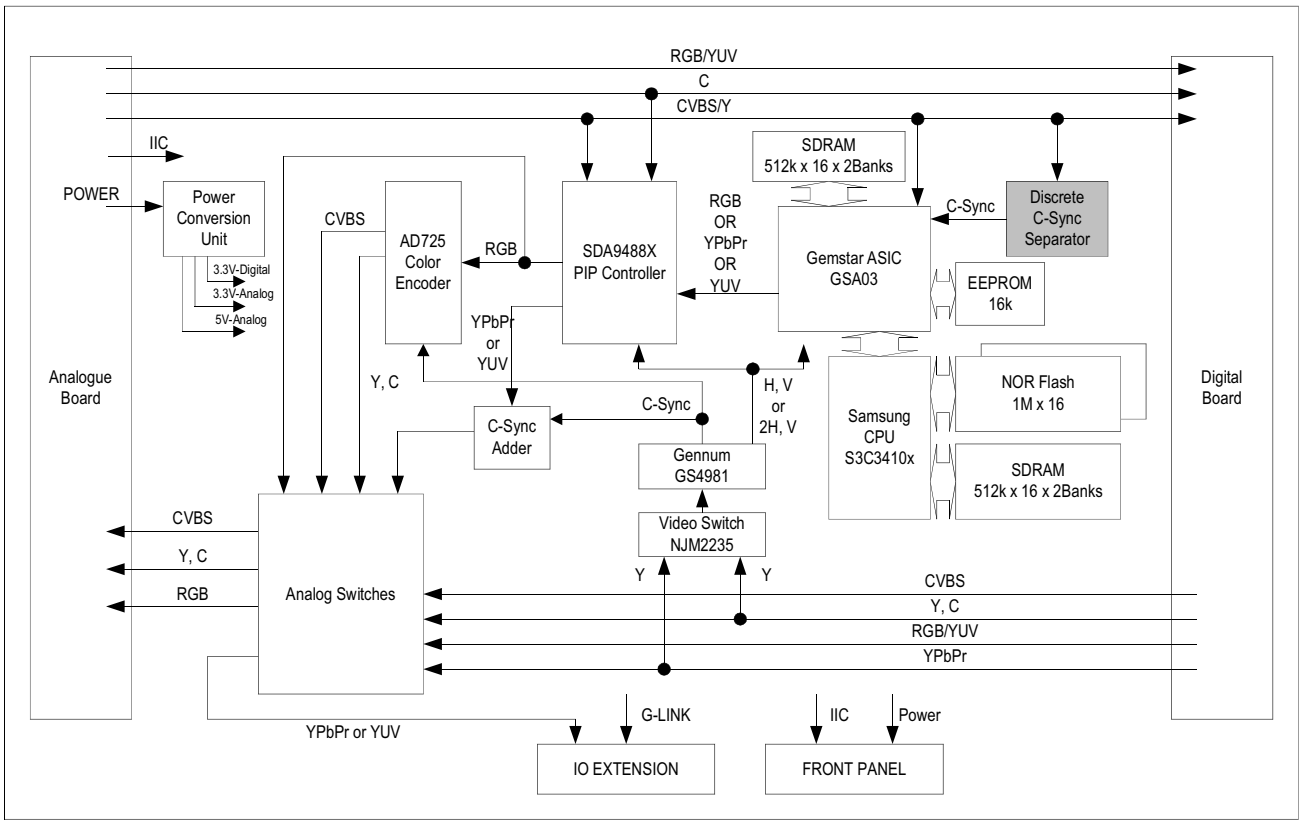


Figure 9-9

Either the board works in 'Loop Trough' mode, or (for EPG) the output path is switched to the 'EPG RGB' video.

9.8.2 Loop Trough

For 'Loop Trough', the input video signals (CVBS, YC, RGB, YUV-interlaced, and YUV-progressive) from the digital board are passing three video switches before going to the Analogue board.

- Item U15 for CVBS and Y/C selection between EPG and Loop trough.
- Items U16, U18, and U19 (and periphery) for RGB selection between EPG and Loop trough.
- Items U42 and U17 for YUV-interlaced and YUV-progressive selection between EPG and Loop trough. These signals are amplified (items U13B, C, and D) for driving a 75-Ohm output.

Note: RGB and YUV-interlaced (VR_DVD, UB_DVD, YG_DVD) are the same signals. It depends on the software, which signal is chosen.

9.8.3 EPG RGB

A V-sync and H-sync (for progressive = 2H-sync) are necessary for outputting an EPG video. A sync separator (item U10) generates these syncs. Input for the sync separator is either the 1fh or the 2fh luminance signal from the Digital board. A video switch (item U50) makes the selection.

The EPG signal goes via a PIP-inserter IC (item U11 and pheripherals) that inserts a PIP (Picture In Picture) into the EPG OSD. Source for this PIP is the CVBS signal from the digital board.
When the PIP output is a YUV signal, the Y signal is without a sync. Therefore, this sync must is added with item U13A.

For RGB-to-CVBS, Y/C conversion is realized by a PAL conversion IC (item U14). The oscillator (item Y5) is necessary for generating the chroma carrier.

For scanning EPG data, the A_YCVBS signal from the Analog board is used. This signal is fed to pin 189 of item U2.
There is also a sync from the Analog board necessary. A discrete circuit (items Q18-Q23 and periphery) generates it.

9.8.4 Power supply

The supply for the video stages and the EPG digital part are generated via DC-DC converters and linear regulators (items U28, U40, and U41) out of the 12VSTBY.

9.9 I/O Extension Board

This board feeds the internal S/PDIF signal from the Digital board to an optical and/or digital out connector. For European players, also an YUV output is present on this board.

9.10 IC Descriptions

9.10.1 Display Board

IC 7103 TMP87CH74F

Block Diagram

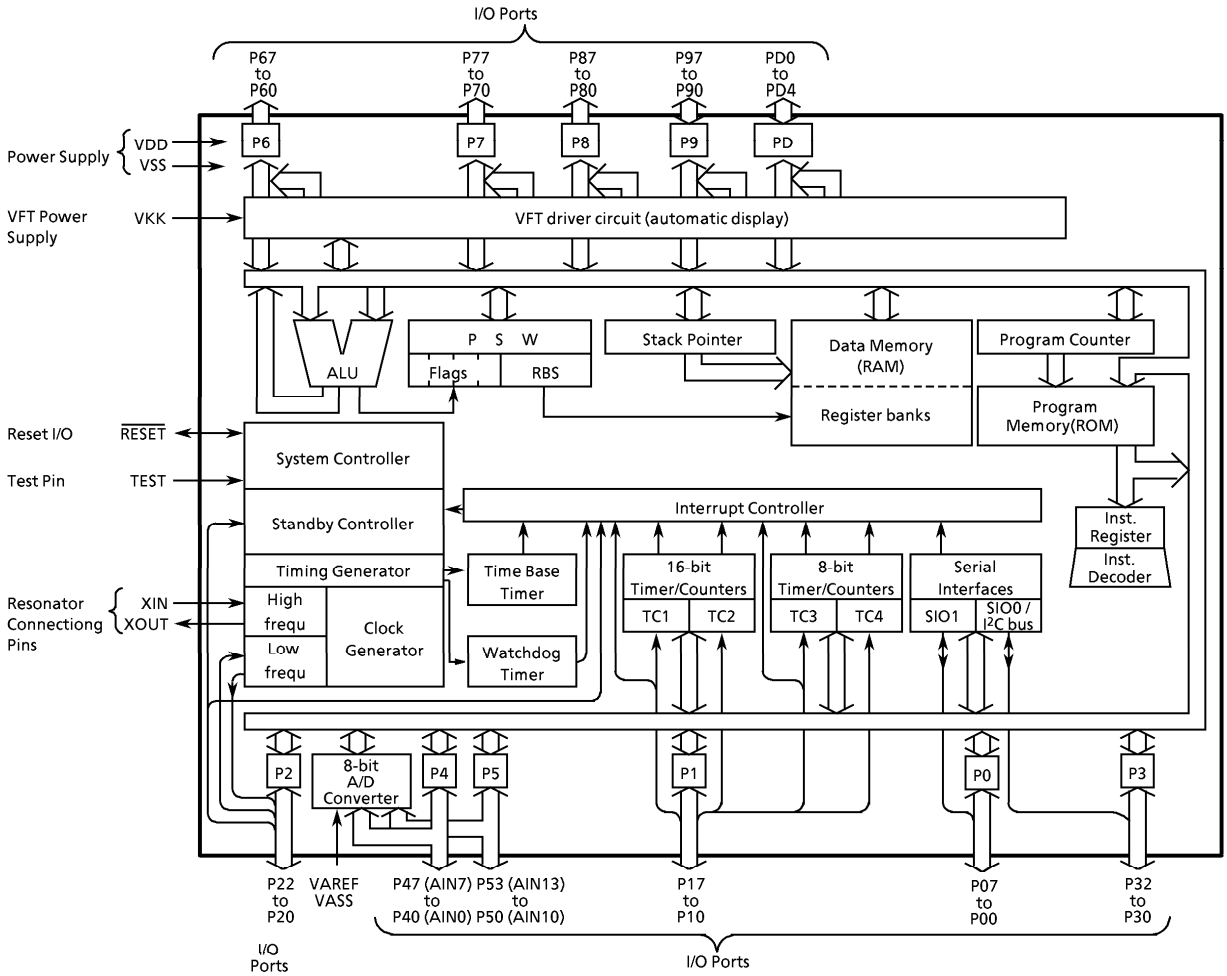


Figure 9-10

Pin Function

Pin Name	Input / Output	Function	
P07 to P03	I/O	Two 8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a SIO input/output, an External interrupt input, a timer/counter input, the latch must be set to "0". When used as a PPG output or divider output, the latch must be set to "1".	
P02 (SO1)	I/O (Output)		SIO1 serial data Output
P01 (SI1)	I/O (Input)		SIO1 serial data Input
P00 ($\overline{SCK1}$)	I/O (I/O)		SIO1 serial clock input/output
P17 (INT4/TC3)	I/O (Input)		External interrupt input 4 or Timer/Counter 3 input
P16 (INT2)			External interrupt input 2
P15 (INT3/TC1)			External interrupt input 3 or Timer/Counter 1 input
P14 (TC4/$\overline{PDO}$/$\overline{PWM}$)	I/O (I/O)		Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output
P13 ($\overline{DVO}$)	I/O (Output)		Divider output
P12 (TC2/$\overline{PPG}$)	I/O (I/O)		Timer counter 2 input or Programmable pulse generator output
P11 (INT1)	I/O (Input)		External interrupt input 1
P10 ($\overline{INT0}$)			External interrupt input 0
P22 (XTOUT)	I/O (Output)	3-bit input/output port with latch. When used as input port, or external interrupt input, STOP mode release signal input, the latch must be set to "1".	Resonator connecting pins (32.768 kHz). For inputting external clock, XTIN is used and XTOUT is opened.
P21 (XTIN)	I/O (Input)		
P20 ($\overline{INT5}$/$\overline{STOP}$)			External interrupt input 5 or STOP mode release signal input
P32 ($\overline{SCK0}$)	I/O (I/O)	3-bit programmable input/output ports (Sink open drain). Each bit of these ports can be individually configured as an input or an output under software control. When used as a I^2C input/output, the latch must be set to "1".	SIO0 serial clock input/output
P31 (SDA/SO0)	I/O (I/O/Output)		I^2Cbus serial data input/output or SIO0 serial data output
P30 (SCL/SI0)	I/O (I/O/Input)		I^2Cbus serial clock input/output or SIO0 serial data Input
P47 (AIN7) to P40 (AIN0)	I/O (Input)	8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P4CR must be set to "0".	A/D converter analog inputs
P53 (AIN13) to P50 (AIN10)	I/O (Input)	4-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P5CR must be set to "0".	A/D converter analog inputs
P67 (V7) to P60 (V0)	I/O (Output)	Four 8-bit high brackdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	VFT driver outputs
P77 (V15) to P70 (V8)			
P87 (V23) to P80 (V16)			
P97 (V31) to P90 (V24)			
PD4 (V36) toPD0 (V32)	I/O (Output)	5-bit high breakdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	

Figure 9-11

Pin Name	Input / Output	Function
XIN, XOUT	Input, Output	Resonator connecting pins for high-frequency clock. For inputting external clock, XIN is used and XOUT is opened.
$\overline{\text{RESET}}$	I/O	Reset signal input or watchdog timer output/address-trap-reset output/system-clock-reset outputted.
TEST	Input	Test pin for out-going test. Be tied to low.
VDD, VSS	Power Supply	+ 5 V, 0 V (GND)
VKK		VFT driver power supply
VAREF, VASS		Analog reference voltage inputs (High, Low)

Figure 9-12

9.10.2 IC's Analog Board

IC7408

STV6618 **GENERAL OVERVIEW**

1.2 Pin Description

Pin No.	Symbol	Description
1	Y/CVBSIN_TUN	Y/CVBS Input from Tuner
2	DIGOUT3	Digital Output Pin 3
3	GND1	Ground Supply 1 for Video Inputs
4	CVBSIN_ENC	CVBS Input from Encoder
5	DECV	Video decoupling capacitor
6	CIN_ENC	Chroma Input from Encoder
7	YIN_ENC	Y Input from Encoder
8	V_{CC}	+5 V Power Supply for Video Inputs
9	R/PR/CIN_ENC	Red or Pr or Chroma Input from Encoder
10	G/YIN_ENC	Green or Y Input from Encoder
11	B/PBIN_ENC	Blue or Pb Input from Encoder
12	GND2	Ground Supply 2 for Video Inputs
13	B/PBIN_AUX	Blue or Pb Input from Auxiliary (SCART2 or external Cinch)
14	DIGOUT4	Digital Output Pin 4
15	G/YIN_AUX	Green or Y Input from Auxiliary (SCART2 or external Cinch)
16	DIGOUT5	Digital Output Pin 5
17	R/PR/CIN_AUX	Red or Pr or Chroma input from Auxiliary (SCART2 or external Cinch)
18	DIGOUT6	Digital Output Pin 6
19	Y/CVBSIN_AUX	Y/CVBS Input from Auxiliary (SCART2 or external Cinch)
20	VCCB_REC	Video Output Recorder Buffer Supply Pin
21	Y/CVBSOUT_REC	Y/CVBS Output to Recorder
22	GNDB_REC	Ground Supply for Recorder Buffer
23	COUT_AUX	Chroma Output to Auxiliary (SCART2 or external Cinch)
24	VCCB1	Video Output Buffer Supply Pin
25	Y/CVBSOUT_AUX	Y/CVBS Output to Auxiliary (SCART2 or external Cinch)
26	GNDB	Ground Supply for Video Buffer
27	B/PBOUT_TV	Blue or Pb Output to TV (SCART1 or external Cinch)
28	C_GATE	External Transistor Command for Bidirectinnal B/C SCART I/O
29	G/YOUT_TV	Green or Y Output to TV (SCART1 or external Cinch)
30	VCCB2	Video Buffer
31	R/PR/COUT_TV	Red or Pr or Chroma Output to TV (SCART1 or external Cinch)
32	VCCB3	Video Output Buffer Supply Pin
33	Y/CVBSOUT_TV	Y/CVBS Output to TV (SCART1 or external Cinch)
34	FBOUT_TV	Fast Blanking Output to TV (SCART1)
35	FBIN_AUX	Fast Blanking Input from Auxiliary (SCART2)

Pin No.	Symbol	Description
36	VDD	+5 V Digital Power Supply
37	SCL	I²C Bus Clock
38	SDA	I²C Bus Data
39	GNDD	Digital Ground Supply
40	CIN_TV	Chroma Input from TV (SCART1 or external Cinch)
41	Y/CVBSIN_TV	Y/CVBS Input from TV (SCART1 or external Cinch)
42	DIGOUT1	Digital Output Pin 1
43	CIN_TUN	Chroma Input from Tuner
44	DIGOUT2	Digital Output Pin 2

Figure 2: STV6618 Input/Output Diagram

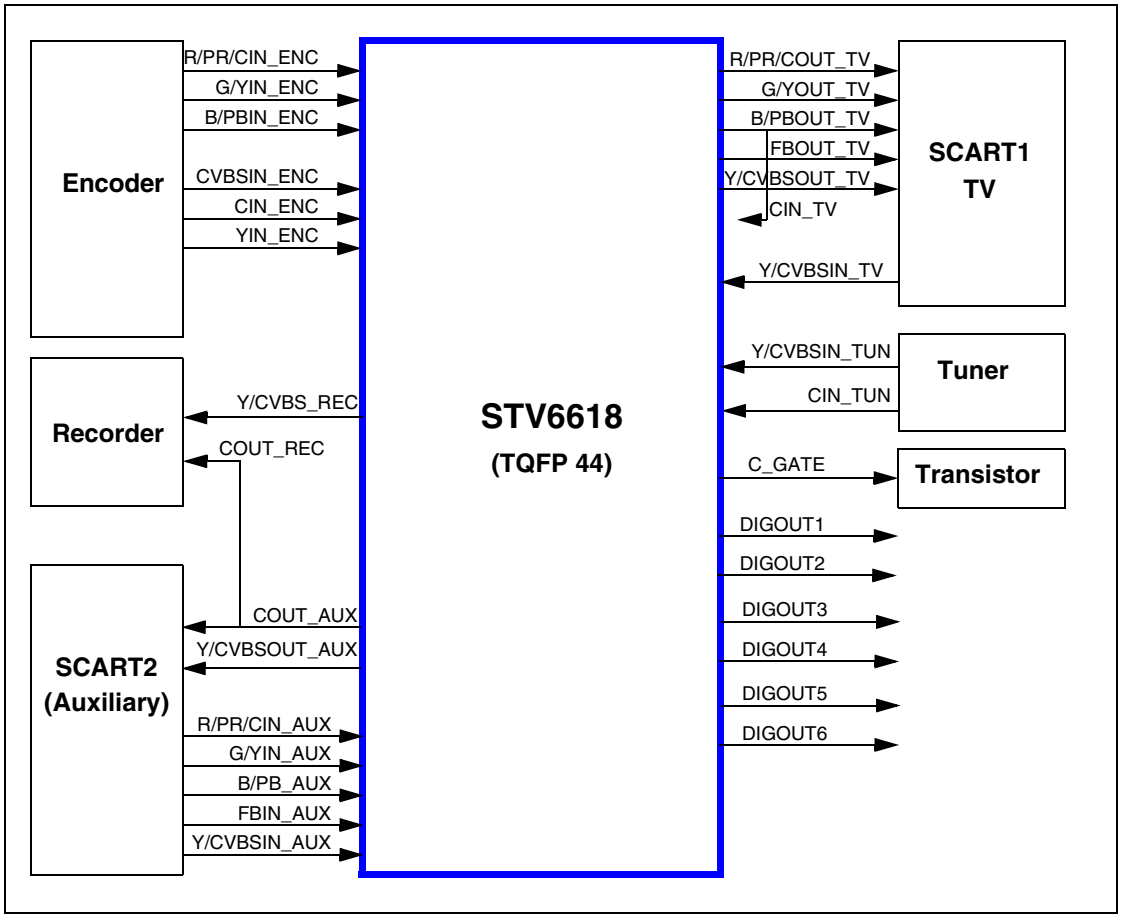
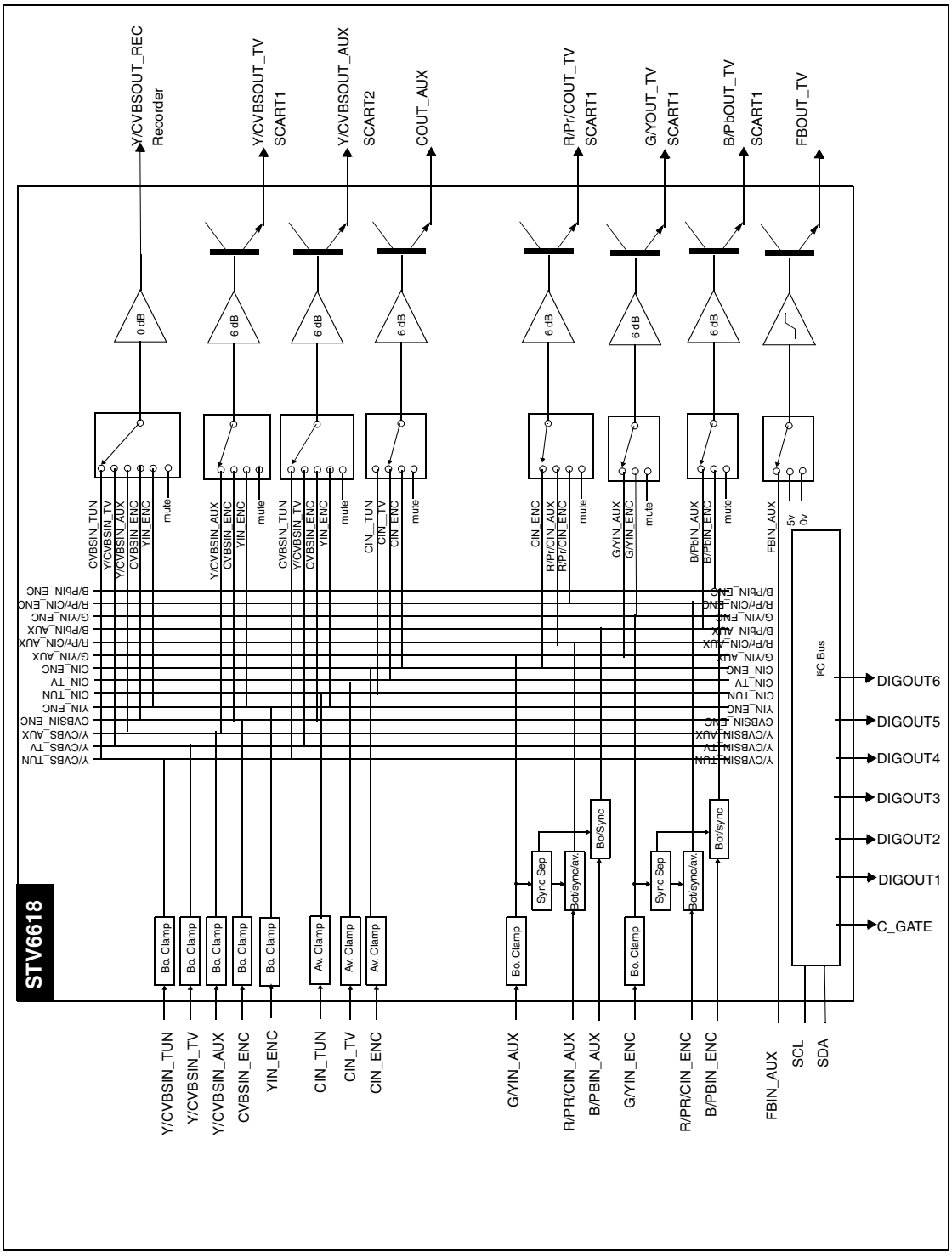
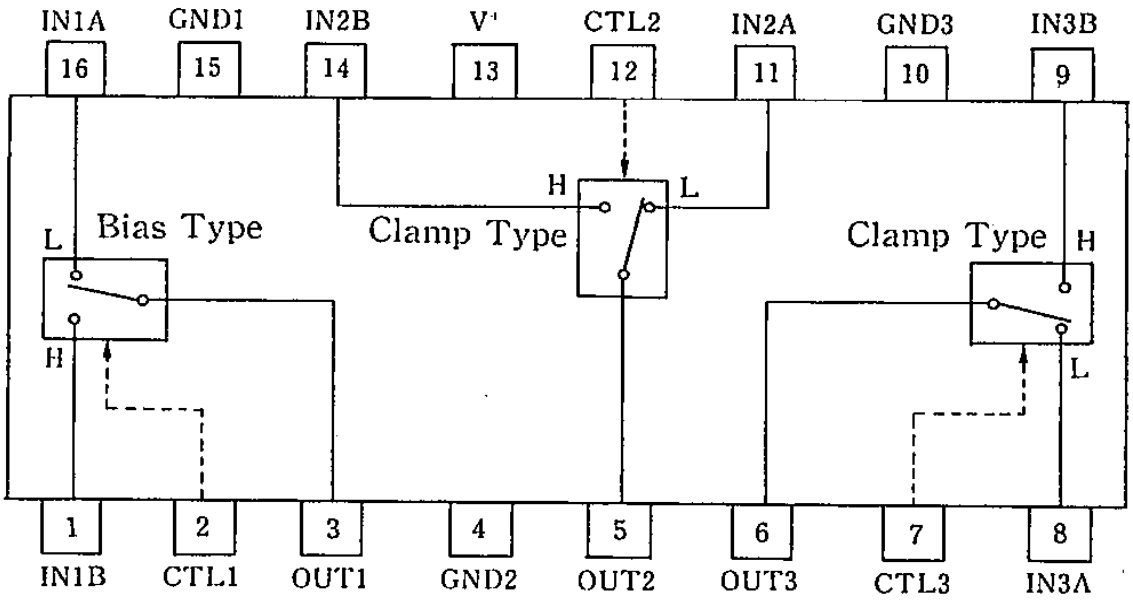


Figure 3: STV6618 Block Diagram



IC7411



NJM2285D
NJM2285M
NJM2285V

BLOCK DIAGRAM

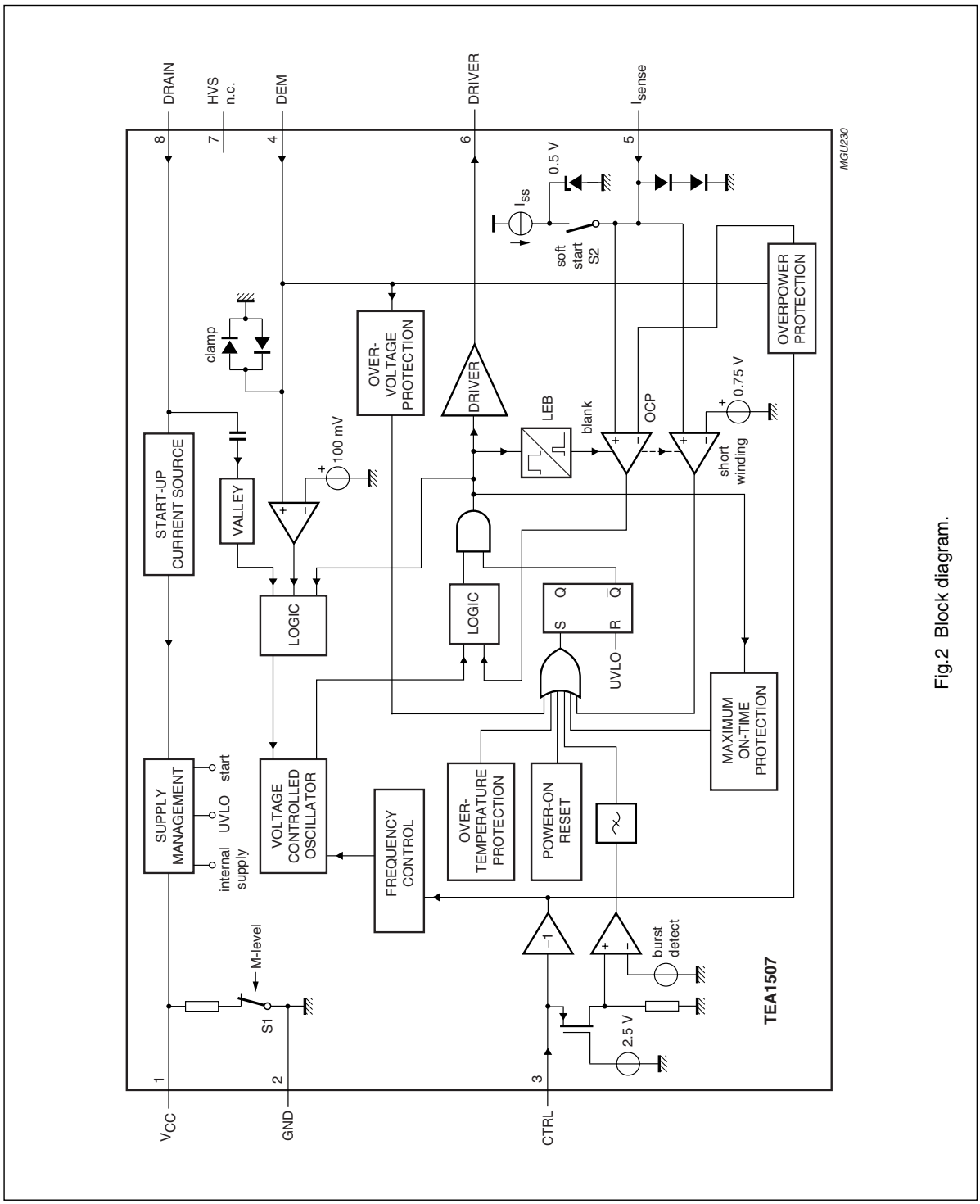
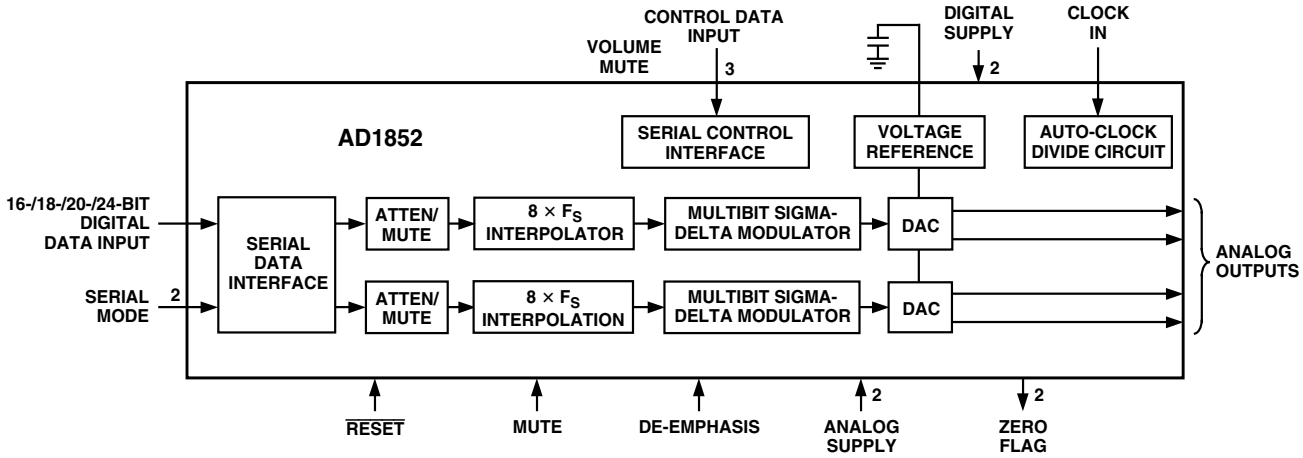


Fig.2 Block diagram.

IC7404: AD1582

FUNCTIONAL BLOCK DIAGRAM



AD1852

PIN FUNCTION DESCRIPTIONS

Pin	Input/Output	Pin Name	Description
1	I	DGND	Digital Ground.
2	I	MCLK	Master Clock Input. Connect to an external clock source at either 256 F_S, 384 F_S, 512 F_S, 768 F_S, or 1024 F_S.
3	I	CLATCH	Latch Input for Control Data. This input is rising-edge sensitive.
4	I	CCLK	Control Clock Input for Control Data. Control input data must be valid on the rising edge of CCLK. CCLK may be continuous or gated.
5	I	CDATA	Serial Control Input, MSB first, containing 16 bits of unsigned data per channel. Used for specifying channel-specific attenuation and mute.
6		NC	No Connect.
7	I	192/$\overline{48}$	Selects 48 kHz (LO) or 192 kHz Sample Frequency.
8	O	ZEROR	Right Channel Zero Flag Output. This pin goes HI when Right Channel has no signal input for more than 1024 LR Clock Cycles.
9	I	DEEMP	De-Emphasis. Digital de-emphasis is enabled when this input signal is HI. This is used to impose a 50 µs/15 µs response characteristic on the output audio spectrum at an assumed 44.1 kHz sample rate. Curves for 32 kHz and 48 kHz sample rates may be selected via SPI control register.
10	I	96/$\overline{48}$	Selects 48 kHz (LO) or 96 kHz Sample Frequency.
11, 15	I	AGND	Analog Ground.
12	O	OUTR+	Right Channel Positive Line Level Analog Output.
13	O	OUTR–	Right Channel Negative Line Level Analog Output.
14	O	FILTR	Voltage Reference Filter Capacitor Connection. Bypass and decouple the voltage reference with parallel 10 µF and 0.1 µF capacitors to the AGND.
16	O	OUTL–	Left Channel Negative Line Level Analog Output.
17	O	OUTL+	Left Channel Positive Line Level Analog Output.
18	I	AVDD	Analog Power Supply. Connect to Analog 5 V Supply.
19		FILTB	Filter Capacitor Connection. Connect 10 µF capacitor to AGND (Pin 15).
20	I	IDPM1	Input Serial Data Port Mode Control One. With IDPM0, defines 1 of 4 serial modes.
21	I	IDPM0	Input Serial Data Port Mode Control Zero. With IDPM1, defines 1 of 4 serial modes.
22	O	ZEROL	Left Channel Zero Flag Output. This pin goes HI when Left Channel has no signal input for more than 1024 LR Clock Cycles.
23	I	MUTE	Mute. Assert HI to mute both stereo analog outputs. Deassert LO for normal operation.
24	I	$\overline{\text{RESET}}$	Reset. The AD1852 is reset on the rising edge of this signal. The serial control port registers are reset to the default values. Connect HI for normal operation.
25	I	L/$\overline{\text{R}}$CLK	Left/$\overline{\text{Right}}$ Clock Input for Input Data. Must run continuously.
26	I	BCLK	Bit Clock Input for Input Data. Need not run continuously; may be gated or used in a burst fashion.
27	I	SDATA	Serial Input, MSB first, containing two channels of 16, 18, 20, and 24 bits of twos complement data per channel.
28	I	DVDD	Digital Power Supply Connect to digital 5 V supply.

Table I. Serial Data Input Mode

IDPM1 (Pin 20)	IDPM0 (Pin 21)	Serial Data Input Format
0	0	Right-Justified
0	1	I^2S-Compatible
1	0	Left-Justified
1	1	DSP

9.10.3 IC's Digital Board

IC7100: VSM

VERSATILE STREAM MANAGER

GENERAL DESCRIPTION

The Versatile Stream Manager (VSM) is an ASIC used in the first generation DVD Video Recorder. Main function of the VSM is to interface directly to the different hardware modules such as Basic Engine, MPEG encoders, MPEG decoders and buffering the data streams that are coming from or going to these hardware modules.
The VSM contains a memory interface to support one 4M*16 SDRAM device. A host interface allows a CPU to directly access this memory and the VSM s internal registers.
Handling of data streams is done using scatter / gather DMA s under software control. Hardware support is provided in the VSM to support software MPEG AV multiplexing.

FEATURES

The VSM features include:
- SDRAM memory interface to support one 4 banks*1M*16 (64Mbit) SDRAM device.
- Glueless Host Interface for STM s STi5505.
- Glueless MPEG Decoder interface for STM s STi5505
- Glueless interface to Philips SAA6750 MPEG Video Encoder or SAA6752 MPEG AV Encoder.
- Glueless interface to Motorola s DSP56362 used as MPEG Audio Encoder.
- Glueless interface to Philips HDR65 as part of Basic Engine interface including the Sector Processor as also included in the STi5505.
- Audio Clock Control providing PLL loop and clock lock detection.
- Double Extraction of VBI decoded data from extended CCIR 656 stream.
- Double UART with hardware handshake and 8 byte Rx/Tx FIFO.
- Generation of additional Host Bus to support Audio Encoder DSP56362.
- Descriptor based DMA Controllers for data stream handling.
- Hardware support for software MPEG multiplex process.
- Internal Interrupt Controller to handle internal and 4 external interrupt sources.
- Operates from single 27 MHz clock input.
- JTAG for production tests.
- 3.3V logic core.
- 3.3V / 5V toleration IO pins.
- 208 PIN LQFP Package. (CR1087)

BLOCK DIAGRAM

Figure 2.1 shows the block diagram of the VSM. The hardware blocks can be divided in to three categories:
- General modules: Host Interface, Memory Interface, Interrupt Controller.
- DMA Controllers.
- Functional Interfaces; the link between the actual external hardware interface and the DMA Controller. Some Functional Interfaces have knowledge about the stream coming through in order to perform for example MPEG stream characteristics extraction and insertion.

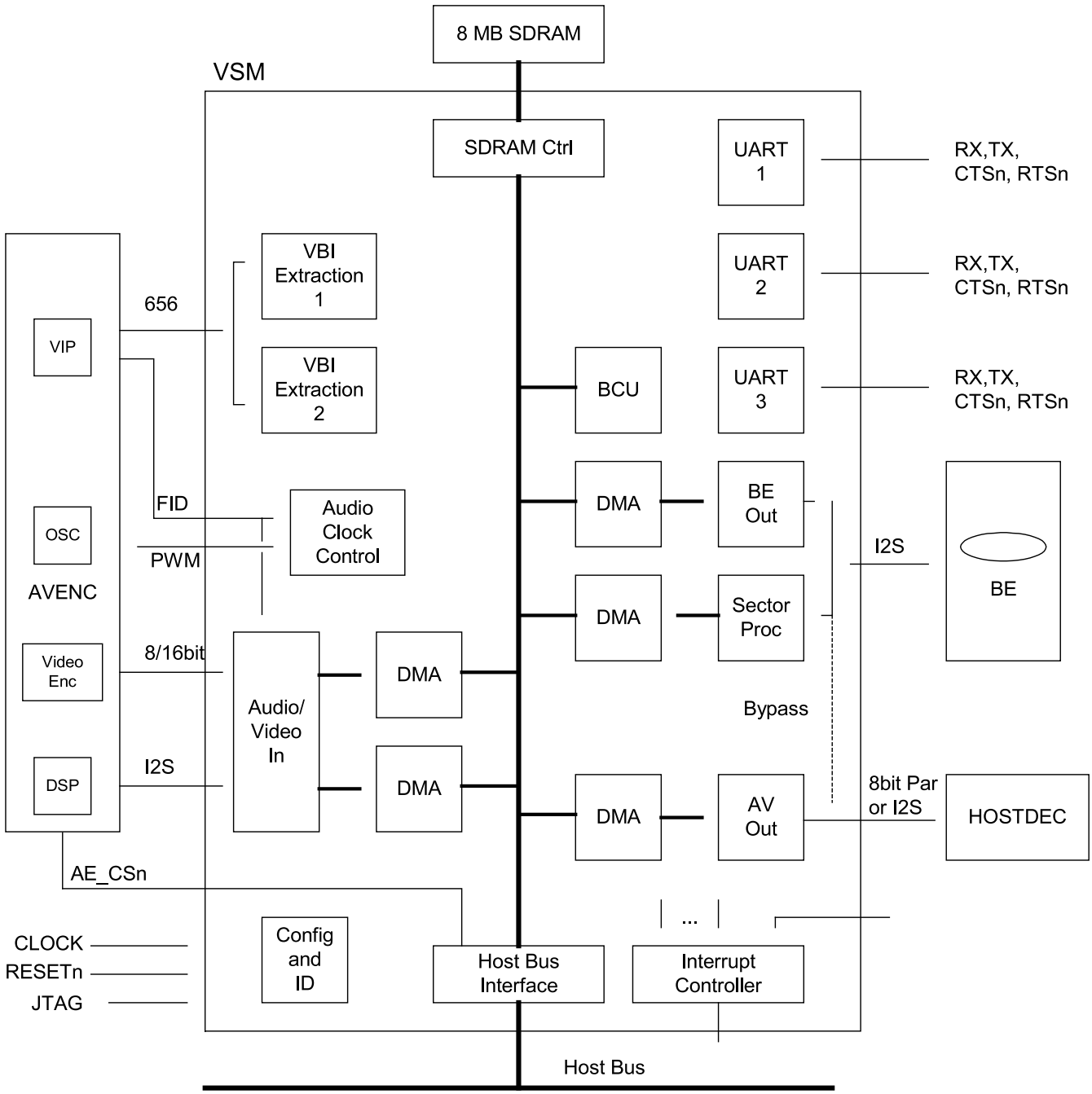


Figure 2.1: VSM Overview

PINNING

OVERVIEW

Name	Pins	Type	Function
System			
RESETn	1	In	
SYSCLK (27MHz)	1	In	
Host Interface			
HO_A(21:1)	21	In	
HO_D(15:0)	16	In/Out	
HO_BEn(1:0)	2	In	
HO_RWn	1	In	
HO_CSLn	1	In	
HO_CSHn	1	In	
HO_A22	1	In	
HO_WAIT	1	Out	
HO_PROCCLK	1	In	
Memory Interface			
M_A(13:0)	14	Out	
M_DQ(15:0)	16	In/Out	
M_RASn	1	Out	
M_CASn	1	Out	
M_WEn	1	Out	
M_LDQM	1	Out	
M_UDQM	1	Out	
M_CLKOUT	1	Out	
M_CLKEN	1	Out	
Basic Engine Interface			
BE_BCLK	1	In	
BE_DATI	1	In	
BE_WCLK	1	In	
BE_SYNC	1	In/Out	
BE_FLAG	1	In	
BE_V4	1	In	
BE_DATO	1	Out	
Video Encoder Interface			
VE_D(15:0)	16	In	
VE_DSn	1	Out	
VE_DTACKn	1	In	
VE_VIP_ERROR	1	In	Signal coming from SAA7114
Audio Encoder Interface			
AE_CSn	1	Out	
AE_BCLK	1	In/Out	(CR151,CR157)
AE_WCLK	1	In/Out	(CR151,CR157)
AE_DATA	1	In	(CR157)

Decoder Interface			
D_PAR_D(7:0)	8	Out	
D_PAR_DVALID	1	Out	
D_PAR_STR	1	Out	
D_PAR_REQ	1	In	
D_PAR_SYNC	1	Out	
D_WCLK	1	Out	
D_V4	1	Out	
Audio Clock Control			
ACC_FID	1	In	(CR200)
ACC_PWM	1	Out	
ACC_ACLK_OSC	1	In	
ACC_ACLK_DAI	1	In	
ACC_ACLK_PLL	1	In	
ACC_ACLK_DEC	1	Out	
VBI Extractor			
VBI_IPD(7:0)	8	In	
VBI_ICLK	1	In	
UART 1			
UART1_RX	1	In	
UART1_TX	1	Out (OC)	
UART1_CTSn	1	In	
UART1_RTSn	1	Out (OC)	
UART 2			
UART2_RX	1	In	
UART2_TX	1	Out (OC)	
UART2_CTSn	1	In	
UART2_RTSn	1	Out (OC)	
UART 3 (**VSM1B**)			
UART3_RX	1	In	
UART3_TX	1	Out	
UART3_CTSn	1	In	
UART3_RTSn	1	Out	
Interrupt Controller			
EXTINT(3:0)	4	In	From: VEnc, AEnc, BE, VSync (STi5505)
CPUINT(1:0)	2	Out (OC)	
JTAG			
TCK	1	In	Boundary Scan
TDI	1	In	
TDO	1	Out/Z	
TMS	1	In	
TRSTn	1	In	
Test			
TEST0	1	In	Amsal Test
TEST1	1	In	
Power Supply			
VDD	20	Power	10% of total pins package
VSS	20	Power	10% of total pins package

Total Pins	208		

IC7403: SAA6752H (EMPRESS)

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer

SAA6752HS

1 FEATURES

1.1 Video input and preprocessing

- Digital YUV input according to *"ITU-R BT.656"* (8 bits at 27 MHz) and *"ITU-R BT.601"*
- Support of enhanced *"ITU-R BT.656"* input format containing decoded VBI data readable via I²C-bus; Closed Caption (CC), Wide Screen Signalling (WSS) and copyright information [Copy Generation Management System (CGMS)]
- Processing of non broadcast video signals from analog VCR according to IEC 756
- Two video clock input pins for switching two digital video sources
- *"ITU-R BT.601"* format conversion to 1/2D1, 2/3D1 and Standard Interchange Format (SIF)
- 4 : 2 : 2 to 4 : 2 : 0 colour format conversion
- Decimation filtering for all format conversions
- Adaptive median filter and motion compensated filter for input noise reduction.

1.2 Video compression

- Real time MPEG-2 encoding compliant to Main Profile at Main Level (MP@ML) for 625 and 525 interlaced line systems
- Supported resolutions: D1, 2/3D1, 1/2D1 and SIF
- IPB frame, IP frame and I frame only encoding supported at all modes
- Supported bit rates: up to 25 Mbit/s I-only encoding; up to 15 Mbit/s IP-only or IBP encoding.
- Variable video bit rate mode for constant picture quality and constant bit rate mode to gain optimum picture quality from a fixed channel transfer rate
- Access to bit rate control parameters whilst encoding to support external real-time control algorithms (e.g. constrained variable bit rate control)
- Programmable Group Of Pictures (GOP) structure
- Innovative motion estimation with wide search range
- Adaptive quantization
- Motion compensated noise filter.

1.3 Audio input

- Audio inputs: I²S format or EIAJ format (16, 18 or 20 bits), master or slave mode at 32, 44.1 and 48 kHz
- Two digital I²S input ports for selection between two digital audio sources
- Audio clock generation: 256/384 × f_s (48 kHz) locked to video frame rate (if video is present)
- Sample rate conversion to 48 kHz (locked to video frame rate) for slave mode operation in all modes except Digital Versatile Disc (DVD) compliant bypass.

1.4 Audio compression

- Dolby®(1) Digital Consumer Encoding (DDCE) also known as AC-3(2) 2 channel audio encoding at 256 kbit/s or 384 kbit/s (only for SAA6752HS/01)
- MPEG-1 layer 2 audio encoding at 256 kbit/s or 384 kbit/s
- Input data bypass for Linear Pulse Code Modulation (LPCM) and compressed audio data [MPEG-1, MPEG-2, Dolby® Digital (DD) and Digital Theatre System (DTS)] according to IEC 61937
- Preamble Pc, Preamble Pd and bit stream information captured for identification of modes during bypass of compressed audio data for MPEG-1, MPEG-2, DD and DTS according to IEC 61937
- Audio mute via I²C-bus control for all modes except DVD-compliant bypass.

1.5 Stream multiplexer

- Multiplexing of video and audio streams according to the MPEG-2 systems standard (*"ISO 13818-1"*)
- Generation and output of MPEG-2 Transport Streams (TS), MPEG-2 Program Streams (PS), Packetized Elementary Streams (PES) and Elementary Streams (ES) compliant to the DVD, D-VHS and DVB standards
- MPEG time stamp (PTS/DTS/SCR/PCR) generation and insertion (synchronization)
- Insertion of metadata
- Optional generation of empty time slots for subsequent insertion of application specific data packets
- Optional insertion of user data in the GOP header and in the picture header.

(1) Dolby is a registered trademark of Dolby Laboratories Licensing Corporation.
(2) AC-3 is a registered trademark of Dolby Laboratories Licensing Corporation.

1.6 Output interface

- Parallel interface 8-bit master/slave output
- 3-state output port
- Glueless interfacing with IEEE 1394 chip sets (for example, PDI 1394 L11)
- Data Expansion Bus Interface (DEBI) interface.

1.7 Control domain

- All control done via I^2C-bus
- I^2C-bus slave transceiver up to 400 kHz
- I^2C-bus slave address select pin
- Host interrupt flag pin.

1.8 Other features

- Single external clock or single crystal 27 MHz
- Separate 27 MHz system clock output
- Interface voltage 3.3 V
- TTL compatible digital outputs
- Power supply voltage 3.3 and 2.5 V
- Boundary Scan Test (BST) supported
- Power-down mode
- Single SDRAM system memory (16 Mbit@16 bit or 64 Mbit@16 bit).

2 GENERAL DESCRIPTION

2.1 General

Philips Semiconductors' second generation real time MPEG-2 encoder, the SAA6752HS, is a highly integrated single chip audio and video encoding solution with very flexible multiplexing functionality. With our expertise in two critical areas for consumer video encoding, noise filtering and motion estimation, we have pushed the boundaries for video quality even further, providing enhanced quality for low bit rates and enabling increased recording times for a given storage capacity. The SAA6752HS will also enable a key driver for new consumer digital recording applications; system cost reduction. By integrating all audio encoding and multiplexing functionality we will be moving from a three chip to a one chip system, with cost efficient design and process technology, thus providing a truly low cost, high quality encoding system.

The SAA6752HS/02 is intended for customers whose application does not require the DDCE function.

The SAA6752HS gives significant advantages to customers developing digital recording applications:

- **Fast time-to-market and low development resources**: By adding a simple external video input processor IC, audio analog-to-digital converter, and an external SDRAM, analog video and audio sources are compressed into high quality MPEG-2 video and MPEG-1 layer 2 or AC-3 audio streams, multiplexed into a single program or transport stream for simple connection to various storage media or broadcast media. Hence, making design effort for our customers a minimum, as well as removing the need for in-depth experience in MPEG encoding.
- **Low system host resources**: All video and audio encoding algorithms and software are run on an internal MIPS®(1) processor. The SAA6752HS only requires small amount of communication from system host processor to set up and control required encoding parameters via I^2C-bus.

2.2 Application ?elds

2.2.1 DVD BASED OPTICAL DISC RECORDERS (DVD+RW, DVD-RW, DVD-RAM)

Emerging optical disc based recording systems target to replace the existing consumer recording (VCR) and playback (DVD and VCD) products. The first generation recordable DVD based products will want to maximise recording times for the 4.7 Gbyte storage capacity. For these systems the SAA6752HS is critical, with its superior noise filtering and motion estimation, in enabling high quality at low bit rates.

Playback compatibility with existing DVD decoding solutions will also be important, which is why the SAA6752HS provides Dolby® digital consumer (AC-3) audio encoding to allow playback through existing players implementing DDCE (AC-3) decoding dominant in current DVD platforms.

The DVD stream is based on MPEG Program Stream (PS). The SAA6752HS directly outputs MPEG PS compliant to the DVD standard.

(1) MIPS is a registered trademark of MIPS Technologies.

2.2.2 HDD BASED TIME SHIFT RECORDING

Hard Disc Drive (HDD) based time-shift systems enable Personalized TV (PTV) functionality, providing consumers with new powers of control over what and when to watch broadcast content. With the audio and video content recorded digitally, identification, search and retrieval becomes a `no brainer' task as compared to traditional VCR functionality. Combine this with electronic program guides and intelligent control, and the PTV can also analyse the viewers watching habits to search for programs likely to be of interest and automatically recorded in anticipation of the viewers preferences.

Since HDD recorders are closed systems, the recording format stream can be proprietary. SAA6752HS flexible multiplexing formats, support a number of recording stream formats for HDD including MPEG Transport Stream (TS) or MPEG Packetized Elementary Stream (PES).

2.2.3 DIGITAL VCR (DVHS) RECORDING

A DVHS player records streams based on MPEG Transport Streams (TS) packed in logical tape tracks. The SAA6752HS output streams are compliant with DVHS standard requirements.

2.2.4 VIDEO EDITING/TRANSMISSION/SURVEILLANCE/ CONFERENCING

The SAA6752HS can operate as a stand-alone device in all above applications. The SAA6752HS' full features and flexibility allows customers to tailor functionality and performance to specific application requirements. All required control settings such as GOP size and bit rate modes can be selected via I^2C-bus.

3 QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{DDP}	digital supply voltage (pad cells)	3.0	3.3	3.6	V
V_{DDCO}	digital supply voltage (core)	2.3	2.5	2.7	V
V_{DDA}	analog supply voltage (oscillator and PLL)	2.3	2.5	2.7	V
$I_{DD(tot)}$	analog + digital supply current	407	453	525	mA
P_{tot}	total power dissipation	1.2	1.4	1.9	W
f_{DCXO}	quartz frequency (digital controlled tuning)	$27 \times (1 - 200 \times 10^{-6})$	27	$27 \times (1 + 200 \times 10^{-6})$	MHz
f_{SDRAM}	SDRAM clock frequency	–	108	–	MHz
f_{SCL}	I^2C-bus input clock frequency	100	–	400	kHz
B	output bit-rate	1.5	–	25	Mbit/s
V_{IH}	HIGH-level digital input voltage	1.7	–	3.6	V
V_{IL}	LOW-level digital input voltage	–0.5	–	+0.7	V
V_{OH}	HIGH-level digital output voltage	$V_{DDP} - 0.4$	–	V_{DDP}	V
V_{OL}	LOW-level digital output voltage	0	–	0.4	V
T_{amb}	ambient temperature	0	–	70	°C

4 ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA6752HS/01(1)	SQFP208	plastic shrink quad ?at package; 208 leads (lead length 1.3 mm); body 28 × 28 × 3.4 mm; high stand-off height	SOT316-1
SAA6752HS/02(2)			

Notes

1. MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer.
2. MPEG-2 video and MPEG-audio encoder with multiplexer, but without AC-3 audio encoder.

