Portable compact disc interactive player CDI 360/00/05/11/17

Service Service Service

Interactive Media Systems

CD-I

Service Manual

COMPACT disc Interactive

Photo CD

The Philips Portable CD-I system

- Combination CD-I player, 6" color LCD screen, and pointing device for home, institutional or professional purposes.
- Ideal stand-alone system for individual, person-to-person and small-groups applications.
- Connectable to any PAL or NTSC TV set or Monitor to form a high-performance CD-I system, ideal for presentations.
- Comprehensive interfaces to remote controller, pointing devices and HiFi stereo systems.
- Plays all CD-I discs, CD-digital audio, Photo CD and CD-Bridge discs.
- Easy operation using on-screen program display.
- Runs on the AC-power adapter 22ER9150.

The optical pick-up assy,Code Number 4822 693 91593, contains the CDM-9.
Optional Remote Control 22ER9051/11 Code Number 4822 218 10438

CONTENTS

SF

Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.

S

Osynlig laserstrålning när denna del är öppnad och spärren ar urkopplad. Betakta ej strålen.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Pour votre sécurité, ces documents soivent être utilisés par des spécialistes agrées, seuls habilités à réparer votre appareil en panne.

CLASS 1
LASER PRODUCT
3122 110 03420

Published by MW october 1992 Service & Support Interactive Media Systems Printed in The Netherlands Subject to modification 4822 725 24112

PHILIPS

PCS 67 285

CHAP. CONTENTS

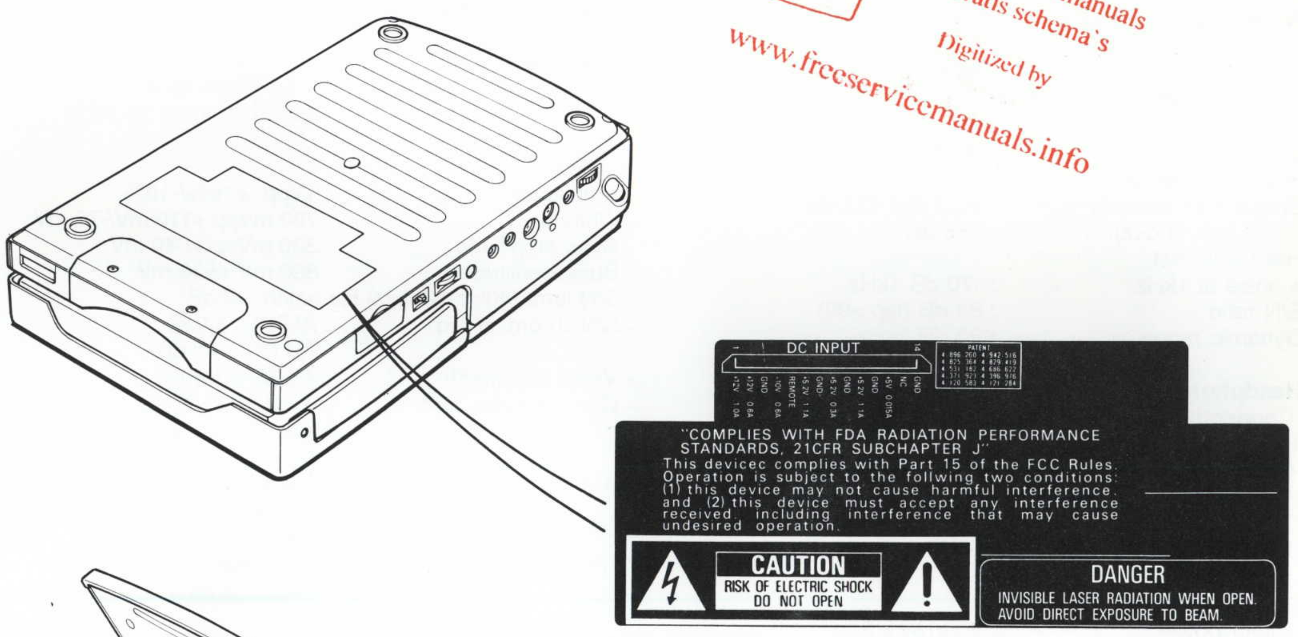
1 CAUTION

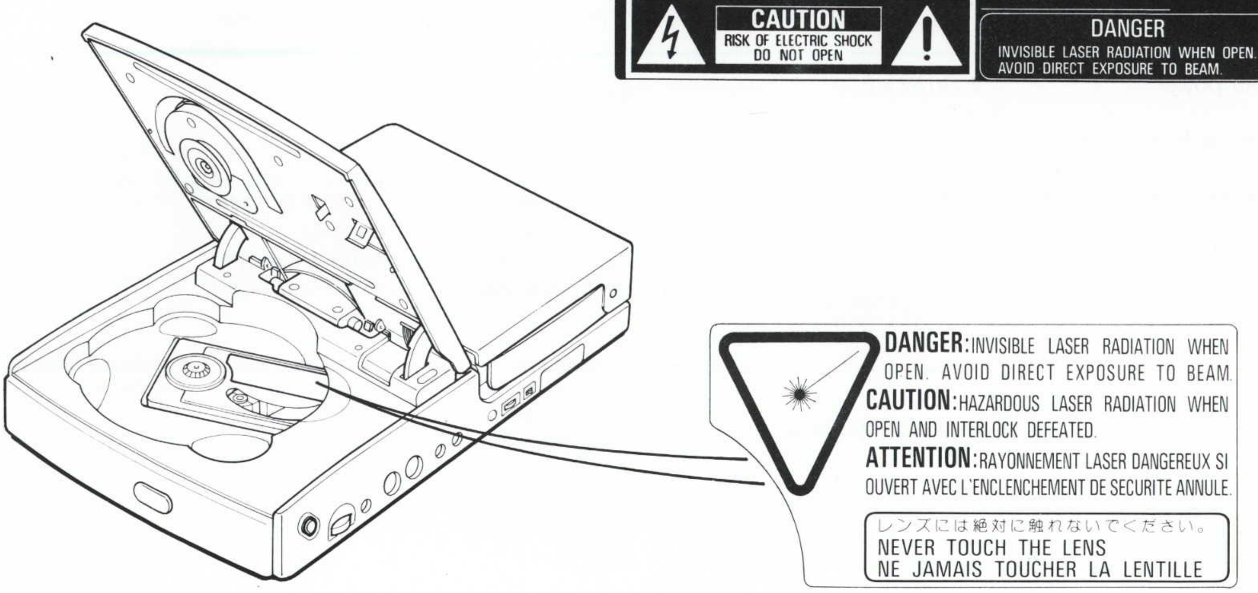
LASER NOTE:
DANGER - Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may in result hazardous radiation exposure.
CAUTION - The use of optical instruments with this product will increase eye hazard.

THE CD-I PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

LASER BEAM RADIATION SPOT
Laser Diode Properties
Material: Ga-Al-As
Wavelength: 760 - 800nm (30°C)
Laser Output: Continuous Wave Tpy. 0.4mW Max. 0.6mW

WARNING !!
When servicing, do not approach the laser exit with the eye too closely.
In case it is necessary to confirm laser beam emission, be sure to observe from a distance of more than 30cm from the surface of the objective lens on the light pen assembly.





2 PRODUCT INFORMATION

2.1 TECHNICAL SPECIFICATION

Physical
- Dimensions (w x d x h)
292 x 190 x 46 mm
(11.5 x 7.5 x 1.9 inch)

- **Weight** (approx.)
1.9 kg
(4.2 lbs)

Power supply
/11 /17 Model ... Japan / USA
100/120V (90V to 132V) 50/60Hz
/00 Model ... Europe
220/240V (198V to 264V) 50/60Hz

Power consumption
Approx. 20.6 W (without extensions)

Approvals
FCC, UL
Conforms with VDE, FTZ, CSA, Nordic, US and german laser safety regulations

Audio L+R:
-Connector
Type : Mini Phone socket
- Output quality in case of CD-DA
Output level : 2V +/- 3 dB
Channel unbalance : 80 dB 1kHz
Frequency range : 20 HZ to 20 kHz
Phase non- linearity : +0.2 dB/ -0.2 dB
Cross talk (1kHz) : - 86 dB
Harmonic dist.
+ noise at 1kHz : -70 dB 1kHz
S/N ratio : 84 dB (typ >90)
Dynamic range : 80 dB 1kHz

Headphone output:
-Connector
Type : Mini Phone socket
-Output quality in case of CD-DA
Load impedance range : 8 Ohm - 2 kOhm
Output power : 10 mW at 1kHz, 32 Ohm
Distortion : 50dB 1kHz 32 ohm