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer

SAA6752HS

5 BLOCK DIAGRAM

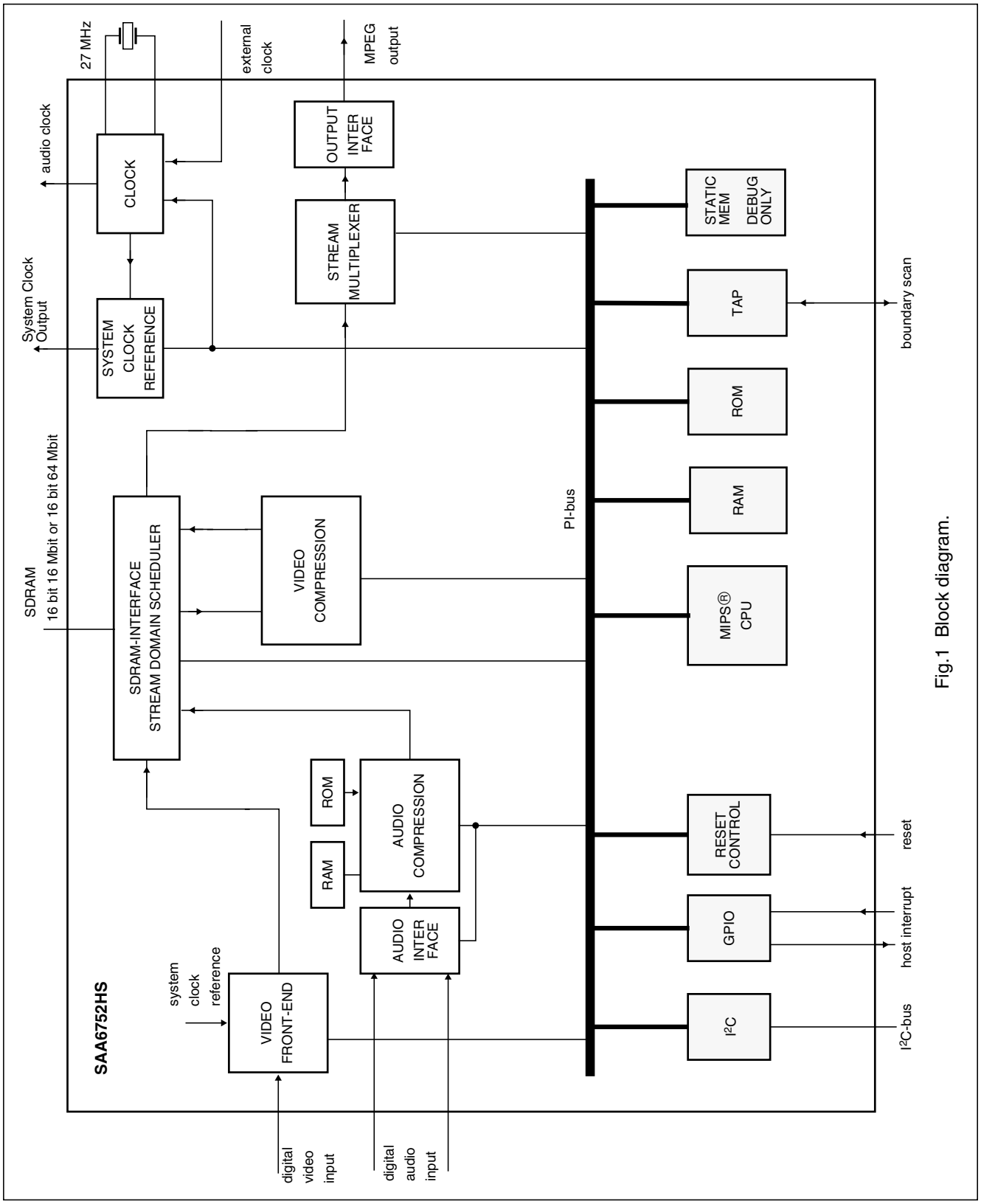


Fig.1 Block diagram.

6 PINNING

SYMBOL	PIN	INPUT/OUTPUT[1]	I_{max} (mA)	DESCRIPTION
V_{SSP}	1	ground	–	pad ground
SDATA1	2	input	–	I^2S-bus serial data input port 1 with internal pull-down resistor
SCLK1	3	input/output	4	I^2S-bus serial clock port 1 with internal pull-down resistor
SWS1	4	input/output	4	I^2S-bus word select port 1 with internal pull-down resistor
V_{DDP}	5	supply	–	pad ring supply voltage (3.3 V)
SDATA2	6	input/output	4	I^2S-bus serial data port 2 with internal pull-down resistor
SCLK2	7	input/output	4	I^2S-bus serial clock port 2 with internal pull-down resistor
SWS2	8	input/output	4	I^2S-bus word select port 2 with internal pull-down resistor
ACLK	9	output	4	audio clock output ($256 \times f_s$ or $384 \times f_s$)
V_{SSP}	10	ground	–	pad ground
IDQ	11	input	–	reserved (recommended connect to pin V_{SSP}) with internal pull-down resistor
YUV0	12	input	–	video input signal bit 0 (LSB)
YUV1	13	input	–	video input signal bit 1
YUV2	14	input	–	video input signal bit 2
YUV3	15	input	–	video input signal bit 3
YUV4	16	input	–	video input signal bit 4
YUV5	17	input	–	video input signal bit 5
YUV6	18	input	–	video input signal bit 6
YUV7	19	input	–	video input signal bit 7 (MSB)
V_{SSP}	20	ground	–	pad ground
HSYNC	21	input	–	horizontal sync input (video) with internal pull-down resistor
VSYNC	22	input	–	vertical sync input (video) with internal pull-down resistor
FID	23	input	–	video ?eld identi?cation input (odd/even ?eld) with internal pull-down resistor
VCLK1	24	input	–	video clock input 1 (27 MHz) with internal pull-down resistor
V_{SSCO}	25	ground	–	core ground
V_{SSCO}	26	ground	–	core ground
V_{DDCO}	27	supply	–	core supply voltage (2.5 V)
V_{DDCO}	28	supply	–	core supply voltage (2.5 V)
V_{DDP}	29	supply	–	pad ring supply voltage (3.3 V)
VCLK2	30	input	–	video clock input 2 (27 MHz) with internal pull-down resistor
PDOAV	31	3-state output	4	parallel stream data output for audio/video identi?er
PDIDS	32	input	–	parallel stream data input for data strobe (request for packet in Data Expansion Bus Interface (DEBI) slave mode) with internal pull-up resistor
PDOSYNC	33	3-state output	4	parallel stream data output for packet sync
V_{SSP}	34	ground	–	pad ground
PDOVAL	35	3-state output	4	parallel stream data valid output with internal pull-up resistor
PDO0	36	3-state output	4	parallel stream data output bit 0 (LSB)

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
PDO1	37	3-state output	4	parallel stream data output bit 1
PDO2	38	3-state output	4	parallel stream data output bit 2
V_{DDP}	39	supply	–	pad ring supply voltage (3.3 V)
PDO3	40	3-state output	4	parallel stream data output bit 3
PDO4	41	3-state output	4	parallel stream data output bit 4
PDO5	42	3-state output	4	parallel stream data output bit 5
PDO6	43	3-state output	4	parallel stream data output bit 6
V_{SSP}	44	ground	–	pad ground
PDO7	45	3-state output	4	parallel stream data output bit 7 (MSB)
PDIOCLK	46	input/output	4	parallel stream clock input/output
I2CADDRSEL	47	input	–	I^2C-bus address select input with internal pull-up resistor
SD_DQ15	48	input/output	8	SDRAM data input/output bit 15 (MSB)
V_{DDP}	49	supply	–	pad ring supply voltage (3.3 V)
SD_DQ0	50	input/output	8	SDRAM data input/output bit 0 (LSB)
SD_DQ14	51	input/output	8	SDRAM data input/output bit 14
SD_DQ1	52	input/output	8	SDRAM data input/output bit 1
V_{SSP}	53	ground	–	pad ground
SD_DQ13	54	input/output	8	SDRAM data input/output bit 13
SD_DQ2	55	input/output	8	SDRAM data input/output bit 2
SD_DQ12	56	input/output	8	SDRAM data input/output bit 12
V_{DDP}	57	supply	–	pad ring supply voltage (3.3 V)
SD_DQ3	58	input/output	8	SDRAM data input/output bit 3
SD_DQ11	59	input/output	8	SDRAM data input/output bit 11
SD_DQ4	60	input/output	8	SDRAM data input/output bit 4
SD_DQ10	61	input/output	8	SDRAM data input/output bit 10
V_{SSP}	62	ground	–	pad ground
SD_DQ5	63	input/output	8	SDRAM data input/output bit 5
SD_DQ9	64	input/output	8	SDRAM data input/output bit 9
SD_DQ6	65	input/output	8	SDRAM data input/output bit 6
SD_DQ8	66	input/output	8	SDRAM data input/output bit 8
V_{DDP}	67	supply	–	pad ring supply voltage (3.3 V)
SD_DQ7	68	input/output	8	SDRAM data input/output bit 7
SD_DQM1	69	output	8	SDRAM data mask enable output bit 1
SD_DQM0	70	output	8	SDRAM data mask enable output bit 0 (LSB)
$\overline{SD_WE}$	71	output	8	SDRAM write enable output (active LOW)
V_{SSP}	72	ground	–	pad ground
$\overline{SD_CAS}$	73	output	8	SDRAM column address strobe output (active LOW)
SD_CLK	74	output	8	SDRAM clock output
$\overline{SD_RAS}$	75	output	8	SDRAM row address strobe output (active LOW)
SD_CKE	76	output	8	SDRAM clock enable output

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
V_{SSCO}	77	ground	–	core ground
V_{SSCO}	78	ground	–	core and substrate ground
V_{DDCO}	79	supply	–	core supply voltage (2.5 V)
V_{DDCO}	80	supply	–	core supply voltage (2.5 V)
V_{DDP}	81	supply	–	pad ring supply voltage (3.3 V)
$\overline{SD_CS}$	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V_{SSP}	86	ground	–	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V_{DDP}	91	supply	–	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V_{SSP}	96	ground	–	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V_{DDP}	101	supply	–	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V_{SSP}	105	ground	–	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V_{DDP}	109	supply	–	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V_{SSP}	114	ground	–	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
V_{SSCO}	77	ground	–	core ground
V_{SSCO}	78	ground	–	core and substrate ground
V_{DDCO}	79	supply	–	core supply voltage (2.5 V)
V_{DDCO}	80	supply	–	core supply voltage (2.5 V)
V_{DDP}	81	supply	–	pad ring supply voltage (3.3 V)
$\overline{SD_CS}$	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V_{SSP}	86	ground	–	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V_{DDP}	91	supply	–	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V_{SSP}	96	ground	–	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V_{DDP}	101	supply	–	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V_{SSP}	105	ground	–	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V_{DDP}	109	supply	–	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V_{SSP}	114	ground	–	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
SD_DQ21	117	input/output	8	reserved (do not connect)
SD_DQ25	118	input/output	8	reserved (do not connect)
V_{DDP}	119	supply	–	pad ring supply voltage (3.3 V)
SD_DQ22	120	input/output	8	reserved (do not connect)
SD_DQ24	121	input/output	8	reserved (do not connect)
SD_DQ23	122	input/output	8	reserved (do not connect)
EXTCLK	123	input	–	27 MHz external clock input with internal pull-up resistor
V_{SSP}	124	ground	–	pad ground
V_{SSA}	125	ground	–	oscillator analog ground
XTALI	126	analog input	–	crystal oscillator input (27 MHz); note 2
XTALO	127	analog output	–	crystal oscillator output (27 MHz)
V_{DDA}	128	supply	–	oscillator analog supply voltage (2.5 V)
V_{SSCO}	129	ground	–	core ground
V_{SSCO}	130	ground	–	core ground
V_{DDCO}	131	supply	–	core supply voltage (2.5 V)
V_{DDCO}	132	supply	–	core supply voltage (2.5 V)
V_{DDP}	133	supply	–	pad ring supply voltage (3.3 V)
TDI	134	input	–	boundary scan test data input; pin must ?oat or set to HIGH during normal operating; with internal pull-up resistor; note 3
TMS	135	input	–	boundary scan test mode select; pin must ?oat or set to HIGH during normal operating; with internal pull-up resistor; note 3
TCK	136	input	–	boundary scan test clock; pin must be set to LOW during normal operating; with internal pull-up resistor; note 3
TDO	137	3-state output	4	boundary scan test data output; pin not active during normal operating; with 3-state output; note 3
V_{SSP}	138	ground	–	pad ground
$\overline{TRST}$	139	input	–	test reset input (active LOW), for boundary scan test (with internal pull-up); notes 3 and 4
CLKOUT	140	output	4	27 MHz system clock output
TEST0	141	input/output	4	reserved (do not connect)
TEST1	142	input/output	4	reserved (do not connect)
V_{DDP}	143	supply	–	pad ring supply voltage (3.3 V)
TEST2	144	input/output	4	reserved (do not connect)
SDA	145	input/open-drain output	–	serial data input/output (I^2C-bus)
SCL	146	input/open-drain output	–	serial clock input/output (I^2C-bus)
$\overline{RESET}$	147	input	–	reset input (active LOW); with internal pull-up resistor
V_{SSP}	148	ground	–	pad ground
$\overline{RTS}$	149	output	4	reserved (do not connect); Universal Asynchronous Receiver/Transmitter (UART) request to send output (active LOW)

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
$\overline{CTS}$	150	input	–	reserved (recommended connect to pin V_{DDP}); UART clear to send input; external static memory select input (active LOW); with internal pull-up resistor
RXD	151	input	–	reserved (recommended connect to pin V_{DDP}); UART receive data; internal boot select input; with internal pull-up resistor
TXD	152	output	4	reserved (do not connect); UART transmit data
V_{DDP}	153	supply	–	pad ring supply voltage (3.3 V)
$\overline{SM_LB}$	154	input/output	4	reserved (do not connect)
$\overline{SM_UB}$	155	input/output	4	reserved (do not connect)
H_IRF	156	3-state output	4	host interrupt ?ag output; with internal pull-up resistor
V_{SSP}	157	ground	–	pad ground
$\overline{SM_OE}$	158	output	4	reserved (do not connect), static memory output enable output (active LOW)
SM_A9	159	output	4	reserved (do not connect), static memory address output bit 9
SM_A10	160	output	4	reserved (do not connect), static memory address output bit 10
V_{DDP}	161	supply	–	pad ring supply voltage (3.3 V)
SM_A8	162	output	4	reserved (do not connect), static memory address output bit 8
SM_A11	163	output	4	reserved (do not connect), static memory address output bit 11
SM_A7	164	output	4	reserved (do not connect), static memory address output bit 7
SM_A12	165	output	4	reserved (do not connect), static memory address output bit 12
V_{SSP}	166	ground	–	pad ground
SM_A6	167	output	4	reserved (do not connect), static memory address output bit 6
SM_A13	168	output	4	reserved (do not connect), static memory address output bit 13
SM_A5	169	output	4	reserved (do not connect), static memory address output bit 5
SM_A14	170	output	4	reserved (do not connect), static memory address output bit 14
V_{DDP}	171	supply	–	pad ring supply voltage (3.3 V)
$\overline{SM_WE}$	172	output	4	reserved (do not connect), static memory write enable output (active LOW)
SM_D7	173	input/output	4	reserved (do not connect), static memory data input/output bit 7 with internal pull-down resistor
SM_D8	174	input/output	4	reserved (do not connect), static memory data input/output bit 8 with internal pull-down resistor
SM_D6	175	input/output	4	reserved (do not connect), static memory data input/output bit 6 with internal pull-down resistor
V_{SSP}	176	ground	–	pad ground
SM_D9	177	input/output	4	reserved (do not connect), static memory data input/output bit 9 with internal pull-down resistor
SM_D5	178	input/output	4	reserved (do not connect), static memory data input/output bit 5 with internal pull-down resistor
SM_D10	179	input/output	4	reserved (do not connect), static memory data input/output bit 10 with internal pull-down resistor

SYMBOL	PIN	INPUT/OUTPUT(1)	I_{max} (mA)	DESCRIPTION
SM_D4	180	input/output	4	reserved (do not connect), static memory data input/output bit 4 with internal pull-down resistor
V_{SSCO}	181	ground	–	internal pre-driver and substrate ground
V_{SSCO}	182	ground	–	core ground
V_{DDCO}	183	supply	–	core supply voltage (2.5 V)
V_{DDCO}	184	supply	–	internal pre-driver supply voltage (2.5 V)
V_{DDP}	185	supply	–	pad ring supply voltage (3.3 V)
SM_D11	186	input/output	4	reserved (do not connect), static memory data input/output bit 11 with internal pull-down resistor
SM_D3	187	input/output	4	reserved (do not connect), static memory data input/output bit 3 with internal pull-down resistor
SM_D12	188	input/output	4	reserved (do not connect), static memory data input/output bit 12 with internal pull-down resistor
SM_D2	189	input/output	4	reserved (do not connect), static memory data input/output bit 2 with internal pull-down resistor
V_{SSP}	190	ground	–	pad ground
SM_D13	191	input/output	4	reserved (do not connect), static memory data input/output bit 13 with internal pull-down resistor
SM_D1	192	input/output	4	reserved (do not connect), static memory data input/output bit 1 with internal pull-down resistor
SM_D14	193	input/output	4	reserved (do not connect), static memory data input/output bit 14 with internal pull-down resistor
SM_D0	194	input/output	4	reserved (do not connect), static memory data input/output bit 0 (LSB) with internal pull-down resistor
V_{DDP}	195	supply	–	pad ring supply voltage (3.3 V)
SM_D15	196	input/output	4	reserved (do not connect), static memory data input/output bit 15 (MSB) with internal pull-down resistor
$\overline{SM_CS3}$	197	output	4	reserved (do not connect), static memory chip select output for external ROM or RAM (active LOW)
SM_A4	198	output	4	reserved (do not connect), static memory address output bit 4
SM_A3	199	output	4	reserved (do not connect), static memory address output bit 3
V_{SSP}	200	ground	–	pad ground
SM_A2	201	output	4	reserved (do not connect), static memory address output bit 2
SM_A15	202	output	4	reserved (do not connect), static memory address output bit 15
SM_A1	203	output	4	reserved (do not connect), static memory address output bit 1
SM_A16	204	output	4	reserved (do not connect), static memory address output bit 16
V_{DDP}	205	supply	–	pad ring supply voltage (3.3 V)
SM_A0	206	output	4	reserved (do not connect), static memory address output bit 0 (LSB)
SM_A17	207	output	4	reserved (do not connect), static memory address output bit 17 (MSB)
$\overline{SM_CS0}$	208	output	4	reserved (do not connect)

IC7700:FLI2200

FLI2200

Description

The FLI2200 is a single chip implementation of Faroudja Laboratories' award winning deinterlacing and post-processing algorithms that produce the highest quality progressive video output from a variety of interlaced video inputs including 525/60 (NTSC) or 625/50 (PAL or SECAM). It uses patented and patent pending motion-adaptive deinterlacing that selects the optimal filtering on a per-pixel basis. This includes detection and proper interleaving of 3:2 and 2:2 pulldown for film-base sources, including continuous monitoring and compensation for bad edits that occur frequently in broadcast material due to poor scene cuts or insertion of commercials. Video material is processed by a set of content-sensitive spatio-temporal filters that adapt to the appropriate direction for smoothest interpolation using the patented Faroudja DCDi™ algorithm. The FLI2200 also includes motion-adaptive cross-color suppression that removes highly objectionable coloration artifacts produced by commonly used video decoders. Its internal processing uses 10 bits per channel to maintain the highest quality. Its inputs and outputs are 10 bits/channel for best quality but also supports 8 bits/channel for more cost-sensitive applications. The FLI2200 requires 4 MB of low cost SDRAM for best quality deinterlacing, but it can also be operated in an optimized intra-field mode without memory for more cost-sensitive applications. This makes possible the use of a single design for both high-end and low-end applications.

The FLI2200 integrates a number of functions to provide maximum flexibility in a low cost configuration. This includes an on-chip clock generator, SDRAM controller, display controller, input and output color-space converters. It uses a standard 2-wire serial control interface for easy control and access to the registers.

The FLI2200 can be connected without glue logic to the FLI2000 video decoder and FLI2220 Enhancer and OSD Generator to produce the highest quality video pipeline for premium applications. It is also fully compatible with other decoders having a ITU-R BT 656 output format.

Applications

Flat panel TV – LCD, PDP

Progressive scan TVs

Multimedia front/rear projectors

Home Theater

Scan Converters

Multimedia PCs/Workstations

DCDi™ is a Faroudja trademark

Features

Motion-adaptive cross-color suppression removes artifacts produced by improper Y/C separation in low-cost video decoders

Motion-adaptive video deinterlacing selects optimal filtering on a per-pixel basis

- Film-mode for proper handling of 3:2 and 2:2 pulldown material
- Bad-edit detection/correction compensates for poor scene cuts and insertions common in broadcast material
- Motion-weighted interpolation for video sources produces maximum resolution without introducing motion artifacts
- Directional Correlational Deinterlacing (DCDi™) minimizes jaggies on angled lines

8/10-bit Y/Cb/Cr (D1) (ITU-R BT 656), 16/20-bit Y Cb/Cr (ITU-R BT 601), 24/30-bit RGB or YCbCr/YPbPr interlaced input options

? Supports 525/60 (NTSC), 625/50 (PAL/SECAM)

? Accepts up to 1100 pixels/line

8/10-bit, 16/20-bit YUV, 24/30-bit RGB or YCbCr/YPbPr progressive output options

Supports 8- or 10-bit inputs and outputs

10-bit internal processing for highest quality

Includes color-space converters at input and output for maximum flexibility

Auto-detection of NTSC/PAL/SECAM inputs

High-order filtering produces smooth chroma output in 4:2:2 to 4:4:4 or 4:4:4 to 4:2:2 conversions

Resolution recovery maximizes output signal-to-noise ratio and dynamic range

Can be operated without glue logic with FLI2000 Video Decoder and FLI2220 Enhancer and OSD Generator ICs to produce highest quality video pipeline

Glue-less interface to most standard video decoders

Built-in display timing generator

On-chip clock generator eliminates external PLLs

On-chip SDRAM controller

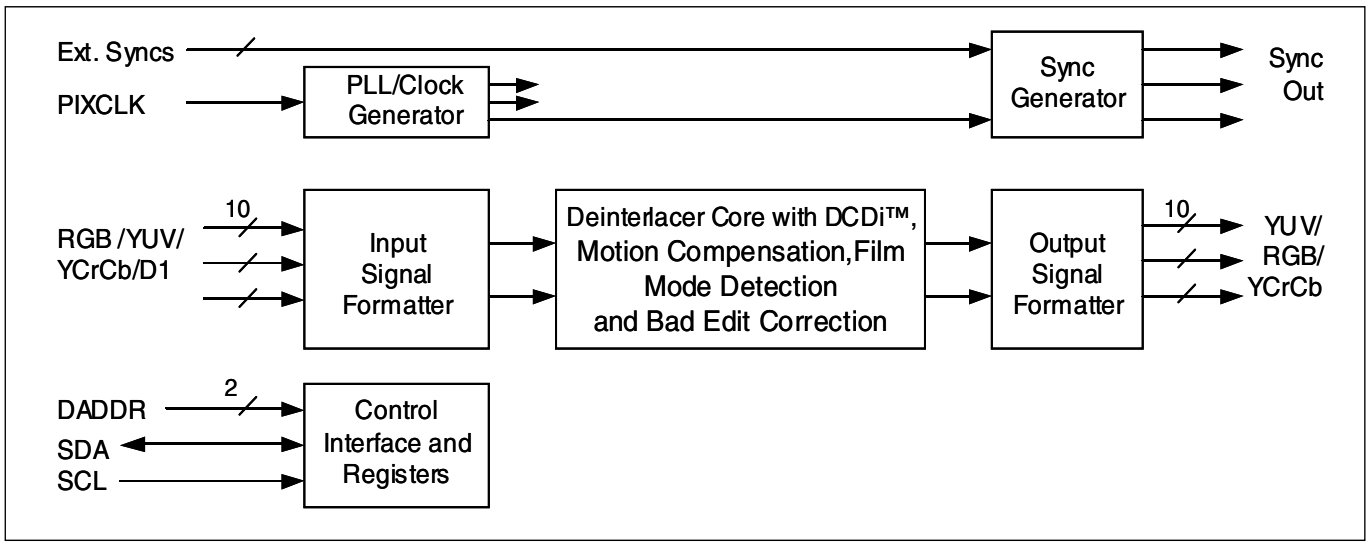
Uses low cost SDRAM as field memory – 4 MB

Optimized intra-field operation allows memory-less configuration for lowest cost applications with same design and layout as for high-end applications

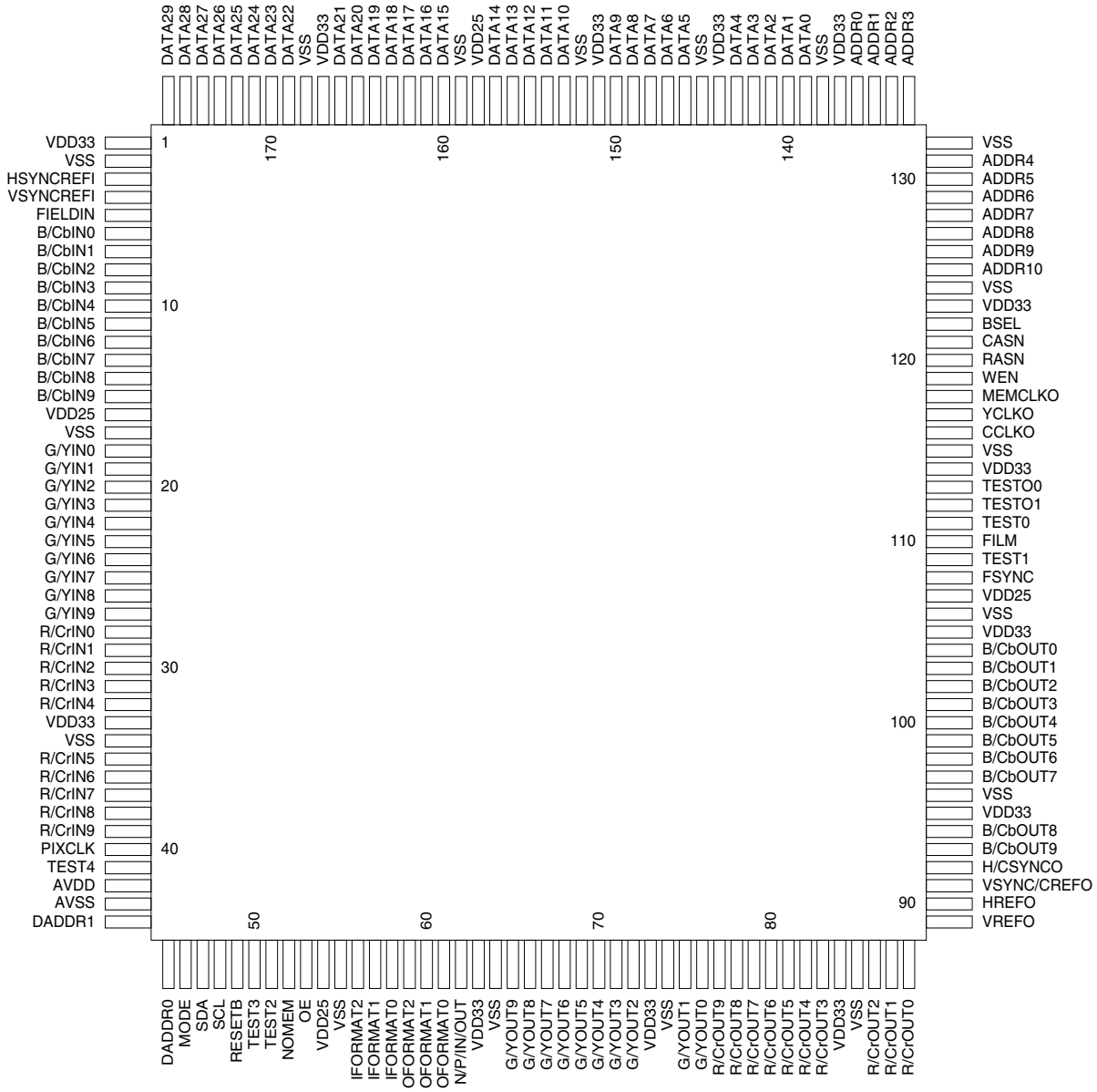
2-wire serial control interface for easy control

176-pin TQFP package

Simplified Block Diagram



Pin description



Pin #	Name	Description
52	NOMEM	No Memory Mode control input. This pin controls the operation of the FLI2200 as follows: When this pin is set low the device is used with external field memories and operates in the full set of deinterlacing modes, i.e., motion adaptive video deinterlacing and full frame film source deinterlacing using 3:2 pulldown detection (2:2 pulldown for 625/50 sources). When this pin is set high the FLI2200 is forced into the intra-field only deinterlacing mode, which requires no external memories, allowing the FLI2200 to be used in low-cost applications where the ultimate video quality is not a requirement. ***To ensure proper startup of the SDRAMs this pin should be set high during the power-up sequence.*** This can be overridden by the NMOvr bit, bit 1 in register 05_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 05_H for details.
27-18	G/YIN_{9-0}	10-bit green or luminance signal input bus. The mode is set by the $IFORMAT_{2-0}$ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 00_H for details. This signal is sampled on the rising edge of PIXCLK.
15-6	$B/CbIN_{9-0}$	10-bit blue or Cb chroma signal input bus. The mode is set by the $IFORMAT_{2-0}$ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 00_H for details. Bits 6, 4 and 3 in register 08_H specify the busses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the Y Cb Cr and Y Pb Pr modes the Cb or Pb signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed Y/Cb/Cr mode and 13.5 MHz in all other modes. These pins should be tied low when not used.
39-35 32-28	$R/CrIN_{9-0}$	10-bit red or Cr chroma signal input bus. The mode is set by the $IFORMAT_{2-0}$ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 00_H for details. Bits 6, 4 and 3 in register 08_H specify the busses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the Y Cb Cr mode the Cr signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed Y/Cb/Cr mode and 13.5 MHz in all other modes. These pins should be tied low when not used.
3	HSYNCREFI	Horizontal sync or reference. The horizontal sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00_H. The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FLI2200 is used in the ITU-R BT 601/D1 input mode with embedded syncs (IFormat = 110) this input is not used and should be tied low; in this case all sync information will be derived from the signal.
4	VSYNCREFI	Vertical sync or reference. The vertical sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00_H. The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FLI2200 is used in the ITU-R BT 601/D1 input mode with embedded syncs (IFormat = 110) this input is not used and should be tied low; in this case all sync information will be derived from the signal.
5	FLDIN	Field identifier input. The field identifier output of the source signal should be connected to this pin. A low setting signifies an even field and a high level signifies an odd field. When bit 4 in register 00_H is set low, the input timing is based on HREF and VREF and this signal is required. When this bit is set high the input timing is based on HSYNC and VSYNC and this signal is generated internally and is not required. When bit 5 in register 06 is set high this signal is also used as the frame boundary identifier for 30 Hz film sources.

Pin Connections and Functions

Pin #	Name	Description
See list	V_{SS}	Ground connections. Connect to the digital ground plane. Pins: 2, 17, 34, 55, 64, 74, 85, 96, 106, 115, 124, 132, 138, 145, 152, 159, 168
See list	V_{DD33}	Pad Ring digital power connections. Connect to the digital 3.3 volt power supply and decouple to the digital ground plane. Pins: 1, 33, 63, 73, 84, 95, 105, 114, 123, 137, 144, 151, 167
See list	V_{DD25}	Core Logic digital power connections. Connect to the digital 2.5 volt power supply and decouple to the digital ground plane. Pins: 16, 54, 107, 158
43	AV_{SS}	Ground connection for the clock PLL circuits. Connect to the digital ground plane
42	AV_{DD}	Analog power connections for the clock PLL circuit. Connect to a separately decoupled 2.5 volt power supply and decouple directly to the AV_{SS} pin..
49	RESETB	Reset. When this input is set low it will reset all the internal registers to the default states. Refer to the section on the control registers for details of these states. The device must be reset after it is powered-up.
53	OE	When this pin is set high the outputs of the FLI2200 will be enabled; when it is set low the outputs will be set into a high-impedance state.
56-58	$IFORMAT_{2-0}$	Input signal format control. The settings of these pins set the format of the input signal. This can be overridden by the IFmtOvr bit, bit 3 in register 00_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 00_H for details.
59-61	$OFORMAT_{2-0}$	Output signal format control. The settings of these pins set the format of the output signal. This can be overridden by the OFmtOvr bit, bit 3 in register 07_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 07_H for details.
44-45	$DADDR_{1-0}$	The settings of $DADDR_{1-0}$ allow the device address of the control bus to be programmed to prevent conflict with the other devices connected to the bus. $DADDR_{1-0}$ allow the device address to be set to any of the following values: $C0/C1_H$, $C2/C3_H$, $E0/E1_H$, $E2/E3_H$. Please refer to the section “Control Bus Operation and Protocol” for further information.
46	MODE	When this pin is set low the control bus will operate in the slave mode; allowing the device to programmed from an external controller. When it is set high the FLI2200 will self-program from an external I^2C memory connected to the bus. Please refer to the “Control Bus Operation and Control Protocol” section for more details.
47	SDA	2-wire serial control bus data. Data can be written to the control registers via this pin when it is in the input mode and data can be read from the status registers when it is in the output mode. Refer to the section on the serial port for timing and format details and to the section on the registers for programming information.
48	SCL	2-wire serial control bus clock. When the control port operates in slave mode this pin will be an input and when it operates in the self programming mode it will be an output.
40	PIXCLK	Pixel clock input. This clock is used to drive all the circuits in the FLI2200. An internal PLL is used to upconvert this clock to provide the master clock signal and other clocks used internally. Note that when the FLI2200 is used in the D1 input mode the PIXCLK input should run at the rate of two cycles per pixel (one for luma and one for chroma).
62	N/P/IN/OUT	NTSC/PAL input or output. The default function of this pin is NTSC/PAL signal indicator output. When the input video signal is a 525 line signal this pin will be set high and when it is a 625 line signal the pin is set low. This function of this pin can be programmed to be an input according to the setting of this pin if the $NPOp_{1-0}$ bits, bits 5-4 in register 03_H, are set to 00_H, overriding the internal line counter. i.e., it will treat the signal as a 525 line signal when it is set high and a 625 line signal when it is set low.

Pin #	Name	Description
65-72 75-76	$G/YOUT_{9-0}$	Green or luminance output bus. In the RGB mode this output is the Green signal and in the YCbCr mode it is the Y signal. The mode is set by the $OFORMAT_{2-0}$ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 07_H for details. The signal is clocked out on the falling edge of YCLKO.
93-94 97-104	$B/CbOUT_{9-0}$	Blue or Cb chrominance output bus. In the RGB mode this output is the Blue signal, in the Y Cb Cr mode it is the Cb signal. The mode is set by the $OFORMAT_{2-0}$ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 07_H for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08_H. The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of YCLKO prior to the next rising edge of CCLKO in the YUV 4:2:2 mode, and on the rising edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
77-83 86-88	$R/CrOUT_{9-0}$	Red or Cr chrominance output bus. In the RGB mode this output is the Red signal, in the YCbCr mode it is the Cr signal. The mode is set by the $OFORMAT_{2-0}$ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07_H, allowing this function to be set or changed via the I^2C bus. Please refer to the description of register 07_H for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08_H. The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of YCLKO prior to the next rising edge of CCLKO in the YUV 4:2:2 mode, and on the rising edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
116	CCLKO	Chroma output sampling clock. This clock is derived from PIXCLK and will be at half the frequency of YCLKO. In 30-bit 4:2:2 output mode the chroma output signals will change on the falling edge of YCLKO prior to the next rising edge this clock.
117	YCLKO	Luma output sampling clock. This clock is derived from PIXCLK and is double the frequency of PIXCLK. In 30-bit and 20-bit output modes the output signals will change on the falling edge of this clock.
89	VREFO	Start of active field or frame indicator. This signal goes high to indicate the first active line in each field or frame and goes low during the vertical blanking interval. The polarity and timing of this signal are programmable.
90	HREFO	Start of active line indicator output. This signal goes high to indicate the first active pixel in each line and goes low during the horizontal blanking interval. The polarity and timing of this signal are programmable.
91	VSYNC/ CREFO	Vertical sync output. This signal provides the vertical sync function for the outputs. Its polarity is programmable to be active high or active low. It can also be programmed to be a composite reference for applications requiring this instead of sync.
92	H/CSYNCO	Horizontal or composite sync output. This signal provides the horizontal sync function for the outputs. Its polarity is programmable to be active high or active low. This signal can also be programmed to be the composite sync output, CSYNC.
108	FSYNC	Film mode sync output. When film mode is detected this pin will toggle in sync with the 3:2 (NTSC) or 2:2 (PAL and 30 Hz film in NTSC) pulldown sequence detected in the source.
110	FILM	Film mode detector output. This pin will be set high when the FLI2200 detects that the video input was converted from 24 fps film with a teleciné machine. If film mode is not detected this pin will be set low.

Pin #	Name	Description
125-131 133-136	$ADDR_{10-0}$	SDRAM Address bus. This signal bus is used to address the external SDRAM(s) used for field memories. It should be connected to the A_{10-0} bus of the memory chip(s). Please refer to the Applications section of this data sheet for further details.
176-169 166-160 157-153 150-146 143-139	$DATA_{29-0}$	SDRAM Data bus. This signal bus is used to transfer the data to and from the external SDRAM(s) used for field memories. It should be connected to the DQ_{29-0} bus of the memory chip when using a 64 Mbit SDRAM. When using two 16 Mbit SDRAMs this 30-bit bus may be connected to the two 16-bit data busses of the memories in two ways: either connect 16 lines to one chip and 14 to the other, or connect 15 to both. In all cases the two unused data lines on the memory chip(s) should be connected to ground via 22 k? resistors. Please refer to the Applications section of this data sheet for further details.
118	MEMCLKO	SDRAM clock and 2x output sampling clock. This clock is derived from PIXCLK and will be at double the frequency of YCLKO. This active signal should be connected to the CLK pin(s) on the SDRAM(s). When the 10-bit output mode selected the output signals will also change at this clock rate and this should then be used as the output clock..
119	WEN	SDRAM Write Enable. This active low signal should be connected to the WE pin(s) on the SDRAM(s).
120	RASN	SDRAM Row Address Select. This active low signal should be connected to the RAS pin(s) on the SDRAM(s).
121	CASN	SDRAM Column Address Select. This active low signal should be connected to the CAS pin(s) on the SDRAM(s).
122	BSEL	SDRAM Bank Select. When using two 16 Mbit SDRAMs this signal should be connected to the BA (also called BS or A_{11}) pin on both SDRAMs. When using a 64 Mbit SDRAM this signal should be connected to the BA0 (also called BS0 or A_{11}) pin on the SDRAM and BA1/ BS1 (also called BA when BA0 is referred to as A_{11}) should be tied low.
41, 50, 51, 109, 111	$TEST_{4-0}$	These pins are used for test purposes only and should always be tied low for normal operation.
112, 113	$TESTO_{1-0}$	These pins are test outputs and should be left unconnected in normal operation.

9.10.4 IC's Divio 1.8

IC7400: uPD72852

DATA SHEET

NEC

MOS INTEGRATED CIRCUIT

μPD72852

IEEE1394a-2000 COMPLIANT 400 Mbps TWO-PORT PHY LSI

The μPD72852 is a two-port physical layer LSI that complies with the IEEE1394a-2000 specifications.

The μPD72852 supports transfers of up to 400 Mbps and consumes less power than the μPD72850B. The μPD72852 is suitable for battery systems with an IEEE1394 interface.

FEATURES

- The two-port physical layer LSI complies with IEEE1394a-2000
- Fully interoperable with IEEE1394 std 1394 Link (FireWire™, i.LINK™)
- Meets Intel™ Mobile Power Guideline 2000
- Full IEEE1394a-2000 support includes: Suspend/Resume, connection debounce, arbitrated short bus reset, multi-speed concatenation, arbitration acceleration, fly-by concatenation
- Fully compliant with OHCI requirements
- Small package: 64-pin plastic LQFP
- Super low power: 68 mA (Operating mode)
  : 115 μA (Suspend mode)
- Data rate: 400/200/100 Mbps
- Supports PHY pinging and remote PHY access packets
- 3.3 V single power supply (if power not supplied via node: 3.0 V single power supply)
- 24.576 MHz crystal clock generation, 393.216 MHz PLL multiplying frequency
- 64-bit flexible register incorporated in PHY register
- Electrically isolated Link interface
- Supports LPS/Link-on as part of PHY/Link interface
- External filter capacitors for PLL not required
- Extended Resume signaling for compatibility with legacy DV devices
- System power management by signaling of node power class information
- Cable power monitor (CPS) is equipped

ORDERING INFORMATION

Part number	Package
μPD72852GB-8EU	64-pin plastic LQFP (10 x 10)

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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Date Published March 2001 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

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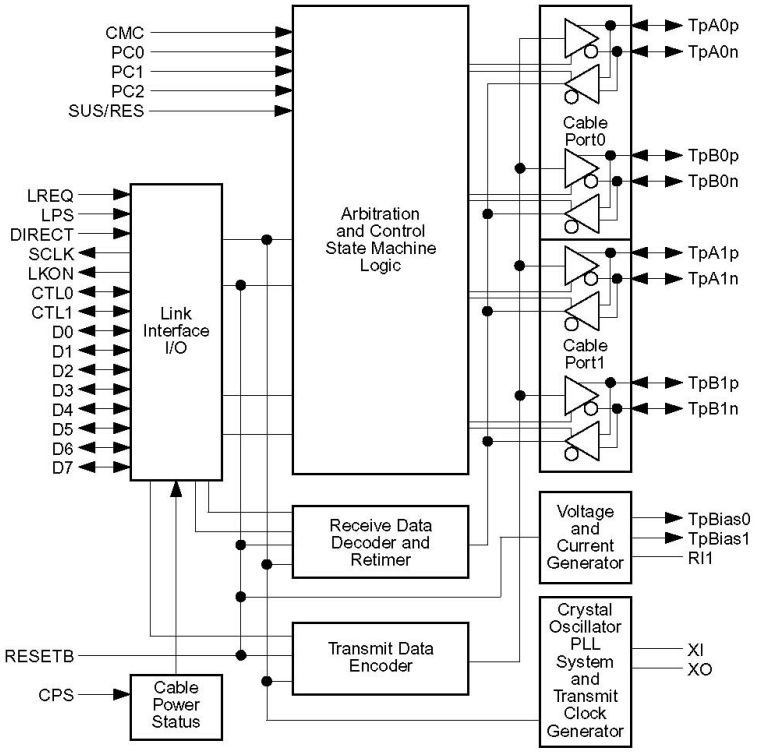
BLOCK DIAGRAM



1. PIN FUNCTIONS

1.1 Cable Interface Pins

Name	Pin No.	I/O	Function
TpA0p	39	I/O	Port 0 twisted pair cable A positive phase I/O
TpA0n	38	I/O	Port 0 twisted pair cable A negative phase I/O
TpB0p	37	I/O	Port 0 twisted pair cable B positive phase I/O
TpB0n	36	I/O	Port 0 twisted pair cable B negative phase I/O
TpA1p	46	I/O	Port 1 twisted pair cable A positive phase I/O
TpA1n	45	I/O	Port 1 twisted pair cable A negative phase I/O
TpB1p	44	I/O	Port 1 twisted pair cable B positive phase I/O
TpB1n	43	I/O	Port 1 twisted pair cable B negative phase I/O
SUS/RES	19	I	Suspend/Resume function select 1: Suspend/Resume on (IEEE1394a-2000 compliant) 0: Suspend/Resume off (P1394a draft 1.3 compliant)
CPS	32	I	Cable power status Connect to the cable through a 390 kΩ resistor and to GND through a 100 kΩ resistor. 0: Cable power fail 1: Cable power on

1.2 Link Interface Pins

Name	Pin No.	I/O	Function
D0	8	I/O	Data input/output (bit 0)
D1	9	I/O	Data input/output (bit 1)
D2	11	I/O	Data input/output (bit 2)
D3	12	I/O	Data input/output (bit 3)
D4	14	I/O	Data input/output (bit 4)
D5	15	I/O	Data input/output (bit 5)
D6	17	I/O	Data input/output (bit 6)
D7	18	I/O	Data input/output (bit 7)
CTL0	5	I/O	Link interface control (bit 0)
CTL1	6	I/O	Link interface control (bit 1)
LREQ	63	I	Link request input
SCLK	2	O	Link control output clock LPS 1: 49.152 MHz output LPS 0: Clamp to 0 (The clock signal will be output within 25 μsec after change to "0")
LPS	59	I	Link power status input 0: Link power off 1: Link power on (PHY/Link direct connection)
LKON	58	O	Link-on signal output Link-on signal is 6.144 MHz clock output. Please refer to **4.2 Link-on Indication**.
DIRECT	50	I	PHY/Link isolation barrier control input 0: Isolation barrier 1: PHY/Link direct connection

1.3 Control Pins

Name	Pin No.	I/O	Function
PC0	26	I	Power class set input This pin status will be loaded to Pwr_class bit which allocated to PHY register 4H. IEEE1394a-2000 chapter [4.3.4.1]
PC1	27	I	
PC2	28	I	
CMC	30	I	Configuration manager capable setting This pin status will be loaded to Contender bit which allocated to PHY register 4H. 0: Non contender 1: Contender
RESETB	55	I	Power-on reset input Connect to GND through a 0.1 μF capacitor. 0: Reset 1: Normal
SPD	61	I	Speed select 0: MAX. S200 1: MAX. S400

1.4 IC

Name	Pin No.	I/O	Function
IC(AL)	29, 51	-	Internally Connected (Low Clamped) Connect to GND.
IC(DL)	3	-	Internally Connected (Low Clamped) Connect to GND.

1.5 Power Supply Pins

Name	Pin No.	I/O	Function
AV_{DD}	25, 31, 40, 47, 54	-	Analog power
AGND	24, 33, 35, 42, 49, 52, 53	-	Analog GND
DV_{DD}	4, 10, 20, 56, 60	-	Digital V_{DD}
DGND	1, 7, 13, 16, 21, 57, 64	-	Digital GND

1.6 Other Pins

Name	Pin No.	I/O	Function
TpBias0	41	O	Port 0 twisted pair output
TpBias1	48	O	Port 1 twisted pair output
RI1	34	-	Resistor connection pin1 for reference current generator Connect to GND through a 9.1 kΩ resistor.
XI	23	-	Crystal oscillator connection XI
XO	22	-	Crystal oscillator connection XO
TEST	62	-	Test pin Internally connected (Low clamped). Connect to GND.

IC7431: uPD72893

PRELIMINARY DATA SHEET

NEC

MOS INTEGRATED CIRCUIT

μPD72893

IEEE1394 LINK LAYER CONTROLLER WITH DV CODEC

DESCRIPTION

The μPD72893 is an IEEE1394 link layer controller developed for digital AV systems and features an on-chip 32-bit RISC CPU (V850E) for IEEE1394 processing.

This link layer controller has two stream interface channels to transmit/receive image data conforming to the IEC61883 Standard, such as MPEG and VD, and these channels can be independently used for transmission and reception. In addition, a total of 8 KB of FIFO buffer space is provided to transmit/receive isochronous signals. This buffer space can be allocated as transmit and receive FIFO buffers in 2 KB units.

The μPD72893 supports IEEE1394 bus control and AV/C commands via the on-chip CPU, as well as external control using either a serial or a parallel interface.

FEATURES

IEC61883 functions

- Supports DVB, DSS, and DVCR formats.
- Supports AV/C commands (for D-VHS).