Speaker output
Output power : 200mW x 2

Video specifications
625 lines : RGB (PAL, SECAM)
525 lines : RGB, Y/C, CVBS (NTSC)

Video interface

General information	PAL	NTSC
Resolution normal	Enviroment	Enviroment
H*V	384*280	384*240
	384*560	384*480
Line period	64.00 us	63.555 us
Active line period	51.20 us	58.84 us
VSC clock	30.0000 MHz	30.2098 MHz
Display format		
non-interlace	312 lines	262 lines
interlace	625 lines	525 lines
(2 different frames)		
interleaved	625 lines	525 lines
(2 identical frames)		

RGB output:
A/ NTSC
- Amplitude : 714mVpp +/- 10% (max. white level)
- Line time : 63.555 uS
- CVBS. output : 1Vpp +15%/- 10%
- S/N on RGB output : > 50 dB (40 Hz - 5 MHz)
- S/N on RGB output : > 45 dB (40 Hz - 10 MHz)
- Bandwidth on RGB out : - 3 dB at 7.5 MHz

B/ PAL
- Amplitude : 700mVpp +/- 10% (max. white level)
- Line time : 64. uS
- CVBS. output : 1Vpp +15%/-10%
- S/N on RGB output : > 50 dB (40 Hz - 5 MHz)
- S/N on RGB output : > 45 dB (40 Hz - 10 MHz)
- Bandwidth on RGB out : - 3 dB at 7.5 MHz

CVBS output:
A/ NTSC
- Amplitude : 1Vpp +15% / -10%
- White bar : 714 mVpp +110 mV / -70 mV
- Sync amplitude : 286 mVpp +/- 40 mV
- Burst amplitude : 290 mV +/- 30 mV
- S/N lum. (40Hz-10MHz) fsc notch >45dB
- S/N chrom. in red : AM (*) > 37 dB
PM (**) > 48 dB
- Video bandwidth : 4.5 MHz (-6dB)
- Chroma subc. freq. : = 3.579545 MHz
locked to sync. +/-70Hz

B/ PAL
- Amplitude : 1Vpp +15%/-10%
- White bar : 700 mVpp +110 mV/-70 mV
- Sync amplitude : 300 mVpp +/-40 mV
- Burs amplitude : 300 mV +/-30 mV
- S/N lum. (40Hz-10MHz) fsc notch >45dB
- S/N chrom. in red : AM (*) > 37 dB
PM (**) > 43 dB
- Video bandwidth : 4.5 MHz (-6dB)
- Chroma subc. freq. : = 4.433661 MHz
X-tal locked +/-50Hz

* AM noise: output of measured value in dB referred to the average amplitude of the colour subcarrier burst applied
** PM noise: output of measured value in dB referred to the constant phase of a reference oscillator

Y/C ouput:
A/ NTSC
- amplitude : Y= 1Vpp +/-10% into 75 Ohm
- amplitude : C= 286 mVpp +/- 10% (burst)
- bandwidth Y : = 4.5 MHz (-3dB)
- bandwidth C : = 1 MHz
- S/N on Y output : 45dB (unweight)
- S/N on C output : 42dB (unweight)

B/ PAL
- amplitude : Y= 1Vpp +15%/-10% into 75 Ohm
- amplitude : C= 300 mVpp +/- 10% (burst)
- bandwidth Y : = 5 MHz (-3dB)
- bandwidth C : = 1.6 MHz
- S/N on Y output : 45dB (unweight)
- S/N on C output : 42dB (unweight)

Laser Detector Grating Unit (LDGU)

Laser type : semi conductor AlGaAs
Wave length : 780 nm
Output power : 3.3 mW typical

RS232-2 (port 2) communication: (INPUT)

Connector type : 8 pins miniDIN (female)
Internal device : on chip UART (SCC68070)
Baudrates : 75, 150, 300, 1200, 2400, 4800, 9600 and 19200
Dataformat : character length: 7 or 8 bits
stopbit length : 1 or 2 bits
parity : odd, even or no
Handshake : hardware: 2 control lines; RTS and CTS.
software : XON/XOFF.

All signal levels and current ratings, except +5V and DTR are according EIA RS-232-C standard.

RATINGS : +5V +/-10% max. 200mA
DTR : +12V +/-10% max. 10mA (Ri = 1k ohm)

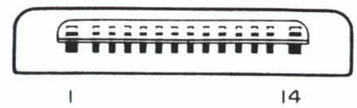
IR interface:

The IR (infra red) receiver for use with the CD-I remote control.
Specification according UAW-0422

- characteristics

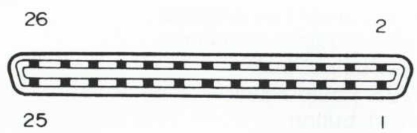
Data format : RC-5 extended format and RC-6 format
-infrared transmission data.
Distance : 20 - 800 cm.
Sampling time : =< 50 ms
Receive angle : 45 degree out of the centre line

DC Power Input



Pin	Signal	Pin	Signal
1	+12v	2	+8v
3	GND	4	-8V
5	Power ON/OFF	6	+5V
7	GND	8	+5V
9	GND	10	+5V
11	GND	12	+5V Standby
13	Voltage detect	14	GND

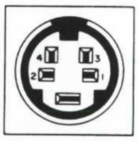
Video (RGB) IN/OUT



Pin	Signal	Pin	Signal
1	Blue GND	2	Blue
3	Green GND	4	Green
5	Red GND	6	Red
7	SW (RGB/CVBS)	8	CVBS/RGB sync
9	SW	10	n.c
11	GND	12	n.c
13	External SW	14	+12V out (300mA max.)
15	Audio in	16	GND
17	V.sync out	18	H.sync out
19	LCD SW	20	Sync in
21	Red in GND	22	Red in
23	Green in GND	24	Green in
25	Blue in GND	26	Blue in

S-Video (Y/C) connector

Pin	Signal
1	GND Y
2	GND C
3	Y
4	C



RS232C (INPUT) connector

Pin	Signal
1	n.c
2	Txd
3	Rxd
4	DTR
5	GND
6	CTS
7	RTS
8	+5V (160mA max.)

2.2 Connections and Controls

Front view

1 LCD screen
2 Disc inspection window
3 Power button and indicator
4 Stereo speakers
5 Basic audio CD control
6 Sensor for remote control
7 Touchpad controller
8 Action buttons
9 Compartment cover

Right hand side view

10 Disc compartment eject button
11 Volume control (Headphone & Speakers)
12 Headphone socket
13 Input connector
- note that connecting an external pointing device disables the touchpad controller/ remote control, expect in certain programs for two persons.

14 Y/C (S-Video) output connector
15 Stereo audio output jack
16 Video (CVBS) output jack
17 Display on/off button
18 Screen brightness control
19 PAL/NTSC selector
20 Video (RGB) IN/OUT

Rear view

21 Cover protecting extension socket
22 Power supply connector (low voltage DC)

AC adapter
- 22ER9150/00 220/240V
- 22ER9150/11, /17 100/120V

23 DC output cable
Squeeze sides to disconnect.
24 Power indicator
25 Adapter
26 AC power cord

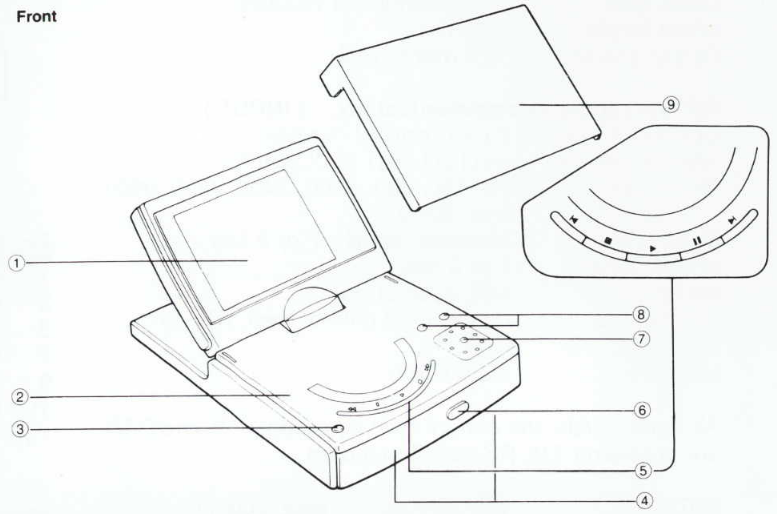
Note The rating plate is affixed to the bottom of the unit.