DV codec functions

- Supports IEEE1394 DV
  Video signal :
  NTSC 720 x 480 x 29.97 Hz (525-60 system)
  PAL 720 x 576 x 25 Hz (625-50 system)
  Audio signal :
  2 channels (48 kHz, 44.1 kHz, 32 kHz, 16 bits)
  4 channels (32 kHz, 12 bits)
- Supports digital AV signal
  Video signal :
  ITU-R REC656
  8 bits, Y/Cb/Cr 4:2:2 (Video CLK = 27 MHz)
  Audio signal :
  Audio PCM serial
  Input 16-bit resolution MCK44, MCK48
  Output LRCKO, BCKO

CPU functions

- 32-bit RISC CPU (V850E)
- Operating frequency : 27 MHz input (@54 MHz internally)
- Memory : ROM 192 KB
  RAM 60 KB

Interface functions

- Stream port (MPEG-TS, DV): 2 ports
  8-bit parallel bus/serial bus support
  Asynchronous transfer format Maximum transfer rate: 13.5 Mbyte/s
- Host interface
  Parallel interface: 16-bit address/data separated type, ISA, 68000, and SH-1 selectable
- ROM interface
  Flash ROM interface. SRAM is also connectable.
- EEPROM™ interface
  For IEEE1394 configuration data
- General-purpose I/O ports: 11 (multiplexed with function pins)

Other functions

- Power-saving function (HALT mode and software STOP mode)
- Supply voltage: Peripheral 3.3 V ±0.3 V
  Internal 2.5 V ±0.2 V
- Package: 208-pin plastic QFP (FP)

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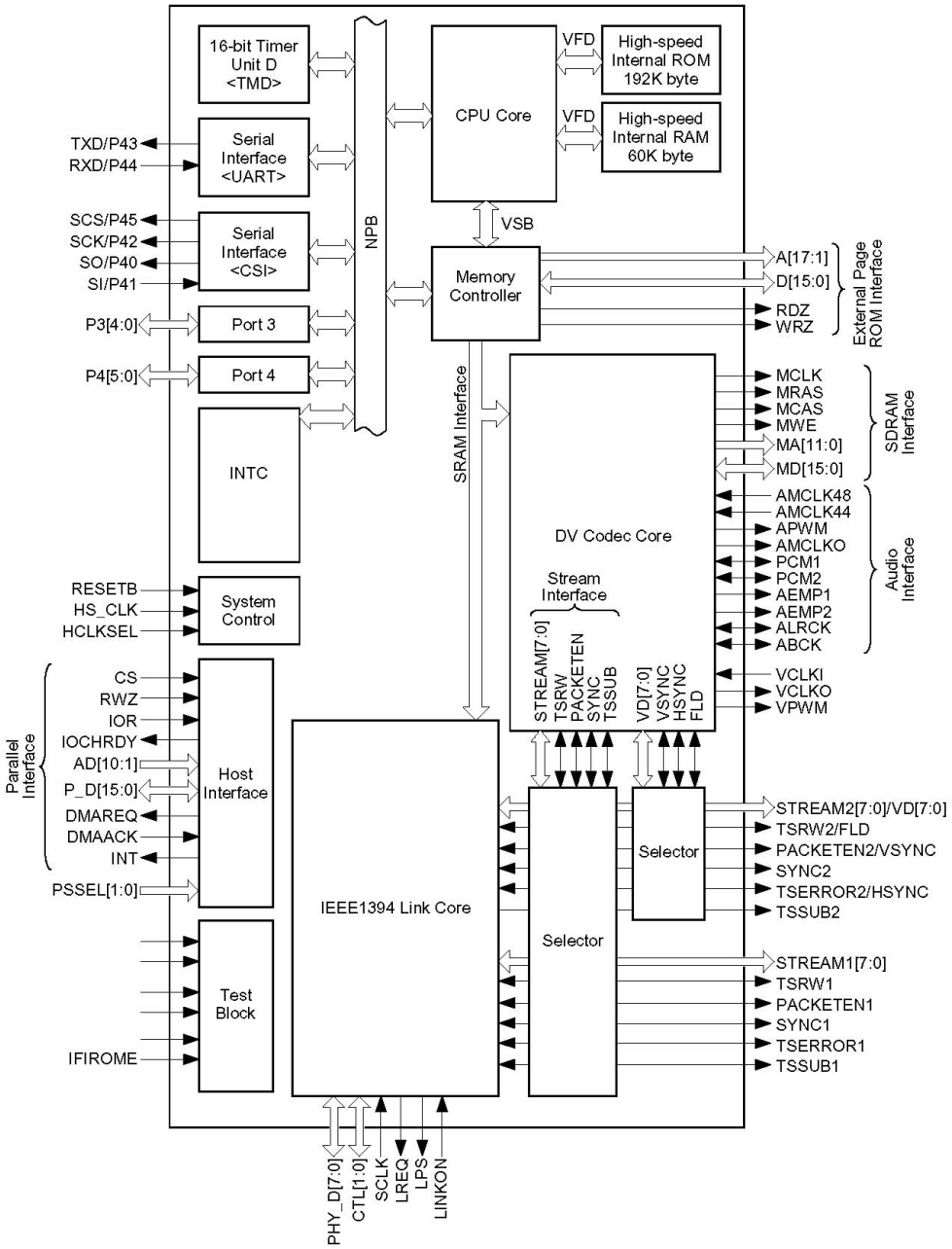
OVERVIEW OF FUNCTIONS

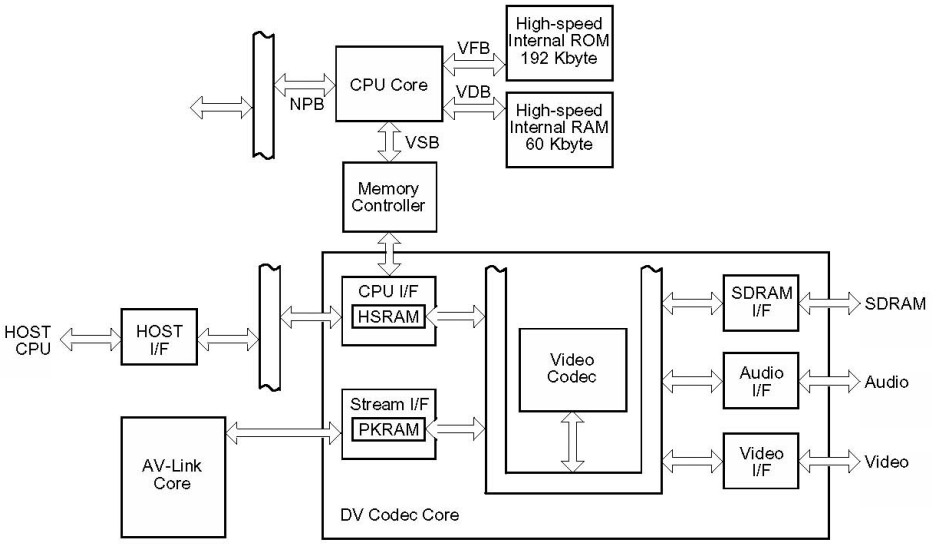
Product Name	μPD72893
IEEE1394 Link core	Conforms to IEEE1394-1995 and IEEE1394a-2000 Standards. Supports data rates of 400 Mbps, 200 Mbps, and 100 Mbps. Two FIFOs for ASYNC transmission/reception Concatenate Isochronous transmission and asynchronous stream transmission are possible. Conforms to IEC61883. CSR's and Config_ROM (RAM) that are frequently accessed incorporated so that response_packet is automatically generated and transmitted by concatenate transfer.
CPU core	32-bit RISC CPU (V850E)
Internal ROM	192 KB
Internal RAM	60 KB
Parallel interface	- 16-bit address/data separated bus (select one mode from the following bus formats) 6800 (Motorola), ISA, SH-1
Serial interface	- Asynchronous serial interface (UART) x 1 channel - Clocked serial interface (CSI) x 1 channel
External ROM connection function	- Page ROM/ROM flash ROM interface - SRAM interface - EEPROM interface
Operating frequency	- 27 MHz clock input - On-chip CPU: 54 MHz (generated by internal PLL from 27 MHz) - IEEE1394 Link core: 49.152 MHz (operates on SCLK from PHY)
Supply voltage	- Peripheral: V_{DD} = 3.3 ±0.3 V - Internal: V_{DD} = 2.5 ±0.2 V
Package	208-pin plastic QFP (fine pitch) (28 x 28)

BLOCK DIAGRAM

μPD72893 Block Diagram



DV Codec Unit Block Diagram



1. PIN FUNCTIONS

(1) Link-related pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
LINKON	18	I	Link-on signal input. Clock input. Inputs 0 if LPS is active.	–	I	–
LPS	17	O	Link power status output Link power OFF : 0 Link power ON : 2.7 MHz pulse output (54 MHz host clock divided by 20)	–	O	–
LREQ	16	O	Link request output	–	O	–
SCLK	15	I	Clock input for Link control When LPS is active : 49.152 MHz input LPS = 0 : Fixed to 0	–	I	–
CTL[1:0]	12, 13	I/O	PHY/Link control signal I/O	–	I	–
PHY_D[7:0]	2 to 4, 6 to 8, 10, 11	I/O	Data I/O between PHY and Link	–	I	–
STREAM1[7:0]	26 to 19	I/O	ISO data bus of stream interface 1 Note	–	I	–
PACKETEN1	27	I/O	Packet enable signal I/O to/from stream interface 1 Note	H/L	I	–
TSERROR1	28	I/O	Packet error signal I/O to/from stream interface 1 Note	H/L	I	–
TSRW1	29	I/O	Data read/write enable signal I/O to/from stream interface 1 Note	–	I	–
SYNC1	30	I/O	Frame sync signal I/O to/from stream interface 1 Note	H/L	I	–
TSSUB1	32	I/O	I :Inputs the packet gap signal when the stream is input through the stream interface O :Not used. Connect this pin to V_{DD} or GND via a resistor.	H/L	I	–
STREAM2[7:0]	47 to 40	I/O	ISO data bus of stream interface 2 Note	–	I	VD[7:0]
PACKETEN2	33	I/O	Packet enable signal I/O to/from stream interface 2 Note	H/L	I	VSYNC
TSERROR2	34	I/O	Packet error signal I/O to/from stream interface 2 Note	H/L	I	HSYNC
TSRW2	36	I/O	Data read/write enable signal I/O to/from stream interface 2 Note	–	I	FLD
SYNC2	37	I/O	Frame sync signal I/O to/from stream interface 2. Note	H/L	I	–
TSSUB2	38	O	Not used. Leave open.	–	O	–

Note When this signal is switched for transmission or reception to/from IEEE1394, it must be controlled that output does not conflict.
To prevent a floating state, connect a pull-up or pull-down resistor to this pin.

Remark Active H/L: A high or low level can be selected as the active level.

(2) Video interface pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
VCLKI	50	I	Video clock input (27 MHz)	–	–	–
VCLKO	51	O	Video clock output (27 MHz)	–	–	–
VD[7:0]	47 to 40	I/O	Video data signal	–	–	STREAM2[7:0]
VSYNC	33	I/O	Vertical sync video signal Note	L	–	PACKETEN2
HSYNC	34	I/O	Horizontal sync video signal Note	L	–	TSERROR2
FLD	36	I/O	Field index signal Note	–	–	TSRW2
VPWM	53	O	PWM signal for video PLL	–	–	–

Note When this signal is switched for transmission or reception to/from IEEE1394, it must be controlled that output does not conflict.

(3) Audio interface pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
AMCLK48	104	I	Audio master clock input (for 48 kHz sampling frequency)	–	–	–
AMCLK44	103	I	Audio master clock input (for 44.1 kHz sampling frequency)	–	–	–
AMCLKO	101	O	Audio master clock output	–	–	–
PCM1	96	I/O	Audio PCM serial data Note With 2 channels: CH1 With 4 channels: CH1 or CH1 and CH2 mixed	–	–	–
PCM2	97	I/O	Audio PCM serial data Note With 2 channels: Mute With 4 channels: CH2	–	–	–
AEMP1	98	O	PCM1 emphasis ON/OFF for PCM1 output	H	–	–
AEMP2	100	O	PCM2 emphasis ON/OFF for PCM2 output	H	–	–
ALRCK	93	I/O	Audio LR clock Note L-ch: High R-ch: Low	–	–	–
ABCK	94	I/O	Audio bit clock Note	–	–	–
AFS[1:2]	48, 49	O	Audio sampling frequency AFS2 AFS1 44.1 kHz 0 1 48 kHz 0 0 32 kHz 1 0	–	–	–
APWM	102	O	PWM signal for audio PLL	–	–	–

Note The input changes according to the switching of the encode/decode mode. It must be controlled so that the output does not conflict when the mode is switched.
To prevent a floating state, connect a pull-up or pull-down resistor to this pin.

(4) SDRAM interface pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
MCLK	77	O	CLK pin connection for SDRAM	–	–	–
MRAS	76	O	RAS pin connection for SDRAM	–	–	–
MCAS	75	O	CAS pin connection for SDRAM	–	–	–
MWE	74	O	WE pin connection for SDRAM	–	–	–
MA[11:0]	92, 90 to 83, 81 to 79	O	Address pin connection for SDRAM	–	–	–
MD[15:0]	73 to 69, 66 to 64, 62 to 57, 55, 54	I/O	Data pin connection for SDRAM These pins must be pulled up or down and then must be directly connected to the SDRAM pins.	–	–	–

(5) Host interface pins

(a) Parallel interface pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
CS	117	I	Parallel interface chip select input	L	I	–
RWZ	119	I	Parallel interface read/write control input ISA bus, SH-1 bus : Write strobe 68000 bus : Read/write select signal	L	I	–
IOR	120	I	Parallel interface IO read control input ISA bus, SH-1 bus : Read strobe 68000 bus : Data strobe (DS)	L	I	–
IOCHRDY	123	O	Parallel interface ready output	L	O	–
AD[10:1]	116 to 107	I	Parallel interface address input	–	I	–
P_D[15:0]	143 to 141, 139 to 132, 130 to 128, 126, 125	I/O	Parallel interface data input/output	–	I	–
DMAREQ	122	O	DMA request output	L	O	SIO_CNTO
DMAACK	121	I	DMA acknowledge input for parallel interface	L	I	SIO_CNTI

(b) Serial interface pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
SO	145	O	Serial transmit data output for clocked serial interface (CSI)	–	O	P40
SI	146	I	Serial receive data input for clocked serial interface (CSI)	–	I	P41
SCK	147	O	Clock output for clocked serial interface (CSI)	–	O	P42
TXD	149	O	Serial transmit data output for asynchronous serial interface (UART)	–	O	P43
RXD	150	I	Serial transmit data input for asynchronous serial interface (UART)	–	I	P44
SCS	151	O	Chip select output for clocked serial interface (CSI)	–	O	P45
SIO_CNTI	121	I	Control input for asynchronous serial interface (UART) Externally input data is loaded in synchronization with the end of RXD of UART.	–	I	DMAACK
SIO_CNTO	122	O	Control output for asynchronous serial interface (UART)	–	O	DMAREQ

(c) Others

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
INT	124	O	Interrupt output to external device	H	O	–
PSSEL[1:0]	106, 105	I	Parallel/serial interface selection. These signals select a parallel or serial interface as the external interface. PSSEL[1:0] Selected interface 00 Serial interface (UART) 01 Parallel interface (ISA bus) 10 Parallel interface (68000 bus) 11 Parallel interface (SH-1 bus)	–	I	–

(6) Port pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
P30	204	I/O	Port 3. This is a 4-bit I/O port that can be set in the input or output mode in 1-bit units. P30 : Connect this pin to GND via a resistor. P32 : This pin outputs an interrupt to the external device to read the DV status. It cannot be used as a port pin when DV is used.	–	I	–
P31	152					–
P32	153					–
P33	154					–
P34	155					–
P40	145	I/O	Port 4. This is a 6-bit I/O port that can be set in the input or output mode in 1-bit units. P40 to P45 are multiplexed with the pins described under the heading Alternate Function (they cannot be used as general-purpose port pins).	–	I	SO
P41	146					SI
P42	147					SCK
P43	149					TXD
P44	150					RXD
P45	151					SCS

(7) External ROM connection pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
D[15:0]	196, 194 to 189, 186 to 178	I/O	External ROM data bus External ROM data bus used to access external ROM	–	I	–
A[17:1]	175, 174, 172, 171, 169 to 167, 165 to 156	O	External ROM address bus External ROM address bus used to access external ROM. A space of 256 KB can be addressed.	–	O	–
RDZ	176	O	ROM read This is a strobe signal that indicates a read cycle to the external ROM. It is inactive in the idle state.	L	O	–
WRZ	177	O	ROM write This is a strobe signal that indicates a write cycle to the external ROM.	L	O	–

(8) Clock and reset pins

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
RESETB	1	I	Reset. RESETB is asynchronous input. If a signal with a specified low-level width is input to this pin independently of the operating clock, a system reset is effected, taking precedence over all the other operations. This signal can also be used to clear the power-saving mode (HALT or software STOP), as well as for normal initialization and starting. **Caution RESETB is active-low.**	L	I	–
HS_CLK	202	I	Host clock. This pin inputs the clock that is to be supplied to the CPU core and internal peripheral I/O. This clock is input to the internal clock generator. An internal clock is generated according to the value of HCLKSEL and is supplied to the CPU core and internal peripheral I/O. Usually, input a clock of 27 MHz to this pin.	–	I	–
HCLKSEL	197	I	Host clock selection. This pin inputs the clock that is to be supplied to the CPU core and internal peripheral I/O. The relationship between the clock supplied by the HS_CLK pin (27 MHz) and the clock supplied to the CPU core and internal peripheral I/O is as follows: HCLKSEL Internal clock frequency PLL operation 0 54 MHz Multiplied by 2 1 Clock stops. PLL operation stops.	–	I	–

(9) Power supply, ground, and others

Pin Name	Pin No.	I/O	Function	Active	After Reset	Alternate Function
$3.3V_{DD}$	5, 31, 52, 63, 78, 95, 127, 140, 166, 187	–	3.3 V power supply. Supplies a positive voltage of 3.3 V to the I/O pins of the 3.3 V interface.	–	–	–
$2.5V_{DD}$	14, 67, 118, 170	–	2.5 V power supply. Supplies a positive voltage of 2.5 V to the respective internal blocks.	–	–	–
2.5GND	39, 91, 144, 195	–	Ground. These are ground pins. Connect all GND pins to a common ground.	–	–	–
3.3GND	9, 35, 56, 68, 82, 99, 131, 148, 173, 188					
$PLLAV_{DD}$	199	–	Analog power supply to multiplication circuit. Supplies a positive analog voltage to the PLL. Supply 2.5 V to this pin.	–	–	–
PLLAGND	200	–	Analog ground for multiplication circuit. Analog ground pin for PLL.	–	–	–
$PLLDV_{DD}$	198	–	Digital power supply to multiplication circuit. Supplies a positive digital voltage to the PLL. Supply 2.5 V to this pin.	–	–	–
PLLDGND	201	–	Digital ground for multiplication circuit. Digital ground pin for PLL.	–	–	–
IC(L)	203, 205 to 207	–	Internally connected pins Directly connect these pins to ground.	–	–	–
IFIROME	208	I	Internal ROM/external ROM select input 0: External ROM mode 1: Internal ROM mode	–	I	–

1.2 Connection of Unused Pins

The following table shows how to connect unused pins.

Table 1-1. Connection of Unused Pins (1/2)

Pin Name	I/O	Interface	Recommended Connection of Unused Pin
PHY_D[7:0]	I/O	I/O Buffer (LVTTL) in 9 mA With Bus Holder	Connect these pins to V_{DD} or GND via a resistor.
CTL[1:0]			
SCLK	I	I/O Buffer (LVTTL) with bus holder	
LREQ	O	3-state Output Buffer (LVTTL) 9 mA	Leave open
LPS	O	Output Buffer (LVTTL) 9 mA	
LINKON	I	Input Buffer (LVTTL)	Connect these pins to V_{DD} or GND via a resistor.
STREAM1[7:0]	I/O	I/O Buffer (LVTTL) 6 mA	
PACKETEN1			
TSERROR1			
TSRW1			
SYNC1			
STREAM2[7:0]			
PACKETEN2			
TSERROR2			
TSRW2			
SYNC2			
TSSUB1			
TSSUB2	O	Output Buffer (LVTTL) 6 mA	Leave open
P3[4:0]	I/O	I/O Buffer (LVTTL) Schmitt in 6 mA	Connect these pins to V_{DD} or GND via a resistor.
P40/SO			
P41/SI			
P42/SCK			
P43/TXD			
P44/RXD			
P45/SCS			
A[17:1]	O	I/O Buffer (LVTTL) 6 mA	
RDZ	O	Output Buffer (LVTTL) 6 mA	Leave open
WRZ			
D[15:0]	I/O	I/O Buffer (LVTTL) 6 mA	Connect these pins to V_{DD} or GND via a resistor.
AD[10:1]	I	Input Buffer (LVTTL)	
PSSEL[1:0]			
CS			
RWZ			
IOR			
DMAACK/SIO_CNTI			

Table 1-1. Connection of Unused Pins (2/2)

Pin Name	I/O	Interface	Recommended Connection of Unused Pin
INT	O	Output Buffer (LVTTL) 6 mA	Leave open
IOCHRDY			
DMAREQ/SIO_CNTO			
P_D[15:0]	I/O	I/O Buffer (LVTTL) 9 mA	Connect these pins to V_{DD} or GND via a resistor.
IFIROME	I	Input Buffer (LVTTL)	–
HS_CLK			
HCLKSEL			
RESETB	I	Output Buffer (LVTTL) Schmitt	

IC7802: uPD78F0988A

DATA SHEET

NEC

MOS INTEGRATED CIRCUIT

μPD78F0988A, 78F0988A(A)

8-BIT SINGLE-CHIP MICROCONTROLLERS

DESCRIPTION

The μPD78F0988A and 78F0988A(A) are products in the μPD780988 Subseries in the 78K/0 Series that have flash memory in the place of the internal ROM of the μPD780988. Flash memory can be written or erased electrically with the device mounted on the board. Therefore, the μPD78F0988A and μPD78F0988A(A) are ideal for evaluation in system development, small-scale production, or systems likely to be upgraded frequently.

Detailed function descriptions are provided in the following user's manuals. Be sure to read them before designing.

μPD780988 Subseries User's Manual: U13029E
78K/0 Series Instruction User's Manual: U12326E

FEATURES

- Pin-compatible with mask ROM version (except V_{PP} pin)
- Flash memory: 60 KB[Note 1]
- Internal high-speed RAM: 1024 bytes
- Internal expansion RAM: 1024 bytes[Note 2]
- Operable in the same supply voltage range as the mask ROM version (V_{DD} = 4.0 to 5.5 V)

Notes 1. The capacity of the flash memory can be changed with the internal memory size switching register (IMS).
2. The capacity of the internal expansion RAM can be changed with the internal expansion RAM size switching register (IXS).

Remark For the differences between the flash memory versions and the mask ROM versions, refer to **1. DIFFERENCES BETWEEN μPD78F0988A AND MASK ROM VERSIONS.**

ORDERING INFORMATION

Part Number	Package	Quality Grade
μPD78F0988ACW	64-pin plastic SDIP (19.05 mm (750))	Standard (for general electrical equipment)
μPD78F0988AGC-AB8	64-pin plastic QFP (14 × 14)	Standard (for general electrical equipment)
μPD78F0988AGC-8BS	64-pin plastic LQFP (14 × 14)	Standard (for general electrical equipment)
μPD78F0988AGC(A)-AB8	64-pin plastic QFP (14 × 14)	Special (for high-reliability electrical equipment)
μPD78F0988AGC(A)-8BS	64-pin plastic LQFP (14 × 14)	Special (for high-reliability electrical equipment)

For details of the quality grade and its application fields, refer to **Quality Grades on NEC Semiconductor Devices (C11531E).**

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OVERVIEW OF FUNCTIONS

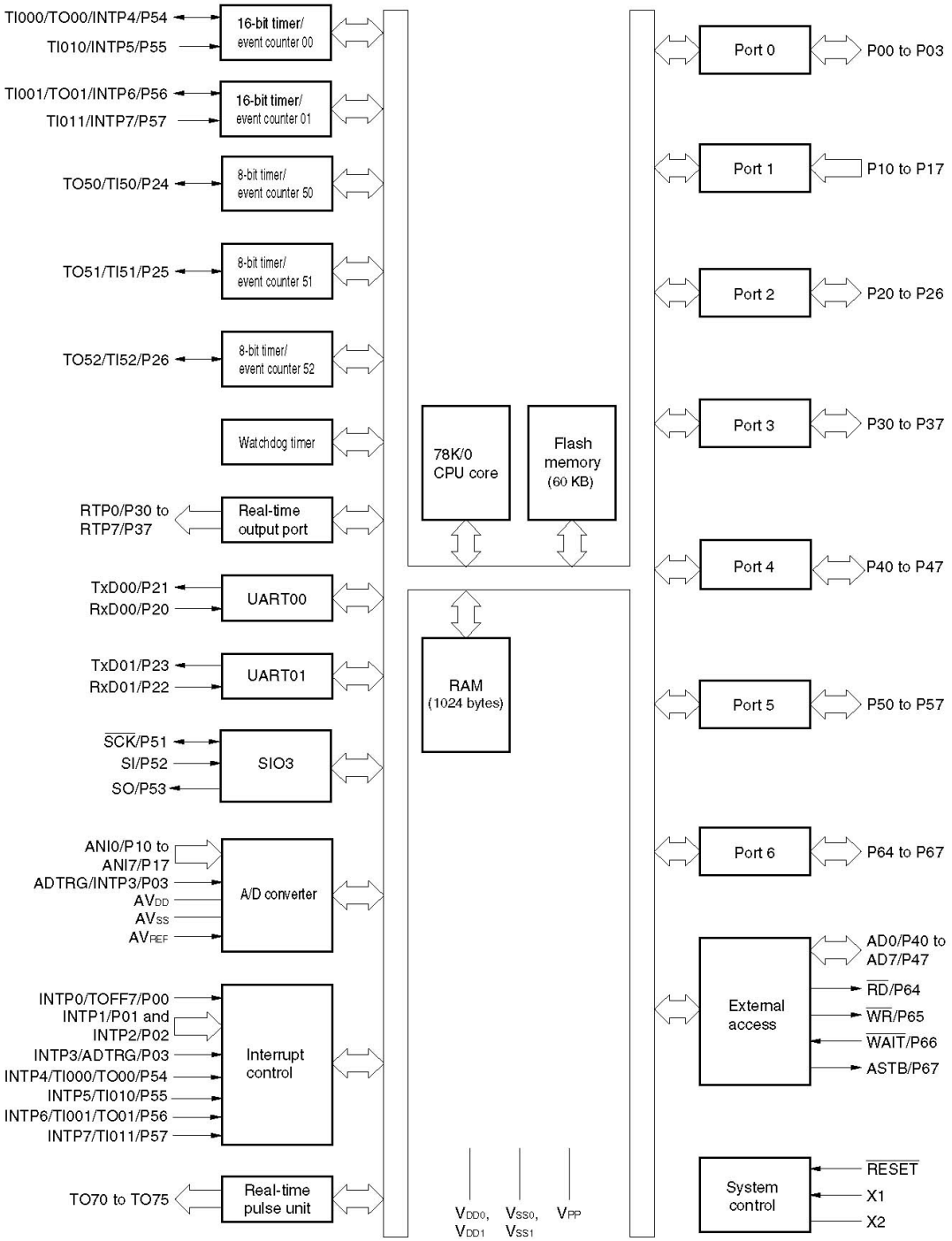
Item		Function
Internal memory	Flash memory	60 KB[Note 1]
	High-speed RAM	1024 bytes
	Expansion RAM	1024 bytes[Note 2]
Memory space		64 KB
General-purpose register		8 bits × 32 registers (8 bits × 8 registers × 4 banks)
Instruction cycle		On-chip instruction execution time variable function 0.24 μs/0.48 μs/0.96 μs/1.9 μs/3.8 μs (@ 8.38 MHz operation with system clock)
Instruction set		• 16-bit operation • Multiply/divide (8 bits × 8 bits, 16 bits ÷ 8 bits) • Bit manipulation (set, reset, test, Boolean operation) • BCD adjust, etc.
I/O ports		Total: 47 • CMOS inputs: 8 • CMOS I/O: 39
Real-time output ports		• 8 bits × 1 or 4 bits × 2 • 6 bits × 1 or 4 bits × 1
A/D converter		• 10-bit resolution × 8 channels • Power supply voltage: AV_{DD} = 4.0 to 5.5 V
Serial interface		• UART mode: 2 channels • 3-wire serial I/O mode: 1 channel
Timer		• 16 bit timer/event counter: 2 channels • 8-bit timer/event counter: 3 channels • 10-bit inverter control timer: 1 channel • Watchdog timer: 1 channel
Timer output		11 (general-purpose outputs: 5, inverter control outputs: 6)
Vectored interrupt sources	Maskable	Internal: 16, external: 8
	Non-maskable	Internal: 1
	Software	1
Power supply voltage		V_{DD} = 4.0 to 5.5 V
Operating ambient temperature		T_A = −40 to +85°C
Package		• 64-pin plastic SDIP (19.05 mm (750))[Note 3] • 64-pin plastic QFP (14 × 14) • 64-pin plastic LQFP (14 × 14)

Notes 1. The capacity of the flash memory can be changed with the internal memory size switching register (IMS).

2. The capacity of the internal expansion RAM can be changed with the internal expansion RAM size switching register (IXS).

3. Standard quality grade products only.

BLOCK DIAGRAM



3. PIN FUNCTIONS

3.1 Port Pins

Pin Name	I/O	Function	After Reset	Alternate Function
P00	I/O	Port 0 4-bit I/O port Input/output can be specified in 1-bit units. Use of an on-chip pull-up resistor can be specified by software setting.	Input	INTP0/TOFF7
P01				INTP1
P02				INTP2
P03				INTP3/ADTRG
P10 to P17	Input	Port 1 8-bit input only port	Input	ANI0 to ANI7
P20	I/O	Port 2 7-bit I/O port Input/output can be specified in 1-bit units. Use of an on-chip pull-up resistor can be specified by software setting.	Input	RxD00
P21				TxD00
P22				RxD01
P23				TxD01
P24				TI50/TO50
P25				TI51/TO51
P26				TI52/TO52
P30 to P37	I/O	Port 3 8-bit I/O port Input/output can be specified in 1-bit units. Use of an on-chip pull-up resistor can be specified by software setting.	Input	RTP0 to RTP7
P40 to P47	I/O	Port 4 8-bit I/O port Input/output can be specified in 1-bit units. Use of an on-chip pull-up resistor can be specified by software setting.	Input	AD0 to AD7
P50	I/O	Port 5 8-bit I/O port Input/output can be specified in 1-bit units. LEDs can be driven directly. Use of an on-chip pull-up resistor can be specified by software setting.	Input	—
P51				$\overline{SCK}$
P52				SI
P53				SO
P54				INTP4/TI000/TO00
P55				INTP5/TI010
P56				INTP6/TI001/TO01
P57				INTP7/TI011
P64	I/O	Port 6 4-bit I/O port Input/output can be specified in 1-bit units. Use of an on-chip pull-up resistor can be specified by software setting.	Input	$\overline{RD}$
P65				$\overline{WR}$
P66				$\overline{WAIT}$
P67				ASTB

3.2 Non-Port Pins (1/2)

Pin Name	I/O	Function	After Reset	Alternate Function
INTP0	Input	External interrupt request input for which the valid edge (rising edge, falling edge, or both rising and falling edges) can be specified	Input	P00/TOFF7
INTP1			Input	P01
INTP2			Input	P02
INTP3			Input	P03/ADTRG
INTP4			Input	P54/TI000/TO00
INTP5			Input	P55/TI010
INTP6			Input	P56/TI001/TO01
INTP7			Input	P57/TI011
TI50	Input	External count clock input to 8-bit timer/event counter 50	Input	P24/TO50
TI51		External count clock input to 8-bit timer/event counter 51	Input	P25/TO51
TI52		External count clock input to 8-bit timer/event counter 52	Input	P26/TO52
TI000		External count clock input to 16-bit timer/event counter 00 Capture trigger input to capture register (CR000, CR010) of 16-bit timer/event counter 00	Input	P54/INTP4/TO00
TI010		Capture trigger input to capture register (CR000) of 16-bit timer/event counter 00	Input	P55/INTP5
TI001		External count clock input to 16-bit timer/event counter 01 Capture trigger input to capture register (CR001, CR011) of 16-bit timer/event counter 01	Input	P56/INTP6/TO01
TI011		Capture trigger input to capture register (CR001) of 16-bit timer/event counter 01	Input	P57/INTP7
TO50	Output	8-bit timer/event counter 50 output	Input	P24/TI50
TO51		8-bit timer/event counter 51 output	Input	P25/TI51
TO52		8-bit timer/event counter 52 output	Input	P26/TI52
TO00		16-bit timer/event counter 00 output	Input	P54/INTP4/TI000
TO01		16-bit timer/event counter 01 output	Input	P56/INTP6/TI001
RTP0 to RTP7	Output	Real-time output port that outputs pulses in synchronization with trigger signals outputs from the real-time pulse unit	Input	P30 to P37
TxD00	Output	Asynchronous serial interface serial data output	Input	P21
TxD01			Input	P23
RxD00	Input	Asynchronous serial interface serial data input	Input	P20
RxD01			Input	P22
$\overline{SCK}$	I/O	Serial interface serial clock input/output	Input	P51
SI	Input	Serial interface serial data input	Input	P52
SO	Output	Serial interface serial data output	Input	P53
ANI0 to ANI7	Input	A/D converter analog input	Input	P10 to P17
ADTRG	Input	External trigger signal input to the A/D converter	Input	P03/INTP3
TO70 to TO75	Output	Timer output for the 3-phase PWM inverter control	Hi-Z	–
TOFF7	Input	Timer output (TO70 to TO75) stop external input	Input	P00/INTP0
AD0 to AD7	I/O	Address/data bus for expanding memory externally	Input	P40 to P47
$\overline{RD}$	Output	Strobe signal output for reading from external memory	Input	P64
$\overline{WR}$		Strobe signal output for writing to external memory	Input	P65
$\overline{WAIT}$	Input	Wait insertion at external memory access	Input	P66
ASTB	Output	Strobe output that externally latches address information output to ports 4 and 5 to access external memory	Input	P67
AV_{REF}	Input	A/D converter reference voltage input	–	–
AV_{DD}	–	A/D converter analog power supply	–	–

3.2 Non-Port Pins (2/2)

Pin Name	I/O	Function	After Reset	Alternate Function
AV_{SS}	–	A/D converter ground potential	–	–
$\overline{RESET}$	Input	System reset input	–	–
X1	Input	Connecting crystal resonator for system clock oscillation	–	–
X2	–		–	–
V_{DD0}	–	Positive power supply for ports	–	–
V_{SS0}	–	Ground potential for ports	–	–
V_{DD1}	–	Positive power supply except for ports	–	–
V_{SS1}	–	Ground potential except for ports	–	–
V_{PP}	–	High-voltage application during program write/verify. In the normal operation mode, connect directly to V_{SS0}.	–	–

3.3 Pin I/O Circuits and Recommended Connection of Unused Pins

The I/O circuit type of each pin and recommended connection of unused pins are shown in Table 3-1.

For the I/O circuit configuration of each type, refer to Figure 3-1.

Table 3-1. Types of Pin I/O Circuits

Pin Name	I/O Circuit Type	I/O	Recommended Connection of Unused Pins
P00/INTP0/TOFF7	8-C	I/O	Input: Independently connect to V_{SS0} via a resistor. Output: Leave open
P01/INTP1			
P02/INTP2			
P03/INTP3/ADTRG			
P10/ANI0 to P17/ANI7	25	Input	Independently connect to V_{DD0} or V_{SS0} via a resistor.
P20/RxD00	8-C	I/O	Input: Independently connect to V_{DD0} or V_{SS0} via a resistor. Output: Leave open.
P21/TxD00	5-H		
P22/RxD01	8-C		
P23/TxD01	5-H		
P24/TI50/TO50	8-C		
P25/TI51/TO51			
P26/TI52/TO52			
P30/RTP0 to P37/RTP7	5-H		
P40/AD0 to P47/AD7			
P50			
P51/$\overline{SCK}$	8-C		
P52/SI	5-H		
P53/SO			
P54/INTP4/TI000/TO00			
P55/INTP5/TI010			
P56/INTP6/TI001/TO01			
P57/INTP7/TI011			
P64/$\overline{RD}$			
P65/$\overline{WR}$			
P66/$\overline{WAIT}$			
P67/ASTB			
TO70 to TO75	4	Output	Leave open.
$\overline{RESET}$	2	Input	–
AV_{DD}	–	–	Connect to V_{DD0}.
AV_{REF}			Connect to V_{SS0}.
AV_{SS}			
V_{PP}			Connect directly to V_{SS0}.

IC7605: BU2288FV

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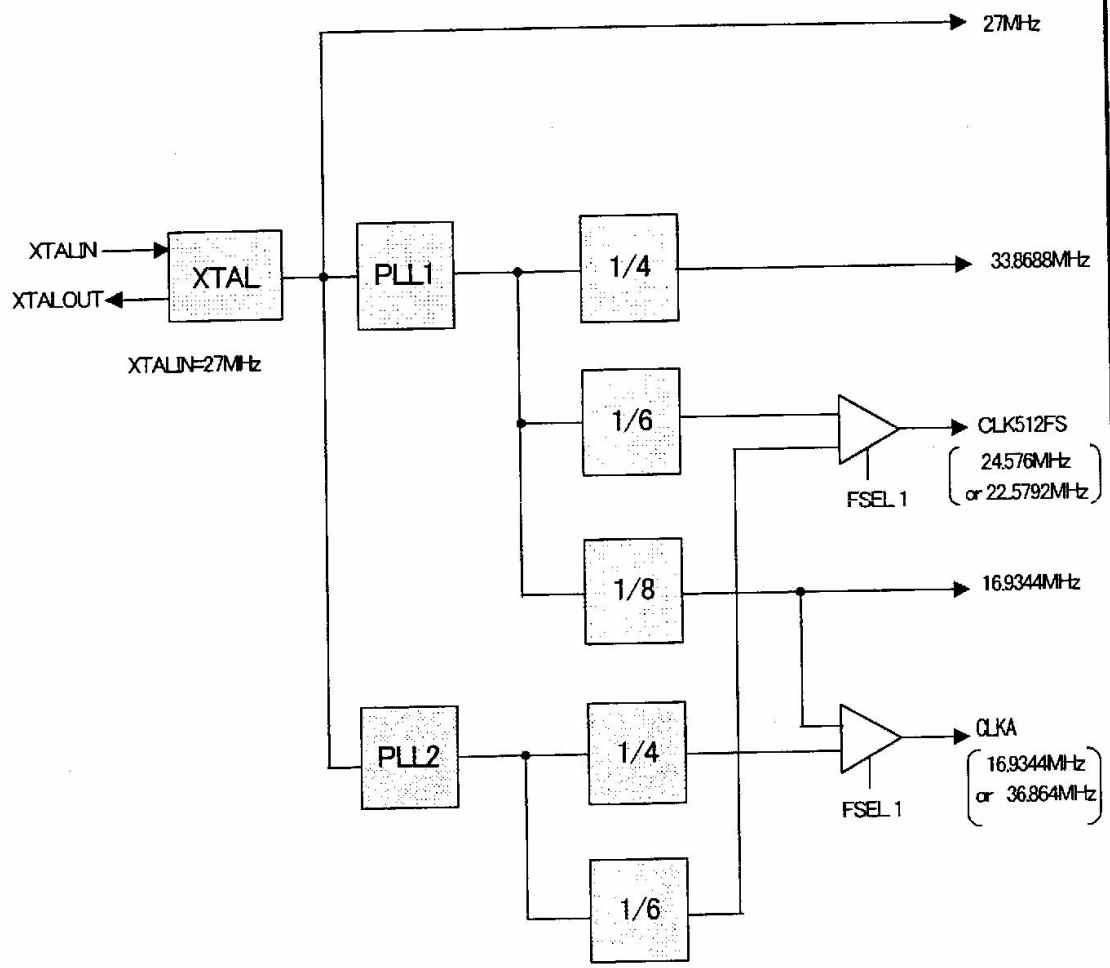
Block Diagram



FSEL1	CLK512FS	CLKA
OPEN	22.5792MHz	16.9344MHz
L	24.576MHz	36.864MHz

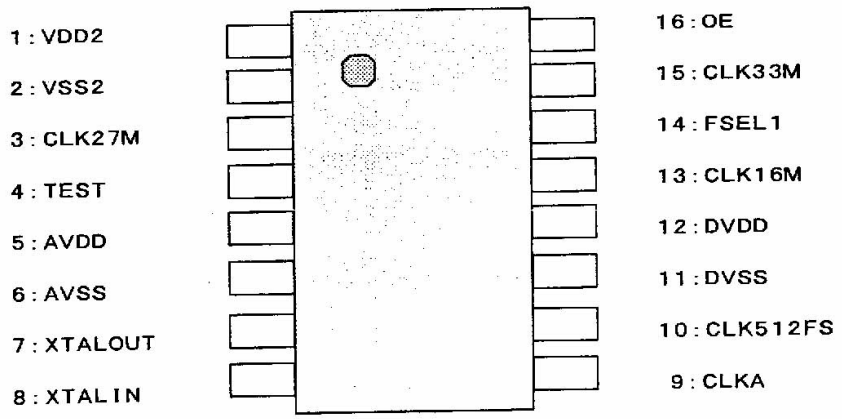
Fig. −1

Date 5/Sep./'00 | Specification

ROHM CO., LTD. | Specification No. TSZ02201-BU2288FV-1-2

Explanation for terminal function

PIN No.	PIN NAME	FUNCTION
1	VDD2	Digital VDD for 27MHz clock output
2	VSS2	Digital GND for 27MHz clock output
3	CLK27M	27MHz clock output
4	TEST	Output for test
5	AVDD	Analog VDD
6	AVSS	Analog GND
7	XTALOUT	Standard crystal output
8	XTALIN	Standard crystal input
9	CLKA	clock output (FSEL1=Open:16.9344MHz, FSEL1=L:36.864MHz)
10	CLK512FS	clock output (FSEL1=Open:22.5792MHz, FSEL1=L:24.576MHz)
11	DVSS	Digital GND
12	DVDD	Digital VDD
13	CLK16M	16.9344MHz clock output
14	FSEL1	Output select :with pull-up Open:16.9344MHz(9pin), 22.5792MHz(10pin) L :36.864MHz(9pin), 24.576MHz(10pin)
15	CLK33M	33.8688MHz clock output
16	OE	Output enable(open:enable, L:disable) :with pull-up



IC7604: BA7082F

ROHM	Product: Semiconductor IC	Type: BA7082F	Page 1/8

STRUCTURE Silicon Monolithic Integrated Circuits

TYPE BA7082F

PACKAGE OUTLINE Fig-1 (Plastic molded)

BLOCK DIAGRAM Fig-2 (Block Diagram)

Function VCO with sencitivity adjustment function and 1/2 Frequency demultiplier.

Features
- It is possible to set up frequency by external parts (Resistor and Capacitor).
- It is possible to set up frequency sencitivity by added resistor.Because it has a built-in amplifer for sencitivity adjustment.
- It is possible to change output by SW.Because it has 1/2 Frequency demultiplier.
- It has a pin to adjust f_o.
- Built-in three switching circuits for changing Frequency sensitivity.

Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	$V_{cc\ max}$	7.0	V
Power dissipation	Pd	※ 500	mW
Operating temp range	Topr	−20~70	℃
Storage temp range	Tstg	−55~125	℃

※ at put on Glass epxy PCB (50×50mm², t=1.6mm)
To use at temperatures higher than Ta=25℃, derate 5mW/℃.

Operating suypply voltage range	Vcc	4.5~5.5	V

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Design	Check	Approval	Date	Specification
K. Ohtsuka	K. Katano	'95. Mar. 6 R. Hayashi	'95/ 2/28	Rev. A
			ROHM CO., LTD.	Specification No. TSZ02201-BA7082F-1-2

A4 3.7 (1·100·50) S

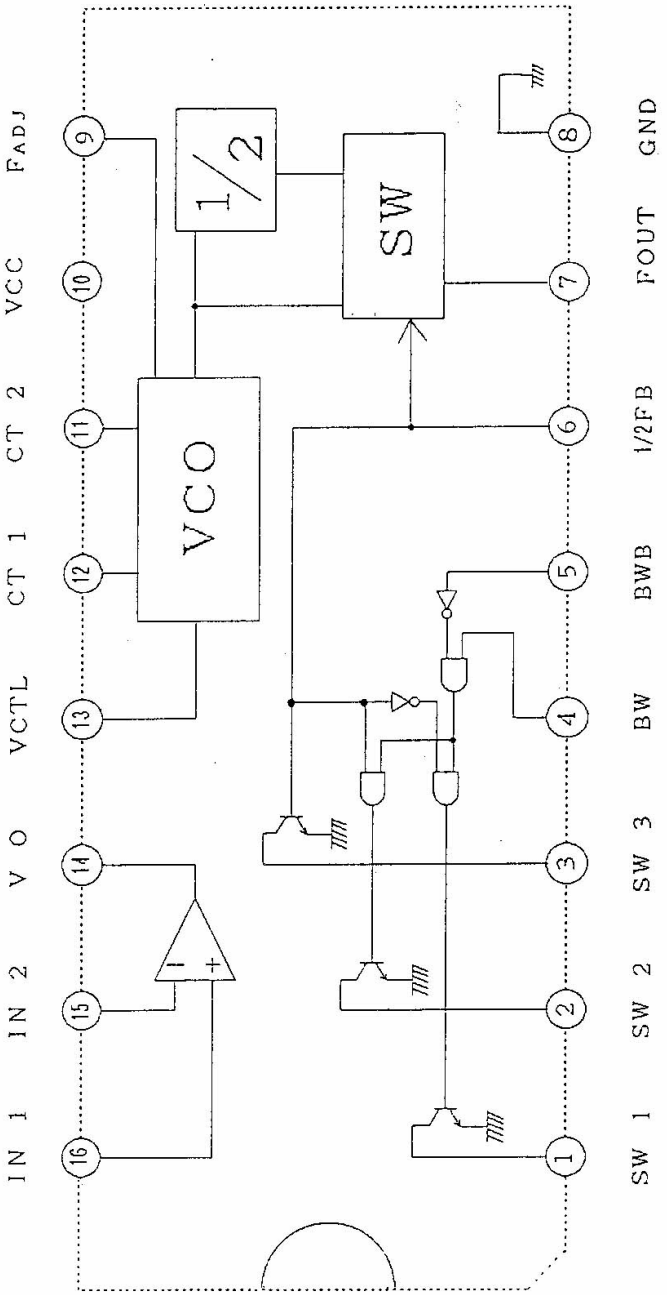
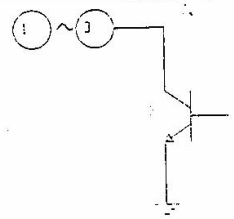
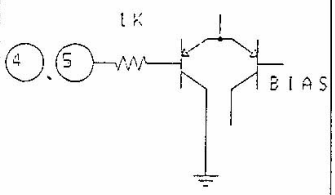
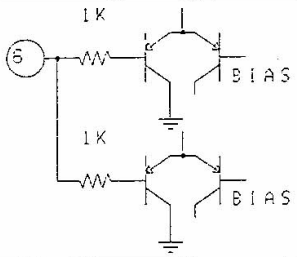
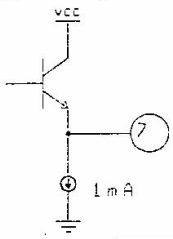
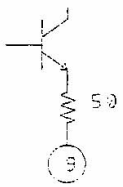


Fig-2 Block diagram

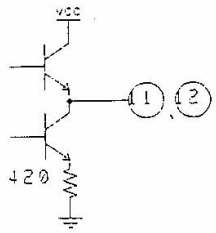
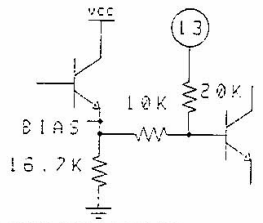
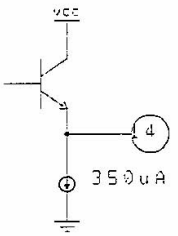
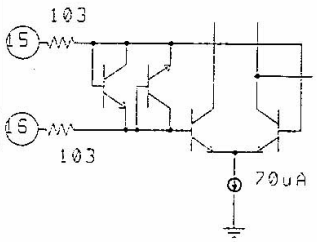
Date '95/ 2/28	Specification
ROHM CO., LTD.	Specification No. TSZ02201-BA7082F-1-2

ROHM | Products: Semiconductor IC | Type: BA7082F | Page: 7/8

No.	Symbol	IN	OUT	normal DC Voltage	Internal pin configuration	Description
1	SW1			L 0.1V		Pin 1-3 are output pins at LOGIC parts for adjustment frequency sencitivity. These pins are open collector output.
2	SW2		O	—		
3	SW3			OPEN 5V		
4	BW					Pin 4,5 are input pins at logic parts for adjustment frequency sencitivity.
5	BWB					
6	1/2FB	O		—		Pin 6 is input pin at LOGIC parts for adjustment frequency sencitivity and changing 1/2 Frequency demultuplier. "H" is through output.and "L" is 1/2 Frequency demultiplier output.
7	Fout		O	3.6V		VCO Output.
8	GND	—	—	0V	GND	GND
9	FADJ	—	—	2.5V		Pin9 is a pin to adjust f0. It is possible to adjust f0 by added resistor(RADJ). If Value of RADJ down, oscillation frequency up. (Use to RADJ>22kΩ).