Remote controler (Option)
- 22ER9051

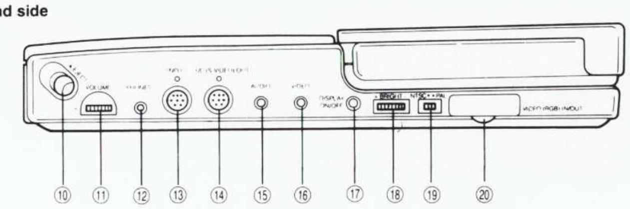
001/3 Action keys
2 Thumbstick
4 "Play" key
5 "Pause" key
6 "Previous" key for instant track skip
7 Mute or TV/CDI selector key*
8 Volume control down key
9 Volume control up key
10 "Next" key for instant track skip
11 "stop" key
*depending on version

The control sits conviniently in the hand, and the thumbstick and action keys, which are by far most-used controls, are easily operated one-handed.

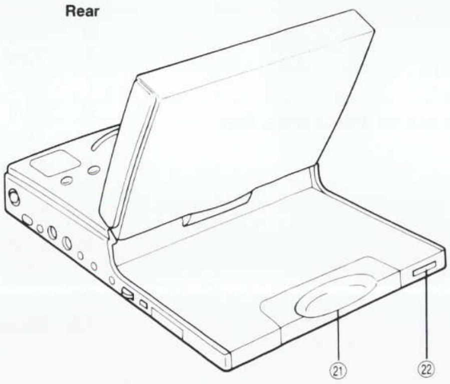
Front



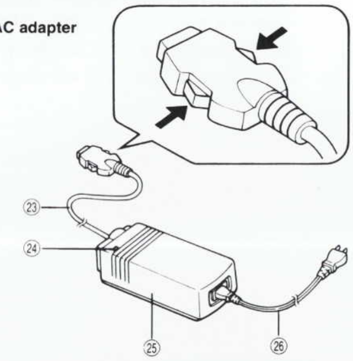
Right hand side

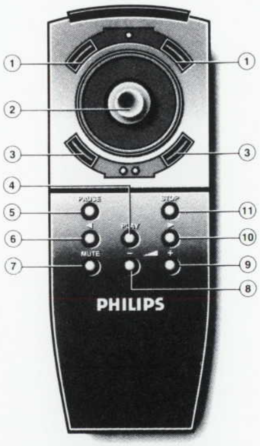


Rear



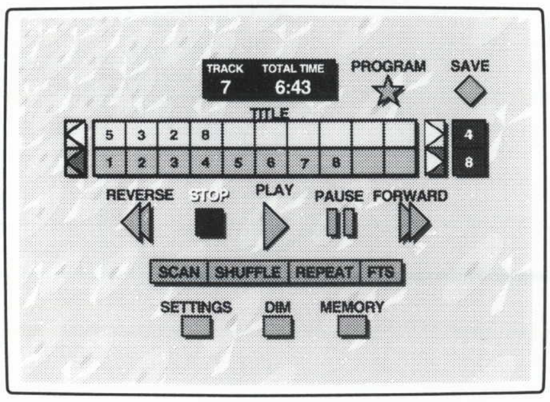
AC adapter





22ER9051 Infra red remote control

The user shell
With just the one "point and click" operation, player functions can be controlled so easily that the actions become intuitive. This is because of the player's specially designed "user shell" program, which presents a series of screen displays that not only allow you a complete choice of play functions, but also guide you in selecting them.



When the player is switched on, the first "user shell" screen invites you to load a disc. Playing a CD-I disc is a simple matter of loading the disc and selecting "Start" on the "CD-I start" screen which then automatically appears. The CD-I program starts to run, and you select options from the screen according to choice.

For CD-Digital Audio discs, the "user shell" presents a play control screen. This offers more than just the functions fitted as standard on CD players (and also provided on the front panel and remote control). It offers all the features found only on top-of-the-range players. These include Program, Favorite Track Selection, Title, Shuffle, Repeat, Play and Scan.

Another "user shell" screen offers "Personal Preference" settings. These include data and time display, Scan time, Auto Shuffle, and Repeat. When "Personal Preference" settings have been made, the player automatically adopts them when starting up.

Further "user shell" screens provide information, CD-DA programming (FTS) facilities, a list of stored programs and other information, and control for CD-Graphics.

User Shell Functions
General screens:
> "Personal preference " seting screen:
Auto Shuffle, Auto FTS, Display Time/Date, Scan Time, Repeat (Disc or Track).
> Memory screen (manages CD-I stored data, as well as FTS programs and titles).
> Dim Screen (LCD display ON/OFF and adjust screen brightness for external TV.)

CD-I start-up screen:
> Start CD-I (stats CD-I or Phote-CD applications).

CD-Digital Audio screen:
> While Playing: Play, Stop and Pause.
> Play Modes: Scan, Shuffle, Repeat and FTS.
> Control: Fast Forward, Fast Rewind, Next Track (directly selectable), Previous Track (directly selectable), Program (programming of selected tracks in any order), Save (stores your favorite track program and allows manual input of titles related to discs or FTS programs).

3 SERVICE INFORMATION

3.1 SAFETY INSTRUCTIONS

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.
  Safety components are marked by the symbol ⚠.
- **ESD**

  All IC's and many other semi-conductors 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 wrist wrap with resistance.
  Keep components and tools also at this potential.
  For detailed information see "Handling ESD-sensitive components".
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit form being rendered unstable.

3.2 SERVICING OF SMDs (Surface Mounted Devices)

3.2.1 General cautions on handling and storage

a. Oxidation on the SMDs terminals results in poor soldering. Do not handle SMDs with bare hand.
b. Avoid for storage places that are sensitive to oxidation such as places with sulfur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity.
As a result the capacitance or resistance value of the SMDs may be affected.
c. Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similary, do not slide the circuit board across any surface.

3.2.2 Removal of SMDs

a. Heat the solder (for 2-3 seconds) at each terminal of the chip. Small components can, by means of litz wire and a limited horizontal force, be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1a) or
b. While holding the SMD with a pair of tweezers take it off gently using th soldering iron's heat applied to each terminal (see Fig. 1b).
c. Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1c).

3.2.2.1 Caution on removal:

a. When handling the soldering iron, use suitable pressure and be careful.
b. When removing the chip, do not use undue force with the pair of tweezers.
c. The soldering iron to be used (approx. 30 W), must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
d The chip, once removed, must **never** be used again.

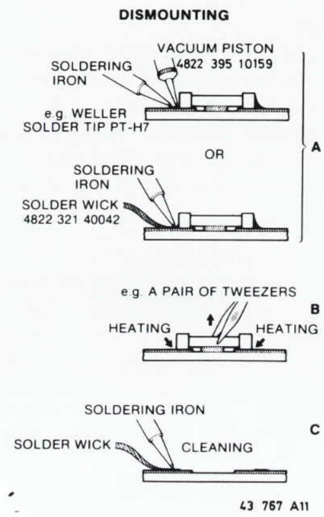


Fig. 1

3.2.3 Attachment of SMDs

a. Locate the SMD on the solder lands by means of tweezers and solder the component at one side. Ensure that the component is positioned well on the solder lands (see Fig. 2a).
b. Next complete te soldering of the terminals of the component (see Fig. 2b).