Date '95/ 2/28	Specification
ROHM CO., LTD.	Specification No. TSZ02201-BA7082F-1-2

ROHM	Products: Semiconductor IC	Type: BA7082F	Page: 8/8

No.	Symbol	IN	OUT	normal DC Voltag	Internal pin configuration	Description
10	VCC	–	–	5.0V	VCC	VCC
11	CT2	–	–	1.9V		Pin 11,12 are added capasitor pins for oscillation. Use to added capacitor betwween CT1 and CT2. If value of capacitor down, oscillation frequency up.
12	CT1					
13	VCTL	○		2.5V		Pin13 is control pin for VCO. A regular this pin connect pin14(VO).
14	VO		○	2.5V		Pin14 is output pin at Amlplfier for sencitivity ajdustment. Adjustment amplifier GAIN by added resistor.
15	IN2	○		2.5V		Pin15,16 are input pins at amplifier for sencitivity adjustment. In1 ; normal input In2 ; inversion input
16	IN1					

Date '95/ 2/28	Specification
ROHM CO., LTD.	Specification No. TSZ02201-BA7082F-1-2

9.11 List of Abbreviations

Analog Board

+5VSTBY
Permanent Supply 5V
8SC2
Pin8 Scart2 (only for Europe)
A_DATA
Data from Analog- to Digital-Board (UART-Communication)
A_RDY
Analog-board ready (status information to digital-board)
A18 - A19
Parallel Address Bus (CC - Flash-ROM and S-RAM)
A8 - A17
Parallel Address Bus (CC - Flash-ROM and S-RAM)
AD0 - AD7
Parallel Address and Data Bus (CC - Flash-ROM and S-RAM)
AFC
Automatic Frequency Control
AFEL
Audio Frontend Left
AFER
Audio Frontend Right
AGC / WSRI
Automatic Gain Control (for Europe), Wide Screen Rear In (for NTSC)
AINFL
Audio In Front Left
AINFR
Audio In Front Right
AKILL
Audio Kill Signal
ALADC
Audio Left to ADC
ALDAC
Audio Left from DAC
ALE
Address Latch Enable
AM0
Adress-mode 0
AM1
Adress-mode 1
ARADC
Audio Right to ADC
ARDAC
Audio Right from DAC
ASCC1M
Audio Scart 1 Mute (System Clock Output for Real time Clock-Adjustment)
AVCC
Power Supply for A/D-converter
AVSS
GND-Pin for A/D-converter
CFIN
Chroma Front In
CS0_
Chip Select 0 (CC - S-RAM)
CS2_
Chip Select 2 (CC - Flash-ROM)
CVBSFIN
Video Front In
D_DATA
Data from Digital- to Analog-Board (UART-Communication)
D_RDY
Digital-board ready (status information from digital-board)
DAC_MUTE
Mute Signal for DAC
DAOUT
Digital Audio Out
DVAL
Audio from Digital Video In Left
DVAR
Audio from Digital Video In Right
DVCC1
Power Supply Pin
DVCC2
Power Supply Pin
DVCC3
Power Supply Pin
DVSS1
GND Pin
DVSS2
GND Pin
DVSS3
GND Pin
FAN_OFF
Fan for Basic engine
FBIN
Fast Blanking input
FOME
FOllow ME Status line (matching signals yes/no; only for Europe)
G1…10
DISPLAY GRID
INT
Interrupt OUT for the CC
INT
Interrupt – line from Display Print
ION
Inverse ON-Line
IPFAIL
Inverse Power Fail Detection
IPOR
Inverse Power On Reset
IRESET
Inverse Reset Input
IRR
Signal from IR-Receiver
K1
Key-Input-Line
K2
Key-Input-Line
KILL
Audio Mute
P50 IN
P50 INput-line (only for Europe)
P50 OUT
P50 OUTput-line (only for Europe)
POR_DC
Power On Reset for Display Control Print (Ext_DL)
PSS
Pal/Secam-Select
PWM_FIL
Control line for Filament Voltage Generation
PWONSW
Amplifier Switch Audio A/D Converter
RD_
Output Enable ReaD (CC - Flash-ROM and S-RAM)
RECLED
Control Signal for REC-LED
RESET_DIG
Reset Line to Digital Board
RP_
Inverse Reset line to Flash-ROM
RSA1/2
Record Selector 1/2
RY/BY_
Ready/Busy – input line (from Flash-ROM)
SIF1
Sound intermediate frequency
SB1
Secam Band 1 (PCB-Test entrance)
SCL
I²C-Bus
SCLSW
Switched I²C-Bus
SDA
I²C-Bus

SDASW
Switched I²C-Bus
SFS_TS
SAW Filter Select Trap Select
STBY
Standby-Line (Flash_Toshiba)
SYNC
Video Sync input
TEMP_SENSE
Temperature Sense Line
VER
HW-version input
VFV
Video from Frontend
VKK
VFT Driver Power Supply
VREFH
Pin for Reference-voltage input to A/D-converter
VREFL
Pin for Reference-voltage input to A/D-converter
VS1/2
View Selector 1/2
WR_
Write Enable (CC - Flash-ROM and S-RAM)
WSFI
Wide Screen Signalling Front In
WU
Wake Up
X1
Oscillator Pin
X2
Oscillator Pin
XIN
Oscillator Pin
XOUT
Oscillator Pin
XT1
Low Frequency Oscillator Pin
XT2
Low Frequency Oscillator Pin
YFIN
Luminance Front In

Digital Board

+12V
+12V Power Supply
+2V5_FLI
+2V5 Power Supply for FLI
+2V5_PLL
+2V5 Power Supply for PLL
+3V3
+3V3 Power Supply
+3V3_ANA
+3V3 Power Supply Analogue
+3V3_DD
+3V3 Power Supply Digital
+3V3_FLI
+3V3 Power Supply for FLI
+5V
+5V Power Supply
+5V_BUFFER
+5V Power Supply for Video Filters
5508_HS
Horizontal Synchronisation from Host Decoder to Progressive Scan
5508_ODD_EVEN
Odd - Even control from Host Decoder to Progressive Scan
-5V
-5V Power Supply
-5V_BUFFER
-5V Power Supply for Video Filters
A_EMPRESS(13:0)
EMPRESS address output to SDRAM
ACC_ACLK_OSC
Audio Clock PLL output sync with incoming video for record
ACC_ACLK_PLL
Audio Clock PLL output for play back
ACLK_EMP
EMPRESS audio clock output
AD_ACLK
Audio Decoder Clock
AD_BCLK
Audio Decoder I2S bit clock
AD_DATAO
Audio Decoder Output data (PCM)
AD_SPDIF33
Audio digital output to the analog board
AD_WCLK
Audio Decoder I2S word clock
AE_ACLK
Audio Encoder Clock
AE_ACLK_OEN
Audio Encoder Clock Output Enable
AE_BCLK
Audio Encoder I2S bit clock
AE_BCLK_DV
Audio Encoder I2S bit clock to DVIO
AE_BCLK_VSM
Audio Encoder I2S bit clock to VSM
AE_DATAI
Audio Encoder Input data (PCM)
AE_DATAI_DV
Audio Encoder Input data (PCM) from DVIO
AE_DATAO
Audio Encoder Output data (PCM)
AE_WCLK
Audio Encoder I2S word clock
AE_WCLK_DV
Audio Encoder I2S word clock to DVIO
AE_WCLK_VSM
Audio Encoder I2S word clock to VSM
ANA_WE
Analogue write enable
ANA_WE_LV
Analogue write enable Low Voltage
B_IN_VIP
Video blue input to Video Input Processor
B_OUT
Video blue output from Host Decoder
B_OUT_B
Filtered blue video output
BA
Bank Address
BCLK_CTL_SERVICE
Bitclock control Service Interface
BE_BCLK
Basic Engine I2S bit clock
BE_BCLK_VSM
Basic Engine I2S bit clock to VSM
BE_CPR
Basic Engine Control Processor ready to accept data
BE_DATA_RD
Basic Engine Data read
BE_DATA_WR
Basic Engine Data write
BE_FAN
Basic Engine FAN
BE_FLAG
Basic Engine error flag
BE_IRQN
Basic Engine interrupt request
BE_LOADN
Basic Engine LOAD(LOW active)
BE_RXD
Basic Engine S2B received data
BE_SUR
Basic Engine servo unit ready to accept data (S2B)
BE_SYNC

Basic Engine sector/abs time sync
BE_TXD
Basic Engine S2B transmitted data
BE_V4
Basic Engine versatile input pin
BE_WCLK
Basic Engine I2S word clock
C_IN
Video Chrominance input
C_IN_VIP
Chrominance input to Video Input Processor
C_OUT
Chrominance output from Host Decoder
C_OUT_B
Filtered Chrominance output
CAS
Column Address strobe
CB_OUT(9:0)
Chrominance Blue out
CLK4
SDRAM clock
CPUINT0
Control processor unit interrupt
CPUINT1
Control processor unit interrupt
CR_OUT(9:0)
Chrominance Red out
CTS1P
Clear to send (Service Interface)
CVBS_OUT
Composite video output out of the Host Decoder
CVBS_OUT_B
Filtered Composite video output
CVBS_OUT_B_VIP
Composite video output to Video Input Processor(digital board video loop)
CVBS_Y_IN
Composite video/Luminance input
CVBS_Y_IN_A
Composite video/Luminance input to Video Input Processor
CVBS_Y_IN_B
Composite video/Luminance input to Video Input Processor
CVBS_Y_IN_C
Composite video/Luminance input to Video Input Processor
D_ADDR(10:0)
Address bus
D_DATA(29:0)
Data bus
D_EMPRESS(15:0)
SDRAM data input/output of EMPRESS
D_PAR_D(7:0)
Front-end parallel interface data (record)
D_PAR_DVALID
Front-end parallel interface data valid
D_PAR_REQ
Front-end parallel interface request
D_PAR_STR
Front-end parallel interface strobe
D_PAR_SYNC
Front-end parallel interface sync
DV_IN_CLK
Digital Video in clock from DVIO board
DV_IN_DATA(7:0)
Digital Video in data bus from DVIO board
DV_IN_HS
Digital Video in horizontal synchronisation from DVIO board
DV_IN_VS
Digital Video in vertical synchronisation from DVIO board
EMI_A(21:1)
External Memory Interface Address Bus(Host Decoder)
EMI_BE0N
External Memory Interface Lower byte enable(Host Decoder)
EMI_BE1N
External Memory Interface Upper byte enable(Host Decoder)
EMI_CAS0N
External Memory Interface SDRAM column address strobe(Host Decoder)
EMI_CE1N
External Memory Interface VSM Lower bank enable
EMI_CE2N
External Memory Interface VSM Higher bank enable
EMI_CE3N
External Memory Interface flash IC's enable
EMI_D(15:0)
External Memory Interface Data Bus(Host Decoder)
EMI_PROCCLK
External Memory Interface Processor Clock(Host Decoder)
EMI_RWN
External Memory Interface Read/Write control signal(Host Decoder)
EMI_WAIT
External Memory Interface Wait state request(Host Decoder)
EMPRESS_BOOT
EMPRESS BOOT select input
EMPRESS_IRQN
EMPRESS Interrupt request output
FLASH_OEN
FLASH output enable control signal
G_IN_VIP
Video green input to Video Input Processor
G_OUT
Video green output from Host Decoder
G_OUT_B
Filtered green video output from Host Decoder
GNDD
Digital Ground
HD_M_AD(13:0)
Host Decoder SDRAM address bus
HD_M_CASN
Host Decoder SDRAM column address strobe
HD_M_CLK
Host Decoder SDRAM clock
HD_M_CS0N
Host Decoder SDRAM chip select
HD_M_DQ(15:0)
Host Decoder SDRAM data bus
HD_M_DQML
Host Decoder SDRAM data mask enable(Lower)
HD_M_DQMU
Host Decoder SDRAM data mask enable(Upper)
HD_M_RASN
Host Decoder SDRAM row address strobe
HD_M_WEN
Host Decoder SDRAM write enable
HSOUT
Horizontal synchronisation OUT
ION
Inverted ON: Enable the power supply for the digital board when LOW
IRESET_DIG
Initialisation of the digital board, HIGH when power ON
JTAG3_TCK
JTAG Test Clock
JTAG3_TD_VIP_TO_VE
JTAG Transmitted Data Video Input Processor to Video Encoder
JTAG3_TD_VSM_TO_VIP
JTAG Transmitted Data Versatile Stream Manager to Video Input Processor
JTAG3_TMS
JTAG Test Mode Select
JTAG3_TRSTN
JTAG Test part ResetN
LOAD_DVN
LOAD Digital Video(LOW active)
MUTEN
Mute enable
MUTEN_LV
Mute enable Low Voltage
P_SCAN_YUV(7:0)

Progressive Scan digital video bus
R_IN_VIP
Video Red input to Video Input Processor
R_OUT
Video Red output from Host Decoder
R_OUT_B
Filtered Red Video output from Host Decoder
RAS
Row Address Strobe
RESETN
Reset Host Decoder
RESETN_BE
System reset basic engine (buffered)
RESETN_DVIO
System reset Digital Video Input Output (buffered)
RESETN_VE
System reset Video Encoder
ROMH_CEN
Flash 2 chip enable
ROML_CEN
Flash 1 chip enable
RSTN_BE
Reset control of basic engine
RSTN_DVIO
Reset control of DVIO
RTS1P
Ready To Send data to service serial interface
RX1P
Receive data from service serial interface
SCL
I2C bus clock
SD_CASN
SDRAM Column Address strobe output (active LOW)
SD_CLK
SDRAM clock output
SD_CLKE
SDRAM clock enable output
SD_CSN
SDRAM
SD_DQM(1:0)
SDRAM data mask enable output
SD_RASN
SDRAM row address strobe output
SD_WEN
SDRAM write enable output
SDA
I2C bus data
SEL_ACLK1
Select audio clock(playback)
SM_CS3N
SRAM chip select
SM_LBN
SRAM lower bank
SM_OEN
SRAM output enable
SM_UBN
SRAM upper bank
SM_WEN
SRAM write enable
SMA(17:0)
SRAM address output
SMD(15:0)
SRAM data input/output
SYSCLK_EMPRESS
System clock EMPRESS
SYSCLK_PROGSCAN
System clock Progressive Scan
SYSCLK_VSM_5508
System clock VSM and Host decoder
TX1P
Transmit data to service serial interface
U_IN
Video U input
U_IN_VIP
Video U input to Video Input Processor
V_IN
Video V input
V_IN_VIP
Video V input to Video Input Processor
VCC3_CLK_BUF
Power supply 3V3 clock buffer
VCC3_VSM
Power supply 3V3 Versatile Stream Manager
VCC3_VSM_MEM
Power supply 3V3 Versatile Stream Manager Memory
VCC5_4046
Power supply 5V to PLL IC
VDD_125
Power supply 5V to buffer 7202
VDD_CORE
Sti5508 Core supply voltage 2.5V
VDD_EMP
Empress supply voltage 3.3V
VDD_EMP_CORE
Empress Core supply voltage 2.5V
VDD_FLASH_H
Flash 7301 supply voltage
VDD_FLASH_L
Flash 7302 supply voltage
VDD_LVC32
Power supply LVC32
VDD_PCM
Power supply Audio decoder of Sti5508
VDD_PLL
Power supply PLL audio decoder of Sti5508
VDD_RGB
Power supply video encoder of Sti5508
VDD_STI
Power supply of Sti5508
VDD_YCC
Power supply video encoder of Sti5508
VDD5_MK2703
Power supply MK2703
VDD5_OSC
Power supply Oscillator
VDDA1A_7118
Power supply for analog input of VIP
VDDA2A_7118
Power supply for analog input of VIP
VDDA3A_7118
Power supply for analog input of VIP
VDDA4A_7118
Power supply for analog input of VIP
VDDE_7118
Power supply digital for peripheral cells of VIP
VDDI_7118
Power supply digital for core of VIP
VDDX_7118
Power supply for crystal oscillator of VIP
VE_DATA(7:0)
Video Encoder data Bus
VE_DSN
Video Encoder Data Strobe
VE_DTACKN
Video Encoder Data Transfer acknowledge
VIP_ERROR
Video Input Processor error
VIP_FB
Video Input Processor Fast Blanking
VIP_FID_FF
Video Input Processor field indentifier to Flip Flop
VIP_HS
Video Input Processor horizontal synchronisation
VIP_ICLK
Video Input Processor input Clock
VIP_IDQ
Video Input Processor output data qualifier
VIP_IGP1
Video Input Processor input general purpose 1
VIP_INT

Video Input Processor interrupt
VIP_RTS1
Video Input Processor ready to send
VIP_VS
Video Input Processor vertical synchronisation
VIP_YUV(7:0)
Video Input Processor digital video(CCIR 656)
VS_IN
Vertical synchronisation IN
VSM_M_A(13:0)
Versatile Stream Manager SDRAM address bus
VSM_M_CASN
Versatile Stream Manager SDRAM column address strobe
VSM_M_CLKEN
Versatile Stream Manager SDRAM clock enable
VSM_M_CLKOUT
Versatile Stream Manager SDRAM clock out
VSM_M_D(15:0)
Versatile Stream Manager SDRAM data bus
VSM_M_LDQM
Versatile Stream Manager SDRAM lower data mask enable
VSM_M_RASN
Versatile Stream Manager SDRAM row address strobe
VSM_M_UDQM
Versatile Stream Manager SDRAM upper data mask enable
VSM_M_WEN
Versatile Stream Manager SDRAM write enable
VSM_UART1_CTSN
Versatile Stream Manager UART1 clear to send to analog board (UART1 is gateway to analog board)
VSM_UART1_RTSN
Versatile Stream Manager UART2 clear to send to DVIO board (UART2 is gateway to DIVIO board)
VSM_UART1_RX
Versatile Stream Manager UART1 ready to send to analog board
VSM_UART1_TX
Versatile Stream Manager UART2 ready to send to DVIO board
VSM_UART2_CTSN
Versatile Stream Manager UART1 received data to analog board
VSM_UART2_RTSN
Versatile Stream Manager UART2 received data to DVIO board
VSM_UART2_RX
Versatile Stream Manager UART1 transmitted data to analog board
VSM_UART2_TX
Versatile Stream Manager UART2 transmitted data to DVIO board
VSOUT
Vertical synchronisation OUT
WE
Write Enable
Y_IN
Luminance input from analog board
Y_OUT
Luminance output from Host Decoder
Y_OUT_B
Filtered luminance output
YY_OUT(9:0)
Luminance output from FLI

Divio 1.8 Board

2V5
+2V5 Power supply for Link+Codec IC7431
3V3
+3V3 Power supply
3V3_A
+3V3 Analog power supply for PHY IC7400
3V3_D
+3V3 Digital power supply for PHY IC7400
3V3_DLY
+3V3 Power supply for IC7500
3V3_LINK
+3V3 Power supply for Link+Codec IC7431
3V3_F
+3V3 Power supply for optional Flash memory IC7432
3V3_RAM
+3V3 Power supply for SDRAM IC7430
3V3_uP
+3V3 Power supply for Micro-controller IC7802
3V3_32kHz
+3V3 Power supply for audio format adaptation circuitry IC7507 & IC7508
3V3_AC
+3V3 Power supply for audio system clock generator IC7605 & IC7606
+5V
+5V Power supply
5V_PLL
+5V Power supply for VCO of audio PLL IC7604
A(1:17)
Flash adress lines of uPD72893
A_MUTE
Audio Mute
ABCK
Audio Bit Clock
AD(1:10)
Address bus lines for Host I/F of Link+Codec IC7431
AEMP1
PCM1 emphasis ON/OFF for PCM1 output
AFS1
Audio sampling frequency indication signal
ALRCLK
Audio Word Select
AMCLK44
11,2896MHz (=256*44.1kHz) audio master clock signal for 44.1kHz audio
AMCLK48
12,288MHz (=256*48kHz) audio master clock signal for 32kHz and 48kHz audio
APWM
PWM signal for audio PLL
BUFENn_AUD
Buffer Enable Audio
BUFENn_VID
Buffer Enable Video
CLK27M_CON
27MHz Clock to Digital Board
CS
Parallel interface chip select input of Link+Codec IC7431
CTL(0:1)
Link interface control lines
CTSN
Clear to Send
D(0:15)
Flash data lines of Link+Codec IC7431
DV_STATUS
Interupt pin for reading DV-status
HS_CLK
Video clock input of Link+Codec IC7431
INT
Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)
IOR
Parallel interface IO read control input of Link+Codec IC7431
ISPN
In System Programming signal (used for programming IC7802)
LKON
Link-on signal output
LPS
Link power status input
LREQ
Link request input
MA(0:10)
SDRAM adress lines of Link+Codec IC7431

MCAS
SDRAM column address strobe signal
MCLK
SDRAM clock signal
MD(0:15)SDRAM data lines of Link+Codec IC7431
MRAS
SDRAM row-address strobe signal
MWE
SDRAM write enable signal
PCM1
Audio Serial Data Output of Link+Codec IC7431
PCM1_NEW
"MSB justified" to I2S converted audio serial data; audio serial data input of audio DAC UDA1334A
PD(0:15)
Data bus lines for Host I/F of Link+Codec IC7431
PHY_D(0:7)
Data bus connection between PHY and LINK device
RESETn
DVIO board reset
RESET_FM
Reset signal driven by Flashmaster programming device
RESTB
Reset input of Link+Codec IC7431
RTSN
Request to Send
RWZ
Parallel interface read/write control input of Link+Codec IC7431
RXD
Receive Data
SCLK
Link control output clock
TXD
Transmit Data
VPP
+10V switchable programming voltage of microcontroller
YUV(0:7)
Digital Video

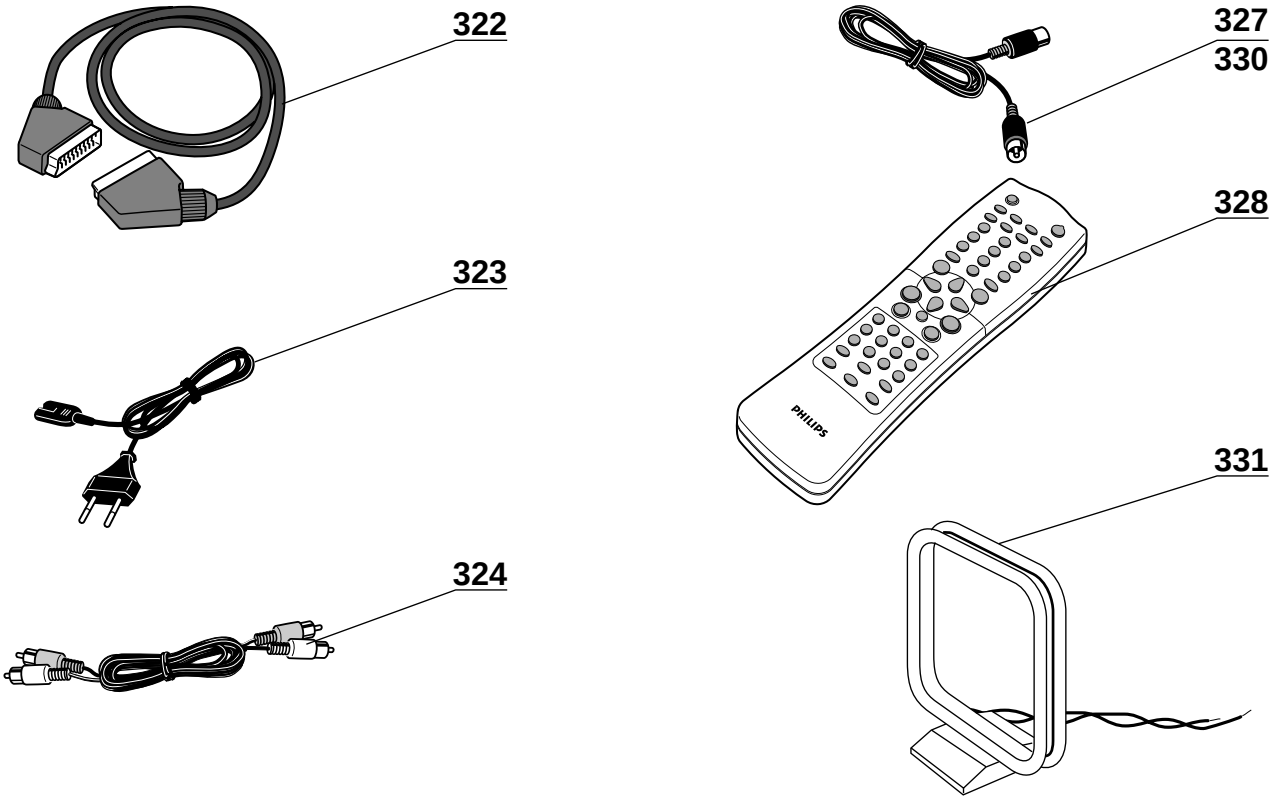
Abbreviations and acronyms set related

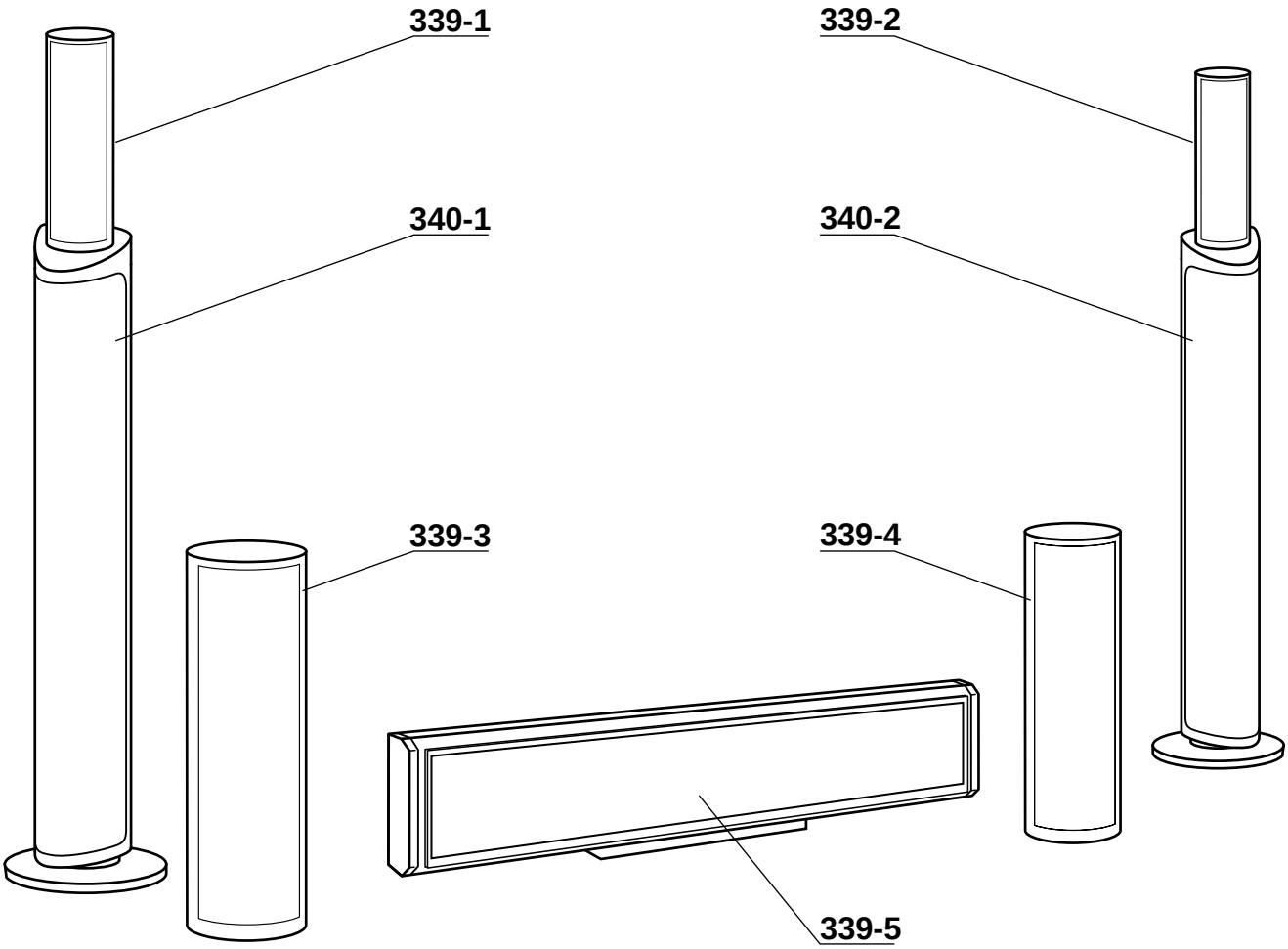
Name	Direction	Description
- 12V_A	7206 →	- 12V supply derived from - A supply
- 5V	7208 →	- 5V supply switched by +12V_M supply
- 5V_STBY	7205 →	- 5V supply also available in Standby mode
- A	7211 → Power Amplifier board	Negative power supply for power amplifiers
+12V_A	7202 →	+12V supply
+12V_AM	7212 → Key board left (via ASP- and Control board)	+12V supply for set fan, display motor and backlight of rotary encoders
+12V_M	7212 → AV board	Switched +12V supply, switched by INV_ON from CECO
+12V_OCD	7222 → 3260	Control line, Overcurrent protection for +12V_A, activates power off via Overvoltage protection and NTC_trafo line
+12V_STBY	7200 →	+12V supply also available in Standby mode
+20V_IN	6211 → 7204	Supply for 7204 (SMPS IC) which delivers +3V3 with high current capability
+3V3	7204 →	+3,3V supply created by a Switched Mode Power Supply IC to enable high output current
+4V4	6217 →	+4,4V supply derived from +5V supply
+5V	7213 →	+5V supply switched by +12V_M supply
+5V_A	7203 →	+5V supply
+5V_STBY	7201 →	+5V supply also available in Standby mode
+9V2	7521 (ASP board) → 7500, 7604, 7654 (ASP board)	Supply voltage for sound processor ICs
+33V_STBY	7281 → AV board (via Power second.- and ASP board)	+33V supply also available in Standby mode
+A	7210 → Power amplifier board	Positive power supply for power amplifiers
+C_OPAMP	3640 (ASP board) → 7600, 7650 (ASP board)	Supply voltage for buffer amplifier ICs 7600 and 7650
+FET	3211 → 7210	Bias voltage for FET 7210
+HP	3555 (ASP board) → 7502 (ASP board)	Supply voltage for buffer amplifier IC7502
9V_TUNER	7520 (ASP board) → Audio Tuner	+9V supply for Audio Tuner
AF_I2C_SCL1	Front µP → ASP board 7500	I2C bus Serial Clock to sound processor IC 7500
AF_I2C_SCL2	Front µP → ASP board 7654	I2C bus Serial Clock to sound processor IC 7654
AF_I2C_SCL3	Front µP → ASP board 7604	I2C bus Serial Clock to sound processor IC 7604
AF_I2C_SDA	Front µP ´ ASP board 7500, 7604, 7654	I2C bus Serial Data to sound processor ICs
AF_MUX1	Front µP → Auxiliary board (via ASP board)	Control line for Source Selector IC 7901 (multiplexer)
AF_MUX2	Front µP → Auxiliary board (via ASP board)	Control line for Source Selector IC 7901 (multiplexer)
AMP_CENTRE	ASP board 2667 → 1302 (Power Amplifier board)	Signal line, AF signal for center loudspeaker (amplifier)
AMP_LEFT/RIGHT	ASP board 3567/3577 → 1302 (Power Amplifier board)	Signal line, left/right AF signal for front loudspeaker (amplifier)
AMP_SL (SR)	ASP board 2627 (2647) → 1303 (Power Amplifier board)	Signal line, left/right AF signal for surround loudspeaker (amplifier)
AMP_SUB	ASP board 2687 → 1303 (Power Amplifier board)	Signal line, AF signal for sub-woofer (amplifier)
BL_DISP	3505 (Front/Control) → Display	Connection line, switches backlight of the display
BL_DISPLAY_HI	Front µP → 3438	Control line, switches Display backlight bright
BL_DISPLAY_LO	Front µP → 3437	Control line, switches Display backlight to low intensity
BL_ROT_S	3402 (Front/Control) → 6404 (Key board left via Key board right)	Connection line, switches backlight rotary encoder “Source”.
BL_ROT_S_HI	Front µP → 3407	Control line, switches backlight rotary encoder “Source” bright
BL_ROT_S_LO	Front µP → 3408	Control line, switches backlight rotary encoder “Source” to low intensity
BL_ROT_V	3411 (Front/Control) → 6402 (Key board right)	Connection line, switches backlight rotary encoder “Volume”.
BL_ROT_V_HI	Front µP → 3403	Control line, switches backlight rotary encoder “Volume” bright
BL_ROT_V_LO	Front µP → 3412	Control line, switches backlight rotary encoder “Volume” to low intensity
C_REF	ASP board junction 3641/3642 → 3665, 3685 (ASP board)	Reference voltage for buffer amplifier IC 7650
CECO	-	CEntral COntroller
CECO_RST	Front µP → CECO	Control line, resets the CECO after startup to enable simulation of key combinations for service tests. Low level=reset 7416 serves as inverter.
CLK	-	Clock
DI_I2C_SDA	Front µP → Display and EEPROM 7408	I2C bus Serial Data, communication to display driver and EEPROM 7408
DI_I2C_CLK	Front µP → Display and EEPROM 7408	I2C bus Serial Clock, communication to display driver and EEPROM 7408
DOWNMIX_L (R)	MDM board 1803 → 1603 (ASP board)	Signal line, digital multi-channel signal converted to stereo Left/Right
DVD_FAN_CTRL	junction 3515/3517/3518 (Front/Control) → 7610 (DVD Fan Control on ASP board)	Control line, sum of DvdFan1+DvdFan2, controls speed of the fan for the Basic Engine. Prepared for AV3 DVD module only.
DvdFan1	Front µP → 3517	Control line, forms with DvdFan2 summary signal DVD_FAN_CTRL
DvdFan2	Front µP → 3518	Control line, forms with DvdFan1 summary signal DVD_FAN_CTRL
ERR	7710 → 1302 (Power Amplifier board) → ASP board	Control line, error signal for detection of DC on one of the amplifier outputs. Low level=error. On ASP board short circuited with “TEMP” to the combined control line “NTC_Amp”.
FREQU_HOP	Front µP → 2606__Clock generator on Power Amplifier board)	Control line, shifts the “tact frequency” of the power amp. to avoid radio interferences during AM reception. High level=on 7412 serves as impedance converter.
GND	-	Ground connection. Added letters indicate different common GND

HIGHPASS_OFF	Front µP → ASP board 3539	Control line, activates high-pass filter for analog input signals which are not processed by MDM board. High level=high-pass off (2528/2548 and 3562/3572 shift the lower cut-off-frequency to 100Hz when transistors 7560/7570 conduct. 2560/2570 serve for DC decoupling only). On the subwoofer output the low-pass is activated via 7655.
HP_DET	Headphone socket → Front µP	Control line, headphone detection. High level=headphone connected
HP_LEFT (RIGHT)	ASP board 3569 (3579) → 1417 (Key board right)	Signal line, separated headphone signal Left/Right to headphone socket.
HP_REF	ASP board junction 3553/3554 → 3564, 3574 (ASP board)	Reference voltage for buffer amplifier IC 7502
INT_CECO	Front µP → CECO	Interrupt request, sent by Front µP. Low level=interrupt. 7417 (impedance converter) serves as provision only.
INV_ON	CECO → Power supply secondary board and Front µP	Control line, switches power supply +12V_M. Low level=on For Front µP it is an indication if all supply voltages are on. 7413 serves as level shift from 3,3V- to 5V logic.
IPOR_DC	CECO → Front µP (via AV board)	Control line, Inverse Power On Reset Display Controller, sent by CECO. Low level=reset. 7415 serves as level shift from 3,3V- to 5V logic. Not used by LX9000R front software.
Key1	Key board right → Front µP	Control line, key input line 1
Key2	Key board left 2 (via Key board left) → Front µP	Control line, key input line 2
LED_InstRec	Front µP → 3530 (Key board right)	Control line, switches Instant LED on. High level=on
LED_REC	Front µP → 3522 (Key board right)	Control line, switches Record LED on. High level=on
LED_Stby	Front µP → 3555 (Key board left)	Control line, switches Standby LED on. High level=on
LINE_L (R)	ASP board 7500 → 2500, 2602, 2652, 3590	Signal line, line signal uncoupled from soundproc. IC 7500. Further used for line out , analog input for MDM board and subwoofer channel in stereo mode
LINE_LEFT	ASP board 3592 → 1901 (Auxiliary board)	Signal line, line out signal, left channel
LINE_RIGHT	ASP board 3596 → 1901 (Auxiliary board)	Signal line, line out signal, right channel
LR_CSUB_ON	Front µP → 7100, 7200 (Power Amplifier board)	Control line, switches L/R- and Center/Subwoofer amplifier on. High level=on
MDM_CENTRE	MDM board 1803 → 1603 (ASP board)	Signal line, decoded signal for center loudspeaker (amplifier)
MDM_IN_L (R)	3500 (3502) on ASP board → MDM board 1802	Signal line, analog input on MDM board derived from Line signal
MDM_IRQ	7711 (micro controller on MDM board) → Front µP	Interrupt Request
MDM_OUT_L (R)	MDM board 1803 → 1603 (ASP board)	Signal line, decoded left/right signal for front loudspeaker (amplifier)
MDM_Reset	Front µP → 7711 (micro controller on MDM board)	Control line, resets micro controller on MDM board. High level=reset
MDM_SCL	Front µP → 7711 (micro controller on MDM board)	I2C bus Serial Clock
MDM_SDA	Front µP ´ 7711 (micro controller on MDM board)	I2C bus Serial Data
MDM_SL (SR)	MDM board 1803 → 1603 (ASP board)	Signal line, decoded left/right signal for surround loudspeaker (amplifier)
MDM_SUB	MDM board 1803 → 1603 (ASP board)	Signal line, decoded signal for sub-woofer (amplifier)
MM_in	Front µP → 7430 (Key board left)	Control line, input signal motor driver IC for display Moving Mechanic
MM_out	Front µP → 7430 (Key board left)	Control line, input signal motor driver IC for display Moving Mechanic
MM_SWI	Display in/out switch 1441 → Front µP (via Key board left)	Control line, indicates end position of display Moving Mechanic. Low level=display moving, High level = display in or out
MUTE_ALL	Front µP → ASP board 3582	Control line, activates Mute for all loudspeakers. Low level=mute
MUTE_CENTRE	Front µP → ASP board 3677	Control line, activates Mute for center loudspeaker. Low level= mute
MUTE_HP	Front µP → ASP board 3559	Control line, activates Mute for Headphone. Low level= mute
MUTE_LINE	Front µP → ASP board 3599	Control line, activates Mute for Line signal. Low level= mute
MUX_LEFT	Auxiliary board 1903 → ASP board 1610	Signal line, analog audio signal left channel from analog in-source selector (multiplexer)
MUX_RIGHT	Auxiliary board 1903 → ASP board 1610	Signal line, analog audio signal right channel from analog in-source selector (multiplexer)
NTC_Amp	Power Amplifier board 1302 → Front µP (via ASP board)	Control line, sensor for temp. of the heat sink on the Power Amplifier board (“TEMP”) and for DC-protection of the power stage (ERR). On ASP board “TEMP” and “ERR” are short-circuited to the combined control line “NTC_Amp”. Low level=active in case of a DC failure. In service mode used to display temperature.
NTC_Front	AV2 DVD module: 3559 (Key board left) → Fan Control on CECO board (via Control- and AV board) AV3 DVD module: 3559 (Key board left) → Front µP 7406	Control line, sensor for ambient temperature (NTC resistor located on Key board left)
NTC_Supply	3241 → Front µP (via ASP board)	Control line, sensor for temp. of the heat sink on Power second. board
NTC_Trafo	Transformer → Front µP (via Power second.- and ASP board)	Control line, sensor for temp. of the transformer (NTC resistor) and in parallel info line from Overvoltage Protection. Low level=active
OverCurr	Key board left → Front µP	Control line, provisional only
PWR_DOWN	6291 → Front µP and AV board (via Power second.- and ASP board)	Control line, gives a quick info when supply breaks down. Low level=active
RC6	Infrared eye 7401 (Key board right) → Front µP	Signal line, Remote Control signal with RC6 code
RELAY_CTRL	Front µP → ASP board → Power second. board → Power prim. board	Control line, switches relay on/off

reset-ceco	Front µP → CECO	Control line, resets the CECO after startup to enable simulation of key combinations for service tests. Low level=reset
RotarySA	Key board left → Front µP	Control line A, rotary encoder “Source”
RotarySB	Key board left → Front µP	Control line B, rotary encoder “Source”
RotaryVA	Key board right → Front µP	Control line A, rotary encoder “Volume”
RotaryVB	Key board right → Front µP	Control line B, rotary encoder “Volume”
SCART_WAKEUP	7403 (“WU” on AV board) → Front µP (via ASP board)	provisional only
SDA_CECO	Front µP ´ 7804 CECO (via AV board)	I2C bus Serial Data, communication CECO - Front µP
SCL_CECO	7804 CECO → Front µP (via AV board)	I2C bus Serial Clock, communication CECO - Front µP
S_REF	ASP board junction 3643/3644 → 3612, 3635 (ASP board)	Reference voltage for buffer amplifier IC 7600
SET_FAN_CTRL	jct. 3516/3519/3520 (Front/Control) → 7219 (Power second.) via ASP board	Control line, sum of SetFan1+SetFan2, controls speed of set fan
SetFan1	Front µP → 3519	Control line, forms with SetFan2 summary signal SET_FAN_CTRL
SetFan2	Front µP → 3520	Control line, forms with SetFan1 summary signal SET_FAN_CTRL
STBY	-	Stand by
STBY_CTRL	CECO (“STBY”) → Front µP (via AV- and ASP board)	Control line, switches from active to passive standby mode. High level=passive standby. 7414 serves as level shift from 3,3V- to 5V logic. Not used by LX9000R front software.
SUR_ON	Front µP → _300__Power Amplifier board)	Control line, switches Surround amplifier on. High level=on
TEMP	3422 → 1302 (Power Amplifier board) → ASP board	Control line, sensor (NTC resistor) for temperature of the heat sink on the Power Amplifier board. On ASP board short-circuited with “ERR” to the combined control line “NTC_Amp”.
TU_CE	Front µP → Audio Tuner (via ASP board)	PLL serial data Chip Enable
TU_CLOCK	Front µP → Audio Tuner (via ASP board)	PLL serial data Clock
TU_DI	Front µP → Audio Tuner (via ASP board)	PLL serial data. Data In
TU_RDS	Audio Tuner → RDS decoder on Front/Control board (via ASP board)	Signal line, MPX signal for RDS decoder
TU_LEFT (RIGHT)	Audio Tuner → ASP board 1606	Signal line, left (right) channel from Audio Tuner
TuRdsClk	RDS decoder IC 7407 → Front µP	Clock RDS data
TuRdsData	RDS decoder IC 7407 → Front µP	Decoded RDS data
TU_SD	Audio Tuner → Front µP (via ASP board)	Control line, Signal Detection. Low level=tuned
TU-stereo	Audio Tuner → Front µP (via ASP board)	PLL serial data. Data Out and control line for stereo indication. Low level=stereo
XHIGHPASS_OFF	ASP board 7501 → ASP board 3666	Control line, inverted HIGHPASS_OFF signal. Activates high-pass filter for analog input signals, which are not processed by MDM board. High level=high-pass on (2528/2548 and 3562/3572 shift the lower cut-off-frequency to 100Hz when transistors 7560/7570 conduct. 2560/2570 serve for DC decoupling only). On the subwoofer output the low-pass is activated via 7655.
XLINE_L (R)	ASP board 7604 → ASP board 2652 (2653)	Signal line, line out signal taken from 7604 (after pre-amp.) for input to 7654. As provision only, to reduce load for 7500.
XMUTE_ALL	ASP board 7514 → ASP board 3620, 3670	Control line, inverse MUTE_ALL signal. High level=mute

ACCESSORIES





see also Exploded View drawings pages 63 and 64

MECHANICAL PARTS

103	3103 301 72421	FRONT COVER-ALU-DISPLAY
118	3103 308 55001	MOTOR, RF310TA-11400 44MM
119	3103 304 73651	WORM GEAR
149	3103 304 75761	FILTER FOIL-VOLUME/SOURCE
150	3103 308 13821	BUTTON, STANDBY
151	3103 304 75541	LIGHT-GUIDE RING, SOURCE
152	3103 308 13661	KNOB ASSY ALU
160	3103 308 13831	BUTTON SET LEFT
175	3103 308 13841	BUTTON SET RIGHT
177	3103 304 75761	FILTER FOIL-VOLUME/SOURCE
178	3103 304 73691	LIGHT-GUIDE RING, VOLUME
187	3103 301 21621	AXLE
188	3103 308 13911	FLAP-ALU-PRI
189	3140 119 50221	ORNAM. FRONT ALU PRE-ASSY /22S
189	3140 119 50231	ORNAM. FRONT ALU PRE-ASSY /25S
251	3103 308 14071	TOP COVER, LACQUERED
252	3103 304 74191	FOOT
265	3103 304 74201	FOOT, RUBBER

MISCELLANEOUS

1201	3103 308 55111	MDM BOARD PRE-ASSY
1203	2422 542 90137	RADIO TUNER MODULE, EU
1207	3104 129 24811	KIT DIG.BOARD DVDR1.5 EU SZEK
1211	3103 308 55051	FAN, KD1206 PT S3
5201	3103 308 30932	TRANSFORMER MAINS, EU
5202	3103 308 30961	TRANSFORMER STANDBY, EU
6001	3103 308 54991	LCD MODULE, WD-S6004M-2TLWA
8001	3104 157 11790	FLEXFOIL CABLE, 30P, 100mm, AD
8002	3103 601 00052	FLEXFOIL CABLE, 22P, 200mm, BD
8003	3103 308 93482	FLEXFOIL CABLE, 22P, 110mm, BD
8005	3103 308 93232	FLEXFOIL CABLE, 10P, 152mm, AD
8007	3103 308 93151	FLEXFOIL CABLE, 10P, 700mm, BD
8012	3103 308 93181	FLEXFOIL CABLE, 15P, 340mm, AD
8017	3103 308 93191	FLEXFOIL CABLE, 10P, 80mm, AD
8018	3103 308 93191	FLEXFOIL CABLE, 10P, 80mm, AD
8022	3139 110 34860	FLEXFOIL CABLE, 4P, 340mm, AD
8023	3103 308 93201	FLEXFOIL CABLE, 11P, 168mm,AD
8026	3103 308 93211	FLEXFOIL CABLE, 23P, 440mm, AD
8027	3103 308 93221	FLEXFOIL CABLE, 21P, 500mm, AD
8032	3103 308 93331	FLEXFOIL CABLE, 14P, 100mm, BD
8033	3103 308 93401	FLEXFOIL CABLE, 7P, 390mm, BD
8034	3103 308 93391	FLEXFOIL CABLE, 8P, 350mm, AD
8035	3103 308 93381	FLEXFOIL CABLE, 9P, 375mm, AD
8036	3103 308 93341	FLEXFOIL CABLE, 3P, 50mm, BD
8040	3103 308 93811	FIRE WIRE CABLE 360MM IEEE1394
8041	3103 308 93771	FLEXFOIL CABLE, 1P, 97mm, GND

ACCESSORIES

322	2422 076 00532	SCART CABLE, 21P
323	2422 070 98151	MAINS CORD, EUROPE
323	9965 000 07586	MAINS CORD, GB
324	3103 308 92610	AUDIO CABLE STEREO CINCH 1.5m
327	4822 320 50377	TV ANTENNA CABLE
328	3103 308 55271	REMOTE CONTROL, LX9000R
330	4822 320 50377	TV ANTENNA CABLE
331	2422 549 45386	AM FRAME ANTENNA
339-1	9965 000 19779	LS-BOX, FRONT L
339-2	9965 000 19780	LS-BOX, FRONT R
339-3	9965 000 19781	LS-BOX, REAR L
339-4	9965 000 19782	LS-BOX, REAR R
339-5	9965 000 19783	LS-BOX, CENTER
340-1	9965 000 19784	LS-BOX, SUBWOOFER L
340-2	9965 000 19785	LS-BOX, SUBWOOFER R

CONTROL BOARD

MISCELLANEOUS

1401	2422 025 15564	FFC-CONNECTOR, 21P, TOP ENTRY
1402	4822 267 10757	FFC-CONNECTOR, 23P, TOP ENTRY
1403	2422 025 16371	FFC-CONNECTOR, 8P, SIDE ENTRY
1404	4822 265 11531	FFC-CONNECTOR, 9P, SIDE ENTRY
1405	4822 265 11208	FFC-CONNECTOR, 10P, SIDE ENTRY
1406	4822 267 11029	FFC-CONNECTOR, 10P, SIDE ENTRY
1407	2422 025 14544	FFC-CONNECTOR, 14P, SIDE ENTRY

CAPACITORS

2400	4822 124 23432	100µF	20%	10V
2401	4822 124 23432	100µF	20%	10V
2402 ©	2238 586 59812	100nF	10%	50V
2403 ©	4822 126 14226	82pF		50V
2404 ©	4822 126 11785	47pF	5%	50V
2405 ©	2238 586 59812	100nF	10%	50V
2406 ©	4822 126 11785	47pF	5%	50V
2407 ©	4822 126 14249	560pF	10%	50V
2408 ©	4822 126 14249	560pF	10%	50V
2409	4822 124 22652	2,2µF	20%	50V
2410	4822 124 23432	100µF	20%	10V
2411 ©	2238 586 59812	100nF	10%	50V
2412 ©	5322 126 11583	10nF	10%	63V
2413	5322 124 41948	0,47µF	20%	50V
2414 ©	5322 126 11583	10nF	10%	63V
2415 ©	4822 126 13881	470pF	5%	50V
2416 ©	4822 126 13881	470pF	5%	50V
2417	4822 124 23432	100µF	20%	10V
2418	4822 124 23432	100µF	20%	10V
2419	4822 124 23432	100µF	20%	10V
2420	4822 124 23432	100µF	20%	10V
2421 ©	5322 126 11578	1nF	10%	63V
2436 ©	2238 586 59812	100nF	10%	50V
2437 ©	2238 586 59812	100nF	10%	50V
2438 ©	2238 586 59812	100nF	10%	50V
2439 ©	5322 126 11578	1nF	10%	63V

RESISTORS

3401 ©	4822 051 30181	180Ω	5%	0,06W
3402 ©	4822 051 30109	10Ω	5%	0,06W
3403 ©	4822 051 30103	10kΩ	5%	0,06W
3404 ©	4822 051 30101	100Ω	5%	0,06W
3405 ©	4822 051 30109	10Ω	5%	0,06W
3406 ©	4822 051 30472	4,7kΩ	5%	0,06W
3407 ©	4822 051 30103	10kΩ	5%	0,06W
3408 ©	4822 051 30103	10kΩ	5%	0,06W
3409 ©	4822 051 30689	68Ω	5%	0,06W
3410 ©	4822 051 30181	180Ω	5%	0,06W
3411 ©	4822 051 30109	10Ω	5%	0,06W
3412 ©	4822 051 30103	10kΩ	5%	0,06W
3413	4822 052 10228	2,2Ω	5%	0,33W
3414 ©	4822 051 30471	470Ω	5%	0,06W
3415 ©	4822 051 30471	470Ω	5%	0,06W
3416 ©	4822 051 30102	1kΩ	5%	0,06W
3417 ©	4822 051 30102	1kΩ	5%	0,06W
3418 ©	4822 051 30471	470Ω	5%	0,06W
3419 ©	4822 051 30103	10kΩ	5%	0,06W
3420 ©	4822 051 30331	330Ω	5%	0,06W
3421 ©	4822 051 30331	330Ω	5%	0,06W
3422 ©	4822 051 30471	470Ω	5%	0,06W
3423 ©	4822 051 30471	470Ω	5%	0,06W

RESISTORS

3424 ©	4822 051 30103	10kΩ	5%	0,06W
3425 ©	4822 051 30471	470Ω	5%	0,06W
3426 ©	4822 051 30471	470Ω	5%	0,06W
3427 ©	4822 051 30471	470Ω	5%	0,06W
3428 ©	4822 051 30102	1kΩ	5%	0,06W
3429 ©	4822 051 30471	470Ω	5%	0,06W
3430 ©	4822 051 30102	1kΩ	5%	0,06W
3431 ©	4822 051 30331	330Ω	5%	0,06W
3432 ©	4822 051 30331	330Ω	5%	0,06W
3433 ©	4822 051 30471	470Ω	5%	0,06W
3434 ©	4822 051 30331	330Ω	5%	0,06W
3435 ©	4822 051 30471	470Ω	5%	0,06W
3436 ©	4822 051 30472	4,7kΩ	5%	0,06W
3437 ©	4822 051 30103	10kΩ	5%	0,06W
3438 ©	4822 051 30103	10kΩ	5%	0,06W
3439 ©	4822 051 30272	2,7kΩ	5%	0,06W
3440 ©	4822 051 30272	2,7kΩ	5%	0,06W
3441 ©	4822 051 30471	470Ω	5%	0,06W
3442 ©	4822 051 30471	470Ω	5%	0,06W
3443 ©	4822 051 30471	470Ω	5%	0,06W
3445 ©	4822 051 30471	470Ω	5%	0,06W
3446 ©	4822 051 30222	2,2kΩ	5%	0,06W
3447 ©	4822 051 30471	470Ω	5%	0,06W
3448 ©	4822 117 12891	220kΩ	1%	0,06W
3449 ©	4822 051 30471	470Ω	5%	0,06W
3451 ©	4822 051 30689	68Ω	5%	0,06W
3452 ©	4822 051 30472	4,7kΩ	5%	0,06W
3453 ©	4822 051 30472	4,7kΩ	5%	0,06W
3454 ©	4822 051 30102	1kΩ	5%	0,06W
3455 ©	4822 051 30102	1kΩ	5%	0,06W
3456 ©	4822 051 30102	1kΩ	5%	0,06W
3457 ©	4822 051 30102	1kΩ	5%	0,06W
3458 ©	4822 051 30471	470Ω	5%	0,06W
3459 ©	4822 051 30102	1kΩ	5%	0,06W
3460 ©	4822 051 30102	1kΩ	5%	0,06W
3461 ©	4822 051 30102	1kΩ	5%	0,06W
3462 ©	4822 051 30102	1kΩ	5%	0,06W
3463 ©	4822 051 30102	1kΩ	5%	0,06W
3464 ©	4822 051 30102	1kΩ	5%	0,06W
3465 ©	4822 051 30102	1kΩ	5%	0,06W
3466 ©	4822 051 30102	1kΩ	5%	0,06W
3467 ©	4822 051 30102	1kΩ	5%	0,06W
3468 ©	4822 051 30101	100Ω	5%	0,06W
3469 ©	4822 051 30102	1kΩ	5%	0,06W
3470 ©	4822 051 30102	1kΩ	5%	0,06W
3471 ©	4822 051 30101	100Ω	5%	0,06W
3472 ©	4822 051 30101	100Ω	5%	0,06W
3473 ©	4822 051 30102	1kΩ	5%	0,06W
3474 ©	4822 051 30101	100Ω	5%	0,06W
3475 ©	4822 051 30101	100Ω	5%	0,06W
3476 ©	4822 051 30101	100Ω	5%	0,06W
3477 ©	4822 051 30102	1kΩ	5%	0,06W
3478 ©	4822 051 30101	100Ω	5%	0,06W
3479 ©	4822 051 30102	1kΩ	5%	0,06W
3480 ©	4822 051 30102	1kΩ	5%	0,06W
3481 ©	4822 051 30101	100Ω	5%	0,06W
3482 ©	4822 051 30102	1kΩ	5%	0,06W
3483 ©	4822 051 30101	100Ω	5%	0,06W
3484 ©	4822 051 30101	100Ω	5%	0,06W
3485 ©	4822 051 30101	100Ω	5%	0,06W
3486 ©	4822 051 30102	1kΩ	5%	0,06W
3489 ©	4822 051 30101	100Ω	5%	0,06W

RESISTORS

3490 ©	4822 051 30103	10kΩ	5%	0,06W
3491 ©	4822 051 30103	10kΩ	5%	0,06W
3492 ©	4822 051 30102	1kΩ	5%	0,06W
3493 ©	4822 051 30102	1kΩ	5%	0,06W
3494 ©	4822 051 30102	1kΩ	5%	0,06W
3495 ©	4822 117 12891	220kΩ	1%	0,06W
3496 ©	4822 117 13632	100kΩ	1%	0,06W
3497 ©	4822 051 30103	10kΩ	5%	0,06W
3498 ©	4822 051 30103	10kΩ	5%	0,06W
3499 ©	4822 051 30103	10kΩ	5%	0,06W
3501 ©	4822 051 30102	1kΩ	5%	0,06W
3502 ©	4822 051 30472	4,7kΩ	5%	0,06W
3503 ©	4822 051 30103	10kΩ	5%	0,06W
3504 ©	4822 051 30103	10kΩ	5%	0,06W
3505 ©	4822 051 30109	10Ω	5%	0,06W
3506 ©	4822 051 30339	33Ω	5%	0,06W
3507 ©	4822 051 30472	4,7kΩ	5%	0,06W
3508 ©	4822 051 30479	47Ω	5%	0,06W
3509 ©	4822 051 30472	4,7kΩ	5%	0,06W
3510 ©	4822 051 30471	470Ω	5%	0,06W
3511 ©	4822 051 30471	470Ω	5%	0,06W
3512 ©	4822 051 30471	470Ω	5%	0,06W
3513 ©	4822 051 30103	10kΩ	5%	0,06W
3514 ©	4822 051 30103	10kΩ	5%	0,06W
3519 ©	4822 051 30103	10kΩ	5%	0,06W
3520 ©	4822 051 30183	18kΩ	5%	0,06W
3521 ©	4822 051 30471	470Ω	5%	0,06W
3522 ©	4822 051 30471	470Ω	5%	0,06W
3523 ©	4822 051 30471	470Ω	5%	0,06W
3524 ©	4822 051 30471	470Ω	5%	0,06W
3525 ©	4822 051 30471	470Ω	5%	0,06W
3526 ©	4822 051 30103	10kΩ	5%	0,06W
3527 ©	4822 051 30103	10kΩ	5%	0,06W
3528 ©	4822 051 30103	10kΩ	5%	0,06W
3529 ©	4822 051 30472	4,7kΩ	5%	0,06W
3530 ©	4822 051 30472	4,7kΩ	5%	0,06W
3531 ©	4822 051 30472	4,7kΩ	5%	0,06W
3532 ©	4822 051 30472	4,7kΩ	5%	0,06W
3533 ©	4822 051 30471	470Ω	5%	0,06W
3534 ©	4822 051 30471	470Ω	5%	0,06W
3535 ©	4822 051 30474	470kΩ	5%	0,06W
3536 ©	4822 051 30684	680kΩ	5%	0,06W
3537 ©	4822 051 30121	120Ω	5%	0,06W
3538 ©	4822 051 30123	12kΩ	5%	0,06W
3539 ©	4822 051 30479	47Ω	5%	0,06W
3540 ©	4822 117 12971	15Ω	5%	0,06W
3541 ©	4822 051 30479	47Ω	5%	0,06W
3543 ©	4822 051 30472	4,7kΩ	5%	0,06W
3546 ©	4822 051 30689	68Ω	5%	0,06W
3547 ©	4822 051 30689	68Ω	5%	0,06W
3549 ©	4822 051 30479	47Ω	5%	0,06W
3551 ©	4822 117 12925	47kΩ	1%	0,06W
3552 ©	4822 117 13632	100kΩ	1%	0,06W
3553 ©	4822 051 30105	1MΩ	5%	0,06W
3554 ©	4822 117 12925	47kΩ	1%	0,06W
3555 ©	4822 117 13632	100kΩ	1%	0,06W
3556	4822 052 10338	3,3Ω	5%	NFR25
3557 ©	4822 117 12925	47kΩ	1%	0,06W
3558 ©	4822 117 13632	100kΩ	1%	0,06W
3559 ©	4822 051 30102	1kΩ	5%	0,06W
3560 ©	4822 051 30103	10kΩ	5%	0,06W
4001 ©	4822 051 30008	CHIP JUMPER 0603		
4400 ©	4822 051 30008	CHIP JUMPER 0603		
4406 ©	4822 051 30008	CHIP JUMPER 0603		

COILS

1408	4822 242 11033	RESONATOR 4,332MHz
1409	5322 242 73686	CERAMIC RESONATOR, 12MHZ
5401	4822 157 11477	2,2µH
5402	4822 157 11477	2,2µH

DIODES

6410	3198 010 55180	DIO REG BZX79-B5V1
6411 ©	4822 130 10838	UDZ3.3B

TRANSISTORS

7402 ©	9340 217 80115	BC847CW
7403 ©	9340 217 80115	BC847CW
7404 ©	9340 217 80115	BC847CW
7405 ©	9340 217 80115	BC847CW
7409 ©	5322 130 60159	BC846B
7410 ©	4822 130 42615	BC817-40
7411 ©	4822 130 42615	BC817-40
7412 ©	3198 010 42320	BC857BW
7413 ©	3198 010 42310	BC847BW
7414 ©	3198 010 42310	BC847BW
7415 ©	3198 010 42310	BC847BW
7416 ©	3198 010 42310	BC847BW

INTEGRATED CIRCUITS

7406 ©	9965 000 20796	TMP88CU74F-V14
7407 ©	9352 686 05118	SAA6581T, RDS DECODER IC
7408 ©	9965 000 09190	M24C02-MN6, EEPROM

FRONT BOARDS

Key board left, Key board left 2, Key board right, A/V Front connectors, Position detection switch Display

MISCELLANEOUS

1411	4822 276 13114	TACT SWITCH
1412	4822 276 13114	TACT SWITCH
1413	4822 276 13114	TACT SWITCH
1414	2422 025 14544	FFC-CONNECTOR, 14P, SIDE ENTRY
1415	4822 267 10956	FFC-CONNECTOR, 7P, SIDE ENTRY
1416	2422 026 05464	SOCKET, HEADPHONE 3.5mm
1417	4822 265 11183	CON. FLEX FOIL 4PIN SIDE ENTRY
1418	2422 129 16936	ROTARY ENCODER, 32P SRGPWJ0200
1420	4822 265 11531	FFC-CONNECTOR, 9P, SIDE ENTRY
1421	4822 267 10956	FFC-CONNECTOR, 7P, SIDE ENTRY
1422	2422 025 16371	FFC-CONNECTOR, 8P, SIDE ENTRY
1423	4822 267 10957	FFC-CONNECTOR, 3P, SIDE ENTRY
1426	2422 129 16934	ROTARY ENCODER, 16P SRGPWJ0500
1427	4822 276 13114	TACT SWITCH
1430	4822 267 10955	FFC-CONNECTOR, 3P, SIDE ENTRY
1431	4822 276 13114	TACT SWITCH
1432	4822 276 13114	TACT SWITCH
1433	4822 276 13114	TACT SWITCH
1434	4822 276 13114	TACT SWITCH
1441	2422 129 16655	LEAF SWITCH 1P, DISPLAY POS. DET.
1445	2422 026 05307	SOCKET, S-VIDEO
1446	2422 026 05301	SOCKET, CINCH, 3P, FJPJ1127 B

CAPACITORS

2430 ©	3198 028 44790	47µF	20%	35V
2431 ©	4822 126 14238	2,2nF	10%	50V
2432 ©	2020 552 94427	100pF	5%	50V
2433 ©	2238 916 15641	22nF	10%	25V
2434 ©	2238 916 15641	22nF	10%	25V
2435 ©	2238 916 15641	22nF	10%	25V
2436 ©	5322 126 11578	1nF	10%	63V
2437 ©	5322 126 11578	1nF	10%	63V
2438 ©	3198 016 31020	1nF	5%	25V
2450	4822 124 81286	47µF	20%	16V
2451 ©	2238 586 59812	100nF	10%	50V
2452 ©	2238 586 59812	100nF	10%	50V
2453 ©	5322 126 11578	1nF	10%	63V
2480 ©	4822 126 14241	330pF		50V
2481 ©	4822 126 14241	330pF		50V
2482 ©	2238 586 59812	100nF	10%	50V
2483 ©	2238 586 59812	100nF	10%	50V
3585 ©	4822 051 30759	75Ω	5%	0,06W
3586 ©	4822 051 30759	75Ω	5%	0,06W
3587 ©	4822 051 30759	75Ω	5%	0,06W

RESISTORS

3520 ©	4822 051 30181	180Ω	5%	0,06W
3521 ©	4822 051 30101	100Ω	5%	0,06W
3522 ©	4822 051 30103	10kΩ	5%	0,06W
3523 ©	4822 051 30103	10kΩ	5%	0,06W
3524 ©	4822 051 30102	1kΩ	5%	0,06W
3525 ©	4822 051 30391	390Ω	5%	0,06W
3526 ©	4822 051 30271	270Ω	5%	0,06W
3527 ©	4822 051 30221	220Ω	5%	0,06W
3528 ©	4822 051 30151	150Ω	5%	0,06W
3529 ©	4822 051 30181	180Ω	5%	0,06W
3530 ©	4822 051 30103	10kΩ	5%	0,06W

RESISTORS

3533 ©	4822 051 30103	10kΩ	5%	0,06W
3548 ©	4822 051 30472	4,7kΩ	5%	0,06W
3549 ©	4822 051 30223	22kΩ	5%	0,06W
3550	4822 052 10338	3,3Ω	5%	NFR25
3551 ©	4822 051 30563	56kΩ	5%	0,06W
3552 ©	4822 051 30221	220Ω	5%	0,06W
3553 ©	4822 051 30153	15kΩ	5%	0,06W
3554 ©	4822 051 30563	56kΩ	5%	0,06W
3555 ©	4822 051 30103	10kΩ	5%	0,06W
3556 ©	4822 051 30221	220Ω	5%	0,06W
3557 ©	4822 051 30151	150Ω	5%	0,06W
3559	4822 117 12063	10kΩ NTC		
3560 ©	4822 051 30223	22kΩ	5%	0,06W
3561 ©	4822 051 30472	4,7kΩ	5%	0,06W
3562 ©	4822 051 30103	10kΩ	5%	0,06W
3563 ©	4822 051 30563	56kΩ	5%	0,06W
3564 ©	4822 051 30563	56kΩ	5%	0,06W
3566 ©	4822 051 30479	47Ω	5%	0,06W
3567 ©	4822 051 30479	47Ω	5%	0,06W
3570 ©	4822 051 30271	270Ω	5%	0,06W
3571 ©	4822 051 30391	390Ω	5%	0,06W
3572 ©	4822 051 30561	560Ω	5%	0,06W
3573 ©	4822 117 12968	820Ω	5%	0,06W
3580 ©	4822 051 30102	1kΩ	5%	0,06W
3581 ©	4822 051 30105	1MΩ	5%	0,06W
3582 ©	4822 051 30102	1kΩ	5%	0,06W
3583 ©	4822 051 30105	1MΩ	5%	0,06W
3584 ©	4822 051 30151	150Ω	5%	0,06W
4321 ©	4822 051 30008	CHIP JUMPER 0603		
4322 ©	4822 051 30008	CHIP JUMPER 0603		
4323 ©	4822 051 30008	CHIP JUMPER 0603		
4325 ©	4822 051 30008	CHIP JUMPER 0603		
4326 ©	4822 051 30008	CHIP JUMPER 0603		
4327 ©	4822 051 30008	CHIP JUMPER 0603		
4328 ©	4822 051 30008	CHIP JUMPER 0603		
4329 ©	4822 051 30008	CHIP JUMPER 0603		
4330 ©	4822 051 30008	CHIP JUMPER 0603		
4331 ©	4822 051 30008	CHIP JUMPER 0603		
4555 ©	4822 051 30008	CHIP JUMPER 0603		
4556 ©	4822 051 30008	CHIP JUMPER 0603		
4557 ©	4822 051 30008	CHIP JUMPER 0603		
4558 ©	4822 051 30008	CHIP JUMPER 0603		
4559 ©	4822 051 30008	CHIP JUMPER 0603		
4560 ©	4822 051 30008	CHIP JUMPER 0603		
4561 ©	4822 051 30008	CHIP JUMPER 0603		
4562 ©	4822 051 30008	CHIP JUMPER 0603		

COILS

5430	4822 157 62552	2,2µH
5431	4822 157 62552	2,2µH
5432	4822 157 62552	2,2µH

DIODES

6401 ©	9322 147 85685	LST770-KL, RED
6402	9322 188 36682	LED LTL912TWKS
6402	9322 200 24667	LED TLWW8600
6403 ©	9322 147 85685	LST770-KL, RED
6404	9322 188 36682	LED LTL912TWKS
6404	9322 200 24667	LED TLWW8600
6420 ©	9322 147 85685	LST770-KL, RED
6480 ©	9322 146 61685	DF3A6.8FU
6481 ©	9322 146 61685	DF3A6.8FU
6482 ©	9322 146 61685	DF3A6.8FU

DIODES

6483 ©	9322 146 61685	DF3A6.8FU
6484 ©	9322 146 61685	DF3A6.8FU

TRANSISTORS

7420 ©	5322 130 60159	BC846B
7421 ©	5322 130 60159	BC846B
7431 ©	5322 130 60159	BC846B
7432 ©	9340 217 80115	BC847CW
7433 ©	9340 217 80115	BC847CW

INTEGRATED CIRCUITS

7401	9322 185 95667	IR-RECEIVER TSOP4836
7430	4822 209 62059	TCA0372DP1, 2-FOLD OP-AMP.

POWER SUPPLY primary BOARD
AUXILIARY BOARD
LOADSPEAKER SOCKET BOARD

MISCELLANEOUS

1280	4822 265 31015	MAINS SOCKET, IEC
1282	9965 000 07788	FUSE RAD T2A
1283	2422 132 07402	RELAY 1P 12V
1290	4822 071 56301	FUSE T 630mA/250V
1291	4822 071 51002	FUSE T1A
1292	4822 071 51002	FUSE T1A
1901	2422 026 05441	CINCH SOCKET 6 FOLD
1902	4822 267 31729	CINCH CONNECTOR, 1 POLE
1903	4822 265 10981	FFC-CONNECTOR, 15P, TOP ENTRY
1922	2422 015 19975	LOADSP. SOCKET, 14x CLICKFIT

CAPACITORS

2281	4822 124 81039	3300µF	20%	25V
2282	4822 124 41458	4700µF	20%	16V
2283	4822 124 41458	4700µF	20%	16V
2284 ©	4822 126 13482	470nF	20%	16V
2285	4822 124 41751	47µF	20%	16V
2286	4822 124 41751	47µF	20%	16V
2287 ©	2222 580 15649	100nF	10%	50V
2288 ©	2222 580 15649	100nF	10%	50V
2289 ©	2222 580 15649	100nF	10%	50V
2290 ©	2222 580 15649	100nF	10%	50V
2291 ©	2222 580 15649	100nF	10%	50V
2292 ©	2222 580 15649	100nF	10%	50V
2901 ©	2238 586 59812	100nF	10%	50V
2902 ©	4822 126 13881	470pF	5%	50V
2903 ©	4822 126 13881	470pF	5%	50V
2904 ©	2020 552 94427	100pF	5%	50V
2905 ©	4822 126 13881	470pF	5%	50V
2906 ©	4822 126 13881	470pF	5%	50V
2907 ©	2020 552 94427	100pF	5%	50V
2908 ©	4822 126 13881	470pF	5%	50V
2909 ©	4822 126 13881	470pF	5%	50V
2910 ©	2238 586 59812	100nF	10%	50V
2911 ©	4822 126 13881	470pF	5%	50V
2912 ©	4822 126 13881	470pF	5%	50V
2913 ©	4822 126 13881	470pF	5%	50V
2914 ©	4822 126 13881	470pF	5%	50V
2916 ©	5322 126 11583	10nF	10%	63V
2917 ©	5322 126 11583	10nF	10%	63V
2918 ©	2020 552 94427	100pF	5%	50V
2919 ©	2020 552 94427	100pF	5%	50V

RESISTORS

2926 ©	5322 126 11583	10nF	10%	63V
2927 ©	5322 126 11583	10nF	10%	63V
2950 ©	4822 126 12105	33nF	5%	63V
2951 ©	4822 126 12105	33nF	5%	63V
2952 ©	4822 126 12105	33nF	5%	63V
2953 ©	4822 126 12105	33nF	5%	63V
2954 ©	4822 126 12105	33nF	5%	63V
2955 ©	4822 126 12105	33nF	5%	63V
2956 ©	4822 126 12105	33nF	5%	63V
3281 ©	4822 051 30472	4,7kΩ	5%	0,06W
3282 ©	4822 051 30472	4,7kΩ	5%	0,06W
3283 ©	4822 051 30472	4,7kΩ	5%	0,06W
3284 ©	4822 051 30223	22kΩ	5%	0,06W
3285 ©	4822 051 30223	22kΩ	5%	0,06W
3290	4822 052 10109	10Ω	5%	NFR
3291	4822 052 10109	10Ω	5%	NFR
3901	4822 116 52175	100Ω	5%	0,5W
3902 ©	4822 051 30102	1kΩ	5%	0,06W
3903 ©	4822 051 30102	1kΩ	5%	0,06W
3904 ©	4822 051 30474	470kΩ	5%	0,06W
3905 ©	4822 051 30474	470kΩ	5%	0,06W
3906 ©	4822 051 30221	220Ω	5%	0,06W
3907 ©	4822 051 30474	470kΩ	5%	0,06W
3908 ©	4822 051 30102	1kΩ	5%	0,06W
3909 ©	4822 051 30102	1kΩ	5%	0,06W
3910 ©	4822 051 30474	470kΩ	5%	0,06W
3911 ©	4822 051 30221	220Ω	5%	0,06W
3912 ©	4822 051 30474	470kΩ	5%	0,06W
3913 ©	4822 051 30474	470kΩ	5%	0,06W
3914 ©	4822 051 30102	1kΩ	5%	0,06W
3915	4822 116 52175	100Ω	5%	0,5W
3916 ©	4822 051 30102	1kΩ	5%	0,06W
3917 ©	4822 051 30474	470kΩ	5%	0,06W
3918 ©	4822 051 30474	470kΩ	5%	0,06W
3919 ©	4822 051 30102	1kΩ	5%	0,06W
3920 ©	4822 051 30102	1kΩ	5%	0,06W
3921 ©	4822 051 30474	470kΩ	5%	0,06W
3922 ©	4822 051 30474	470kΩ	5%	0,06W
3923 ©	4822 051 30471	470Ω	5%	0,06W
3924 ©	4822 051 30471	470Ω	5%	0,06W
3926 ©	4822 051 30109	10Ω	5%	0,06W
3927 ©	4822 051 30109	10Ω	5%	0,06W
4902 ©	4822 051 30008	CHIP JUMPER 0603		
4903 ©	4822 051 30008	CHIP JUMPER 0603		
4904 ©	4822 051 30008	CHIP JUMPER 0603		
4905 ©	4822 051 30008	CHIP JUMPER 0603		
4906 ©	4822 051 30008	CHIP JUMPER 0603		
4908 ©	4822 051 30008	CHIP JUMPER 0603		

COILS

5280	4822 157 11832	400µH
5281	4822 157 11832	400µH

DIODES

6280	4822 130 30621	1N4148
6281	4822 130 31878	1N4003G
6282	4822 130 31878	1N4003G
6283	4822 130 31878	1N4003G
6284	4822 130 31878	1N4003G
6285	4822 130 31878	1N4003G
6286	4822 130 31878	1N4003G
6287	4822 130 31878	1N4003G
6288	4822 130 31878	1N4003G

DIODES

6289	4822 130 30621	1N4148
6290	4822 130 30621	1N4148
6291	4822 130 34382	BZX79-B8V2
6292	4822 130 31878	1N4003G
6293	4822 130 31878	1N4003G
6294	3198 010 53390	BZX79-B33

TRANSISTORS

7281	4822 130 40855	BC337-40
7282	9322 139 23687	BDX53BFP

INTEGRATED CIRCUITS

7901	5322 209 11102	HEF4052BT

POWER secondary BOARD

MECHANICAL PARTS

15	4822 255 40179	SPRING CLIP TO220

MISCELLANEOUS

1211	4822 071 55002	FUSE T5A
1212	4822 071 55002	FUSE T5A
1213	4822 071 53152	FUSE RAD T 3.15A
1214	4822 071 53152	FUSE RAD T 3.15A

CAPACITORS

2200	4822 124 21732	10µF	20%	25V
2201	4822 124 21913	1µF	20%	63V
2202	4822 124 21732	10µF	20%	25V
2203	4822 124 40769	4,7µF	20%	100V
2204	4822 124 81144	1000µF	20%	16V
2205	4822 124 22652	2,2µF	20%	50V
2206	4822 124 21913	1µF	20%	63V
2207	4822 124 12255	10µF	20%	50V
2208©	4822 124 11946	22µF	20%	16V
2209©	4822 124 11946	22µF	20%	16V
2210	4822 124 81286	47µF	20%	16V
2211©	4822 124 11946	22µF	20%	16V
2212	2020 021 91799	4700µF	20%	16V
2213	2020 021 91801	4700µF	20%	35V
2214	4822 124 40248	10µF	20%	63V
2216	4822 124 41751	47µF	20%	16V
2217	4822 124 41751	47µF	20%	16V
2218	4822 124 22652	2,2µF	20%	50V
2219	4822 124 21913	1µF	20%	63V
2220	2020 021 91801	4700µF	20%	35V
2221	2020 021 91801	4700µF	20%	35V
2222	2020 021 91799	4700µF	20%	16V
2223	2020 021 91799	4700µF	20%	16V
2224	4822 124 21732	10µF	20%	25V
2225©	4822 126 14491	2,2µF		10V
2226	4822 124 81286	47µF	20%	16V
2231©	2020 552 96683	220nF	10%	50V
2232©	2020 552 96683	220nF	10%	50V
2233©	2020 552 96683	220nF	10%	50V
2234©	2020 552 96683	220nF	10%	50V
2235©	2020 552 96683	220nF	10%	50V
2236©	2020 552 96683	220nF	10%	50V
2237©	2020 552 96683	220nF	10%	50V
2238©	2020 552 96683	220nF	10%	50V
2239©	2020 552 96683	220nF	10%	50V

RESISTORS

2240©	2020 552 96683	220nF	10%	50V
2241©	2020 552 96683	220nF	10%	50V
2242©	2020 552 96683	220nF	10%	50V
2243	4822 124 12255	10µF	20%	50V
3205©	4822 051 30222	2,2kΩ	5%	0,06W
3207©	4822 051 30472	4,7kΩ	5%	0,06W
3208©	4822 051 30472	4,7kΩ	5%	0,06W
3209©	4822 051 30103	10kΩ	5%	0,06W
3210©	4822 051 30103	10kΩ	5%	0,06W
3211©	4822 051 30103	10kΩ	5%	0,06W
3212©	4822 051 30681	680Ω	5%	0,06W
3213©	4822 051 30222	2,2kΩ	5%	0,06W
3214©	4822 051 30331	330Ω	5%	0,06W
3215©	4822 051 30222	2,2kΩ	5%	0,06W
3216©	4822 051 30681	680Ω	5%	0,06W
3217©	4822 051 30331	330Ω	5%	0,06W
3218©	4822 117 12925	47kΩ	1%	0,06W
3219©	4822 051 30102	1kΩ	5%	0,06W
3220©	4822 051 30332	3,3kΩ	5%	0,06W
3221©	4822 117 12925	47kΩ	1%	0,06W
3222©	4822 051 30121	120Ω	5%	0,06W
3223©	4822 051 30102	1kΩ	5%	0,06W
3224©	4822 051 30152	1,5kΩ	5%	0,06W
3225©	4822 051 30103	10kΩ	5%	0,06W
3226©	4822 051 30183	18kΩ	5%	0,06W
3227©	4822 051 30103	10kΩ	5%	0,06W
3228©	4822 051 30103	10kΩ	5%	0,06W
3229©	4822 051 30562	5,6kΩ	5%	0,06W
3230©	4822 051 30102	1kΩ	5%	0,06W
3231©	4822 051 30682	6,8kΩ	5%	0,06W
3232©	4822 051 30273	27kΩ	5%	0,06W
3233©	4822 051 30102	1kΩ	5%	0,06W
3234©	4822 117 13632	100kΩ	1%	0,06W
3235©	4822 051 30102	1kΩ	5%	0,06W
3236©	4822 051 30102	1kΩ	5%	0,06W
3237©	4822 051 30102	1kΩ	5%	0,06W
3238©	4822 051 30102	1kΩ	5%	0,06W
3239©	4822 051 30103	10kΩ	5%	0,06W
3240©	4822 051 30103	10kΩ	5%	0,06W
3241©	4822 051 30102	1kΩ	5%	0,06W
3242	2322 640 63103	10kΩ	NTC	
3243©	4822 051 30102	1kΩ	5%	0,06W
3244©	4822 051 30102	1kΩ	5%	0,06W
3245©	4822 051 30102	1kΩ	5%	0,06W
3249©	4822 117 12902	8,2kΩ	1%	0,06W
3250©	4822 051 30152	1,5kΩ	5%	0,06W
3251©	4822 051 30102	1kΩ	5%	0,06W
3252	4822 052 10109	10Ω	5%	NFR
3254©	4822 051 30101	100Ω	5%	0,06W
3255	4822 052 10109	10Ω	5%	NFR
3256	4822 117 11744	0,22Ω	5%	1W
3257©	4822 051 30102	1kΩ	5%	0,06W
3258©	4822 051 30103	10kΩ	5%	0,06W
3259©	4822 051 30271	270Ω	5%	0,06W
3260©	4822 051 30103	10kΩ	5%	0,06W
3261©	4822 051 30102	1kΩ	5%	0,06W
3263©	4822 051 30333	33kΩ	5%	0,06W
3264©	4822 117 12891	220kΩ	1%	0,06W
3265©	4822 117 13632	100kΩ	1%	0,06W
3266©	4822 117 11817	1,2kΩ	1%	0,06W
3267©	4822 051 30103	10kΩ	5%	0,06W
3268©	4822 051 30153	15kΩ	5%	0,06W
3269©	4822 051 30223	22kΩ	5%	0,06W

RESISTORS

3270 ©	4822 051 30102	1kΩ	5%	0,06W
3271 ©	4822 051 30103	10kΩ	5%	0,06W
3272 ©	4822 051 30682	6,8kΩ	5%	0,06W
3273 ©	4822 051 30683	68kΩ	5%	0,06W
3274 ©	4822 051 30103	10kΩ	5%	0,06W
3275 ©	4822 051 30682	6,8kΩ	5%	0,06W
3276 ©	4822 051 30152	1,5kΩ	5%	0,06W
4201 ©	4822 051 30008	CHIP JUMPER 0603		

COILS

5200	2422 536 00562	100µH	10%

DIODES

6210	4822 130 11139	GBU8D
6211	4822 130 83302	BRIDGE RECTIFIER GBU4D
6212 ©	4822 130 11522	UDZ15B
6213 ©	4822 130 11522	UDZ15B
6214 ©	4822 130 10838	UDZ3.3B
6215 ©	4822 130 11416	PDZ6.8B
6216 ©	4822 130 11397	BAS316
6217	4822 130 31878	1N4003G
6219 ©	9322 187 19668	SK36
6220	4822 130 31878	1N4003G
6221 ©	4822 130 11397	BAS316
6222 ©	4822 130 11397	BAS316
6223 ©	4822 130 11397	BAS316
6224 ©	9340 548 61115	PDZ12B
6225 ©	9340 548 61115	PDZ12B
6226 ©	4822 130 11551	BZX384-C10
6227 ©	4822 130 11397	BAS316
6230 ©	4822 130 11416	PDZ6.8B
6231 ©	9340 548 61115	PDZ12B
6232 ©	3198 020 55680	BZX384-C5V6
6233 ©	4822 130 11522	UDZ15B

TRANSISTORS

7202	9322 139 23687	BDX53BFP
7207 ©	3198 010 42310	BC847BW
7208 ©	9322 163 75685	SI2306DS
7209 ©	3198 010 42310	BC847BW
7210	9322 198 89687	STP36NE06FP
7211	9322 198 89687	STP36NE06FP
7212 ©	9322 163 75685	SI2306DS
7213 ©	9322 163 75685	SI2306DS
7214 ©	9340 218 60115	BC857CW
7215 ©	9340 218 60115	BC857CW
7216 ©	3198 010 42310	BC847BW
7217 ©	3198 010 42310	BC847BW
7218 ©	3198 010 42310	BC847BW
7219 ©	3198 010 42310	BC847BW
7220	4822 130 41246	BC327-25
7221 ©	3198 010 42310	BC847BW
7222 ©	3198 010 42320	BC857BW
7223 ©	9340 218 60115	BC857CW
7224 ©	9340 218 60115	BC857CW
7225 ©	9322 163 75685	SI2306DS
7226 ©	3198 010 42310	BC847BW
7227 ©	3198 010 42310	BC847BW
7228 ©	3198 010 42320	BC857BW

INTEGRATED CIRCUITS

7200	9322 189 78682	LD1086V120
7201	4822 209 13061	L4940V5
7203	4822 209 32955	LM2941CT
7204	9322 188 75682	LM2576T-3.3
7205	4822 209 31842	L7905CP
7206	9322 131 68687	L7912CP

ASP BOARD

MISCELLANEOUS

1600	2422 025 15564	FFC-CONNECTOR, 21P, SIDE ENTRY
1601	4822 267 10757	FFC-CONNECTOR, 23P, TOP ENTRY
1606	4822 267 11039	FFC-CONNECTOR, 11P, TOP ENTRY
1610	4822 265 10981	FFC-CONNECTOR, 15P, TOP ENTRY
1611	4822 267 10733	FFC-CONNECTOR, 4P, TOP ENTRY
1621	4822 267 10729	FFC-CONNECTOR, 10P, TOP ENTRY

CAPACITORS

2500	4822 124 22726	4,7µF	20%	35V
2501	4822 124 22726	4,7µF	20%	35V
2502	4822 124 22726	4,7µF	20%	35V
2503	4822 124 22726	4,7µF	20%	35V
2504	4822 124 22651	1µF	20%	50V
2505	4822 124 22651	1µF	20%	50V
2506	4822 124 22651	1µF	20%	50V
2507	4822 124 22651	1µF	20%	50V
2508	4822 124 22726	4,7µF	20%	35V
2509	4822 124 22726	4,7µF	20%	35V
2510 ©	2020 552 94427	100pF	5%	50V
2511 ©	2020 552 94427	100pF	5%	50V
2512 ©	2020 552 94427	100pF	5%	50V
2513 ©	2020 552 94427	100pF	5%	50V
2514 ©	2020 552 94427	100pF	5%	50V
2515 ©	2020 552 94427	100pF	5%	50V
2516 ©	2020 552 94427	100pF	5%	50V
2517 ©	2020 552 94427	100pF	5%	50V
2518 ©	5322 126 11578	1nF	10%	63V
2520 ©	2238 586 59812	100nF	10%	50V
2521	4822 124 81286	47µF	20%	16V
2522 ©	4822 126 14238	2,2nF	10%	50V
2523	4822 124 41643	100µF	20%	16V
2524	4822 124 81286	47µF	20%	16V
2525 ©	2238 916 15641	22nF	10%	25V
2526	4822 124 81286	47µF	20%	16V
2527 ©	5322 126 11578	1nF	10%	63V
2528	5322 124 41948	0,47µF	20%	50V
2534 ©	4822 126 13193	4,7nF	10%	63V
2535 ©	4822 126 14585	100nF	10%	50V
2536 ©	2020 552 96326	220nF	10%	16V
2538 ©	2020 552 94427	100pF	5%	50V
2539 ©	2020 552 94427	100pF	5%	50V
2544 ©	4822 126 13193	4,7nF	10%	63V
2545 ©	4822 126 14585	100nF	10%	50V
2546 ©	2020 552 96326	220nF	10%	16V
2548	5322 124 41948	0,47µF	20%	50V
2549 ©	5322 126 11578	1nF	10%	63V
2550	4822 124 23432	100µF	20%	10V
2551 ©	2238 916 15641	22nF	10%	25V
2552	4822 124 81286	47µF	20%	16V
2554	4822 124 22726	4,7µF	20%	35V
2555	4822 124 22726	4,7µF	20%	35V
2556 ©	2238 586 59812	100nF	10%	50V
2560	4822 124 22726	4,7µF	20%	35V

CAPACITORS

2561 ©	5322 126 11578	1nF	10%	63V	
2562 ©	4822 126 11785	47pF	5%	50V	
2563	4822 124 23432	100µF	20%	10V	
2564 ©	2020 552 94427	100pF	5%	50V	
2570	4822 124 22726	4,7µF	20%	35V	
2571 ©	5322 126 11578	1nF	10%	63V	
2572 ©	4822 126 11785	47pF	5%	50V	
2573	4822 124 23432	100µF	20%	10V	
2574 ©	2020 552 94427	100pF	5%	50V	
2590	4822 124 22726	4,7µF	20%	35V	
2591 ©	4822 126 13881	470pF	5%	50V	
2592	4822 124 22726	4,7µF	20%	35V	
2593 ©	4822 126 13881	470pF	5%	50V	
2595	4822 124 22726	4,7µF	20%	35V	
2600	4822 124 22651	1µF	20%	50V	
2601	4822 124 22651	1µF	20%	50V	
2602 ©	4822 126 14456	56nF	10%	50V	
2603 ©	4822 126 14456	56nF	10%	50V	
2606	4822 124 81286	47µF	20%	16V	
2607 ©	2238 916 15641	22nF	10%	25V	
2608	4822 124 81286	47µF	20%	16V	
2609 ©	2020 552 94427	100pF	5%	50V	
2610 ©	2020 552 94427	100pF	5%	50V	
2611 ©	2020 552 94427	100pF	5%	50V	
2612 ©	2020 552 94427	100pF	5%	50V	
2613 ©	2020 552 94427	100pF	5%	50V	
2614 ©	2020 552 94427	100pF	5%	50V	
2615 ©	4822 126 13193	4,7nF	10%	63V	
2618 ©	3198 016 31020	1nF	5%	25V	
2619	5322 124 41948	0,47µF	20%	50V	
2620 ©	2020 552 94427	100pF	5%	50V	
2621 ©	3198 016 31020	1nF	5%	25V	
2622 ©	2020 552 94427	100pF	5%	50V	
2623 ©	2020 552 94427	100pF	5%	50V	
2624 ©	2020 552 94427	100pF	5%	50V	
2625 ©	2020 552 96684	470nF	10%	25V	
2627	4822 124 81286	47µF	20%	16V	
2630 ©	4822 126 13193	4,7nF	10%	63V	
2633 ©	2020 552 94427	100pF	5%	50V	
2637 ©	2020 552 96327	330nF	10%	16V	
2638 ©	3198 016 31020	1nF	5%	25V	
2639	5322 124 41948	0,47µF	20%	50V	
2640 ©	2020 552 94427	100pF	5%	50V	
2641 ©	3198 016 31020	1nF	5%	25V	
2642	4822 124 81286	47µF	20%	16V	
2643	4822 124 23432	100µF	20%	10V	
2644	4822 124 23432	100µF	20%	10V	
2647	4822 124 81286	47µF	20%	16V	
2650	4822 124 22651	1µF	20%	50V	
2651	3198 028 41090	10µF	20%	35V	
2652	3198 028 41090	10µF	20%	35V	
2653	3198 028 41090	10µF	20%	35V	
2654 ©	4822 126 14549	33nF	10%	16V	
2655 ©	4822 126 14549	33nF	10%	16V	
2656	4822 124 81286	47µF	20%	16V	
2657 ©	2238 916 15641	22nF	10%	25V	
2658	4822 124 81286	47µF	20%	16V	
2659 ©	2020 552 96327	330nF	10%	16V	
2660 ©	2020 552 94427	100pF	5%	50V	
2661 ©	2020 552 94427	100pF	5%	50V	
2662 ©	2020 552 94427	100pF	5%	50V	
2663 ©	2020 552 96327	330nF	10%	16V	
2664 ©	2020 552 94427	100pF	5%	50V	

CAPACITORS

2665 ©	4822 126 13193	4,7nF	10%	63V
2667	4822 124 81286	47µF	20%	16V
2668 ©	3198 016 31020	1nF	5%	25V
2669	5322 124 41948	0,47µF	20%	50V
2670 ©	2020 552 94427	100pF	5%	50V
2671 ©	3198 016 31020	1nF	5%	25V
2672 ©	2020 552 94427	100pF	5%	50V
2673 ©	2020 552 96684	470nF	10%	25V
2674 ©	2020 552 94427	100pF	5%	50V
2675 ©	2020 552 94427	100pF	5%	50V
2676	4822 124 22726	4,7µF	20%	35V
2680 ©	2020 552 94427	100pF	5%	50V
2681 ©	2020 552 96684	470nF	10%	25V
2682 ©	4822 126 14456	56nF	10%	50V
2684 ©	2020 552 96326	220nF	10%	16V
2685 ©	2020 552 96326	220nF	10%	16V
2686 ©	2020 552 94427	100pF	5%	50V
2687	4822 124 81286	47µF	20%	16V
2688 ©	3198 016 31020	1nF	5%	25V
2690 ©	2020 552 94427	100pF	5%	50V
2691 ©	5322 126 11583	10nF	10%	63V
2692 ©	5322 126 11583	10nF	10%	63V
2693 ©	5322 126 11583	10nF	10%	63V
2696 ©	5322 126 11583	10nF	10%	63V
2697 ©	5322 126 11583	10nF	10%	63V

RESISTORS

3500 ©	4822 051 30101	100Ω	5%	0,06W
3501 ©	4822 117 13632	100kΩ	1%	0,06W
3502 ©	4822 051 30101	100Ω	5%	0,06W
3503 ©	4822 117 13632	100kΩ	1%	0,06W
3504 ©	4822 051 30472	4,7kΩ	5%	0,06W
3505 ©	4822 051 30472	4,7kΩ	5%	0,06W
3506 ©	4822 051 30472	4,7kΩ	5%	0,06W
3507 ©	4822 051 30472	4,7kΩ	5%	0,06W
3508 ©	4822 051 30102	1kΩ	5%	0,06W
3509 ©	4822 051 30393	39kΩ	5%	0,06W
3510 ©	4822 051 30102	1kΩ	5%	0,06W
3511 ©	4822 051 30393	39kΩ	5%	0,06W
3512 ©	4822 051 30472	4,7kΩ	5%	0,06W
3514 ©	4822 051 30472	4,7kΩ	5%	0,06W
3516 ©	4822 051 30221	220Ω	5%	0,06W
3517 ©	4822 051 30221	220Ω	5%	0,06W
3518 ©	4822 051 30221	220Ω	5%	0,06W
3519 ©	4822 051 30221	220Ω	5%	0,06W
3523 ©	5322 117 13038	27kΩ	1%	0.06W
3524 ©	2322 704 61804	180kΩ	1%	0,06W
3525 ©	4822 051 30479	47Ω	5%	0,06W
3526 ©	4822 051 30102	1kΩ	5%	0,06W
3527 ©	4822 051 30221	220Ω	5%	0,06W
3528 ©	4822 051 30221	220Ω	5%	0,06W
3529 ©	4822 051 30221	220Ω	5%	0,06W
3530 ©	4822 051 30221	220Ω	5%	0,06W
3536 ©	4822 051 30682	6,8kΩ	5%	0,06W
3537 ©	4822 051 30332	3,3kΩ	5%	0,06W
3538 ©	4822 051 30333	33kΩ	5%	0,06W
3539 ©	4822 051 30103	10kΩ	5%	0,06W
3540 ©	4822 051 30472	4,7kΩ	5%	0,06W
3546 ©	4822 051 30682	6,8kΩ	5%	0,06W
3547 ©	4822 051 30332	3,3kΩ	5%	0,06W
3548 ©	4822 051 30333	33kΩ	5%	0,06W
3549 ©	4822 051 30221	220Ω	5%	0,06W
3550 ©	4822 051 30102	1kΩ	5%	0,06W

RESISTORS

3551 ©	4822 051 30102	1kΩ	5%	0,06W
3552 ©	4822 051 30221	220Ω	5%	0,06W
3553 ©	4822 051 30472	4,7kΩ	5%	0,06W
3554 ©	4822 117 12902	8,2kΩ	1%	0,06W
3555	4822 052 10229	22Ω	5%	0,33W
3556 ©	4822 051 30102	1kΩ	5%	0,06W
3557 ©	4822 051 30102	1kΩ	5%	0,06W
3558 ©	4822 051 30103	10kΩ	5%	0,06W
3559 ©	4822 051 30153	15kΩ	5%	0,06W
3560 ©	4822 051 30472	4,7kΩ	5%	0,06W
3561 ©	4822 051 30474	470kΩ	5%	0,06W
3562 ©	4822 051 30332	3,3kΩ	5%	0,06W
3563 ©	4822 051 30221	220Ω	5%	0,06W
3564 ©	4822 051 30223	22kΩ	5%	0,06W
3565 ©	4822 051 30682	6,8kΩ	5%	0,06W
3566 ©	4822 051 30273	27kΩ	5%	0,06W
3567 ©	4822 051 30331	330Ω	5%	0,06W
3568 ©	4822 051 30479	47Ω	5%	0,06W
3569 ©	4822 051 30339	33Ω	5%	0,06W
3570 ©	4822 051 30472	4,7kΩ	5%	0,06W
3571 ©	4822 051 30474	470kΩ	5%	0,06W
3572 ©	4822 051 30332	3,3kΩ	5%	0,06W
3573 ©	4822 051 30221	220Ω	5%	0,06W
3574 ©	4822 051 30223	22kΩ	5%	0,06W
3575 ©	4822 051 30682	6,8kΩ	5%	0,06W
3576 ©	4822 051 30273	27kΩ	5%	0,06W
3577 ©	4822 051 30331	330Ω	5%	0,06W
3578 ©	4822 051 30479	47Ω	5%	0,06W
3579 ©	4822 051 30339	33Ω	5%	0,06W
3580 ©	4822 051 30472	4,7kΩ	5%	0,06W
3581 ©	4822 051 30103	10kΩ	5%	0,06W
3582 ©	4822 051 30153	15kΩ	5%	0,06W
3583 ©	4822 051 30151	150Ω	5%	0,06W
3584 ©	4822 051 30151	150Ω	5%	0,06W
3585 ©	4822 051 30102	1kΩ	5%	0,06W
3586 ©	4822 051 30102	1kΩ	5%	0,06W
3587 ©	4822 051 30103	10kΩ	5%	0,06W
3588 ©	4822 051 30103	10kΩ	5%	0,06W
3589 ©	4822 051 30103	10kΩ	5%	0,06W
3590 ©	4822 051 30102	1kΩ	5%	0,06W
3591 ©	4822 117 12925	47kΩ	1%	0,06W
3592 ©	4822 051 30471	470Ω	5%	0,06W
3593 ©	4822 051 30222	2,2kΩ	5%	0,06W
3594 ©	4822 051 30102	1kΩ	5%	0,06W
3595 ©	4822 117 12925	47kΩ	1%	0,06W
3596 ©	4822 051 30471	470Ω	5%	0,06W
3597 ©	4822 051 30222	2,2kΩ	5%	0,06W
3598 ©	4822 051 30103	10kΩ	5%	0,06W
3599 ©	4822 051 30103	10kΩ	5%	0,06W
3600 ©	4822 051 30472	4,7kΩ	5%	0,06W
3601 ©	4822 051 30472	4,7kΩ	5%	0,06W
3602 ©	4822 051 30472	4,7kΩ	5%	0,06W
3603 ©	4822 051 30472	4,7kΩ	5%	0,06W
3604 ©	4822 051 30221	220Ω	5%	0,06W
3605 ©	4822 051 30221	220Ω	5%	0,06W
3606 ©	4822 051 30221	220Ω	5%	0,06W
3608 ©	4822 051 30221	220Ω	5%	0,06W
3609 ©	4822 051 30221	220Ω	5%	0,06W
3611 ©	4822 051 30102	1kΩ	5%	0,06W
3612 ©	4822 051 30103	10kΩ	5%	0,06W
3613 ©	4822 051 30221	220Ω	5%	0,06W
3614 ©	4822 051 30221	220Ω	5%	0,06W
3615 ©	4822 051 30103	10kΩ	5%	0,06W

RESISTORS

3617 ©	4822 051 30102	1kΩ	5%	0,06W
3618 ©	4822 051 30682	6,8kΩ	5%	0,06W
3619 ©	4822 051 30102	1kΩ	5%	0,06W
3620 ©	4822 051 30102	1kΩ	5%	0,06W
3621 ©	4822 051 30102	1kΩ	5%	0,06W
3622 ©	4822 051 30102	1kΩ	5%	0,06W
3623 ©	4822 051 30103	10kΩ	5%	0,06W
3625 ©	4822 051 30103	10kΩ	5%	0,06W
3626 ©	4822 051 30103	10kΩ	5%	0,06W
3627 ©	4822 051 30101	100Ω	5%	0,06W
3629 ©	4822 051 30102	1kΩ	5%	0,06W
3631 ©	4822 051 30102	1kΩ	5%	0,06W
3632 ©	4822 051 30103	10kΩ	5%	0,06W
3633 ©	4822 051 30221	220Ω	5%	0,06W
3634 ©	4822 051 30221	220Ω	5%	0,06W
3635 ©	4822 051 30103	10kΩ	5%	0,06W
3638 ©	4822 051 30682	6,8kΩ	5%	0,06W
3639 ©	4822 051 30471	470Ω	5%	0,06W
3640	4822 052 10229	22Ω	5%	0,33W
3641 ©	4822 051 30472	4,7kΩ	5%	0,06W
3642 ©	4822 117 12902	8,2kΩ	1%	0,06W
3643 ©	4822 051 30472	4,7kΩ	5%	0,06W
3644 ©	4822 117 12902	8,2kΩ	1%	0,06W
3645 ©	4822 051 30103	10kΩ	5%	0,06W
3646 ©	4822 051 30103	10kΩ	5%	0,06W
3647 ©	4822 051 30101	100Ω	5%	0,06W
3649 ©	4822 051 30102	1kΩ	5%	0,06W
3650 ©	4822 051 30472	4,7kΩ	5%	0,06W
3651 ©	4822 051 30472	4,7kΩ	5%	0,06W
3652 ©	4822 051 30102	1kΩ	5%	0,06W
3654 ©	4822 051 30221	220Ω	5%	0,06W
3655 ©	4822 051 30221	220Ω	5%	0,06W
3656 ©	4822 051 30221	220Ω	5%	0,06W
3657 ©	4822 051 30472	4,7kΩ	5%	0,06W
3658 ©	4822 051 30221	220Ω	5%	0,06W
3659 ©	4822 051 30472	4,7kΩ	5%	0,06W
3661 ©	4822 051 30102	1kΩ	5%	0,06W
3662 ©	4822 051 30103	10kΩ	5%	0,06W
3663 ©	4822 051 30221	220Ω	5%	0,06W
3664 ©	4822 051 30221	220Ω	5%	0,06W
3665 ©	4822 051 30103	10kΩ	5%	0,06W
3666 ©	4822 051 30222	2,2kΩ	5%	0,06W
3667 ©	4822 051 30101	100Ω	5%	0,06W
3668 ©	4822 051 30682	6,8kΩ	5%	0,06W
3669 ©	4822 051 30102	1kΩ	5%	0,06W
3670 ©	4822 051 30102	1kΩ	5%	0,06W
3673 ©	4822 051 30102	1kΩ	5%	0,06W
3674 ©	4822 051 30102	1kΩ	5%	0,06W
3675 ©	4822 051 30102	1kΩ	5%	0,06W
3676 ©	4822 051 30103	10kΩ	5%	0,06W
3677 ©	4822 051 30153	15kΩ	5%	0,06W
3681 ©	4822 051 30332	3,3kΩ	5%	0,06W
3682 ©	4822 051 30562	5,6kΩ	5%	0,06W
3683 ©	4822 051 30332	3,3kΩ	5%	0,06W
3684 ©	4822 051 30103	10kΩ	5%	0,06W
3685 ©	4822 051 30103	10kΩ	5%	0,06W
3686 ©	4822 051 30223	22kΩ	5%	0,06W
3687 ©	4822 051 30101	100Ω	5%	0,06W
3688 ©	4822 051 30222	2,2kΩ	5%	0,06W
3689 ©	4822 051 30102	1kΩ	5%	0,06W
3690 ©	4822 051 30103	10kΩ	5%	0,06W
3691 ©	4822 051 30471	470Ω	5%	0,06W
3693 ©	4822 051 30103	10kΩ	5%	0,06W

RESISTORS

3694 ©	4822 051 30103	10kΩ	5%	0,06W
3695 ©	4822 051 30471	470Ω	5%	0,06W
3696 ©	4822 051 30471	470Ω	5%	0,06W
3697 ©	4822 051 30471	470Ω	5%	0,06W
3698 ©	4822 051 30103	10kΩ	5%	0,06W
3699 ©	4822 051 30103	10kΩ	5%	0,06W
3702 ©	4822 051 30102	1kΩ	5%	0,06W
3703 ©	4822 051 30103	10kΩ	5%	0,06W
3704 ©	4822 117 13613	2,2Ω	5%	0,06W
3705 ©	4822 117 13613	2,2Ω	5%	0,06W
3706 ©	4822 117 13613	2,2Ω	5%	0,06W
3707 ©	4822 117 13613	2,2Ω	5%	0,06W
3708 ©	4822 051 30682	6,8kΩ	5%	0,06W
3709 ©	4822 117 12891	220kΩ	1%	0,06W
3710 ©	4822 117 12902	8,2kΩ	1%	0,06W
4501 ©	4822 051 30008	CHIP JUMPER 0603		
4502 ©	4822 051 30008	CHIP JUMPER 0603		
4503 ©	4822 051 30008	CHIP JUMPER 0603		
4504 ©	4822 051 30008	CHIP JUMPER 0603		
4505 ©	4822 051 30008	CHIP JUMPER 0603		
4620 ©	4822 051 30008	CHIP JUMPER 0603		
4625 ©	4822 051 30008	CHIP JUMPER 0603		
4640 ©	4822 051 30008	CHIP JUMPER 0603		
4650 ©	4822 051 30008	CHIP JUMPER 0603		
4652 ©	4822 051 30008	CHIP JUMPER 0603		
4694 ©	4822 051 30008	CHIP JUMPER 0603		

DIODES

6520 ©	4822 130 11397	BAS316

TRANSISTORS

7501 ©	4822 130 60373	BC856B
7510 ©	4822 130 42804	BC817-25
7511 ©	4822 130 60373	BC856B
7512 ©	4822 130 42804	BC817-25
7514 ©	4822 130 60373	BC856B
7516 ©	4822 130 42804	BC817-25
7517 ©	4822 130 42804	BC817-25
7521 ©	5322 130 60159	BC846B
7550 ©	4822 130 60373	BC856B
7551 ©	5322 130 60159	BC846B
7552 ©	5322 130 60159	BC846B
7560 ©	5322 130 60159	BC846B
7570 ©	5322 130 60159	BC846B
7601 ©	4822 130 42804	BC817-25
7602 ©	4822 130 42804	BC817-25
7612 ©	5322 130 60159	BC846B
7613 ©	5322 130 60159	BC846B
7651 ©	4822 130 42804	BC817-25
7652 ©	4822 130 60373	BC856B
7653 ©	4822 130 42804	BC817-25
7655 ©	5322 130 60159	BC846B

INTEGRATED CIRCUITS

7500 ©	9322 150 74668	TDA7468D, SOURCE SEL. & SOUND
7502 ©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7520 ©	9322 186 70668	LM2931D
7600 ©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7604 ©	9322 150 74668	TDA7468D, SOURCE SEL. & SOUND
7650 ©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7654 ©	9322 150 74668	TDA7468D, SOURCE SEL. & SOUND

MDM BOARD

MISCELLANEOUS

1201	3103 308 55111	MDM BOARD PRE-ASSY
1701	4822 252 51172	FUSE 315mA
1702	4822 252 51172	FUSE 315mA

CAPACITORS

2702	4822 123 14025	2200µF	20%	16V

COILS

1704	2422 543 01118	RESONATOR 16MHz
1705	2422 543 01132	RESONATOR 12,288MHz

INTEGRATED CIRCUITS

7702	4822 209 16978	LF33CV

AMPLIFIER BOARD

MECHANICAL PARTS

8	3104 211 29861	SPRING, TRANSISTOR

MISCELLANEOUS

1302	4822 267 10729	FFC-CONNECTOR, 10P, TOP ENTRY
1303	4822 267 10729	FFC-CONNECTOR, 10P, TOP ENTRY

CAPACITORS

2101 ©	2222 580 15649	100nF	10%	50V
2102 ©	2222 580 15649	100nF	10%	50V
2104	2222 601 55649	100nF	10%	100V
2105 ©	2222 580 15649	100nF	10%	50V
2106	2020 021 91431	22µF	20%	100V
2107	2222 601 55649	100nF	10%	100V
2108 ©	2222 580 15649	100nF	10%	50V
2111 ©	4822 126 13188	15nF	5%	63V
2114 ©	5322 116 80853	560pF	5%	63V
2115 ©	5322 116 80853	560pF	5%	63V
2116	4822 121 51252	470nF	5%	63V
2117 ©	2222 581 15654	220nF	10%	50V
2120 ©	4822 126 13188	15nF	5%	63V
2122 ©	5322 116 80853	560pF	5%	63V
2124 ©	2222 581 15654	220nF	10%	50V
2125	4822 121 51252	470nF	5%	63V
2126 ©	5322 116 80853	560pF	5%	63V
2127 ©	2222 580 15649	100nF	10%	50V
2128 ©	2222 580 15649	100nF	10%	50V
2129 ©	2222 580 15649	100nF	10%	50V
2130 ©	2222 580 15649	100nF	10%	50V
2131 ©	4822 126 14241	330pF		50V
2134 ©	2238 780 55654	220nF	10%	16V
2135 ©	4822 126 13956	68pF	5%	63V
2136 ©	4822 126 14241	330pF		50V
2201 ©	2222 580 15649	100nF	10%	50V
2202 ©	2222 580 15649	100nF	10%	50V
2204	2222 601 55649	100nF	10%	100V
2205 ©	2222 580 15649	100nF	10%	50V
2206	2020 021 91431	22µF	20%	100V
2207	2222 601 55649	100nF	10%	100V
2208 ©	2222 580 15649	100nF	10%	50V
2211 ©	4822 126 13188	15nF	5%	63V
2214 ©	5322 116 80853	560pF	5%	63V
2215 ©	5322 116 80853	560pF	5%	63V