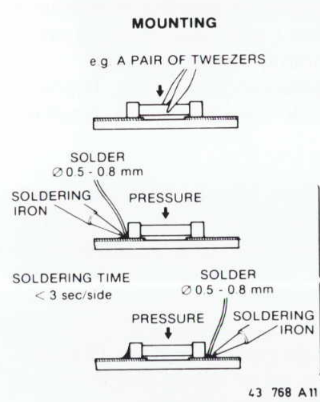


Fig. 2

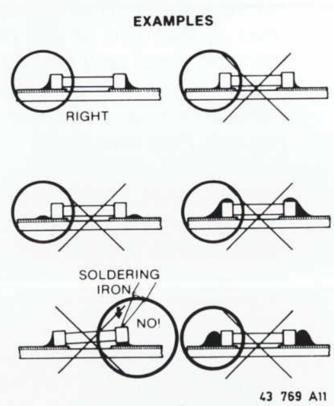


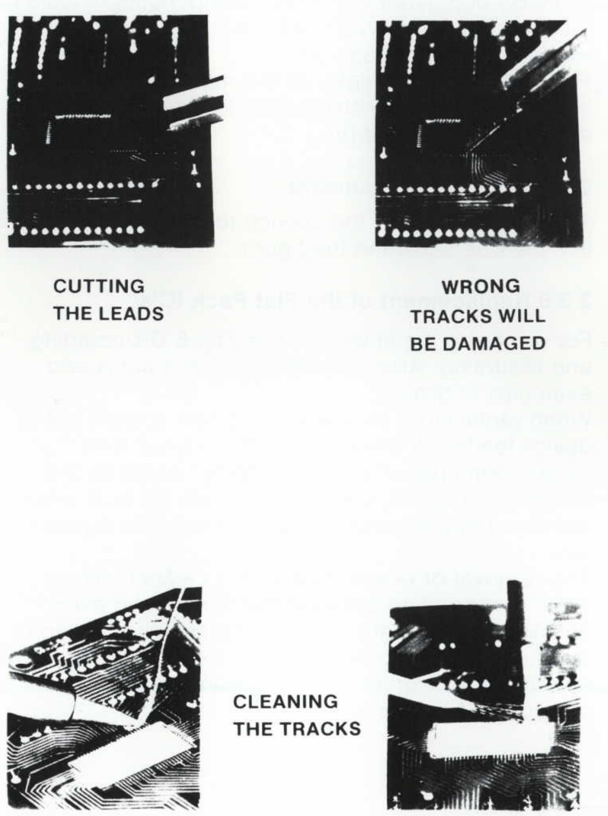
Fig. 3

3.2.3.1 Caution on attachment:

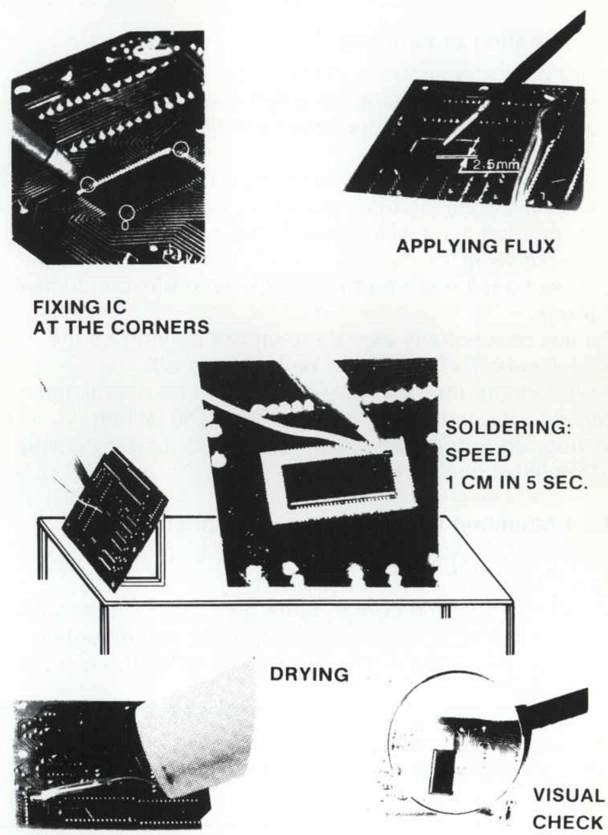
a. When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible; care must be taken to avoid damage to the terminals and the body itself.
b. Keep the SMD's body in contact with the printed board when soldering.
c. The soldering iron to be used (approx. 30 W) must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
d. Soldering should not be done outside the solder land.
e. Soldering flux (of rosin) may be used but should not be acidic.
f. After soldering, let the SMD cool down gradually at room temperature.
g. The quantity of solder must be proportional with the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

TOOLS TO BE USED

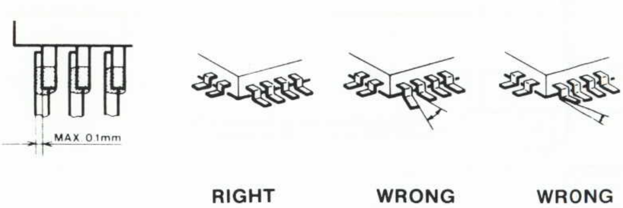
DISMOUNTING



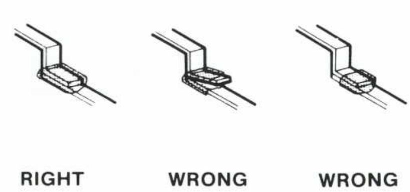
MOUNTING



ALIGNING THE LEADS



SOLDERING



3.3 HANDLING ESD-SENSITIVE COMPONENTS

3.3.1 Personal safety

The testing, handling and replacing of ESD-sensitve components requires special attention for personal safety. A person dealing with ESD-sensitive components should, normally speaking, be connected via a resistance to the same potential as the chassis of the set to protect him against direct contact with the supply voltage.
This resistance is often applied in the connection lead of wrist wraps. If necessary, make use of an isolating transformer.