CAPACITORS

2216		4822 121 51252	470nF	5%	63V
2217	©	2222 581 15654	220nF	10%	50V
2220	©	4822 126 13188	15nF	5%	63V
2222	©	5322 116 80853	560pF	5%	63V
2224	©	2222 581 15654	220nF	10%	50V
2225		4822 121 51252	470nF	5%	63V
2226	©	5322 116 80853	560pF	5%	63V
2227	©	2222 580 15649	100nF	10%	50V
2228	©	2222 580 15649	100nF	10%	50V
2229	©	2222 580 15649	100nF	10%	50V
2230	©	2222 580 15649	100nF	10%	50V
2231	©	4822 126 14241	330pF		50V
2234	©	2238 780 55654	220nF	10%	16V
2235	©	4822 126 13956	68pF	5%	63V
2236	©	4822 126 14241	330pF		50V
2301	©	2222 580 15649	100nF	10%	50V
2302	©	2222 580 15649	100nF	10%	50V
2304		2222 601 55649	100nF	10%	100V
2305	©	2222 580 15649	100nF	10%	50V
2306		2020 021 91431	22µF	20%	100V
2307		2222 601 55649	100nF	10%	100V
2308	©	2222 580 15649	100nF	10%	50V
2311	©	4822 126 13188	15nF	5%	63V
2314	©	5322 116 80853	560pF	5%	63V
2315	©	5322 116 80853	560pF	5%	63V
2316		4822 121 51252	470nF	5%	63V
2317	©	2222 581 15654	220nF	10%	50V
2320	©	4822 126 13188	15nF	5%	63V
2322	©	5322 116 80853	560pF	5%	63V
2324	©	2222 581 15654	220nF	10%	50V
2325		4822 121 51252	470nF	5%	63V
2326	©	5322 116 80853	560pF	5%	63V
2327	©	2222 580 15649	100nF	10%	50V
2328	©	2222 580 15649	100nF	10%	50V
2329	©	2222 580 15649	100nF	10%	50V
2330	©	2222 580 15649	100nF	10%	50V
2331	©	4822 126 14241	330pF		50V
2334	©	2238 780 55654	220nF	10%	16V
2335	©	4822 126 13956	68pF	5%	63V
2336	©	4822 126 14241	330pF		50V
2400	©	2222 580 15649	100nF	10%	50V
2401		4822 124 80062	470µF	20%	35V
2402		4822 124 80062	470µF	20%	35V
2403	©	2222 580 15649	100nF	10%	50V
2404		4822 124 80062	470µF	20%	35V
2405		4822 124 80062	470µF	20%	35V
2406		4822 123 14026	470µF	20%	35V
2407		4822 123 14026	470µF	20%	35V
2408	©	5322 126 11578	1nF	10%	63V
2409	©	5322 126 11578	1nF	10%	63V
2410	©	5322 126 11578	1nF	10%	63V
2411	©	5322 126 11578	1nF	10%	63V
2412	©	5322 126 11578	1nF	10%	63V
2413	©	5322 126 11578	1nF	10%	63V
2414	©	5322 126 11578	1nF	10%	63V
2415	©	5322 126 11578	1nF	10%	63V
2416	©	5322 126 11578	1nF	10%	63V
2417	©	5322 126 11578	1nF	10%	63V
2418	©	5322 126 11578	1nF	10%	63V
2419	©	2238 586 59812	100nF	10%	50V
2420	©	5322 126 11578	1nF	10%	63V
2421	©	5322 126 11578	1nF	10%	63V
2422	©	5322 126 11578	1nF	10%	63V

CAPACITORS

2423	©	2238 586 59812	100nF	10%	50V
2425	©	5322 126 11578	1nF	10%	63V
2600	©	2238 586 59812	100nF	10%	50V
2602	©	2020 552 94427	100pF	5%	50V
2603	©	2020 552 94427	100pF	5%	50V
2604	©	2238 586 59812	100nF	10%	50V
2605	©	4822 126 13881	470pF	5%	50V
2606	©	5322 126 11578	1nF	10%	63V
2607	©	2020 552 94427	100pF	5%	50V
2608	©	2020 552 94427	100pF	5%	50V
2611	©	2020 552 96507	10µF	20%	10V
2700	©	2020 552 96507	10µF	20%	10V

RESISTORS

3100	©	4822 051 10568	5,6Ω	5%	0,25W
3101	©	4822 051 10568	5,6Ω	5%	0,25W
3102	©	4822 051 10568	5,6Ω	5%	0,25W
3105	©	4822 051 10568	5,6Ω	5%	0,25W
3200	©	4822 051 10568	5,6Ω	5%	0,25W
3201	©	4822 051 10568	5,6Ω	5%	0,25W
3202	©	4822 051 10568	5,6Ω	5%	0,25W
3205	©	4822 051 10568	5,6Ω	5%	0,25W
3300	©	4822 051 10568	5,6Ω	5%	0,25W
3301	©	4822 051 10568	5,6Ω	5%	0,25W
3302	©	4822 051 10568	5,6Ω	5%	0,25W
3305	©	4822 051 10568	5,6Ω	5%	0,25W
3103	©	2322 762 60229	22Ω	5%	0,25W
3104	©	2322 762 60229	22Ω	5%	0,25W
3107	©	4822 051 30109	10Ω	5%	0,06W
3109	©	4822 051 30109	10Ω	5%	0,06W
3203	©	2322 762 60229	22Ω	5%	0,25W
3204	©	2322 762 60229	22Ω	5%	0,25W
3207	©	4822 051 30109	10Ω	5%	0,06W
3209	©	4822 051 30109	10Ω	5%	0,06W
3303	©	2322 762 60229	22Ω	5%	0,25W
3304	©	2322 762 60229	22Ω	5%	0,25W
3307	©	4822 051 30109	10Ω	5%	0,06W
3309	©	4822 051 30109	10Ω	5%	0,06W
3401	©	4822 051 30562	5,6kΩ	5%	0,06W
3404	©	4822 051 30221	220Ω	5%	0,06W
3405	©	4822 051 30562	5,6kΩ	5%	0,06W
3408	©	4822 051 30221	220Ω	5%	0,06W
3410	©	4822 051 30562	5,6kΩ	5%	0,06W
3411	©	4822 051 30562	5,6kΩ	5%	0,06W
3412	©	4822 051 30221	220Ω	5%	0,06W
3413	©	4822 051 30562	5,6kΩ	5%	0,06W
3414	©	4822 051 30562	5,6kΩ	5%	0,06W
3415	©	4822 051 30562	5,6kΩ	5%	0,06W
3420	©	2322 615 23103	10kΩ	5%	NTC
3421	©	4822 051 30562	5,6kΩ	5%	0,06W
3422	©	4822 051 30101	100Ω	5%	0,06W
3423	©	4822 051 30562	5,6kΩ	5%	0,06W
3424	©	4822 051 30562	5,6kΩ	5%	0,06W
3425	©	4822 051 30562	5,6kΩ	5%	0,06W
3426	©	4822 051 30562	5,6kΩ	5%	0,06W
3600	©	4822 051 10821	820Ω	2%	0,25W
3600	©	4822 051 30222	2,2kΩ	5%	0,06W
3601	©	4822 051 10821	820Ω	2%	0,25W
3601	©	4822 051 30222	2,2kΩ	5%	0,06W
3602	©	4822 117 13632	100kΩ	1%	0,06W
3604	©	4822 051 30103	10kΩ	5%	0,06W
3605	©	4822 051 30682	6,8kΩ	5%	0,06W
3606	©	4822 117 13632	100kΩ	1%	0,06W

RESISTORS

3607 ©	4822 051 30102	1kΩ	5%	0,06W
3608 ©	4822 051 30105	1MΩ	5%	0,06W
3609 ©	4822 117 13632	100kΩ	1%	0,06W
3610 ©	4822 117 12139	22Ω	5%	0,06W
3700 ©	4822 117 12925	47kΩ	1%	0,06W
3701 ©	4822 117 12925	47kΩ	1%	0,06W
3703 ©	4822 117 12925	47kΩ	1%	0,06W
3709 ©	4822 117 12925	47kΩ	1%	0,06W
3712 ©	4822 117 12925	47kΩ	1%	0,06W
3713 ©	4822 051 30103	10kΩ	5%	0,06W
3716 ©	4822 117 12925	47kΩ	1%	0,06W
3718 ©	4822 117 12925	47kΩ	1%	0,06W
3721 ©	4822 051 30103	10kΩ	5%	0,06W
3722 ©	4822 051 30103	10kΩ	5%	0,06W
4132 ©	4822 051 20008	CHIP JUMPER 0805		
4133 ©	4822 051 20008	CHIP JUMPER 0805		
4137 ©	4822 051 20008	CHIP JUMPER 0805		
4138 ©	4822 051 20008	CHIP JUMPER 0805		
4232 ©	4822 051 20008	CHIP JUMPER 0805		
4233 ©	4822 051 20008	CHIP JUMPER 0805		
4237 ©	4822 051 20008	CHIP JUMPER 0805		
4238 ©	4822 051 20008	CHIP JUMPER 0805		
4332 ©	4822 051 20008	CHIP JUMPER 0805		
4333 ©	4822 051 20008	CHIP JUMPER 0805		
4337 ©	4822 051 20008	CHIP JUMPER 0805		
4338 ©	4822 051 20008	CHIP JUMPER 0805		

COILS

1600	2422 540 98514	CER. RESONATOR 602kHz
1601	2422 540 98568	CER. RESONATOR 700kHz
5102	2422 536 00496	22µH 10%
5103	2422 536 00496	22µH 10%
5202	2422 536 00496	22µH 10%
5203	2422 536 00496	22µH 10%
5302	2422 536 00496	22µH 10%
5303	2422 536 00496	22µH 10%
5400	4822 157 11411	FERRITE BEAD
5401	4822 157 11411	FERRITE BEAD

DIODES

6600 ©	3198 020 55680	BZX384-C5V6
6713 ©	4822 130 11397	BAS316
6714 ©	4822 130 11397	BAS316
6715 ©	4822 130 11397	BAS316

TRANSISTORS

7602 ©	5322 130 60159	BC846B
7608 ©	4822 130 60373	BC856B
7710 ©	5322 130 60159	BC846B
7716 ©	4822 130 60373	BC856B

INTEGRATED CIRCUITS

7100 ©	9352 705 74518	TDA8920TH/N1
7200 ©	9352 705 74518	TDA8920TH/N1
7300 ©	9352 705 74518	TDA8920TH/N1
7600 ©	5322 209 11517	PC74HCU04T, HEX INVERTER IC
7607 ©	5322 209 14477	HEF4013BT

A/V BOARD /22S (EU)

MISCELLANEOUS

1001	2422 086 10919	FUSE 125mA 65V MP13
1705	3139 147 17001	TUNER UV1316MK3
1900	4822 265 11154	FFC-CONNECTOR, 22P, TOP ENTRY
1986	2422 025 16677	FFC-CONNECTOR, 10P, SIDE ENTRY
7581	9322 155 48687	OPTICAL IN CONNECT. GP1FA550RZ

CAPACITORS

2001	4822 124 80483	47µF	20%	6,3V
2002 ©	2238 586 59812	100nF	10%	50V
2003 ©	2238 586 59812	100nF	10%	50V
2004	4822 124 80483	47µF	20%	6,3V
2005	4822 124 42234	100µF	20%	6,3V
2006 ©	4822 126 11785	47pF	5%	50V
2007	4822 124 21732	10µF	20%	25V
2008 ©	3198 016 31020	1nF	5%	25V
2009 ©	2238 586 59812	100nF	10%	50V
2010	4822 124 80483	47µF	20%	6,3V
2011	4822 124 21732	10µF	20%	25V
2012 ©	2238 586 59812	100nF	10%	50V
2013	4822 124 42234	100µF	20%	6,3V
2014 ©	2238 586 59812	100nF	10%	50V
2015 ©	2238 586 59812	100nF	10%	50V
2018 ©	2238 586 59812	100nF	10%	50V
2019 ©	2238 586 59812	100nF	10%	50V
2020	4822 124 80483	47µF	20%	6,3V
2023	4822 124 80483	47µF	20%	6,3V
2024 ©	4822 126 11669	27pF	10%	50V
2025 ©	3198 016 31020	1nF	5%	25V
2026 ©	4822 126 11669	27pF	10%	50V
2029	4822 124 80483	47µF	20%	6,3V
2031	4822 124 22652	2,2µF	20%	50V
2032 ©	5322 126 11583	10nF	10%	63V
2033 ©	4822 126 13881	470pF	5%	50V
2034 ©	4822 126 13881	470pF	5%	50V
2037 ©	4822 126 13193	4,7nF	10%	63V
2038 ©	4822 126 13193	4,7nF	10%	63V
2039 ©	4822 126 13193	4,7nF	10%	63V
2040 ©	4822 126 13193	4,7nF	10%	63V
2332	4822 124 22652	2,2µF	20%	50V
2334 ©	2238 586 59812	100nF	10%	50V
2402 ©	2238 586 59812	100nF	10%	50V
2403	4822 124 80483	47µF	20%	6,3V
2404 ©	2238 586 59812	100nF	10%	50V
2405	4822 124 80483	47µF	20%	6,3V
2406 ©	5322 126 11583	10nF	10%	63V
2407 ©	4822 122 33741	10pF	10%	50V
2408 ©	3198 017 41050	1µF	20%	10V
2409 ©	2238 586 59812	100nF	10%	50V
2410 ©	3198 017 41050	1µF	20%	10V
2411 ©	2238 586 59812	100nF	10%	50V
2412 ©	4822 122 33741	10pF	10%	50V
2413	4822 124 80483	47µF	20%	6,3V
2414 ©	2238 586 59812	100nF	10%	50V
2416 ©	3198 017 41050	1µF	20%	10V
2417	4822 124 11947	10µF	20%	16V
2418 ©	3198 017 41050	1µF	20%	10V
2419 ©	3198 017 41050	1µF	20%	10V
2421	4822 124 11947	10µF	20%	16V
2423 ©	3198 017 41050	1µF	20%	10V
2427 ©	3198 017 41050	1µF	20%	10V
2428	4822 124 11947	10µF	20%	16V
2433 ©	3198 017 34730	47nF	10%	16V
2434	4822 124 80483	47µF	20%	6,3V
2435 ©	2238 586 59812	100nF	10%	50V

CAPACITORS

2436 ©	3198 017 41050	1µF	20%	10V
2437 ©	3198 017 41050	1µF	20%	10V
2438 ©	3198 017 41050	1µF	20%	10V
2439 ©	2238 586 59812	100nF	10%	50V
2440 ©	3198 017 41050	1µF	20%	10V
2441 ©	3198 017 41050	1µF	20%	10V
2446 ©	3198 017 41050	1µF	20%	10V
2449 ©	4822 126 13956	68pF	5%	63V
2450 ©	2238 586 59812	100nF	10%	50V
2459 ©	3198 017 41050	1µF	20%	10V
2464	4822 124 21732	10µF	20%	25V
2501 ©	3198 017 41050	1µF	20%	10V
2502 ©	2238 586 59812	100nF	10%	50V
2503 ©	2238 586 59812	100nF	10%	50V
2504 ©	3198 017 41050	1µF	20%	10V
2505 ©	3198 017 41050	1µF	20%	10V
2506 ©	3198 017 41050	1µF	20%	10V
2507 ©	3198 017 41050	1µF	20%	10V
2508 ©	3198 017 41050	1µF	20%	10V
2509 ©	2238 586 59812	100nF	10%	50V
2510	4822 124 42234	100µF	20%	6,3V
2511	2020 009 90097	100µF	20%	16V
2512 ©	2238 586 59812	100nF	10%	50V
2513 ©	3198 017 41050	1µF	20%	10V
2514 ©	2238 586 59812	100nF	10%	50V
2515 ©	3198 017 41050	1µF	20%	10V
2516	2020 009 90097	100µF	20%	16V
2517 ©	5322 126 11578	1nF	10%	63V
2518 ©	2238 586 59812	100nF	10%	50V
2519	4822 124 42234	100µF	20%	6,3V
2520 ©	5322 126 11578	1nF	10%	63V
2521 ©	2238 586 59812	100nF	10%	50V
2522	2020 009 90097	100µF	20%	16V
2523 ©	5322 126 11578	1nF	10%	63V
2524 ©	3198 017 41050	1µF	20%	10V
2525 ©	3198 017 41050	1µF	20%	10V
2526	2020 009 90097	100µF	20%	16V
2527 ©	5322 126 11578	1nF	10%	63V
2530 ©	2238 586 59812	100nF	10%	50V
2535 ©	2238 586 59812	100nF	10%	50V
2536 ©	2238 586 59812	100nF	10%	50V
2581 ©	2238 586 59812	100nF	10%	50V
2582 ©	2238 586 59812	100nF	10%	50V
2583 ©	2020 552 94427	100pF	5%	50V
2584 ©	2020 552 94427	100pF	5%	50V
2600	4822 124 21732	10µF	20%	25V
2601 ©	5322 126 11583	10nF	10%	63V
2602	4822 124 21732	10µF	20%	25V
2603 ©	2238 586 59812	100nF	10%	50V
2604 ©	5322 126 11583	10nF	10%	63V
2605	4822 124 21732	10µF	20%	25V
2606 ©	2238 586 59812	100nF	10%	50V
2607 ©	4822 126 14225	56pF	5%	50V
2608	4822 124 21732	10µF	20%	25V
2609 ©	4822 126 14225	56pF	5%	50V
2610 ©	5322 126 11583	10nF	10%	63V
2611	4822 124 80231	47µF	20%	16V
2612	4822 124 40769	4,7µF	20%	100V
2616 ©	5322 126 11578	1nF	10%	63V
2617 ©	5322 126 11578	1nF	10%	63V
2620 ©	3198 016 33380	3,3pF	10%	50V
2621 ©	3198 016 33380	3,3pF	10%	50V
2623 ©	2238 586 59812	100nF	10%	50V
2626	4822 124 22652	2,2µF	20%	50V

CAPACITORS

2627	4822 124 22652	2,2µF	20%	50V
2713 ©	4822 124 11946	22µF	20%	16V
2719 ©	4822 126 13883	220pF	5%	50V
2720	4822 124 42234	100µF	20%	6,3V
2721 ©	5322 122 33861	120pF	5%	NP0
2722	5322 124 41379	2,2µF	20%	50V
2723 ©	4822 126 13881	470pF	5%	50V
2724 ©	2238 586 59812	100nF	10%	50V
2727 ©	2238 586 59812	100nF	10%	50V
2728 ©	5322 126 11583	10nF	10%	63V
2729	4822 124 21732	10µF	20%	25V
2730 ©	4822 126 13879	220nF	20%	16V
2731 ©	2020 552 94523	8,2pF	5%	50V
2732	4822 124 22652	2,2µF	20%	50V
2733 ©	2238 586 59812	100nF	10%	50V
2734 ©	5322 126 11578	1nF	10%	63V
2737	4822 124 80483	47µF	20%	6,3V
2740	4822 124 22652	2,2µF	20%	50V
2741 ©	5322 126 11578	1nF	10%	63V
2742 ©	5322 126 11578	1nF	10%	63V
2800 ©	2238 586 59812	100nF	10%	50V
2801 ©	4822 122 33752	15pF	5%	50V
2802 ©	4822 122 33752	15pF	5%	50V
2803 ©	2238 586 59812	100nF	10%	50V
2804 ©	2238 586 59812	100nF	10%	50V
2805 ©	2238 586 59812	100nF	10%	50V
2806 ©	2238 586 59812	100nF	10%	50V
2807 ©	4822 126 13879	220nF	20%	16V
2808 ©	2238 586 59812	100nF	10%	50V
2809 ©	2238 586 59812	100nF	10%	50V
2810 ©	4822 122 33741	10pF	10%	50V
2811 ©	4822 122 33741	10pF	10%	50V
2812 ©	5322 126 11583	10nF	10%	63V
2813 ©	4822 122 33741	10pF	10%	50V
2814 ©	4822 122 33741	10pF	10%	50V
2815 ©	4822 126 13883	220pF	5%	50V
2816	4822 124 11968	220MF	20%	5,5V
2817 ©	2238 586 59812	100nF	10%	50V
2818 ©	4822 126 13883	220pF	5%	50V
2819	4822 124 42234	100µF	20%	6,3V
2820 ©	5322 126 11583	10nF	10%	63V
2821 ©	5322 126 11583	10nF	10%	63V
2822 ©	2238 586 59812	100nF	10%	50V
2823 ©	5322 126 11578	1nF	10%	63V
2824 ©	3198 017 41050	1µF	20%	10V
2825 ©	2020 552 94427	100pF	5%	50V
2828 ©	2238 586 59812	100nF	10%	50V
2829	4822 124 21732	10µF	20%	25V
2830 ©	2238 586 59812	100nF	10%	50V
2831 ©	5322 126 11583	10nF	10%	63V
2932 ©	2238 586 59812	100nF	10%	50V
2933	4822 124 80483	47µF	20%	6,3V
2934 ©	2238 586 59812	100nF	10%	50V
2935 ©	2238 586 59812	100nF	10%	50V
2936 ©	4822 122 33761	22pF	5%	50V
2937 ©	4822 122 33761	22pF	5%	50V
2938 ©	2238 586 59812	100nF	10%	50V
2940 ©	2238 586 59812	100nF	10%	50V
2941	4822 124 21732	10µF	20%	25V
2942 ©	4822 126 14238	2,2nF	10%	50V
2943 ©	4822 126 14508	180pF	5%	50V
2944 ©	4822 126 14238	2,2nF	10%	50V
2945 ©	4822 126 14508	180pF	5%	50V
2946 ©	3198 017 41050	1µF	20%	10V

CAPACITORS

2947©	3198 017 41050	1µF	20%	10V
3404©	4822 051 30759	75Ω	5%	0,06W
3411©	4822 051 30759	75Ω	5%	0,06W
3413©	4822 051 30759	75Ω	5%	0,06W
3414©	4822 051 30759	75Ω	5%	0,06W
3417©	4822 051 30759	75Ω	5%	0,06W
3427©	4822 051 30759	75Ω	5%	0,06W
3584©	4822 051 30759	75Ω	5%	0,06W
3867©	4822 051 30759	75Ω	5%	0,06W

RESISTORS

3001©	4822 117 13613	2,2Ω	5%	0,06W
3002©	4822 117 13613	2,2Ω	5%	0,06W
3003©	4822 051 30103	10kΩ	5%	0,06W
3004©	4822 117 12139	22Ω	5%	0,06W
3005©	4822 117 12139	22Ω	5%	0,06W
3006©	4822 117 12139	22Ω	5%	0,06W
3007©	4822 117 12925	47kΩ	1%	0,06W
3008©	4822 051 30102	1kΩ	5%	0,06W
3009©	5322 117 13026	4,7kΩ	1%	0,06W
3010©	4822 117 13632	100kΩ	1%	0,06W
3011©	4822 117 12917	1Ω	5%	0,06W
3012©	5322 117 13047	330Ω	1%	0,06W
3013©	4822 117 12139	22Ω	5%	0,06W
3014©	4822 051 30103	10kΩ	5%	0,06W
3015©	4822 117 13613	2,2Ω	5%	0,06W
3017©	4822 117 13613	2,2Ω	5%	0,06W
3018©	4822 117 12139	22Ω	5%	0,06W
3019©	4822 117 12139	22Ω	5%	0,06W
3020©	4822 117 12139	22Ω	5%	0,06W
3024©	4822 117 12925	47kΩ	1%	0,06W
3026©	4822 117 12925	47kΩ	1%	0,06W
3027©	5322 117 13026	4,7kΩ	1%	0,06W
3029©	4822 117 12917	1Ω	5%	0,06W
3030©	5322 117 13047	330Ω	1%	0,06W
3034©	4822 117 12925	47kΩ	1%	0,06W
3035	4822 050 21003	10kΩ	2%	0,25W
3039	4822 050 21003	10kΩ	2%	0,25W
3041	4822 050 21003	10kΩ	2%	0,25W
3043©	4822 117 12139	22Ω	5%	0,06W
3044©	4822 051 30103	10kΩ	5%	0,06W
3045©	4822 117 13632	100kΩ	1%	0,06W
3046©	4822 051 30471	470Ω	5%	0,06W
3047©	4822 117 13632	100kΩ	1%	0,06W
3048©	4822 051 30101	100Ω	5%	0,06W
3049©	4822 051 30472	4,7kΩ	5%	0,06W
3050©	4822 117 13632	100kΩ	1%	0,06W
3051©	4822 051 30223	22kΩ	5%	0,06W
3052©	4822 051 30332	3,3kΩ	5%	0,06W
3053©	4822 117 13632	100kΩ	1%	0,06W
3054©	4822 051 30332	3,3kΩ	5%	0,06W
3327©	4822 051 30105	1MΩ	5%	0,06W
3329©	3198 021 32250	2,2MΩ	5%	0,06W
3348©	4822 051 30681	680Ω	5%	0,06W
3349©	4822 051 30479	47Ω	5%	0,06W
3355©	4822 051 30479	47Ω	5%	0,06W
3362©	4822 051 30681	680Ω	5%	0,06W
3371©	4822 051 30479	47Ω	5%	0,06W
3372©	4822 051 30339	33Ω	5%	0,06W
3373©	4822 051 30339	33Ω	5%	0,06W
3401©	5322 117 13055	75Ω	1%	0,06W
3402©	5322 117 13055	75Ω	1%	0,06W
3403©	5322 117 13055	75Ω	1%	0,06W
3405©	4822 051 30223	22kΩ	5%	0,06W

RESISTORS

3406©	4822 117 12891	220kΩ	1%	0,06W
3407©	4822 051 30332	3,3kΩ	5%	0,06W
3408©	4822 051 30392	3,9kΩ	5%	0,06W
3409©	5322 117 13055	75Ω	1%	0,06W
3410©	5322 117 13055	75Ω	1%	0,06W
3412	4822 116 52201	75Ω	5%	0,5W
3415©	4822 051 30102	1kΩ	5%	0,06W
3416©	4822 051 30472	4,7kΩ	5%	0,06W
3418©	4822 117 13632	100kΩ	1%	0,06W
3419©	4822 051 30223	22kΩ	5%	0,06W
3420©	4822 051 30151	150Ω	5%	0,06W
3421©	4822 051 30273	27kΩ	5%	0,06W
3422	4822 116 52231	820Ω	5%	0,5W
3423©	4822 051 30391	390Ω	5%	0,06W
3424©	4822 051 30333	33kΩ	5%	0,06W
3426©	4822 051 30333	33kΩ	5%	0,06W
3428©	4822 117 13632	100kΩ	1%	0,06W
3429©	4822 117 12925	47kΩ	1%	0,06W
3431©	4822 051 30472	4,7kΩ	5%	0,06W
3432	4822 116 52175	100Ω	5%	0,5W
3433	4822 116 52175	100Ω	5%	0,5W
3437©	4822 051 30103	10kΩ	5%	0,06W
3438©	4822 051 30103	10kΩ	5%	0,06W
3439©	4822 051 30103	10kΩ	5%	0,06W
3440©	4822 051 30103	10kΩ	5%	0,06W
3442©	4822 051 30154	150kΩ	5%	0,06W
3445©	4822 051 30151	150Ω	5%	0,06W
3446©	4822 117 12925	47kΩ	1%	0,06W
3447	4822 116 83884	47kΩ	5%	0,16W
3451	4822 050 21003	10kΩ	2%	0,25W
3452©	4822 051 30151	150Ω	5%	0,06W
3454	4822 050 11002	1kΩ	5%	0,2W
3455©	4822 051 30103	10kΩ	5%	0,06W
3458©	4822 051 30472	4,7kΩ	5%	0,06W
3459©	4822 051 30103	10kΩ	5%	0,06W
3460©	4822 051 30472	4,7kΩ	5%	0,06W
3461©	2122 551 00031	VDR 1MA/6V4		
3462©	2122 551 00031	VDR 1MA/6V4		
3463©	2122 551 00031	VDR 1MA/6V4		
3464©	2122 551 00031	VDR 1MA/6V4		
3465©	2122 551 00031	VDR 1MA/6V4		
3466©	2122 551 00031	VDR 1MA/6V4		
3467©	2122 551 00031	VDR 1MA/6V4		
3468©	2122 551 00031	VDR 1MA/6V4		
3469©	4822 117 13632	100kΩ	1%	0,06W
3470©	4822 117 13632	100kΩ	1%	0,06W
3471©	4822 117 13632	100kΩ	1%	0,06W
3472©	4822 117 13632	100kΩ	1%	0,06W
3475©	4822 051 30101	100Ω	5%	0,06W
3476©	4822 051 30101	100Ω	5%	0,06W
3477©	4822 051 30101	100Ω	5%	0,06W
3478©	4822 051 30101	100Ω	5%	0,06W
3489©	4822 117 12864	82kΩ	5%	0,06W
3490©	4822 051 30151	150Ω	5%	0,06W
3491©	4822 051 30151	150Ω	5%	0,06W
3492©	4822 051 30151	150Ω	5%	0,06W
3493©	4822 051 30151	150Ω	5%	0,06W
3494©	4822 051 30151	150Ω	5%	0,06W
3501©	4822 051 30102	1kΩ	5%	0,06W
3502	4822 050 11002	1kΩ	5%	0,2W
3503©	4822 117 13632	100kΩ	1%	0,06W
3504©	4822 117 13632	100kΩ	1%	0,06W
3505©	4822 117 13632	100kΩ	1%	0,06W
3506©	4822 117 13632	100kΩ	1%	0,06W

RESISTORS

3507 ©	4822 117 13632	100kΩ	1%	0,06W
3508 ©	4822 051 30102	1kΩ	5%	0,06W
3509	4822 050 11002	1kΩ	5%	0,2W
3510 ©	4822 117 13632	100kΩ	1%	0,06W
3511 ©	4822 117 13632	100kΩ	1%	0,06W
3512 ©	4822 051 30102	1kΩ	5%	0,06W
3513 ©	4822 051 30102	1kΩ	5%	0,06W
3514 ©	4822 117 13632	100kΩ	1%	0,06W
3515	4822 050 11002	1kΩ	5%	0,2W
3516 ©	4822 117 13632	100kΩ	1%	0,06W
3517	4822 116 52283	4,7kΩ	5%	0,5W
3518 ©	4822 051 30102	1kΩ	5%	0,06W
3519	4822 116 52283	4,7kΩ	5%	0,5W
3520 ©	4822 051 30221	220Ω	5%	0,06W
3521 ©	4822 051 30221	220Ω	5%	0,06W
3522 ©	4822 051 30221	220Ω	5%	0,06W
3523	4822 050 11002	1kΩ	5%	0,2W
3524 ©	4822 117 12968	820Ω	5%	0,06W
3525 ©	4822 051 30221	220Ω	5%	0,06W
3526 ©	4822 051 30102	1kΩ	5%	0,06W
3527 ©	4822 117 12968	820Ω	5%	0,06W
3528 ©	4822 051 30472	4,7kΩ	5%	0,06W
3529 ©	4822 051 30472	4,7kΩ	5%	0,06W
3530 ©	4822 117 12968	820Ω	5%	0,06W
3531 ©	4822 117 12968	820Ω	5%	0,06W
3532	4822 050 11002	1kΩ	5%	0,2W
3533	4822 050 11002	1kΩ	5%	0,2W
3534 ©	4822 117 13632	100kΩ	1%	0,06W
3585 ©	4822 051 30331	330Ω	5%	0,06W
3586 ©	4822 051 30479	47Ω	5%	0,06W
3587 ©	4822 117 12917	1Ω	5%	0,06W
3600 ©	4822 051 30103	10kΩ	5%	0,06W
3601	4822 116 52175	100Ω	5%	0,5W
3602 ©	4822 051 30472	4,7kΩ	5%	0,06W
3603	4822 116 52175	100Ω	5%	0,5W
3606 ©	4822 051 30102	1kΩ	5%	0,06W
3607 ©	4822 051 30102	1kΩ	5%	0,06W
3611 ©	4822 051 30101	100Ω	5%	0,06W
3612 ©	4822 051 30101	100Ω	5%	0,06W
3701	4822 116 52228	680Ω	5%	0,5W
3702 ©	4822 051 30471	470Ω	5%	0,06W
3703	4822 116 52245	150kΩ	5%	0,16W
3704 ©	4822 051 30221	220Ω	5%	0,06W
3705 ©	4822 051 30103	10kΩ	5%	0,06W
3710 ©	4822 051 30562	5,6kΩ	5%	0,06W
3711 ©	4822 051 30333	33kΩ	5%	0,06W
3714 ©	4822 051 30183	18kΩ	5%	0,06W
3715 ©	4822 051 30103	10kΩ	5%	0,06W
3716 ©	4822 051 30472	4,7kΩ	5%	0,06W
3717 ©	4822 051 30472	4,7kΩ	5%	0,06W
3720 ©	4822 051 30331	330Ω	5%	0,06W
3724	4822 100 12158	POTENTIOMETER, 22k		
3725 ©	4822 117 12902	8,2kΩ	1%	0,06W
3726 ©	4822 051 30101	100Ω	5%	0,06W
3727 ©	4822 117 12917	1Ω	5%	0,06W
3728 ©	4822 051 30101	100Ω	5%	0,06W
3729 ©	4822 117 12917	1Ω	5%	0,06W
3730 ©	4822 051 30472	4,7kΩ	5%	0,06W
3731 ©	4822 051 30271	270Ω	5%	0,06W
3732 ©	4822 051 30102	1kΩ	5%	0,06W
3733 ©	4822 051 30472	4,7kΩ	5%	0,06W
3734 ©	4822 051 30272	2,7kΩ	5%	0,06W
3735 ©	4822 051 30332	3,3kΩ	5%	0,06W
3736 ©	4822 051 30331	330Ω	5%	0,06W

RESISTORS

3737 ©	4822 051 30222	2,2kΩ	5%	0,06W
3738 ©	4822 051 30682	6,8kΩ	5%	0,06W
3739 ©	4822 051 30562	5,6kΩ	5%	0,06W
3740 ©	4822 051 30681	680Ω	5%	0,06W
3741 ©	4822 051 30472	4,7kΩ	5%	0,06W
3742 ©	4822 051 30472	4,7kΩ	5%	0,06W
3743 ©	4822 051 30563	56kΩ	5%	0,06W
3744 ©	4822 117 13632	100kΩ	1%	0,06W
3745 ©	4822 051 30562	5,6kΩ	5%	0,06W
3746 ©	4822 051 30562	5,6kΩ	5%	0,06W
3758 ©	4822 051 30103	10kΩ	5%	0,06W
3800 ©	4822 051 30223	22kΩ	5%	0,06W
3801 ©	4822 051 30103	10kΩ	5%	0,06W
3802 ©	4822 051 30223	22kΩ	5%	0,06W
3803 ©	4822 051 30102	1kΩ	5%	0,06W
3804 ©	4822 051 30103	10kΩ	5%	0,06W
3805 ©	4822 051 30101	100Ω	5%	0,06W
3806 ©	4822 051 30223	22kΩ	5%	0,06W
3807 ©	4822 117 13632	100kΩ	1%	0,06W
3808 ©	4822 117 13632	100kΩ	1%	0,06W
3809 ©	4822 117 13632	100kΩ	1%	0,06W
3810 ©	4822 117 13632	100kΩ	1%	0,06W
3811 ©	4822 051 30101	100Ω	5%	0,06W
3812 ©	4822 051 30223	22kΩ	5%	0,06W
3813 ©	4822 051 30103	10kΩ	5%	0,06W
3814 ©	4822 051 30103	10kΩ	5%	0,06W
3815 ©	4822 051 30183	18kΩ	5%	0,06W
3816 ©	4822 051 30103	10kΩ	5%	0,06W
3817 ©	4822 051 30222	2,2kΩ	5%	0,06W
3818 ©	4822 051 30472	4,7kΩ	5%	0,06W
3819 ©	4822 051 30103	10kΩ	5%	0,06W
3820 ©	4822 051 30102	1kΩ	5%	0,06W
3821 ©	4822 051 30103	10kΩ	5%	0,06W
3822 ©	4822 051 30103	10kΩ	5%	0,06W
3823 ©	4822 117 13632	100kΩ	1%	0,06W
3824 ©	4822 051 30102	1kΩ	5%	0,06W
3825 ©	4822 051 30103	10kΩ	5%	0,06W
3826 ©	4822 051 30102	1kΩ	5%	0,06W
3827 ©	4822 051 30102	1kΩ	5%	0,06W
3828 ©	4822 051 30103	10kΩ	5%	0,06W
3829 ©	4822 051 30103	10kΩ	5%	0,06W
3830 ©	4822 051 30102	1kΩ	5%	0,06W
3831 ©	4822 051 30102	1kΩ	5%	0,06W
3832 ©	4822 051 30333	33kΩ	5%	0,06W
3833 ©	4822 051 30102	1kΩ	5%	0,06W
3834 ©	4822 051 30102	1kΩ	5%	0,06W
3835 ©	4822 051 30102	1kΩ	5%	0,06W
3836 ©	4822 051 30101	100Ω	5%	0,06W
3837 ©	4822 051 30123	12kΩ	5%	0,06W
3838 ©	4822 051 30102	1kΩ	5%	0,06W
3839 ©	4822 051 30273	27kΩ	5%	0,06W
3840 ©	4822 051 30472	4,7kΩ	5%	0,06W
3841 ©	4822 117 13632	100kΩ	1%	0,06W
3842 ©	4822 117 12891	220kΩ	1%	0,06W
3843 ©	4822 051 30333	33kΩ	5%	0,06W
3844 ©	4822 051 30221	220Ω	5%	0,06W
3845 ©	4822 051 30102	1kΩ	5%	0,06W
3846 ©	4822 051 30333	33kΩ	5%	0,06W
3847 ©	4822 051 30103	10kΩ	5%	0,06W
3849 ©	4822 117 12925	47kΩ	1%	0,06W
3850 ©	4822 051 30183	18kΩ	5%	0,06W
3851 ©	4822 051 30103	10kΩ	5%	0,06W
3852 ©	4822 051 30103	10kΩ	5%	0,06W
3854 ©	4822 051 30102	1kΩ	5%	0,06W

RESISTORS

3855 ©	4822 051 30471	470Ω	5%	0,06W	
3856 ©	4822 051 30103	10kΩ	5%	0,06W	
3857 ©	4822 051 30103	10kΩ	5%	0,06W	
3858 ©	4822 117 13632	100kΩ	1%	0,06W	
3860 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3861 ©	3198 021 32250	2,2MΩ	5%	0,06W	
3862 ©	4822 051 30103	10kΩ	5%	0,06W	
3863 ©	4822 117 13608	4,7Ω	5%	0,06W	
3864 ©	4822 117 13608	4,7Ω	5%	0,06W	
3865 ©	4822 117 13608	4,7Ω	5%	0,06W	
3866 ©	4822 117 13608	4,7Ω	5%	0,06W	
3868 ©	4822 051 30103	10kΩ	5%	0,06W	
3869 ©	4822 051 30331	330Ω	5%	0,06W	
3870 ©	4822 117 13632	100kΩ	1%	0,06W	
3871 ©	4822 051 30103	10kΩ	5%	0,06W	
3872 ©	4822 051 30103	10kΩ	5%	0,06W	
3873 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3874 ©	4822 051 30103	10kΩ	5%	0,06W	
3875 ©	4822 051 30103	10kΩ	5%	0,06W	
3876 ©	4822 051 30103	10kΩ	5%	0,06W	
3878 ©	4822 051 30102	1kΩ	5%	0,06W	
3879 ©	4822 051 30102	1kΩ	5%	0,06W	
3881 ©	4822 117 12925	47kΩ	1%	0,06W	
3882 ©	4822 117 12925	47kΩ	1%	0,06W	
3884 ©	4822 051 30101	100Ω	5%	0,06W	
3885 ©	4822 051 30101	100Ω	5%	0,06W	
3886 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3887 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3888 ©	4822 051 30471	470Ω	5%	0,06W	
3889 ©	4822 051 30183	18kΩ	5%	0,06W	
3916 ©	4822 051 30273	27kΩ	5%	0,06W	
3917 ©	2322 704 63603	36kΩ	1%	0,06W	
3919 ©	5322 117 13024	33kΩ	1%	0,06W	
3920 ©	4822 051 30562	5,6kΩ	5%	0,06W	
3921 ©	4822 051 30471	470Ω	5%	0,06W	
3922 ©	4822 051 30102	1kΩ	5%	0,06W	
3923 ©	4822 051 30103	10kΩ	5%	0,06W	
3924 ©	4822 051 30103	10kΩ	5%	0,06W	
3925 ©	4822 117 12706	10kΩ	1%	0,06W	
3927 ©	4822 051 30333	33kΩ	5%	0,06W	
3931 ©	4822 117 12925	47kΩ	1%	0,06W	
3932 ©	4822 117 12925	47kΩ	1%	0,06W	
3933 ©	4822 117 12925	47kΩ	1%	0,06W	
3934 ©	4822 051 30101	100Ω	5%	0,06W	
3935 ©	4822 051 30101	100Ω	5%	0,06W	
3936 ©	4822 051 30103	10kΩ	5%	0,06W	
3937 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3938 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3939 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3940 ©	3198 021 31060	10MΩ	5%	0,06W	
3941 ©	3198 021 31060	10MΩ	5%	0,06W	
3942 ©	4822 051 30333	33kΩ	5%	0,06W	
3943 ©	4822 051 30333	33kΩ	5%	0,06W	
3944 ©	4822 051 30333	33kΩ	5%	0,06W	
3945 ©	4822 051 30333	33kΩ	5%	0,06W	
3946 ©	4822 051 30333	33kΩ	5%	0,06W	
3947 ©	4822 051 30333	33kΩ	5%	0,06W	
3948 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3950 ©	4822 117 13632	100kΩ	1%	0,06W	
3951 ©	4822 051 30223	22kΩ	5%	0,06W	
3952 ©	4822 051 30273	27kΩ	5%	0,06W	
3953 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3954 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3955 ©	4822 051 30103	10kΩ	5%	0,06W	

RESISTORS

4003 ©	4822 051 30008	CHIP JUMPER 0603
4004 ©	4822 051 30008	CHIP JUMPER 0603
4402 ©	4822 051 30008	CHIP JUMPER 0603
4403 ©	4822 051 30008	CHIP JUMPER 0603
4411 ©	4822 051 30008	CHIP JUMPER 0603
4412 ©	4822 051 30008	CHIP JUMPER 0603
4413 ©	4822 051 30008	CHIP JUMPER 0603
4414 ©	4822 051 30008	CHIP JUMPER 0603
4415 ©	4822 051 30008	CHIP JUMPER 0603
4416 ©	4822 051 30008	CHIP JUMPER 0603
4417 ©	4822 051 30008	CHIP JUMPER 0603
4418 ©	4822 051 30008	CHIP JUMPER 0603
4419 ©	4822 051 30008	CHIP JUMPER 0603
4420 ©	4822 051 30008	CHIP JUMPER 0603
4421 ©	4822 051 30008	CHIP JUMPER 0603
4422 ©	4822 051 30008	CHIP JUMPER 0603
4423 ©	4822 051 30008	CHIP JUMPER 0603
4424 ©	4822 051 30008	CHIP JUMPER 0603
4425 ©	4822 051 30008	CHIP JUMPER 0603
4426 ©	4822 051 30008	CHIP JUMPER 0603
4427 ©	4822 051 30008	CHIP JUMPER 0603
4428 ©	4822 051 30008	CHIP JUMPER 0603
4429 ©	4822 051 30008	CHIP JUMPER 0603
4430 ©	4822 051 30008	CHIP JUMPER 0603
4431 ©	4822 051 30008	CHIP JUMPER 0603
4433 ©	4822 051 30008	CHIP JUMPER 0603
4434 ©	4822 051 30008	CHIP JUMPER 0603
4435 ©	4822 051 30008	CHIP JUMPER 0603
4437 ©	4822 051 30008	CHIP JUMPER 0603
4442 ©	4822 051 30008	CHIP JUMPER 0603
4443 ©	4822 051 30008	CHIP JUMPER 0603
4444 ©	4822 051 30008	CHIP JUMPER 0603
4446 ©	4822 051 30008	CHIP JUMPER 0603
4447 ©	4822 051 30008	CHIP JUMPER 0603
4448 ©	4822 051 30008	CHIP JUMPER 0603
4449 ©	4822 051 30008	CHIP JUMPER 0603
4450 ©	4822 051 30008	CHIP JUMPER 0603
4581 ©	4822 051 30008	CHIP JUMPER 0603
4582 ©	4822 051 30008	CHIP JUMPER 0603
4583 ©	4822 051 30008	CHIP JUMPER 0603
4584 ©	4822 051 30008	CHIP JUMPER 0603
4601 ©	4822 051 30008	CHIP JUMPER 0603
4901 ©	4822 051 30008	CHIP JUMPER 0603
4902 ©	4822 051 30008	CHIP JUMPER 0603
4903 ©	4822 051 30008	CHIP JUMPER 0603
4999 ©	4822 051 30008	CHIP JUMPER 0603

COILS

1600	4822 242 10434	RESONATOR 18,432MHz
1702	2422 549 44341	FILTER OFWK9656M
1703	4822 242 10307	FILTER OFWG3956M
1704	2422 549 44611	FILTER 5,5MHz
1801	2422 543 01115	RESONATOR 24M576 CX-11F
1805	4822 242 70938	CRYSTAL 32,768kHz
1990	4822 242 73552	RESONATOR 13,875MHz
5001 ©	2422 549 43062	COIL 100MHZ, 600Ω
5401	4822 157 11706	10µH
5402	4822 157 11706	10µH
5403	4822 157 11706	10µH
5406	4822 157 11706	10µH
5600	4822 157 11706	10µH
5601	4822 157 11706	10µH
5602	4822 157 11706	10µH

COILS

5705	4822 157 11139	6,8µH
5709	4822 157 11139	6,8µH
5710	2422 549 44162	COIL VARIABLE
5711	2422 549 44162	COIL VARIABLE
5713	4822 157 11747	15µH
5714	4822 157 11747	15µH
5801 ©	2422 549 44607	FERRITE BEAD
5802 ©	2422 549 44607	FERRITE BEAD
5803 ©	2422 549 44607	FERRITE BEAD
5804 ©	2422 549 44607	FERRITE BEAD
5931	4822 157 11706	10µH
5932 ©	2422 549 43062	COIL 100MHZ, 600Ω

DIODES

6001 ©	4822 130 83757	BAS216
6002 ©	4822 130 83757	BAS216
6003 ©	4822 130 83757	BAS216
6314 ©	9322 129 39685	BZM55-C8V2
6320 ©	4822 130 11397	BAS316
6401 ©	9340 548 61115	PDZ12B
6402 ©	9340 548 61115	PDZ12B
6403 ©	9340 548 61115	PDZ12B
6404 ©	9340 548 61115	PDZ12B
6409 ©	9322 129 38685	BZM55-C6V8
6414 ©	9322 129 38685	BZM55-C6V8
6415 ©	9340 548 61115	PDZ12B
6416 ©	9340 548 61115	PDZ12B
6417 ©	9340 548 61115	PDZ12B
6418 ©	9340 548 61115	PDZ12B
6419 ©	9340 548 61115	PDZ12B
6420 ©	9340 548 61115	PDZ12B
6422 ©	9322 129 34685	BZX284-C3V9
6423 ©	9340 548 61115	PDZ12B
6424 ©	9340 548 61115	PDZ12B
6600 ©	4822 130 83757	BAS216
6703 ©	9340 552 30115	BA591
6704 ©	9340 552 30115	BA591
6705 ©	9340 552 30115	BA591
6800 ©	4822 130 11397	BAS316
6801 ©	4822 130 11564	BZX384-C3V9
6802 ©	4822 130 10654	BAT254
6803 ©	4822 130 10654	BAT254
6804 ©	4822 130 10654	BAT254
6805 ©	4822 130 10654	BAT254
6901 ©	5322 130 34331	BAV70

TRANSISTORS

7003 ©	4822 130 60854	PDTA124EU-W
7006 ©	3198 010 42320	BC857BW
7008 ©	3198 010 42310	BC847BW
7009 ©	3198 010 42310	BC847BW
7010 ©	4822 130 61553	PDTC124EU
7011 ©	3198 010 42320	BC857BW
7308 ©	4822 130 61553	PDTC124EU
7319 ©	5322 130 60159	BC846B
7320 ©	9322 163 75685	SI2306DS
7321 ©	4822 130 61553	PDTC124EU
7401 ©	3198 010 42320	BC857BW
7402 ©	3198 010 42310	BC847BW
7403 ©	3198 010 42320	BC857BW
7404 ©	3198 010 42320	BC857BW
7405 ©	3198 010 42310	BC847BW
7407 ©	3198 010 42310	BC847BW

TRANSISTORS

7409 ©	3198 010 42310	BC847BW
7412 ©	4822 130 61553	PDTC124EU
7421 ©	3198 010 42310	BC847BW
7506 ©	9340 219 30115	BC817-25W
7508 ©	9340 219 30115	BC817-25W
7509 ©	9340 219 30115	BC817-25W
7511 ©	9340 219 30115	BC817-25W
7701 ©	4822 130 61553	PDTC124EU
7702 ©	4822 130 61553	PDTC124EU
7704 ©	4822 130 61553	PDTC124EU
7705 ©	4822 130 61553	PDTC124EU
7706 ©	4822 130 61553	PDTC124EU
7711 ©	3198 010 42320	BC857BW
7712 ©	4822 130 61553	PDTC124EU
7713 ©	3198 010 42320	BC857BW
7714 ©	3198 010 42310	BC847BW
7716 ©	3198 010 42320	BC857BW
7717 ©	5322 130 42755	BC847C
7802 ©	4822 130 61553	PDTC124EU
7807 ©	4822 209 73852	PMBT2369
7813 ©	3198 010 42310	BC847BW
7814 ©	3198 010 42310	BC847BW
7815 ©	3198 010 42310	BC847BW
7816 ©	3198 010 42310	BC847BW
7817 ©	3198 010 42310	BC847BW
7818 ©	4822 130 60854	PDTA124EU-W
7903 ©	4822 130 61553	PDTC124EU
7906 ©	4822 130 61553	PDTC124EU
7908 ©	4822 130 61553	PDTC124EU
7932 ©	3198 010 42310	BC847BW
7933 ©	3198 010 42310	BC847BW

INTEGRATED CIRCUITS

1701	4822 242 81436	OFWK3953M
7001 ©	9352 668 47118	UDA1334BTS/N2
7002 ©	4822 209 62312	MC33078
7004 ©	9322 173 41668	ST6618
7005 ©	9352 670 99118	UDA1361TS/N1
7408 ©	9322 186 87668	MSP3415G-QG-B8V3
7411 ©	9322 179 71668	NJM2285M
7419 ©	9340 560 36235	BSH111
7420 ©	9340 560 36235	BSH111
7501	5322 209 11102	HEF4052BT
7502 ©	4822 209 32071	MC33079D
7503	5322 209 11102	HEF4052BT
7504	5322 209 11102	HEF4052BT
7505 ©	4822 209 62312	MC33078
7710 ©	9352 606 11118	TDA9818T/V1
7801 ©	9352 190 00118	74LVC573AD, SHIFT REGISTER
7803 ©	9322 186 16668	CY62128VLL-70SC, 128K RAM
7804 ©	3103 165 13721	TMP91CW12AF/LIRP1, CECO
7805 ©	9965 000 20214	M29W800DT-70N6/AN190016 V.016
7806 ©	9322 163 26685	NCP301LSN30, RESET IC
7808 ©	4822 209 16907	M24C16-MN6T, 2K EEPROM
7821 ©	9340 560 36235	BSH111
7822 ©	9340 560 36235	BSH111
7825 ©	9322 181 92682	LA7213
7902 ©	4822 209 63709	LM324D, 4-FOLD OPAMP.
7931 ©	4822 209 17505	STV5348D, VPS DECODER
7934 ©	4822 209 60177	LM339D, 4X OPAMP

A/V BOARD /25S (GB)

MISCELLANEOUS

1001	2422 086 10919	FUSE 125mA 65V MP13
1705	3139 147 17001	TUNER UV1316MK3
1900	4822 265 11154	FFC-CONNECTOR, 22P, TOP ENTRY
1940	2422 033 00334	SCART SOCKET
1943	4822 267 11031	FFC-CONNECTOR, 10P, TOP ENTRY
1947	4822 265 11154	FFC-CONNECTOR, 22P, TOP ENTRY
1951	4822 267 31729	CINCH CONNECTOR, 1 POLE
1986	2422 025 16677	FFC-CONNECTOR, 10P, SIDE ENTRY
7581	9322 155 48687	OPTICAL IN CONNECT. GP1FA550RZ

CAPACITORS

2001	4822 124 80483	47µF	20%	6,3V
2002 ©	2238 586 59812	100nF	10%	50V
2003 ©	2238 586 59812	100nF	10%	50V
2004	4822 124 80483	47µF	20%	6,3V
2005	4822 124 42234	100µF	20%	6,3V
2006 ©	4822 126 11785	47pF	5%	50V
2007	4822 124 21732	10µF	20%	25V
2008 ©	3198 016 31020	1nF	5%	25V
2009 ©	2238 586 59812	100nF	10%	50V
2010	4822 124 80483	47µF	20%	6,3V
2011	4822 124 21732	10µF	20%	25V
2012 ©	2238 586 59812	100nF	10%	50V
2013	4822 124 42234	100µF	20%	6,3V
2014 ©	2238 586 59812	100nF	10%	50V
2015 ©	2238 586 59812	100nF	10%	50V
2018 ©	2238 586 59812	100nF	10%	50V
2019 ©	2238 586 59812	100nF	10%	50V
2020	4822 124 80483	47µF	20%	6,3V
2023	4822 124 80483	47µF	20%	6,3V
2024 ©	4822 126 11669	27pF	10%	50V
2025 ©	3198 016 31020	1nF	5%	25V
2026 ©	4822 126 11669	27pF	10%	50V
2029	4822 124 80483	47µF	20%	6,3V
2031	4822 124 22652	2,2µF	20%	50V
2032 ©	5322 126 11583	10nF	10%	63V
2033 ©	4822 126 13881	470pF	5%	50V
2034 ©	4822 126 13881	470pF	5%	50V
2037 ©	4822 126 13193	4,7nF	10%	63V
2038 ©	4822 126 13193	4,7nF	10%	63V
2039 ©	4822 126 13193	4,7nF	10%	63V
2040 ©	4822 126 13193	4,7nF	10%	63V
2332	4822 124 22652	2,2µF	20%	50V
2334 ©	2238 586 59812	100nF	10%	50V
2402 ©	2238 586 59812	100nF	10%	50V
2403	4822 124 80483	47µF	20%	6,3V
2404 ©	2238 586 59812	100nF	10%	50V
2405	4822 124 80483	47µF	20%	6,3V
2406 ©	5322 126 11583	10nF	10%	63V
2407 ©	4822 122 33741	10pF	10%	50V
2408 ©	3198 017 41050	1µF	20%	10V
2409 ©	2238 586 59812	100nF	10%	50V
2410 ©	3198 017 41050	1µF	20%	10V
2411 ©	2238 586 59812	100nF	10%	50V
2412 ©	4822 122 33741	10pF	10%	50V
2413	4822 124 80483	47µF	20%	6,3V
2414 ©	2238 586 59812	100nF	10%	50V
2416 ©	3198 017 41050	1µF	20%	10V
2417	4822 124 11947	10µF	20%	16V
2418 ©	3198 017 41050	1µF	20%	10V
2419 ©	3198 017 41050	1µF	20%	10V
2421	4822 124 11947	10µF	20%	16V
2423 ©	3198 017 41050	1µF	20%	10V
2427 ©	3198 017 41050	1µF	20%	10V

CAPACITORS

2428	4822 124 11947	10µF	20%	16V
2433 ©	3198 017 34730	47nF	10%	16V
2434	4822 124 80483	47µF	20%	6,3V
2435 ©	2238 586 59812	100nF	10%	50V
2436 ©	3198 017 41050	1µF	20%	10V
2437 ©	3198 017 41050	1µF	20%	10V
2438 ©	3198 017 41050	1µF	20%	10V
2439 ©	2238 586 59812	100nF	10%	50V
2440 ©	3198 017 41050	1µF	20%	10V
2441 ©	3198 017 41050	1µF	20%	10V
2446 ©	3198 017 41050	1µF	20%	10V
2449 ©	4822 126 13956	68pF	5%	63V
2450 ©	2238 586 59812	100nF	10%	50V
2459 ©	3198 017 41050	1µF	20%	10V
2464	4822 124 21732	10µF	20%	25V
2501 ©	3198 017 41050	1µF	20%	10V
2502 ©	2238 586 59812	100nF	10%	50V
2503 ©	2238 586 59812	100nF	10%	50V
2504 ©	3198 017 41050	1µF	20%	10V
2505 ©	3198 017 41050	1µF	20%	10V
2506 ©	3198 017 41050	1µF	20%	10V
2507 ©	3198 017 41050	1µF	20%	10V
2508 ©	3198 017 41050	1µF	20%	10V
2509 ©	2238 586 59812	100nF	10%	50V
2510	4822 124 42234	100µF	20%	6,3V
2511	2020 009 90097	100µF	20%	16V
2512 ©	2238 586 59812	100nF	10%	50V
2513 ©	3198 017 41050	1µF	20%	10V
2514 ©	2238 586 59812	100nF	10%	50V
2515 ©	3198 017 41050	1µF	20%	10V
2516	2020 009 90097	100µF	20%	16V
2517 ©	5322 126 11578	1nF	10%	63V
2518 ©	2238 586 59812	100nF	10%	50V
2519	4822 124 42234	100µF	20%	6,3V
2520 ©	5322 126 11578	1nF	10%	63V
2521 ©	2238 586 59812	100nF	10%	50V
2522	2020 009 90097	100µF	20%	16V
2523 ©	5322 126 11578	1nF	10%	63V
2524 ©	3198 017 41050	1µF	20%	10V
2525 ©	3198 017 41050	1µF	20%	10V
2526	2020 009 90097	100µF	20%	16V
2527 ©	5322 126 11578	1nF	10%	63V
2530 ©	2238 586 59812	100nF	10%	50V
2535 ©	2238 586 59812	100nF	10%	50V
2536 ©	2238 586 59812	100nF	10%	50V
2581 ©	2238 586 59812	100nF	10%	50V
2582 ©	2238 586 59812	100nF	10%	50V
2583 ©	2020 552 94427	100pF	5%	50V
2584 ©	2020 552 94427	100pF	5%	50V
2600	4822 124 21732	10µF	20%	25V
2601 ©	5322 126 11583	10nF	10%	63V
2602	4822 124 21732	10µF	20%	25V
2603 ©	2238 586 59812	100nF	10%	50V
2604 ©	5322 126 11583	10nF	10%	63V
2605	4822 124 21732	10µF	20%	25V
2606 ©	2238 586 59812	100nF	10%	50V
2607 ©	4822 126 14225	56pF	5%	50V
2608	4822 124 21732	10µF	20%	25V
2609 ©	4822 126 14225	56pF	5%	50V
2610 ©	5322 126 11583	10nF	10%	63V
2611	4822 124 80231	47µF	20%	16V
2612	4822 124 40769	4,7µF	20%	100V
2616 ©	5322 126 11578	1nF	10%	63V
2617 ©	5322 126 11578	1nF	10%	63V

CAPACITORS

2620 ©	3198 016 33380	3,3pF	10%	50V	
2621 ©	3198 016 33380	3,3pF	10%	50V	
2623 ©	2238 586 59812	100nF	10%	50V	
2626	4822 124 22652	2,2µF	20%	50V	
2627	4822 124 22652	2,2µF	20%	50V	
2713 ©	4822 124 11946	22µF	20%	16V	
2720	4822 124 42234	100µF	20%	6,3V	
2722	5322 124 41379	2,2µF	20%	50V	
2723 ©	4822 126 13881	470pF	5%	50V	
2724 ©	2238 586 59812	100nF	10%	50V	
2725 ©	4822 122 33761	22pF	5%	50V	
2728 ©	5322 126 11583	10nF	10%	63V	
2729	4822 124 21732	10µF	20%	25V	
2730 ©	4822 126 13879	220nF	20%	16V	
2731 ©	2020 552 94523	8,2pF	5%	50V	
2732	4822 124 22652	2,2µF	20%	50V	
2733 ©	2238 586 59812	100nF	10%	50V	
2734 ©	5322 126 11578	1nF	10%	63V	
2737	4822 124 80483	47µF	20%	6,3V	
2740	4822 124 22652	2,2µF	20%	50V	
2741 ©	5322 126 11578	1nF	10%	63V	
2800 ©	2238 586 59812	100nF	10%	50V	
2801 ©	4822 122 33752	15pF	5%	50V	
2802 ©	4822 122 33752	15pF	5%	50V	
2803 ©	2238 586 59812	100nF	10%	50V	
2804 ©	2238 586 59812	100nF	10%	50V	
2805 ©	2238 586 59812	100nF	10%	50V	
2806 ©	2238 586 59812	100nF	10%	50V	
2807 ©	4822 126 13879	220nF	20%	16V	
2808 ©	2238 586 59812	100nF	10%	50V	
2809 ©	2238 586 59812	100nF	10%	50V	
2810 ©	4822 122 33741	10pF	10%	50V	
2811 ©	4822 122 33741	10pF	10%	50V	
2812 ©	5322 126 11583	10nF	10%	63V	
2813 ©	4822 122 33741	10pF	10%	50V	
2814 ©	4822 122 33741	10pF	10%	50V	
2815 ©	4822 126 13883	220pF	5%	50V	
2816	4822 124 11968	220MF	20%	5,5V	
2817 ©	2238 586 59812	100nF	10%	50V	
2818 ©	4822 126 13883	220pF	5%	50V	
2819	4822 124 42234	100µF	20%	6,3V	
2820 ©	5322 126 11583	10nF	10%	63V	
2821 ©	5322 126 11583	10nF	10%	63V	
2822 ©	2238 586 59812	100nF	10%	50V	
2823 ©	5322 126 11578	1nF	10%	63V	
2824 ©	3198 017 41050	1µF	20%	10V	
2825 ©	2020 552 94427	100pF	5%	50V	
2828 ©	2238 586 59812	100nF	10%	50V	
2829	4822 124 21732	10µF	20%	25V	
2830 ©	2238 586 59812	100nF	10%	50V	
2831 ©	5322 126 11583	10nF	10%	63V	
2932 ©	2238 586 59812	100nF	10%	50V	
2933	4822 124 80483	47µF	20%	6,3V	
2934 ©	2238 586 59812	100nF	10%	50V	
2935 ©	2238 586 59812	100nF	10%	50V	
2936 ©	4822 122 33761	22pF	5%	50V	
2937 ©	4822 122 33761	22pF	5%	50V	
2938 ©	2238 586 59812	100nF	10%	50V	
2940 ©	2238 586 59812	100nF	10%	50V	
2941	4822 124 21732	10µF	20%	25V	
2942 ©	4822 126 14238	2,2nF	10%	50V	
2943 ©	4822 126 14508	180pF	5%	50V	
2944 ©	4822 126 14238	2,2nF	10%	50V	
2945 ©	4822 126 14508	180pF	5%	50V	

CAPACITORS

2946 ©	3198 017 41050	1µF	20%	10V	
2947 ©	3198 017 41050	1µF	20%	10V	
3404 ©	4822 051 30759	75Ω	5%	0,06W	
3411 ©	4822 051 30759	75Ω	5%	0,06W	
3413 ©	4822 051 30759	75Ω	5%	0,06W	
3414 ©	4822 051 30759	75Ω	5%	0,06W	
3417 ©	4822 051 30759	75Ω	5%	0,06W	
3427 ©	4822 051 30759	75Ω	5%	0,06W	
3584 ©	4822 051 30759	75Ω	5%	0,06W	
3867 ©	4822 051 30759	75Ω	5%	0,06W	

RESISTORS

3001 ©	4822 117 13613	2,2Ω	5%	0,06W	
3002 ©	4822 117 13613	2,2Ω	5%	0,06W	
3003 ©	4822 051 30103	10kΩ	5%	0,06W	
3004 ©	4822 117 12139	22Ω	5%	0,06W	
3005 ©	4822 117 12139	22Ω	5%	0,06W	
3006 ©	4822 117 12139	22Ω	5%	0,06W	
3007 ©	4822 117 12925	47kΩ	1%	0,06W	
3008 ©	4822 051 30102	1kΩ	5%	0,06W	
3009 ©	5322 117 13026	4,7kΩ	1%	0,06W	
3010 ©	4822 117 13632	100kΩ	1%	0,06W	
3011 ©	4822 117 12917	1Ω	5%	0,06W	
3012 ©	5322 117 13047	330Ω	1%	0,06W	
3013 ©	4822 117 12139	22Ω	5%	0,06W	
3014 ©	4822 051 30103	10kΩ	5%	0,06W	
3015 ©	4822 117 13613	2,2Ω	5%	0,06W	
3017 ©	4822 117 13613	2,2Ω	5%	0,06W	
3018 ©	4822 117 12139	22Ω	5%	0,06W	
3019 ©	4822 117 12139	22Ω	5%	0,06W	
3020 ©	4822 117 12139	22Ω	5%	0,06W	
3024 ©	4822 117 12925	47kΩ	1%	0,06W	
3026 ©	4822 117 12925	47kΩ	1%	0,06W	
3027 ©	5322 117 13026	4,7kΩ	1%	0,06W	
3029 ©	4822 117 12917	1Ω	5%	0,06W	
3030 ©	5322 117 13047	330Ω	1%	0,06W	
3034 ©	4822 117 12925	47kΩ	1%	0,06W	
3035	4822 050 21003	10kΩ	2%	0,25W	
3039	4822 050 21003	10kΩ	2%	0,25W	
3041	4822 050 21003	10kΩ	2%	0,25W	
3043 ©	4822 117 12139	22Ω	5%	0,06W	
3044 ©	4822 051 30103	10kΩ	5%	0,06W	
3045 ©	4822 117 13632	100kΩ	1%	0,06W	
3046 ©	4822 051 30471	470Ω	5%	0,06W	
3047 ©	4822 117 13632	100kΩ	1%	0,06W	
3048 ©	4822 051 30101	100Ω	5%	0,06W	
3049 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3050 ©	4822 117 13632	100kΩ	1%	0,06W	
3051 ©	4822 051 30223	22kΩ	5%	0,06W	
3052 ©	4822 051 30332	3,3kΩ	5%	0,06W	
3053 ©	4822 117 13632	100kΩ	1%	0,06W	
3054 ©	4822 051 30332	3,3kΩ	5%	0,06W	
3327 ©	4822 051 30105	1MΩ	5%	0,06W	
3329 ©	3198 021 32250	2,2MΩ	5%	0,06W	
3348 ©	4822 051 30681	680Ω	5%	0,06W	
3349 ©	4822 051 30479	47Ω	5%	0,06W	
3355 ©	4822 051 30479	47Ω	5%	0,06W	
3362 ©	4822 051 30681	680Ω	5%	0,06W	
3371 ©	4822 051 30479	47Ω	5%	0,06W	
3372 ©	4822 051 30339	33Ω	5%	0,06W	
3373 ©	4822 051 30339	33Ω	5%	0,06W	
3401 ©	5322 117 13055	75Ω	1%	0,06W	
3402 ©	5322 117 13055	75Ω	1%	0,06W	
3403 ©	5322 117 13055	75Ω	1%	0,06W	

RESISTORS

3405 ©	4822 051 30223	22kΩ	5%	0,06W
3406 ©	4822 117 12891	220kΩ	1%	0,06W
3407 ©	4822 051 30332	3,3kΩ	5%	0,06W
3408 ©	4822 051 30392	3,9kΩ	5%	0,06W
3409 ©	5322 117 13055	75Ω	1%	0,06W
3410 ©	5322 117 13055	75Ω	1%	0,06W
3412	4822 116 52201	75Ω	5%	0,5W
3415 ©	4822 051 30102	1kΩ	5%	0,06W
3416 ©	4822 051 30472	4,7kΩ	5%	0,06W
3418 ©	4822 117 13632	100kΩ	1%	0,06W
3419 ©	4822 051 30223	22kΩ	5%	0,06W
3420 ©	4822 051 30151	150Ω	5%	0,06W
3421 ©	4822 051 30273	27kΩ	5%	0,06W
3422	4822 116 52231	820Ω	5%	0,5W
3423 ©	4822 051 30391	390Ω	5%	0,06W
3424 ©	4822 051 30333	33kΩ	5%	0,06W
3426 ©	4822 051 30333	33kΩ	5%	0,06W
3428 ©	4822 117 13632	100kΩ	1%	0,06W
3429 ©	4822 117 12925	47kΩ	1%	0,06W
3431 ©	4822 051 30472	4,7kΩ	5%	0,06W
3432	4822 116 52175	100Ω	5%	0,5W
3433	4822 116 52175	100Ω	5%	0,5W
3437 ©	4822 051 30103	10kΩ	5%	0,06W
3438 ©	4822 051 30103	10kΩ	5%	0,06W
3439 ©	4822 051 30103	10kΩ	5%	0,06W
3440 ©	4822 051 30103	10kΩ	5%	0,06W
3442 ©	4822 051 30154	150kΩ	5%	0,06W
3445 ©	4822 051 30151	150Ω	5%	0,06W
3446 ©	4822 117 12925	47kΩ	1%	0,06W
3447	4822 116 83884	47kΩ	5%	0,16W
3451	4822 050 21003	10kΩ	2%	0,25W
3452 ©	4822 051 30151	150Ω	5%	0,06W
3454	4822 050 11002	1kΩ	5%	0,2W
3455 ©	4822 051 30103	10kΩ	5%	0,06W
3458 ©	4822 051 30472	4,7kΩ	5%	0,06W
3459 ©	4822 051 30103	10kΩ	5%	0,06W
3460 ©	4822 051 30472	4,7kΩ	5%	0,06W
3461 ©	2122 551 00031	VDR 1MA/6V44		
3462 ©	2122 551 00031	VDR 1MA/6V44		
3463 ©	2122 551 00031	VDR 1MA/6V44		
3464 ©	2122 551 00031	VDR 1MA/6V44		
3465 ©	2122 551 00031	VDR 1MA/6V44		
3466 ©	2122 551 00031	VDR 1MA/6V44		
3467 ©	2122 551 00031	VDR 1MA/6V44		
3468 ©	2122 551 00031	VDR 1MA/6V44		
3469 ©	4822 117 13632	100kΩ	1%	0,06W
3470 ©	4822 117 13632	100kΩ	1%	0,06W
3471 ©	4822 117 13632	100kΩ	1%	0,06W
3472 ©	4822 117 13632	100kΩ	1%	0,06W
3475 ©	4822 051 30101	100Ω	5%	0,06W
3476 ©	4822 051 30101	100Ω	5%	0,06W
3477 ©	4822 051 30101	100Ω	5%	0,06W
3478 ©	4822 051 30101	100Ω	5%	0,06W
3489 ©	4822 117 12864	82kΩ	5%	0,06W
3490 ©	4822 051 30151	150Ω	5%	0,06W
3491 ©	4822 051 30151	150Ω	5%	0,06W
3492 ©	4822 051 30151	150Ω	5%	0,06W
3493 ©	4822 051 30151	150Ω	5%	0,06W
3494 ©	4822 051 30151	150Ω	5%	0,06W
3501 ©	4822 051 30102	1kΩ	5%	0,06W
3502	4822 050 11002	1kΩ	5%	0,2W
3503 ©	4822 117 13632	100kΩ	1%	0,06W
3504 ©	4822 117 13632	100kΩ	1%	0,06W
3505 ©	4822 117 13632	100kΩ	1%	0,06W

RESISTORS

3506 ©	4822 117 13632	100kΩ	1%	0,06W
3507 ©	4822 117 13632	100kΩ	1%	0,06W
3508 ©	4822 051 30102	1kΩ	5%	0,06W
3509	4822 050 11002	1kΩ	5%	0,2W
3510 ©	4822 117 13632	100kΩ	1%	0,06W
3511 ©	4822 117 13632	100kΩ	1%	0,06W
3512 ©	4822 051 30102	1kΩ	5%	0,06W
3513 ©	4822 051 30102	1kΩ	5%	0,06W
3514 ©	4822 117 13632	100kΩ	1%	0,06W
3515	4822 050 11002	1kΩ	5%	0,2W
3516 ©	4822 117 13632	100kΩ	1%	0,06W
3517	4822 116 52283	4,7kΩ	5%	0,5W
3518 ©	4822 051 30102	1kΩ	5%	0,06W
3519	4822 116 52283	4,7kΩ	5%	0,5W
3520 ©	4822 051 30221	220Ω	5%	0,06W
3521 ©	4822 051 30221	220Ω	5%	0,06W
3522 ©	4822 051 30221	220Ω	5%	0,06W
3523	4822 050 11002	1kΩ	5%	0,2W
3524 ©	4822 117 12968	820Ω	5%	0,06W
3525 ©	4822 051 30221	220Ω	5%	0,06W
3526 ©	4822 051 30102	1kΩ	5%	0,06W
3527 ©	4822 117 12968	820Ω	5%	0,06W
3528 ©	4822 051 30472	4,7kΩ	5%	0,06W
3529 ©	4822 051 30472	4,7kΩ	5%	0,06W
3530 ©	4822 117 12968	820Ω	5%	0,06W
3531 ©	4822 117 12968	820Ω	5%	0,06W
3532	4822 050 11002	1kΩ	5%	0,2W
3533	4822 050 11002	1kΩ	5%	0,2W
3534 ©	4822 117 13632	100kΩ	1%	0,06W
3585 ©	4822 051 30331	330Ω	5%	0,06W
3586 ©	4822 051 30479	47Ω	5%	0,06W
3587 ©	4822 117 12917	1Ω	5%	0,06W
3600 ©	4822 051 30103	10kΩ	5%	0,06W
3601	4822 116 52175	100Ω	5%	0,5W
3602 ©	4822 051 30472	4,7kΩ	5%	0,06W
3603	4822 116 52175	100Ω	5%	0,5W
3606 ©	4822 051 30102	1kΩ	5%	0,06W
3607 ©	4822 051 30102	1kΩ	5%	0,06W
3611 ©	4822 051 30101	100Ω	5%	0,06W
3612 ©	4822 051 30101	100Ω	5%	0,06W
3701	4822 116 52228	680Ω	5%	0,5W
3702 ©	4822 051 30471	470Ω	5%	0,06W
3703	4822 116 52245	150kΩ	5%	0,16W
3704 ©	4822 051 30221	220Ω	5%	0,06W
3711 ©	4822 051 30333	33kΩ	5%	0,06W
3714 ©	4822 051 30183	18kΩ	5%	0,06W
3715 ©	4822 051 30103	10kΩ	5%	0,06W
3720 ©	4822 051 30331	330Ω	5%	0,06W
3724	4822 100 12158	POTENTIOMETER, 22k		
3725 ©	4822 117 12902	8,2kΩ	1%	0,06W
3727 ©	4822 117 12917	1Ω	5%	0,06W
3729 ©	4822 117 12917	1Ω	5%	0,06W
3731 ©	4822 051 30331	330Ω	5%	0,06W
3732 ©	4822 051 30102	1kΩ	5%	0,06W
3734 ©	4822 051 30272	2,7kΩ	5%	0,06W
3735 ©	4822 051 30332	3,3kΩ	5%	0,06W
3736 ©	4822 051 30331	330Ω	5%	0,06W
3739 ©	4822 051 30562	5,6kΩ	5%	0,06W
3743 ©	4822 051 30563	56kΩ	5%	0,06W
3744 ©	4822 117 13632	100kΩ	1%	0,06W
3800 ©	4822 051 30223	22kΩ	5%	0,06W
3801 ©	4822 051 30103	10kΩ	5%	0,06W
3802 ©	4822 051 30223	22kΩ	5%	0,06W
3803 ©	4822 051 30102	1kΩ	5%	0,06W

RESISTORS

3804 ©	4822 051 30103	10kΩ	5%	0,06W	
3805 ©	4822 051 30101	100Ω	5%	0,06W	
3806 ©	4822 051 30223	22kΩ	5%	0,06W	
3807 ©	4822 117 13632	100kΩ	1%	0,06W	
3808 ©	4822 117 13632	100kΩ	1%	0,06W	
3809 ©	4822 117 13632	100kΩ	1%	0,06W	
3810 ©	4822 117 13632	100kΩ	1%	0,06W	
3811 ©	4822 051 30101	100Ω	5%	0,06W	
3812 ©	4822 051 30223	22kΩ	5%	0,06W	
3813 ©	4822 051 30103	10kΩ	5%	0,06W	
3814 ©	4822 051 30103	10kΩ	5%	0,06W	
3815 ©	4822 051 30183	18kΩ	5%	0,06W	
3816 ©	4822 051 30103	10kΩ	5%	0,06W	
3817 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3818 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3819 ©	4822 051 30103	10kΩ	5%	0,06W	
3820 ©	4822 051 30102	1kΩ	5%	0,06W	
3821 ©	4822 051 30103	10kΩ	5%	0,06W	
3822 ©	4822 051 30103	10kΩ	5%	0,06W	
3823 ©	4822 117 13632	100kΩ	1%	0,06W	
3824 ©	4822 051 30102	1kΩ	5%	0,06W	
3825 ©	4822 051 30103	10kΩ	5%	0,06W	
3826 ©	4822 051 30102	1kΩ	5%	0,06W	
3827 ©	4822 051 30102	1kΩ	5%	0,06W	
3828 ©	4822 051 30103	10kΩ	5%	0,06W	
3829 ©	4822 051 30103	10kΩ	5%	0,06W	
3830 ©	4822 051 30102	1kΩ	5%	0,06W	
3831 ©	4822 051 30102	1kΩ	5%	0,06W	
3832 ©	4822 051 30333	33kΩ	5%	0,06W	
3833 ©	4822 051 30102	1kΩ	5%	0,06W	
3834 ©	4822 051 30102	1kΩ	5%	0,06W	
3835 ©	4822 051 30102	1kΩ	5%	0,06W	
3836 ©	4822 051 30101	100Ω	5%	0,06W	
3837 ©	4822 051 30123	12kΩ	5%	0,06W	
3838 ©	4822 051 30102	1kΩ	5%	0,06W	
3839 ©	4822 051 30273	27kΩ	5%	0,06W	
3840 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3841 ©	4822 117 13632	100kΩ	1%	0,06W	
3842 ©	4822 117 12891	220kΩ	1%	0,06W	
3843 ©	4822 051 30333	33kΩ	5%	0,06W	
3844 ©	4822 051 30221	220Ω	5%	0,06W	
3845 ©	4822 051 30102	1kΩ	5%	0,06W	
3846 ©	4822 051 30333	33kΩ	5%	0,06W	
3847 ©	4822 051 30103	10kΩ	5%	0,06W	
3849 ©	4822 117 12925	47kΩ	1%	0,06W	
3850 ©	4822 051 30183	18kΩ	5%	0,06W	
3851 ©	4822 051 30103	10kΩ	5%	0,06W	
3852 ©	4822 051 30103	10kΩ	5%	0,06W	
3854 ©	4822 051 30102	1kΩ	5%	0,06W	
3855 ©	4822 051 30471	470Ω	5%	0,06W	
3856 ©	4822 051 30103	10kΩ	5%	0,06W	
3857 ©	4822 051 30103	10kΩ	5%	0,06W	
3858 ©	4822 117 13632	100kΩ	1%	0,06W	
3860 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3861 ©	3198 021 32250	2,2MΩ	5%	0,06W	
3862 ©	4822 051 30103	10kΩ	5%	0,06W	
3863 ©	4822 117 13608	4,7Ω	5%	0,06W	
3864 ©	4822 117 13608	4,7Ω	5%	0,06W	
3865 ©	4822 117 13608	4,7Ω	5%	0,06W	
3866 ©	4822 117 13608	4,7Ω	5%	0,06W	
3868 ©	4822 051 30103	10kΩ	5%	0,06W	
3869 ©	4822 051 30331	330Ω	5%	0,06W	
3870 ©	4822 117 13632	100kΩ	1%	0,06W	
3871 ©	4822 051 30103	10kΩ	5%	0,06W	

RESISTORS

3872 ©	4822 051 30103	10kΩ	5%	0,06W	
3873 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3874 ©	4822 051 30103	10kΩ	5%	0,06W	
3875 ©	4822 051 30103	10kΩ	5%	0,06W	
3876 ©	4822 051 30103	10kΩ	5%	0,06W	
3878 ©	4822 051 30102	1kΩ	5%	0,06W	
3879 ©	4822 051 30102	1kΩ	5%	0,06W	
3881 ©	4822 117 12925	47kΩ	1%	0,06W	
3882 ©	4822 117 12925	47kΩ	1%	0,06W	
3884 ©	4822 051 30101	100Ω	5%	0,06W	
3885 ©	4822 051 30101	100Ω	5%	0,06W	
3886 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3887 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3888 ©	4822 051 30471	470Ω	5%	0,06W	
3889 ©	4822 051 30183	18kΩ	5%	0,06W	
3916 ©	4822 051 30273	27kΩ	5%	0,06W	
3917 ©	2322 704 63603	36kΩ	1%	0,06W	
3919 ©	5322 117 13024	33kΩ	1%	0,06W	
3920 ©	4822 051 30562	5,6kΩ	5%	0,06W	
3921 ©	4822 051 30471	470Ω	5%	0,06W	
3922 ©	4822 051 30102	1kΩ	5%	0,06W	
3923 ©	4822 051 30103	10kΩ	5%	0,06W	
3924 ©	4822 051 30103	10kΩ	5%	0,06W	
3925 ©	4822 117 12706	10kΩ	1%	0,06W	
3927 ©	4822 051 30333	33kΩ	5%	0,06W	
3931 ©	4822 117 12925	47kΩ	1%	0,06W	
3932 ©	4822 117 12925	47kΩ	1%	0,06W	
3933 ©	4822 117 12925	47kΩ	1%	0,06W	
3934 ©	4822 051 30101	100Ω	5%	0,06W	
3935 ©	4822 051 30101	100Ω	5%	0,06W	
3936 ©	4822 051 30103	10kΩ	5%	0,06W	
3937 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3938 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3939 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3940 ©	3198 021 31060	10MΩ	5%	0,06W	
3941 ©	3198 021 31060	10MΩ	5%	0,06W	
3942 ©	4822 051 30333	33kΩ	5%	0,06W	
3943 ©	4822 051 30333	33kΩ	5%	0,06W	
3944 ©	4822 051 30333	33kΩ	5%	0,06W	
3945 ©	4822 051 30333	33kΩ	5%	0,06W	
3946 ©	4822 051 30333	33kΩ	5%	0,06W	
3947 ©	4822 051 30333	33kΩ	5%	0,06W	
3948 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3950 ©	4822 117 13632	100kΩ	1%	0,06W	
3951 ©	4822 051 30223	22kΩ	5%	0,06W	
3952 ©	4822 051 30273	27kΩ	5%	0,06W	
3953 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3954 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3955 ©	4822 051 30103	10kΩ	5%	0,06W	
4003 ©	4822 051 30008	CHIP JUMPER 0603			
4004 ©	4822 051 30008	CHIP JUMPER 0603			
4402 ©	4822 051 30008	CHIP JUMPER 0603			
4403 ©	4822 051 30008	CHIP JUMPER 0603			
4411 ©	4822 051 30008	CHIP JUMPER 0603			
4412 ©	4822 051 30008	CHIP JUMPER 0603			
4413 ©	4822 051 30008	CHIP JUMPER 0603			
4414 ©	4822 051 30008	CHIP JUMPER 0603			
4415 ©	4822 051 30008	CHIP JUMPER 0603			
4416 ©	4822 051 30008	CHIP JUMPER 0603			
4417 ©	4822 051 30008	CHIP JUMPER 0603			
4418 ©	4822 051 30008	CHIP JUMPER 0603			
4419 ©	4822 051 30008	CHIP JUMPER 0603			
4420 ©	4822 051 30008	CHIP JUMPER 0603			
4421 ©	4822 051 30008	CHIP JUMPER 0603			

RESISTORS

4422 ©	4822 051 30008	CHIP JUMPER 0603
4423 ©	4822 051 30008	CHIP JUMPER 0603
4424 ©	4822 051 30008	CHIP JUMPER 0603
4425 ©	4822 051 30008	CHIP JUMPER 0603
4426 ©	4822 051 30008	CHIP JUMPER 0603
4427 ©	4822 051 30008	CHIP JUMPER 0603
4428 ©	4822 051 30008	CHIP JUMPER 0603
4429 ©	4822 051 30008	CHIP JUMPER 0603
4430 ©	4822 051 30008	CHIP JUMPER 0603
4431 ©	4822 051 30008	CHIP JUMPER 0603
4433 ©	4822 051 30008	CHIP JUMPER 0603
4434 ©	4822 051 30008	CHIP JUMPER 0603
4435 ©	4822 051 30008	CHIP JUMPER 0603
4437 ©	4822 051 30008	CHIP JUMPER 0603
4442 ©	4822 051 30008	CHIP JUMPER 0603
4443 ©	4822 051 30008	CHIP JUMPER 0603
4444 ©	4822 051 30008	CHIP JUMPER 0603
4446 ©	4822 051 30008	CHIP JUMPER 0603
4447 ©	4822 051 30008	CHIP JUMPER 0603
4448 ©	4822 051 30008	CHIP JUMPER 0603
4449 ©	4822 051 30008	CHIP JUMPER 0603
4450 ©	4822 051 30008	CHIP JUMPER 0603
4581 ©	4822 051 30008	CHIP JUMPER 0603
4582 ©	4822 051 30008	CHIP JUMPER 0603
4583 ©	4822 051 30008	CHIP JUMPER 0603
4584 ©	4822 051 30008	CHIP JUMPER 0603
4601 ©	4822 051 30008	CHIP JUMPER 0603
4700 ©	4822 051 30008	CHIP JUMPER 0603
4701 ©	4822 051 30008	CHIP JUMPER 0603
4901 ©	4822 051 30008	CHIP JUMPER 0603
4902 ©	4822 051 30008	CHIP JUMPER 0603
4903 ©	4822 051 30008	CHIP JUMPER 0603
4999 ©	4822 051 30008	CHIP JUMPER 0603

COILS

1600	4822 242 10434	RESONATOR 18,432MHz
1702	2422 549 44341	FILTER OFWK9656M
1706	4822 242 81572	TPS 6,0MHZ
1801	2422 543 01115	RESONATOR 24M576 CX-11F
1805	4822 242 70938	CRYSTAL 32,768kHz
1990	4822 242 73552	RESONATOR 13,875MHz
5001 ©	2422 549 43062	COIL 100MHZ, 600Ω
5401	4822 157 11706	10µH
5402	4822 157 11706	10µH
5403	4822 157 11706	10µH
5406	4822 157 11706	10µH
5600	4822 157 11706	10µH
5601	4822 157 11706	10µH
5602	4822 157 11706	10µH
5705	4822 157 11139	6,8µH
5709	4822 157 11139	6,8µH
5711	2422 549 44162	COIL VARIABLE
5714	4822 157 11747	15µH
5801 ©	2422 549 44607	FERRITE BEAD
5802 ©	2422 549 44607	FERRITE BEAD
5803 ©	2422 549 44607	FERRITE BEAD
5804 ©	2422 549 44607	FERRITE BEAD
5931	4822 157 11706	10µH
5932 ©	2422 549 43062	COIL 100MHZ, 600Ω

DIODES

6001 ©	4822 130 83757	BAS216
6002 ©	4822 130 83757	BAS216
6003 ©	4822 130 83757	BAS216

DIODES

6314 ©	9322 129 39685	BZM55-C8V2
6320 ©	4822 130 11397	BAS316
6401 ©	9340 548 61115	PDZ12B
6402 ©	9340 548 61115	PDZ12B
6403 ©	9340 548 61115	PDZ12B
6404 ©	9340 548 61115	PDZ12B
6409 ©	9322 129 38685	BZM55-C6V8
6414 ©	9322 129 38685	BZM55-C6V8
6415 ©	9340 548 61115	PDZ12B
6416 ©	9340 548 61115	PDZ12B
6417 ©	9340 548 61115	PDZ12B
6418 ©	9340 548 61115	PDZ12B
6419 ©	9340 548 61115	PDZ12B
6420 ©	9340 548 61115	PDZ12B
6422 ©	9322 129 34685	BZX284-C3V9
6423 ©	9340 548 61115	PDZ12B
6424 ©	9340 548 61115	PDZ12B
6600 ©	4822 130 83757	BAS216
6800 ©	4822 130 11397	BAS316
6801 ©	4822 130 11564	BZX384-C3V9
6802 ©	4822 130 10654	BAT254
6803 ©	4822 130 10654	BAT254
6804 ©	4822 130 10654	BAT254
6805 ©	4822 130 10654	BAT254
6901 ©	5322 130 34331	BAV70

TRANSISTORS

7003 ©	4822 130 60854	PDTA124EU-W
7006 ©	3198 010 42320	BC857BW
7008 ©	3198 010 42310	BC847BW
7009 ©	3198 010 42310	BC847BW
7010 ©	4822 130 61553	PDTC124EU
7011 ©	3198 010 42320	BC857BW
7308 ©	4822 130 61553	PDTC124EU
7319 ©	5322 130 60159	BC846B
7320 ©	9322 163 75685	SI2306DS
7321 ©	4822 130 61553	PDTC124EU
7401 ©	3198 010 42320	BC857BW
7402 ©	3198 010 42310	BC847BW
7403 ©	3198 010 42320	BC857BW
7404 ©	3198 010 42320	BC857BW
7405 ©	3198 010 42310	BC847BW
7407 ©	3198 010 42310	BC847BW
7409 ©	3198 010 42310	BC847BW
7412 ©	4822 130 61553	PDTC124EU
7421 ©	3198 010 42310	BC847BW
7506 ©	9340 219 30115	BC817-25W
7508 ©	9340 219 30115	BC817-25W
7509 ©	9340 219 30115	BC817-25W
7511 ©	9340 219 30115	BC817-25W
7711 ©	3198 010 42320	BC857BW
7717 ©	5322 130 42755	BC847C
7802 ©	4822 130 61553	PDTC124EU
7807 ©	4822 209 73852	PMBT2369
7813 ©	3198 010 42310	BC847BW
7814 ©	3198 010 42310	BC847BW
7815 ©	3198 010 42310	BC847BW
7816 ©	3198 010 42310	BC847BW
7817 ©	3198 010 42310	BC847BW
7818 ©	4822 130 60854	PDTA124EU-W
7903 ©	4822 130 61553	PDTC124EU
7906 ©	4822 130 61553	PDTC124EU
7908 ©	4822 130 61553	PDTC124EU
7932 ©	3198 010 42310	BC847BW

TRANSISTORS

7933 ©	3198 010 42310	BC847BW

INTEGRATED CIRCUITS

1703	4822 242 81436	OFWK3953M
7001 ©	9352 668 47118	UDA1334BTS/N2
7002 ©	4822 209 62312	MC33078
7004 ©	9322 173 41668	ST6618
7005 ©	9352 670 99118	UDA1361TS/N1
7408 ©	9322 186 87668	MSP3415G-QG-B8V3
7411 ©	9322 179 71668	NJM2285M
7419 ©	9340 560 36235	BSH111
7420 ©	9340 560 36235	BSH111
7501	5322 209 11102	HEF4052BT
7502 ©	4822 209 32071	MC33079D
7503	5322 209 11102	HEF4052BT
7504	5322 209 11102	HEF4052BT
7505 ©	4822 209 62312	MC33078
7710 ©	9352 621 13118	TDA9817T/V1
7801 ©	9352 190 00118	74LVC573AD, SHIFT REGISTER
7803 ©	9322 186 16668	CY62128VLL-70SC, 128K RAM
7804 ©	3103 165 13721	TMP91CW12AF/LIRP1, CECO
7805 ©	9965 000 20214	M29W800DT-70N6/AN190016 V.016
7806 ©	9322 163 26685	NCP301LSN30, RESET IC
7808 ©	4822 209 16907	M24C16-MN6T, 2K EEPROM
7821 ©	9340 560 36235	BSH111
7822 ©	9340 560 36235	BSH111
7825 ©	9322 181 92682	LA7213
7902 ©	4822 209 63709	LM324D, 4-FOLD OPAMP.
7931 ©	4822 209 17505	STV5348D, VPS DECODER
7934 ©	4822 209 60177	LM339D, 4X OPAMP

sub µP BOARD

MISCELLANEOUS

1986	2422 025 16677	FFC-CONNECTOR, 10P, SIDE ENTRY

CAPACITORS

2800 ©	2238 586 59812	100nF	10%	50V
2801 ©	4822 122 33752	15pF	5%	50V
2802 ©	4822 122 33752	15pF	5%	50V
2803 ©	2238 586 59812	100nF	10%	50V
2804 ©	2238 586 59812	100nF	10%	50V
2805 ©	2238 586 59812	100nF	10%	50V
2806 ©	2238 586 59812	100nF	10%	50V
2807 ©	4822 126 13879	220nF	20%	16V
2808 ©	2238 586 59812	100nF	10%	50V
2809 ©	2238 586 59812	100nF	10%	50V
2810 ©	4822 122 33741	10pF	10%	50V
2811 ©	4822 122 33741	10pF	10%	50V
2812 ©	5322 126 11583	10nF	10%	63V
2813 ©	4822 122 33741	10pF	10%	50V
2814 ©	4822 122 33741	10pF	10%	50V
2815 ©	4822 126 13883	220pF	5%	50V
2816	4822 124 11968	220MF	20%	5,5V
2817 ©	2238 586 59812	100nF	10%	50V
2818 ©	4822 126 13883	220pF	5%	50V
2819	4822 124 42234	100µF	20%	6,3V
2820 ©	5322 126 11583	10nF	10%	63V
2821 ©	5322 126 11583	10nF	10%	63V
2822 ©	2238 586 59812	100nF	10%	50V
2823 ©	5322 126 11578	1nF	10%	63V
2824 ©	3198 017 41050	1µF	20%	10V
2825 ©	2020 552 94427	100pF	5%	50V
2828 ©	2238 586 59812	100nF	10%	50V
2829	4822 124 21732	10µF	20%	25V
2830 ©	2238 586 59812	100nF	10%	50V
2831 ©	5322 126 11583	10nF	10%	63V
3867 ©	4822 051 30759	75Ω	5%	0,06W

RESISTORS

3800 ©	4822 051 30223	22kΩ	5%	0,06W
3801 ©	4822 051 30103	10kΩ	5%	0,06W
3802 ©	4822 051 30223	22kΩ	5%	0,06W
3803 ©	4822 051 30102	1kΩ	5%	0,06W
3804 ©	4822 051 30103	10kΩ	5%	0,06W
3805 ©	4822 051 30101	100Ω	5%	0,06W
3806 ©	4822 051 30223	22kΩ	5%	0,06W
3807 ©	4822 117 13632	100kΩ	1%	0,06W
3808 ©	4822 117 13632	100kΩ	1%	0,06W
3809 ©	4822 117 13632	100kΩ	1%	0,06W
3810 ©	4822 117 13632	100kΩ	1%	0,06W
3811 ©	4822 051 30101	100Ω	5%	0,06W
3812 ©	4822 051 30223	22kΩ	5%	0,06W
3813 ©	4822 051 30103	10kΩ	5%	0,06W
3814 ©	4822 051 30103	10kΩ	5%	0,06W
3815 ©	4822 051 30183	18kΩ	5%	0,06W
3816 ©	4822 051 30103	10kΩ	5%	0,06W
3817 ©	4822 051 30222	2,2kΩ	5%	0,06W
3818 ©	4822 051 30472	4,7kΩ	5%	0,06W
3819 ©	4822 051 30103	10kΩ	5%	0,06W
3820 ©	4822 051 30102	1kΩ	5%	0,06W
3821 ©	4822 051 30103	10kΩ	5%	0,06W
3822 ©	4822 051 30103	10kΩ	5%	0,06W
3823 ©	4822 117 13632	100kΩ	1%	0,06W
3824 ©	4822 051 30102	1kΩ	5%	0,06W
3825 ©	4822 051 30103	10kΩ	5%	0,06W
3826 ©	4822 051 30102	1kΩ	5%	0,06W

RESISTORS

3827 ©	4822 051 30102	1kΩ	5%	0,06W	
3828 ©	4822 051 30103	10kΩ	5%	0,06W	
3829 ©	4822 051 30103	10kΩ	5%	0,06W	
3830 ©	4822 051 30102	1kΩ	5%	0,06W	
3831 ©	4822 051 30102	1kΩ	5%	0,06W	
3832 ©	4822 051 30333	33kΩ	5%	0,06W	
3833 ©	4822 051 30102	1kΩ	5%	0,06W	
3834 ©	4822 051 30102	1kΩ	5%	0,06W	
3835 ©	4822 051 30102	1kΩ	5%	0,06W	
3836 ©	4822 051 30101	100Ω	5%	0,06W	
3837 ©	4822 051 30123	12kΩ	5%	0,06W	
3838 ©	4822 051 30102	1kΩ	5%	0,06W	
3839 ©	4822 051 30273	27kΩ	5%	0,06W	
3840 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3841 ©	4822 117 13632	100kΩ	1%	0,06W	
3842 ©	4822 117 12891	220kΩ	1%	0,06W	
3843 ©	4822 051 30333	33kΩ	5%	0,06W	
3844 ©	4822 051 30221	220Ω	5%	0,06W	
3845 ©	4822 051 30102	1kΩ	5%	0,06W	
3846 ©	4822 051 30333	33kΩ	5%	0,06W	
3847 ©	4822 051 30103	10kΩ	5%	0,06W	
3849 ©	4822 117 12925	47kΩ	1%	0,06W	
3850 ©	4822 051 30183	18kΩ	5%	0,06W	
3851 ©	4822 051 30103	10kΩ	5%	0,06W	
3852 ©	4822 051 30103	10kΩ	5%	0,06W	
3854 ©	4822 051 30102	1kΩ	5%	0,06W	
3855 ©	4822 051 30471	470Ω	5%	0,06W	
3856 ©	4822 051 30103	10kΩ	5%	0,06W	
3857 ©	4822 051 30103	10kΩ	5%	0,06W	
3858 ©	4822 117 13632	100kΩ	1%	0,06W	
3860 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3861 ©	3198 021 32250	2,2MΩ	5%	0,06W	
3862 ©	4822 051 30103	10kΩ	5%	0,06W	
3863 ©	4822 117 13608	4,7Ω	5%	0,06W	
3864 ©	4822 117 13608	4,7Ω	5%	0,06W	
3865 ©	4822 117 13608	4,7Ω	5%	0,06W	
3866 ©	4822 117 13608	4,7Ω	5%	0,06W	
3868 ©	4822 051 30103	10kΩ	5%	0,06W	
3869 ©	4822 051 30331	330Ω	5%	0,06W	
3870 ©	4822 117 13632	100kΩ	1%	0,06W	
3871 ©	4822 051 30103	10kΩ	5%	0,06W	
3872 ©	4822 051 30103	10kΩ	5%	0,06W	
3873 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3874 ©	4822 051 30103	10kΩ	5%	0,06W	
3875 ©	4822 051 30103	10kΩ	5%	0,06W	
3876 ©	4822 051 30103	10kΩ	5%	0,06W	
3878 ©	4822 051 30102	1kΩ	5%	0,06W	
3879 ©	4822 051 30102	1kΩ	5%	0,06W	
3881 ©	4822 117 12925	47kΩ	1%	0,06W	
3882 ©	4822 117 12925	47kΩ	1%	0,06W	
3884 ©	4822 051 30101	100Ω	5%	0,06W	
3885 ©	4822 051 30101	100Ω	5%	0,06W	
3886 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3887 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3888 ©	4822 051 30471	470Ω	5%	0,06W	
3889 ©	4822 051 30183	18kΩ	5%	0,06W	
3916 ©	4822 051 30273	27kΩ	5%	0,06W	
3917 ©	2322 704 63603	36kΩ	1%	0,06W	
3919 ©	5322 117 13024	33kΩ	1%	0,06W	
3920 ©	4822 051 30562	5,6kΩ	5%	0,06W	
3921 ©	4822 051 30471	470Ω	5%	0,06W	
3922 ©	4822 051 30102	1kΩ	5%	0,06W	
3923 ©	4822 051 30103	10kΩ	5%	0,06W	
3924 ©	4822 051 30103	10kΩ	5%	0,06W	

RESISTORS

3925 ©	4822 117 12706	10kΩ	1%	0,06W	
3927 ©	4822 051 30333	33kΩ	5%	0,06W	
4901 ©	4822 051 30008	CHIP JUMPER 0603			
4902 ©	4822 051 30008	CHIP JUMPER 0603			
4903 ©	4822 051 30008	CHIP JUMPER 0603			

COILS

1801	2422 543 01115	RESONATOR 24M576 CX-11F
1805	4822 242 70938	CRYSTAL 32,768kHz
5801 ©	2422 549 44607	FERRITE BEAD
5802 ©	2422 549 44607	FERRITE BEAD
5803 ©	2422 549 44607	FERRITE BEAD
5804 ©	2422 549 44607	FERRITE BEAD

DIODES

6800 ©	4822 130 11397	BAS316
6801 ©	4822 130 11564	BZX384-C3V9
6802 ©	4822 130 10654	BAT254
6803 ©	4822 130 10654	BAT254
6804 ©	4822 130 10654	BAT254
6805 ©	4822 130 10654	BAT254
6901 ©	5322 130 34331	BAV70

TRANSISTORS

7802 ©	4822 130 61553	PDTC124EU
7807 ©	4822 209 73852	PMBT2369
7813 ©	3198 010 42310	BC847BW
7814 ©	3198 010 42310	BC847BW
7815 ©	3198 010 42310	BC847BW
7816 ©	3198 010 42310	BC847BW
7817 ©	3198 010 42310	BC847BW
7818 ©	4822 130 60854	PDTA124EU-W
7903 ©	4822 130 61553	PDTC124EU
7906 ©	4822 130 61553	PDTC124EU
7908 ©	4822 130 61553	PDTC124EU

INTEGRATED CIRCUITS

7801 ©	9352 190 00118	74LVC573AD, SHIFT REGISTER
7803 ©	9322 186 16668	CY62128VLL-70SC, 128K RAM
7804 ©	3103 165 13721	TMP91CW12AF/LIRP1, CECO
7805 ©	9965 000 20214	M29W800DT-70N6/AN190016 V.016
7806 ©	9322 163 26685	NCP301LSN30, RESET IC
7808 ©	4822 209 16907	M24C16-MN6T, 2K EEPROM
7821 ©	9340 560 36235	BSH111
7822 ©	9340 560 36235	BSH111
7825 ©	9322 181 92682	LA7213
7902 ©	4822 209 63709	LM324D, 4-FOLD OPAMP.

DVIO BOARD

MISCELLANEOUS

1500	2422 025 17084	BOARD-BOARD CONNECT. 60P, TOP
1501	2422 025 16543	CONNECTOR, 4P, SIDE ENTRY
1502 ©	2422 086 11075	FUSE 750mA 125V UL
1901	2422 025 17106	CONNECTOR, 4P, IEEE 1394
1903	2422 025 16542	CONNECTOR, 2P, SIDE ENTRY

CAPACITORS

2400 ©	2238 586 59812	100nF	10%	50V
2401 ©	3198 017 41050	1µF	20%	10V
2402 ©	4822 126 14506	270pF	5%	50V
2403 ©	4822 124 80151	47µF	20%	16V
2404 ©	2238 586 59812	100nF	10%	50V
2405 ©	2238 586 59812	100nF	10%	50V
2406 ©	2238 586 59812	100nF	10%	50V
2407 ©	2238 586 59812	100nF	10%	50V
2408 ©	2238 586 59812	100nF	10%	50V
2412 ©	4822 122 33741	10pF	10%	50V
2413 ©	4822 122 33741	10pF	10%	50V
2415 ©	4822 124 80151	47µF	20%	16V
2416 ©	2238 586 59812	100nF	10%	50V
2417 ©	2238 586 59812	100nF	10%	50V
2418 ©	2238 586 59812	100nF	10%	50V
2419 ©	2238 586 59812	100nF	10%	50V
2420 ©	2238 586 59812	100nF	10%	50V
2431 ©	4822 124 80151	47µF	20%	16V
2432 ©	2238 586 59812	100nF	10%	50V
2433 ©	2238 586 59812	100nF	10%	50V
2434 ©	2238 586 59812	100nF	10%	50V
2435 ©	2238 586 59812	100nF	10%	50V
2436 ©	2238 586 59812	100nF	10%	50V
2437 ©	2238 586 59812	100nF	10%	50V
2438 ©	2238 586 59812	100nF	10%	50V
2439 ©	2238 586 59812	100nF	10%	50V
2440 ©	2238 586 59812	100nF	10%	50V
2441 ©	2238 586 59812	100nF	10%	50V
2442 ©	2238 586 59812	100nF	10%	50V
2443 ©	2238 586 59812	100nF	10%	50V
2444 ©	2238 586 59812	100nF	10%	50V
2445 ©	2238 586 59812	100nF	10%	50V
2446 ©	2238 586 59812	100nF	10%	50V
2447 ©	2238 586 59812	100nF	10%	50V
2449 ©	2238 586 59812	100nF	10%	50V
2450 ©	4822 124 23002	10µF	20%	16V
2451 ©	2238 586 59812	100nF	10%	50V
2452 ©	2238 586 59812	100nF	10%	50V
2453 ©	2238 586 59812	100nF	10%	50V
2454 ©	2238 586 59812	100nF	10%	50V
2455 ©	2238 586 59812	100nF	10%	50V
2456 ©	2238 586 59812	100nF	10%	50V
2501 ©	2238 586 59812	100nF	10%	50V
2502 ©	2238 586 59812	100nF	10%	50V
2503 ©	2238 586 59812	100nF	10%	50V
2504 ©	2238 586 59812	100nF	10%	50V
2505 ©	2238 586 59812	100nF	10%	50V
2506 ©	4822 124 80151	47µF	20%	16V
2507 ©	4822 124 80151	47µF	20%	16V
2508 ©	2238 586 59812	100nF	10%	50V
2512 ©	2238 586 59812	100nF	10%	50V
2513 ©	2238 586 59812	100nF	10%	50V
2514 ©	4822 124 80151	47µF	20%	16V
2520 ©	2238 586 59812	100nF	10%	50V
2521 ©	4822 124 80151	47µF	20%	16V
2522 ©	4822 124 80151	47µF	20%	16V
2523 ©	5322 126 11583	10nF	10%	63V

CAPACITORS

2524 ©	5322 126 11583	10nF	10%	63V
2525 ©	4822 124 80151	47µF	20%	16V
2526 ©	2238 586 59812	100nF	10%	50V
2527 ©	2238 586 59812	100nF	10%	50V
2528 ©	2238 586 59812	100nF	10%	50V
2529 ©	2238 586 59812	100nF	10%	50V
2534 ©	2238 586 59812	100nF	10%	50V
2600 ©	2238 586 59812	100nF	10%	50V
2601 ©	4822 124 23002	10µF	20%	16V
2602 ©	3198 017 44740	470nF	20%	10V
2603 ©	2238 586 59812	100nF	10%	50V
2605 ©	2238 586 59812	100nF	10%	50V
2606 ©	3198 016 31020	1nF	5%	25V
2607 ©	2238 586 59812	100nF	10%	50V
2608 ©	2238 586 59812	100nF	10%	50V
2609 ©	2238 586 59812	100nF	10%	50V
2610 ©	2238 586 59812	100nF	10%	50V
2611 ©	2238 586 59812	100nF	10%	50V
2612 ©	2238 586 59812	100nF	10%	50V
2613 ©	2238 586 59812	100nF	10%	50V
2614 ©	3198 017 44740	470nF	20%	10V
2617 ©	2238 586 59812	100nF	10%	50V
2618 ©	2238 861 18229	22pF	1%	50V
2801 ©	4822 126 11669	27pF	10%	50V
2802 ©	4822 126 11669	27pF	10%	50V
2803 ©	2238 586 59812	100nF	10%	50V
2804 ©	2238 586 59812	100nF	10%	50V
2805 ©	4822 124 80151	47µF	20%	16V
2806 ©	2238 586 59812	100nF	10%	50V
2807 ©	4822 124 80151	47µF	20%	16V
2808 ©	2238 586 59812	100nF	10%	50V
2809 ©	2238 586 59812	100nF	10%	50V
2810 ©	2238 586 59812	100nF	10%	50V
2812 ©	2238 586 59812	100nF	10%	50V
2813 ©	2238 586 59812	100nF	10%	50V
2814 ©	5322 124 41945	22µF	20%	35V
2816 ©	2238 586 59812	100nF	10%	50V
2818 ©	2238 586 59812	100nF	10%	50V
2820 ©	2238 586 59812	100nF	10%	50V
2822 ©	3198 016 31020	1nF	5%	25V

RESISTORS

3400 ©	4822 051 30103	10kΩ	5%	0,06W
3401 ©	2322 734 65609	56Ω	1%	0,06W
3402 ©	2322 734 65609	56Ω	1%	0,06W
3403 ©	4822 117 12139	22Ω	5%	0,06W
3404 ©	2322 734 65609	56Ω	1%	0,06W
3405 ©	2322 734 65609	56Ω	1%	0,06W
3406 ©	2322 704 65102	5,1kΩ	1%	0,06W
3407 ©	4822 051 30103	10kΩ	5%	0,06W
3408 ©	4822 117 13632	100kΩ	1%	0,06W
3409 ©	2350 546 09102	9,1kΩ	5%	0,06W
3409 ©	4822 117 12902	8,2kΩ	1%	0,06W
3410 ©	4822 117 12139	22Ω	5%	0,06W
3413 ©	4822 117 12139	22Ω	5%	0,06W
3414 ©	4822 117 12139	22Ω	5%	0,06W
3415 ©	4822 117 12139	22Ω	5%	0,06W
3416 ©	4822 117 12139	22Ω	5%	0,06W
3417 ©	4822 117 12139	22Ω	5%	0,06W
3418 ©	4822 117 12139	22Ω	5%	0,06W
3419 ©	4822 117 12139	22Ω	5%	0,06W
3420 ©	4822 117 12139	22Ω	5%	0,06W
3421 ©	4822 117 12139	22Ω	5%	0,06W
3422 ©	4822 117 12139	22Ω	5%	0,06W

RESISTORS

3423 ©	4822 117 12139	22Ω	5%	0,06W
3424 ©	4822 117 12139	22Ω	5%	0,06W
3425 ©	4822 051 30103	10kΩ	5%	0,06W
3426 ©	4822 051 30103	10kΩ	5%	0,06W
3427 ©	4822 051 30103	10kΩ	5%	0,06W
3428 ©	4822 051 30103	10kΩ	5%	0,06W
3429 ©	4822 051 30103	10kΩ	5%	0,06W
3430 ©	4822 051 30103	10kΩ	5%	0,06W
3431 ©	4822 051 30103	10kΩ	5%	0,06W
3432 ©	4822 051 30103	10kΩ	5%	0,06W
3433 ©	4822 051 30103	10kΩ	5%	0,06W
3434 ©	4822 051 30103	10kΩ	5%	0,06W
3435 ©	4822 051 30103	10kΩ	5%	0,06W
3436 ©	4822 051 30103	10kΩ	5%	0,06W
3437 ©	4822 051 30103	10kΩ	5%	0,06W
3438 ©	4822 051 30103	10kΩ	5%	0,06W
3439 ©	4822 051 30103	10kΩ	5%	0,06W
3440 ©	4822 051 30103	10kΩ	5%	0,06W
3441 ©	4822 051 30103	10kΩ	5%	0,06W
3442 ©	4822 051 30103	10kΩ	5%	0,06W
3443 ©	4822 051 30103	10kΩ	5%	0,06W
3444 ©	4822 051 30103	10kΩ	5%	0,06W
3445 ©	4822 051 30103	10kΩ	5%	0,06W
3446 ©	4822 051 30103	10kΩ	5%	0,06W
3447 ©	4822 051 30103	10kΩ	5%	0,06W
3448 ©	4822 051 30103	10kΩ	5%	0,06W
3449 ©	4822 051 30103	10kΩ	5%	0,06W
3450 ©	4822 051 30103	10kΩ	5%	0,06W
3451 ©	4822 051 30103	10kΩ	5%	0,06W
3452 ©	4822 051 30103	10kΩ	5%	0,06W
3453 ©	4822 051 30102	1kΩ	5%	0,06W
3454 ©	4822 051 30103	10kΩ	5%	0,06W
3455 ©	4822 051 30103	10kΩ	5%	0,06W
3456 ©	4822 051 30103	10kΩ	5%	0,06W
3457 ©	4822 051 30103	10kΩ	5%	0,06W
3458 ©	4822 051 30103	10kΩ	5%	0,06W
3459 ©	4822 051 30103	10kΩ	5%	0,06W
3460 ©	4822 051 30103	10kΩ	5%	0,06W
3461 ©	4822 117 12925	47kΩ	1%	0,06W
3462 ©	4822 051 30103	10kΩ	5%	0,06W
3463 ©	4822 051 30103	10kΩ	5%	0,06W
3464 ©	4822 051 30103	10kΩ	5%	0,06W
3465 ©	4822 051 30103	10kΩ	5%	0,06W
3466 ©	4822 051 30103	10kΩ	5%	0,06W
3467 ©	4822 051 30103	10kΩ	5%	0,06W
3468 ©	4822 051 30103	10kΩ	5%	0,06W
3469 ©	4822 051 30103	10kΩ	5%	0,06W
3470 ©	4822 051 30103	10kΩ	5%	0,06W
3471 ©	4822 051 30103	10kΩ	5%	0,06W
3472 ©	4822 051 30102	1kΩ	5%	0,06W
3473 ©	4822 051 30103	10kΩ	5%	0,06W
3474 ©	4822 051 30102	1kΩ	5%	0,06W
3475 ©	4822 051 30103	10kΩ	5%	0,06W
3476 ©	4822 051 30103	10kΩ	5%	0,06W
3477 ©	4822 051 30103	10kΩ	5%	0,06W
3478 ©	4822 051 30102	1kΩ	5%	0,06W
3481 ©	4822 051 30103	10kΩ	5%	0,06W
3482 ©	4822 051 30103	10kΩ	5%	0,06W
3483 ©	4822 051 30103	10kΩ	5%	0,06W
3484 ©	4822 051 30103	10kΩ	5%	0,06W
3485 ©	4822 051 30103	10kΩ	5%	0,06W
3486 ©	4822 051 30103	10kΩ	5%	0,06W
3487 ©	4822 051 30103	10kΩ	5%	0,06W
3488 ©	4822 051 30103	10kΩ	5%	0,06W

RESISTORS

3489 ©	4822 051 30103	10kΩ	5%	0,06W
3490 ©	4822 051 30103	10kΩ	5%	0,06W
3491 ©	4822 051 30103	10kΩ	5%	0,06W
3492 ©	4822 051 30103	10kΩ	5%	0,06W
3493 ©	4822 051 30103	10kΩ	5%	0,06W
3494 ©	4822 051 30103	10kΩ	5%	0,06W
3495 ©	4822 051 30103	10kΩ	5%	0,06W
3496 ©	4822 051 30103	10kΩ	5%	0,06W
3497 ©	4822 051 30103	10kΩ	5%	0,06W
3498 ©	4822 051 30103	10kΩ	5%	0,06W
3499 ©	4822 051 30103	10kΩ	5%	0,06W
3502 ©	4822 051 30479	47Ω	5%	0,06W
3503 ©	4822 051 30479	47Ω	5%	0,06W
3504 ©	4822 051 30479	47Ω	5%	0,06W
3505 ©	4822 051 30479	47Ω	5%	0,06W
3506 ©	4822 051 30479	47Ω	5%	0,06W
3507 ©	4822 051 30479	47Ω	5%	0,06W
3508 ©	4822 051 30479	47Ω	5%	0,06W
3509 ©	4822 051 30479	47Ω	5%	0,06W
3510 ©	4822 051 30479	47Ω	5%	0,06W
3514 ©	4822 051 30479	47Ω	5%	0,06W
3515 ©	4822 051 30479	47Ω	5%	0,06W
3516 ©	4822 051 30479	47Ω	5%	0,06W
3517 ©	4822 051 30101	100Ω	5%	0,06W
3518 ©	4822 051 30101	100Ω	5%	0,06W
3519 ©	4822 117 12891	220kΩ	1%	0,06W
3520 ©	4822 117 12891	220kΩ	1%	0,06W
3530 ©	4822 117 12139	22Ω	5%	0,06W
3531 ©	4822 117 12139	22Ω	5%	0,06W
3532 ©	4822 117 12139	22Ω	5%	0,06W
3533 ©	4822 117 12139	22Ω	5%	0,06W
3534 ©	4822 117 12139	22Ω	5%	0,06W
3535 ©	4822 117 12139	22Ω	5%	0,06W
3536 ©	4822 117 12139	22Ω	5%	0,06W
3537 ©	4822 117 12139	22Ω	5%	0,06W
3538 ©	4822 117 12139	22Ω	5%	0,06W
3539 ©	4822 117 12139	22Ω	5%	0,06W
3540 ©	4822 117 12139	22Ω	5%	0,06W
3541 ©	4822 117 12139	22Ω	5%	0,06W
3542 ©	4822 117 12139	22Ω	5%	0,06W
3543 ©	4822 117 12139	22Ω	5%	0,06W
3544 ©	4822 117 12139	22Ω	5%	0,06W
3545 ©	4822 117 12139	22Ω	5%	0,06W
3546 ©	4822 117 12139	22Ω	5%	0,06W
3547 ©	4822 117 12139	22Ω	5%	0,06W
3548 ©	4822 117 12139	22Ω	5%	0,06W
3549 ©	4822 117 12139	22Ω	5%	0,06W
3550 ©	4822 117 12139	22Ω	5%	0,06W
3551 ©	4822 117 12139	22Ω	5%	0,06W
3552 ©	4822 117 12139	22Ω	5%	0,06W
3553 ©	4822 117 12139	22Ω	5%	0,06W
3554 ©	4822 117 12139	22Ω	5%	0,06W
3555 ©	4822 117 12139	22Ω	5%	0,06W
3556 ©	4822 117 12139	22Ω	5%	0,06W
3557 ©	4822 117 12139	22Ω	5%	0,06W
3558 ©	4822 117 12139	22Ω	5%	0,06W
3559 ©	4822 117 12139	22Ω	5%	0,06W
3560 ©	4822 117 12139	22Ω	5%	0,06W
3561 ©	4822 117 12139	22Ω	5%	0,06W
3562 ©	4822 051 30103	10kΩ	5%	0,06W
3563 ©	4822 117 12917	1Ω	5%	0,06W
3564 ©	4822 117 12139	22Ω	5%	0,06W
3600 ©	4822 117 12891	220kΩ	1%	0,06W
3601 ©	4822 117 12917	1Ω	5%	0,06W

RESISTORS

3602 ©	4822 051 30103	10kΩ	5%	0,06W	
3603 ©	4822 117 12917	1Ω	5%	0,06W	
3605 ©	2120 358 90533	POTMETER 22kΩ			
3606 ©	4822 117 12706	10kΩ	1%	0,06W	
3607 ©	2322 702 60184	180kΩ	5%	0,06W	
3608 ©	4822 117 12891	220kΩ	1%	0,06W	
3609 ©	2322 704 65604	560kΩ	1%	0,06W	
3610 ©	2322 704 62003	20kΩ	1%	0,06W	
3610 ©	5322 117 13024	33kΩ	1%	0,06W	
3612 ©	4822 117 12706	10kΩ	1%	0,06W	
3613 ©	2322 704 65102	5,1kΩ	1%	0,06W	
3614 ©	4822 117 13632	100kΩ	1%	0,06W	
3617 ©	4822 051 30103	10kΩ	5%	0,06W	
3618 ©	4822 051 30103	10kΩ	5%	0,06W	
3800 ©	4822 051 30331	330Ω	5%	0,06W	
3801 ©	4822 051 30103	10kΩ	5%	0,06W	
3802 ©	4822 051 30223	22kΩ	5%	0,06W	
3803 ©	4822 051 30103	10kΩ	5%	0,06W	
3804 ©	4822 051 30103	10kΩ	5%	0,06W	
3806 ©	4822 051 30103	10kΩ	5%	0,06W	
3807 ©	4822 051 30103	10kΩ	5%	0,06W	
3808 ©	4822 051 30008	CHIP JUMPER 0603			
3809 ©	4822 051 30103	10kΩ	5%	0,06W	
3810 ©	4822 051 30103	10kΩ	5%	0,06W	
3812 ©	4822 051 30103	10kΩ	5%	0,06W	
3814 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3815 ©	5322 117 13047	330Ω	1%	0,06W	
3816 ©	5322 117 13018	1kΩ	1%	0.0625W	
3817 ©	4822 051 30103	10kΩ	5%	0,06W	
3818 ©	4822 051 30103	10kΩ	5%	0,06W	
3819 ©	4822 051 30102	1kΩ	5%	0,06W	
3820 ©	4822 117 12925	47kΩ	1%	0,06W	
3821 ©	4822 051 30103	10kΩ	5%	0,06W	
3822 ©	4822 117 13632	100kΩ	1%	0,06W	
3823 ©	5322 117 13018	1kΩ	1%	0.0625W	
3824 ©	5322 117 13042	3,9kΩ	1%	0,06W	
3825 ©	4822 051 30101	100Ω	5%	0,06W	
3826 ©	4822 051 30101	100Ω	5%	0,06W	
3827 ©	4822 051 30103	10kΩ	5%	0,06W	
3828 ©	4822 051 30101	100Ω	5%	0,06W	
3829 ©	4822 117 12925	47kΩ	1%	0,06W	
3831 ©	4822 117 13632	100kΩ	1%	0,06W	
3832 ©	4822 051 30103	10kΩ	5%	0,06W	
3833 ©	4822 051 30103	10kΩ	5%	0,06W	
3834 ©	4822 051 30103	10kΩ	5%	0,06W	
3835 ©	4822 051 30102	1kΩ	5%	0,06W	
3836 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3837 ©	4822 051 30103	10kΩ	5%	0,06W	
3838 ©	4822 051 30102	1kΩ	5%	0,06W	
3839 ©	4822 051 30222	2,2kΩ	5%	0,06W	
4401 ©	4822 051 30008	CHIP JUMPER 0603			
4402 ©	4822 051 30008	CHIP JUMPER 0603			
4501 ©	4822 051 30008	CHIP JUMPER 0603			
4503 ©	4822 051 30008	CHIP JUMPER 0603			
4602 ©	4822 051 30008	CHIP JUMPER 0603			
4603 ©	4822 051 30008	CHIP JUMPER 0603			
4605 ©	4822 051 30008	CHIP JUMPER 0603			
4606 ©	4822 051 30008	CHIP JUMPER 0603			
4608 ©	4822 051 30008	CHIP JUMPER 0603			
4609 ©	4822 051 30008	CHIP JUMPER 0603			

COILS

1400	2422 543 01115	RESONATOR 24M576 CX-11F
1800 ©	2422 543 89022	RESONATOR 6M CX-5F
5400 ©	4822 157 11499	BLM11P600SPT
5401 ©	4822 157 11499	BLM11P600SPT
5431 ©	4822 157 11499	BLM11P600SPT
5432 ©	4822 157 11499	BLM11P600SPT
5433 ©	4822 157 11499	BLM11P600SPT
5501 ©	4822 157 11499	BLM11P600SPT
5503 ©	4822 157 11499	BLM11P600SPT
5504 ©	4822 157 11499	BLM11P600SPT
5505 ©	4822 157 11499	BLM11P600SPT
5600 ©	4822 157 11499	BLM11P600SPT
5601 ©	4822 157 11499	BLM11P600SPT
5602 ©	4822 157 11499	BLM11P600SPT
5603 ©	4822 157 11499	BLM11P600SPT
5800 ©	4822 157 11499	BLM11P600SPT
5801 ©	4822 157 11499	BLM11P600SPT
5802 ©	4822 157 71593	10µH 10%

DIODES

6801 ©	9340 548 52115	BZX284-C5V1
6802 ©	4822 130 11397	BAS316
6803 ©	4822 130 11397	BAS316
6804 ©	4822 130 11397	BAS316

TRANSISTORS

7803 ©	3198 010 42310	BC847BW
7804 ©	3198 010 42310	BC847BW
7805 ©	3198 010 42310	BC847BW
7810 ©	3198 010 42320	BC857BW
7811 ©	3198 010 42310	BC847BW

INTEGRATED CIRCUITS

7400 ©	9322 182 04671	UPD72852GB-8EU
7430 ©	9322 144 59668	MT48LC1M16A1TG-7S
7431 ©	9322 184 70671	UPD72893GD-LML
7433 ©	9322 142 88668	LF25CDT
7501 ©	9352 685 96115	74LVC1GU04GW
7505 ©	9352 029 90118	74LVT16244BDGG
7506 ©	9352 668 39118	UDA1334ATS/N2
7507 ©	9351 751 40118	74LV74PW
7508 ©	9352 685 96115	74LVC1GU04GW
7601 ©	2722 171 08709	OSCILLATOR FXO-31FL
7602 ©	9352 456 40115	74HCT1G04GW
7604 ©	9322 186 60668	BA7082F
7605 ©	9322 186 59668	BU2288FV
7606 ©	9351 751 40118	74LV74PW
7608 ©	9352 685 96115	74LVC1GU04GW
7800 ©	9340 310 30215	PDTC144ET
7801 ©	9322 186 70668	LM2931D
7802 ©	3103 607 40011	UPD78F0988AGC DV91XX0105
7802 ©	9322 185 35671	UPD78F0988AGC-8BS
7806 ©	9340 310 30215	PDTC144ET
7807 ©	9352 683 81115	74LVC1G32GW
7808 ©	9340 560 36235	BSH111
7809 ©	9352 683 81115	74LVC1G32GW

DIGITAL BOARD

MISCELLANEOUS

1100	2422 025 17018	FFC-CONNECTOR, 15P, TOP ENTRY
1101	2422 025 17018	FFC-CONNECTOR, 15P, TOP ENTRY
1200	2422 025 16794	FFC-CONNECTOR, 7P, TOP ENTRY
1600	2422 025 16729	FFC-CONNECTOR, 10P, TOP ENTRY
1601	2422 025 16389	FFC-CONNECTOR, 22P, TOP ENTRY
1602	2422 025 16389	FFC-CONNECTOR, 22P, TOP ENTRY
1603	2422 025 16939	BOARD-BOARD CONNECT. 60P, TOP
1900	2422 025 17441	CONNECTOR, 12P, TOP ENTRY

CAPACITORS

2100 ©	2238 586 59812	100nF	10%	50V
2101 ©	2238 586 59812	100nF	10%	50V
2102 ©	2238 586 59812	100nF	10%	50V
2103 ©	2238 586 59812	100nF	10%	50V
2104 ©	2238 586 59812	100nF	10%	50V
2105 ©	2238 586 59812	100nF	10%	50V
2106 ©	2238 586 59812	100nF	10%	50V
2107 ©	2238 586 59812	100nF	10%	50V
2108 ©	2238 586 59812	100nF	10%	50V
2109 ©	2238 586 59812	100nF	10%	50V
2110 ©	2238 586 59812	100nF	10%	50V
2111 ©	2238 586 59812	100nF	10%	50V
2112 ©	2238 586 59812	100nF	10%	50V
2113 ©	2238 586 59812	100nF	10%	50V
2114 ©	2238 586 59812	100nF	10%	50V
2115 ©	2238 586 59812	100nF	10%	50V
2116 ©	2238 586 59812	100nF	10%	50V
2117 ©	2238 586 59812	100nF	10%	50V
2118 ©	2238 586 59812	100nF	10%	50V
2119 ©	3198 030 74780	4,7µF	20%	35V
2120 ©	2238 586 59812	100nF	10%	50V
2121 ©	2238 586 59812	100nF	10%	50V
2122 ©	2238 586 59812	100nF	10%	50V
2123 ©	2238 586 59812	100nF	10%	50V
2124 ©	2238 586 59812	100nF	10%	50V
2125 ©	2238 586 59812	100nF	10%	50V
2126 ©	2238 586 59812	100nF	10%	50V
2127 ©	3198 030 74780	4,7µF	20%	35V
2128 ©	3198 016 31020	1nF	5%	25V
2129 ©	2222 867 15339	33pF	5%	50V
2129 ©	4822 126 13956	68pF	5%	63V
2130 ©	3198 030 82280	2,2µF	20%	50V
2131 ©	3198 030 74780	4,7µF	20%	35V
2131 ©	5322 124 41945	22µF	20%	35V
2132 ©	2238 586 59812	100nF	10%	50V
2135 ©	3198 030 74780	4,7µF	20%	35V
2136 ©	4822 126 11785	47pF	5%	50V
2137 ©	2238 586 59812	100nF	10%	50V
2139 ©	2238 586 59812	100nF	10%	50V
2141 ©	4822 126 11785	47pF	5%	50V
2146 ©	2238 586 59812	100nF	10%	50V
2154 ©	4822 126 13879	220nF	20%	16V
2200 ©	3198 016 31020	1nF	5%	25V
2201 ©	4822 126 14494	22nF	10%	25V
2202 ©	2238 586 59812	100nF	10%	50V
2203 ©	3198 030 74780	4,7µF	20%	35V
2204 ©	2222 867 15339	33pF	5%	50V
2205 ©	2238 586 59812	100nF	10%	50V
2206 ©	2238 586 59812	100nF	10%	50V
2207 ©	2222 867 15339	33pF	5%	50V
2208 ©	2238 586 59812	100nF	10%	50V
2209 ©	2238 586 59812	100nF	10%	50V
2210 ©	2238 586 59812	100nF	10%	50V
2211 ©	2238 586 59812	100nF	10%	50V

CAPACITORS

2212 ©	2238 586 59812	100nF	10%	50V
2213 ©	2238 586 59812	100nF	10%	50V
2214 ©	2238 586 59812	100nF	10%	50V
2215 ©	2238 586 59812	100nF	10%	50V
2216 ©	2238 586 59812	100nF	10%	50V
2217 ©	2238 586 59812	100nF	10%	50V
2218 ©	3198 030 74780	4,7µF	20%	35V
2219 ©	2238 586 59812	100nF	10%	50V
2220 ©	2238 586 59812	100nF	10%	50V
2221 ©	2238 586 59812	100nF	10%	50V
2222 ©	2238 586 59812	100nF	10%	50V
2223 ©	2238 586 59812	100nF	10%	50V
2224 ©	2238 586 59812	100nF	10%	50V
2225 ©	2238 586 59812	100nF	10%	50V
2226 ©	2238 586 59812	100nF	10%	50V
2227 ©	2238 586 59812	100nF	10%	50V
2228 ©	2238 586 59812	100nF	10%	50V
2229 ©	2238 586 59812	100nF	10%	50V
2230 ©	3198 030 74780	4,7µF	20%	35V
2231 ©	2238 586 59812	100nF	10%	50V
2300 ©	2238 586 59812	100nF	10%	50V
2301 ©	2238 586 59812	100nF	10%	50V
2302 ©	2238 586 59812	100nF	10%	50V
2303 ©	2238 586 59812	100nF	10%	50V
2304 ©	3198 030 74780	4,7µF	20%	35V
2305 ©	3198 030 74780	4,7µF	20%	35V
2306 ©	2238 586 59812	100nF	10%	50V
2307 ©	2238 586 59812	100nF	10%	50V
2308 ©	2238 586 59812	100nF	10%	50V
2309 ©	2238 586 59812	100nF	10%	50V
2310 ©	2238 586 59812	100nF	10%	50V
2311 ©	3198 030 74780	4,7µF	20%	35V
2312 ©	2238 586 59812	100nF	10%	50V
2402 ©	2238 586 59812	100nF	10%	50V
2403 ©	3198 030 74780	4,7µF	20%	35V
2404 ©	2238 586 59812	100nF	10%	50V
2405 ©	2238 586 59812	100nF	10%	50V
2406 ©	2238 586 59812	100nF	10%	50V
2407 ©	2238 586 59812	100nF	10%	50V
2408 ©	2238 586 59812	100nF	10%	50V
2409 ©	2238 586 59812	100nF	10%	50V
2410 ©	2238 586 59812	100nF	10%	50V
2411 ©	3198 030 74780	4,7µF	20%	35V
2412 ©	2238 586 59812	100nF	10%	50V
2413 ©	2238 586 59812	100nF	10%	50V
2414 ©	2238 586 59812	100nF	10%	50V
2415 ©	2238 586 59812	100nF	10%	50V
2416 ©	2238 586 59812	100nF	10%	50V
2417 ©	2238 586 59812	100nF	10%	50V
2418 ©	2238 586 59812	100nF	10%	50V
2419 ©	2238 586 59812	100nF	10%	50V
2420 ©	2238 586 59812	100nF	10%	50V
2421 ©	2238 586 59812	100nF	10%	50V
2422 ©	2238 586 59812	100nF	10%	50V
2423 ©	2238 586 59812	100nF	10%	50V
2424 ©	2238 586 59812	100nF	10%	50V
2425 ©	2238 586 59812	100nF	10%	50V
2426 ©	2238 586 59812	100nF	10%	50V
2427 ©	2238 586 59812	100nF	10%	50V
2428 ©	2238 586 59812	100nF	10%	50V
2429 ©	2238 586 59812	100nF	10%	50V
2430 ©	2238 586 59812	100nF	10%	50V
2431 ©	3198 030 74780	4,7µF	20%	35V
2432 ©	2238 586 59812	100nF	10%	50V

CAPACITORS

2433 ©	2238 586 59812	100nF	10%	50V
2434 ©	2238 586 59812	100nF	10%	50V
2435 ©	2238 586 59812	100nF	10%	50V
2436 ©	2238 586 59812	100nF	10%	50V
2437 ©	2238 586 59812	100nF	10%	50V
2438 ©	2238 586 59812	100nF	10%	50V
2439 ©	2238 586 59812	100nF	10%	50V
2440 ©	2238 586 59812	100nF	10%	50V
2441 ©	3198 030 74780	4,7µF	20%	35V
2442 ©	2238 586 59812	100nF	10%	50V
2443 ©	4822 122 33741	10pF	10%	50V
2444 ©	2238 586 59812	100nF	10%	50V
2446 ©	3198 016 31020	1nF	5%	25V
2500 ©	3198 016 31020	1nF	5%	25V
2501 ©	2238 586 59812	100nF	10%	50V
2502 ©	2238 586 59812	100nF	10%	50V
2503 ©	2238 586 59812	100nF	10%	50V
2504 ©	2238 586 59812	100nF	10%	50V
2505 ©	2238 586 59812	100nF	10%	50V
2506 ©	2238 586 59812	100nF	10%	50V
2507 ©	2238 586 59812	100nF	10%	50V
2508 ©	2238 586 59812	100nF	10%	50V
2509 ©	2238 586 59812	100nF	10%	50V
2510 ©	4822 122 33761	22pF	5%	50V
2510 ©	4822 126 14507	18pF	5%	50V
2511 ©	4822 122 33741	10pF	10%	50V
2511 ©	4822 126 14507	18pF	5%	50V
2512 ©	2238 586 59812	100nF	10%	50V
2513 ©	2238 586 59812	100nF	10%	50V
2514 ©	2238 586 59812	100nF	10%	50V
2515 ©	2238 586 59812	100nF	10%	50V
2516 ©	2238 586 59812	100nF	10%	50V
2517 ©	3198 030 74780	4,7µF	20%	35V
2518 ©	3198 030 74780	4,7µF	20%	35V
2519 ©	3198 030 74780	4,7µF	20%	35V
2520 ©	3198 030 74780	4,7µF	20%	35V
2521 ©	2238 586 59812	100nF	10%	50V
2522 ©	2238 586 59812	100nF	10%	50V
2523 ©	2238 586 59812	100nF	10%	50V
2524 ©	2238 586 59812	100nF	10%	50V
2525 ©	2238 586 59812	100nF	10%	50V
2526 ©	2238 586 59812	100nF	10%	50V
2527 ©	2238 586 59812	100nF	10%	50V
2528 ©	2238 586 59812	100nF	10%	50V
2529 ©	2238 586 59812	100nF	10%	50V
2530 ©	2238 586 59812	100nF	10%	50V
2531 ©	2238 586 59812	100nF	10%	50V
2532 ©	2238 586 59812	100nF	10%	50V
2533 ©	2238 586 59812	100nF	10%	50V
2534 ©	2238 586 59812	100nF	10%	50V
2535 ©	2238 586 59812	100nF	10%	50V
2536 ©	2238 586 59812	100nF	10%	50V
2537 ©	2238 586 59812	100nF	10%	50V
2538 ©	2238 586 59812	100nF	10%	50V
2539 ©	3198 030 74780	4,7µF	20%	35V
2540 ©	3198 030 74780	4,7µF	20%	35V
2541 ©	3198 030 74780	4,7µF	20%	35V
2542 ©	3198 030 74780	4,7µF	20%	35V
2543 ©	2238 586 59812	100nF	10%	50V
2544 ©	2238 586 59812	100nF	10%	50V
2565 ©	4822 122 33753	150pF	5%	50V
2600 ©	2238 586 59812	100nF	10%	50V
2601 ©	4822 126 11785	47pF	5%	50V
2602 ©	4822 126 11785	47pF	5%	50V

CAPACITORS

2605 ©	2238 586 59812	100nF	10%	50V
2606 ©	4822 126 11785	47pF	5%	50V
2607 ©	4822 126 11785	47pF	5%	50V
2608 ©	2238 586 59812	100nF	10%	50V
2609 ©	2238 586 59812	100nF	10%	50V
2610 ©	2238 586 59812	100nF	10%	50V
2611 ©	4822 126 11785	47pF	5%	50V
2612 ©	4822 126 11785	47pF	5%	50V
2613 ©	2238 586 59812	100nF	10%	50V
2614 ©	2238 586 59812	100nF	10%	50V
2615 ©	2238 586 59812	100nF	10%	50V
2616 ©	4822 126 11785	47pF	5%	50V
2617 ©	4822 126 11785	47pF	5%	50V
2618 ©	2238 586 59812	100nF	10%	50V
2619 ©	2238 586 59812	100nF	10%	50V
2620 ©	2238 586 59812	100nF	10%	50V
2621 ©	4822 126 11785	47pF	5%	50V
2622 ©	4822 126 11785	47pF	5%	50V
2625 ©	2238 586 59812	100nF	10%	50V
2626 ©	4822 126 11785	47pF	5%	50V
2627 ©	4822 126 11785	47pF	5%	50V
2628 ©	2238 586 59812	100nF	10%	50V
2629 ©	2238 586 59812	100nF	10%	50V
2630 ©	3198 030 74780	4,7µF	20%	35V
2632 ©	2238 586 59812	100nF	10%	50V
2633 ©	2238 586 59812	100nF	10%	50V
2634 ©	4822 126 14494	22nF	10%	25V
2635 ©	2238 586 59812	100nF	10%	50V
2636 ©	3198 030 74780	4,7µF	20%	35V
2722 ©	2238 586 59812	100nF	10%	50V
2900 ©	2238 586 59812	100nF	10%	50V
2901 ©	2238 586 59812	100nF	10%	50V
2902 ©	2238 586 59812	100nF	10%	50V
2903 ©	2238 586 59812	100nF	10%	50V
2904 ©	2238 586 59812	100nF	10%	50V
2906 ©	2238 586 59812	100nF	10%	50V
2907 ©	3198 030 74780	4,7µF	20%	35V
2908 ©	2238 586 59812	100nF	10%	50V
2909 ©	4822 126 14247	1,5nF	10%	50V
2911 ©	2238 586 59812	100nF	10%	50V
2912 ©	4822 126 14247	1,5nF	10%	50V
2914 ©	3198 030 74780	4,7µF	20%	35V
2915 ©	2238 586 59812	100nF	10%	50V
2916 ©	4822 126 14494	22nF	10%	25V

RESISTORS

3100 ©	4822 051 30103	10kΩ	5%	0,06W
3101 ©	4822 051 30222	2,2kΩ	5%	0,06W
3102 ©	4822 051 30103	10kΩ	5%	0,06W
3103 ©	4822 051 30103	10kΩ	5%	0,06W
3104 ©	4822 051 30479	47Ω	5%	0,06W
3105 ©	4822 051 30479	47Ω	5%	0,06W
3106 ©	4822 051 30479	47Ω	5%	0,06W
3107 ©	4822 051 30109	10Ω	5%	0,06W
3108 ©	4822 051 30479	47Ω	5%	0,06W
3109 ©	4822 051 30479	47Ω	5%	0,06W
3110 ©	4822 051 30479	47Ω	5%	0,06W
3111 ©	4822 051 30472	4,7kΩ	5%	0,06W
3112 ©	4822 051 30472	4,7kΩ	5%	0,06W
3113 ©	4822 051 30472	4,7kΩ	5%	0,06W
3114 ©	4822 051 30472	4,7kΩ	5%	0,06W
3115 ©	4822 051 30103	10kΩ	5%	0,06W
3116 ©	4822 051 30103	10kΩ	5%	0,06W
3117 ©	4822 117 12139	22Ω	5%	0,06W

RESISTORS

3118 ©	4822 117 12139	22Ω	5%	0,06W
3119 ©	4822 051 30222	2,2kΩ	5%	0,06W
3120 ©	4822 051 30153	15kΩ	5%	0,06W
3121 ©	4822 117 12917	1Ω	5%	0,06W
3122 ©	4822 051 30123	12kΩ	5%	0,06W
3122 ©	5322 117 13033	15kΩ	1%	0.06W
3123 ©	2322 704 61103	11kΩ	1%	0,06W
3123 ©	2322 704 62002	2kΩ	1%	0,06W
3124 ©	2322 704 63002	3kΩ	1%	0,06W
3124 ©	4822 051 30562	5,6kΩ	5%	0,06W
3125 ©	4822 117 12139	22Ω	5%	0,06W
3126 ©	4822 117 12891	220kΩ	1%	0,06W
3127 ©	4822 051 30479	47Ω	5%	0,06W
3128 ©	4822 051 30479	47Ω	5%	0,06W
3129 ©	4822 051 30479	47Ω	5%	0,06W
3130 ©	2120 611 00019	4,7kΩ	5%	NTC
3131 ©	4822 117 12917	1Ω	5%	0,06W
3132 ©	4822 117 12917	1Ω	5%	0,06W
3133 ©	4822 117 12917	1Ω	5%	0,06W
3134 ©	4822 117 12917	1Ω	5%	0,06W
3135 ©	4822 117 12917	1Ω	5%	0,06W
3136 ©	4822 117 12917	1Ω	5%	0,06W
3137 ©	4822 051 30472	4,7kΩ	5%	0,06W
3138 ©	4822 051 30472	4,7kΩ	5%	0,06W
3200 ©	4822 051 30332	3,3kΩ	5%	0,06W
3201 ©	4822 051 30152	1,5kΩ	5%	0,06W
3202 ©	4822 051 30103	10kΩ	5%	0,06W
3203 ©	4822 117 12139	22Ω	5%	0,06W
3204 ©	4822 051 30101	100Ω	5%	0,06W
3205 ©	4822 051 30101	100Ω	5%	0,06W
3206 ©	4822 051 30101	100Ω	5%	0,06W
3207 ©	4822 051 30103	10kΩ	5%	0,06W
3208 ©	4822 117 12139	22Ω	5%	0,06W
3209 ©	4822 051 30103	10kΩ	5%	0,06W
3211 ©	4822 051 30222	2,2kΩ	5%	0,06W
3212 ©	4822 051 30152	1,5kΩ	5%	0,06W
3213 ©	4822 051 30103	10kΩ	5%	0,06W
3214 ©	4822 051 30103	10kΩ	5%	0,06W
3215 ©	4822 051 30103	10kΩ	5%	0,06W
3216 ©	4822 051 30103	10kΩ	5%	0,06W
3217 ©	4822 051 30101	100Ω	5%	0,06W
3218 ©	4822 051 30101	100Ω	5%	0,06W
3219 ©	4822 051 30103	10kΩ	5%	0,06W
3220 ©	4822 051 30103	10kΩ	5%	0,06W
3221 ©	4822 051 30103	10kΩ	5%	0,06W
3222 ©	4822 051 30103	10kΩ	5%	0,06W
3223 ©	4822 051 30222	2,2kΩ	5%	0,06W
3224 ©	4822 051 30103	10kΩ	5%	0,06W
3225 ©	4822 051 30103	10kΩ	5%	0,06W
3226 ©	4822 051 30103	10kΩ	5%	0,06W
3227 ©	4822 117 12139	22Ω	5%	0,06W
3228 ©	4822 117 12139	22Ω	5%	0,06W
3229 ©	2322 704 61303	13kΩ	1%	0,06W
3230 ©	2322 704 61303	13kΩ	1%	0,06W
3231 ©	5322 117 13042	3,9kΩ	1%	0,06W
3232 ©	5322 117 13042	3,9kΩ	1%	0,06W
3234 ©	3198 031 14720	4x4,7kΩ	5%	
3235 ©	4822 117 12917	1Ω	5%	0,06W
3236 ©	4822 117 13576	4x33Ω	5%	
3237 ©	4822 117 13576	4x33Ω	5%	
3239 ©	4822 051 30103	10kΩ	5%	0,06W
3241 ©	4822 051 30103	10kΩ	5%	0,06W
3243 ©	4822 051 30103	10kΩ	5%	0,06W
3244 ©	4822 051 30103	10kΩ	5%	0,06W

RESISTORS

3245 ©	4822 051 30103	10kΩ	5%	0,06W
3300 ©	4822 051 30479	47Ω	5%	0,06W
3301 ©	4822 051 30479	47Ω	5%	0,06W
3400 ©	4822 051 30101	100Ω	5%	0,06W
3401 ©	4822 051 30101	100Ω	5%	0,06W
3403 ©	4822 051 30103	10kΩ	5%	0,06W
3404 ©	4822 051 30008	CHIP JUMPER 0603		
3405 ©	4822 051 30332	3,3kΩ	5%	0,06W
3406 ©	4822 051 30479	47Ω	5%	0,06W
3407 ©	4822 051 30181	180Ω	5%	0,06W
3408 ©	4822 117 12139	22Ω	5%	0,06W
3409 ©	4822 117 12139	22Ω	5%	0,06W
3410 ©	4822 117 12139	22Ω	5%	0,06W
3500 ©	4822 051 30101	100Ω	5%	0,06W
3501 ©	4822 051 30101	100Ω	5%	0,06W
3502 ©	4822 051 30222	2,2kΩ	5%	0,06W
3503 ©	4822 051 30102	1kΩ	5%	0,06W
3504 ©	4822 051 30681	680Ω	5%	0,06W
3505 ©	4822 117 12139	22Ω	5%	0,06W
3506 ©	4822 051 30222	2,2kΩ	5%	0,06W
3507 ©	4822 051 30472	4,7kΩ	5%	0,06W
3508 ©	4822 051 30103	10kΩ	5%	0,06W
3513 ©	4822 051 30681	680Ω	5%	0,06W
3515 ©	4822 117 12917	1Ω	5%	0,06W
3600 ©	2322 704 65609	56Ω	1%	0,06W
3601 ©	5322 117 13059	560Ω	1%	0,06W
3602 ©	5322 117 13059	560Ω	1%	0,06W
3603 ©	4822 051 30102	1kΩ	5%	0,06W
3604 ©	4822 051 30101	100Ω	5%	0,06W
3605 ©	4822 117 12917	1Ω	5%	0,06W
3606 ©	5322 117 13059	560Ω	1%	0,06W
3607 ©	5322 117 13059	560Ω	1%	0,06W
3608 ©	4822 051 30102	1kΩ	5%	0,06W
3610 ©	4822 117 12917	1Ω	5%	0,06W
3611 ©	5322 117 13059	560Ω	1%	0,06W
3612 ©	5322 117 13059	560Ω	1%	0,06W
3613 ©	4822 051 30102	1kΩ	5%	0,06W
3615 ©	4822 051 30101	100Ω	5%	0,06W
3616 ©	5322 117 13059	560Ω	1%	0,06W
3617 ©	5322 117 13059	560Ω	1%	0,06W
3618 ©	4822 051 30102	1kΩ	5%	0,06W
3619 ©	4822 051 30561	560Ω	5%	0,06W
3620 ©	4822 051 30222	2,2kΩ	5%	0,06W
3621 ©	5322 117 13059	560Ω	1%	0,06W
3622 ©	5322 117 13059	560Ω	1%	0,06W
3623 ©	4822 051 30101	100Ω	5%	0,06W
3624 ©	4822 051 30102	1kΩ	5%	0,06W
3625 ©	4822 051 30101	100Ω	5%	0,06W
3626 ©	5322 117 13059	560Ω	1%	0,06W
3627 ©	5322 117 13059	560Ω	1%	0,06W
3628 ©	4822 051 30102	1kΩ	5%	0,06W
3629 ©	4822 051 30181	180Ω	5%	0,06W
3630 ©	4822 051 30181	180Ω	5%	0,06W
3631 ©	4822 117 12917	1Ω	5%	0,06W
3632 ©	4822 051 30561	560Ω	5%	0,06W
3633 ©	4822 051 30561	560Ω	5%	0,06W
3635 ©	4822 051 30101	100Ω	5%	0,06W
3636 ©	4822 051 30181	180Ω	5%	0,06W
3637 ©	4822 051 30101	100Ω	5%	0,06W
3638 ©	4822 051 30222	2,2kΩ	5%	0,06W
3639 ©	4822 051 20008	CHIP JUMPER 0805		
3639 ©	4822 051 30008	CHIP JUMPER 0603		
3900 ©	4822 051 30103	10kΩ	5%	0,06W
3901 ©	4822 117 12139	22Ω	5%	0,06W

RESISTORS

3902 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3902 ©	4822 117 12925	47kΩ	1%	0,06W	
3903 ©	4822 051 30472	4,7kΩ	5%	0,06W	
3903 ©	4822 117 13632	100kΩ	1%	0,06W	
3904 ©	4822 117 12139	22Ω	5%	0,06W	
3906 ©	4822 051 30479	47Ω	5%	0,06W	
3908 ©	4822 117 12139	22Ω	5%	0,06W	
3910 ©	4822 051 30101	100Ω	5%	0,06W	
3911 ©	4822 051 30103	10kΩ	5%	0,06W	
3913 ©	4822 051 30682	6,8kΩ	5%	0,06W	
3914 ©	4822 051 30479	47Ω	5%	0,06W	
3915 ©	4822 051 30479	47Ω	5%	0,06W	
3916 ©	4822 117 13632	100kΩ	1%	0,06W	
3917 ©	4822 117 12139	22Ω	5%	0,06W	
3918 ©	4822 117 13632	100kΩ	1%	0,06W	
3919 ©	4822 051 30101	100Ω	5%	0,06W	
3920 ©	4822 117 12139	22Ω	5%	0,06W	
3921 ©	4822 051 30103	10kΩ	5%	0,06W	
3922 ©	4822 051 30682	6,8kΩ	5%	0,06W	
3923 ©	4822 117 13632	100kΩ	1%	0,06W	
3924 ©	4822 051 30152	1,5kΩ	5%	0,06W	
3925 ©	4822 051 30472	4,7kΩ	5%	0,06W	
4100 ©	4822 051 30008	CHIP JUMPER 0603			
4103 ©	4822 051 30008	CHIP JUMPER 0603			
4104 ©	4822 051 30008	CHIP JUMPER 0603			
4106 ©	4822 051 30008	CHIP JUMPER 0603			
4107 ©	4822 051 30008	CHIP JUMPER 0603			
4108 ©	4822 051 30008	CHIP JUMPER 0603			
4109 ©	4822 051 30008	CHIP JUMPER 0603			
4110 ©	4822 051 30008	CHIP JUMPER 0603			
4111 ©	4822 051 30008	CHIP JUMPER 0603			
4406 ©	4822 051 30008	CHIP JUMPER 0603			
4409 ©	4822 051 30008	CHIP JUMPER 0603			
4501 ©	4822 051 30008	CHIP JUMPER 0603			

COILS

1500	2422 543 01115	RESONATOR 24M576 CX-11F
5100 ©	4822 157 11717	FILTER 100MHz
5101 ©	4822 157 11717	FILTER 100MHz
5102 ©	4822 157 11499	BLM11P600SPT
5103 ©	4822 157 11499	BLM11P600SPT
5200 ©	4822 157 11499	BLM11P600SPT
5201 ©	4822 157 11499	BLM11P600SPT
5202 ©	4822 157 11499	BLM11P600SPT
5203 ©	4822 157 11499	BLM11P600SPT
5204 ©	4822 157 11499	BLM11P600SPT
5205 ©	4822 157 11499	BLM11P600SPT
5206 ©	4822 157 11499	BLM11P600SPT
5207 ©	4822 157 11499	BLM11P600SPT
5208 ©	4822 157 11499	BLM11P600SPT
5209 ©	4822 157 11499	BLM11P600SPT
5300 ©	4822 157 11499	BLM11P600SPT
5302 ©	4822 157 11499	BLM11P600SPT
5400 ©	4822 157 11499	BLM11P600SPT
5402 ©	4822 157 11499	BLM11P600SPT
5403 ©	4822 157 11499	BLM11P600SPT
5404 ©	4822 157 11499	BLM11P600SPT
5500 ©	4822 157 11499	BLM11P600SPT
5501 ©	4822 157 11499	BLM11P600SPT
5502 ©	4822 157 11499	BLM11P600SPT
5503 ©	4822 157 11499	BLM11P600SPT
5504 ©	4822 157 11499	BLM11P600SPT
5505 ©	4822 157 11499	BLM11P600SPT
5506 ©	4822 157 11499	BLM11P600SPT

COILS

5507 ©	4822 157 11499	BLM11P600SPT
5508 ©	4822 157 11499	BLM11P600SPT
5600 ©	4822 157 70651	12µH
5601 ©	4822 157 70651	12µH
5602 ©	4822 157 70651	12µH
5603 ©	4822 157 70651	12µH
5604 ©	4822 157 70651	12µH
5605 ©	4822 157 70651	12µH
5606	4822 157 70649	4,7µH
5607	4822 157 70649	4,7µH
5900 ©	4822 157 11717	FILTER 100MHz
5901 ©	4822 157 11717	FILTER 100MHz
5903 ©	4822 157 11499	BLM11P600SPT
5904 ©	4822 157 11717	FILTER 100MHz
5905 ©	4822 157 11499	BLM11P600SPT
5907 ©	4822 157 11499	BLM11P600SPT

DIODES

6500 ©	4822 130 80622	BAT54
6900 ©	4822 130 80622	BAT54

TRANSISTORS

7504 ©	5322 130 60159	BC846B
7600 ©	5322 130 60159	BC846B
7601 ©	5322 130 60159	BC846B
7602 ©	5322 130 60159	BC846B
7603 ©	5322 130 60159	BC846B
7604 ©	5322 130 60159	BC846B
7605 ©	5322 130 60159	BC846B
7606 ©	5322 130 60159	BC846B
7901 ©	5322 130 60159	BC846B

INTEGRATED CIRCUITS

7100 ©	9352 692 48557	SAA7333HL/M1
7101 ©	9322 166 67668	MT48LC4M16A2TG-7E (DRAM)
7102 ©	5322 209 16384	PC74HCT9046AD
7103 ©	9322 170 16685	NC7SZ58
7104 ©	9352 456 50115	HC1G04, Inverter
7200 ©	9322 169 81671	STI5508EVB
7201 ©	9322 130 41668	M24C64, EEPROM
7202 ©	4822 209 30212	PC74HCT125T
7203 ©	9322 142 88668	LF25CDT
7204 ©	9322 142 88668	LF25CDT
7300 ©	9322 166 67668	MT48LC4M16A2TG-7E (DRAM)
7301 ©	3104 123 96771	FLASH ROM2 DVDR1.5 EU DIG2.BIN
7302 ©	3104 123 96761	FLASH ROM1 DVDR1.5 EU DIG1.BIN
7303 ©	9352 499 60118	74LVC00AD
7402 ©	9322 166 67668	MT48LC4M16A2TG-7E (DRAM)
7403 ©	9352 701 80557	SAA6752HS/V101
7404 ©	9322 142 88668	LF25CDT
7500 ©	9352 673 95518	SAA7118E/V1
7501 ©	9352 500 60118	74LVC32AD
7502 ©	5322 209 71589	74HC74D
7702 ©	9352 501 00118	74LVC86ADB
7900 ©	9322 151 71668	MK2703STR
7902 ©	9322 165 15685	NCP303LSN30
7904 ©	4822 209 16399	74LVC04AD
7905 ©	5322 209 71568	PC74HCT14T
7906 ©	4822 242 10838	FX0-31FT (OSCILLATOR)