3.3.2 Storage and transport

Transport and store the circuits and PCBs in their original packages.
As an alternative to the original package one may use a conductive material or special IC package which short-circuits all the pins of the component with one another.
Always discharge the package before opening it.

3.3.3 Testing or handling

Work on a conductive surface when testing loose circuits and components or when transferring components and circuits from one package to another.
Use a conductive wrist wrap with lead to make an electrical connection between the conductive surface and yourself via a resistance in the connection lead of the wrist wrap.
Connect equipment and tools also with this conductive surface.
Do not connect any signals to inputs as long as the power supply of the set to be tested is off.
All the inputs that are not used should be connected either to ground or to the supply voltage. When testing, do not use any freon sprays for under-cooling of sensitive components.

3.3.4 Mounting ESD-sensitive components

Mount ESD-sensitive components only after all other components have been mounted.
Make sure that the components themselves, the metal parts of the PCB, mounting equipment and mounting operator are at the same potential level as the chassis of the set.
If it is impossible to ground the PCB, the mounting operator should pick the PCB up before bringing it into contact with the components to be replaced.

3.3.5 Soldering

Soldering iron tips, also those of low-voltage soldering stations, should be kept at the same potential as the components and the PCB.
It is better to use solder-removing braid than solder suckers.

3.3.6 Electrostatic charges

One should stick to the precautionary measures also after the ESD-sensitive components have been mounted on the PCB. Until the sub-PCBs have been incorporated into a complete system on which the correct supply voltages are connected, the PCB is nothing more than an extension of the conductors of the components on this PCB. To prevent electrostatic discharges from passing to the components via the terminals, we recommend that you apply conductive clips or conductive tape on the terminals of the PCB.

3.3.7 Transients (switch-on phenomena)

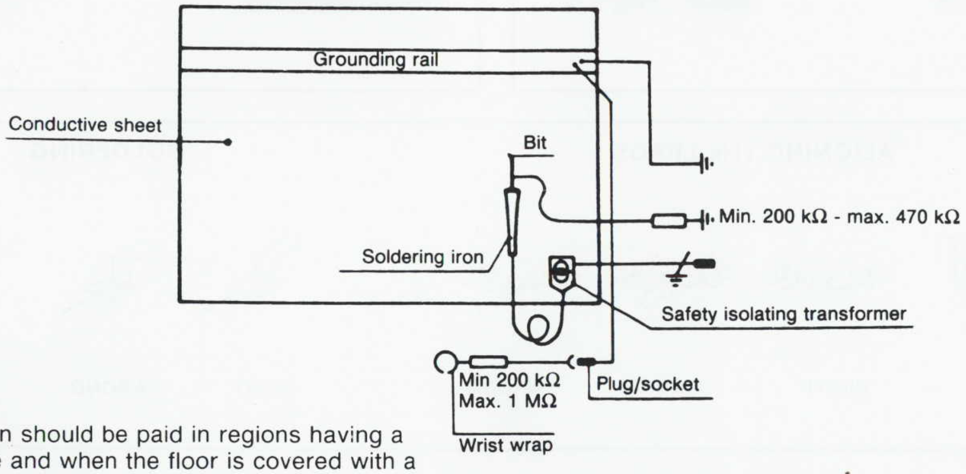
To prevent permanent damages as a result of switch-on phenomena, no ESD-sensitive components, or PCBs populated with these components, should be inserted in or removed from test-sockets or systems with the supply voltage on.
Prevent switching peeks on the mains as a consequence of switching electric equipment, relay and DC lines on and off.

3.3.8 Working environment

The work bench for the service technician should look like the one shown in the figure.

3.3.9 Replacement of the Flat Pack IC's

For replacing a component see Fig. 6 Dismounting and Mounting. Also a number of precautions and examples is given.
When replacing a flat pack, rosin flux applied to the device leads will ensure a good soldered joint.
Since rosin flux, when not properly heated by the soldering process, is sticky, it will attract dust which will result in component degeneration over a period of time.
The removal of excess flux with a cleaner will not solve this problem because the flux is then even spread over a greater area by the cleaner. Drying of the flux can be accomplished by blowing the area with a common hair dryer for 1 or 2 minutes at a distance of approx. 10 centimeters.



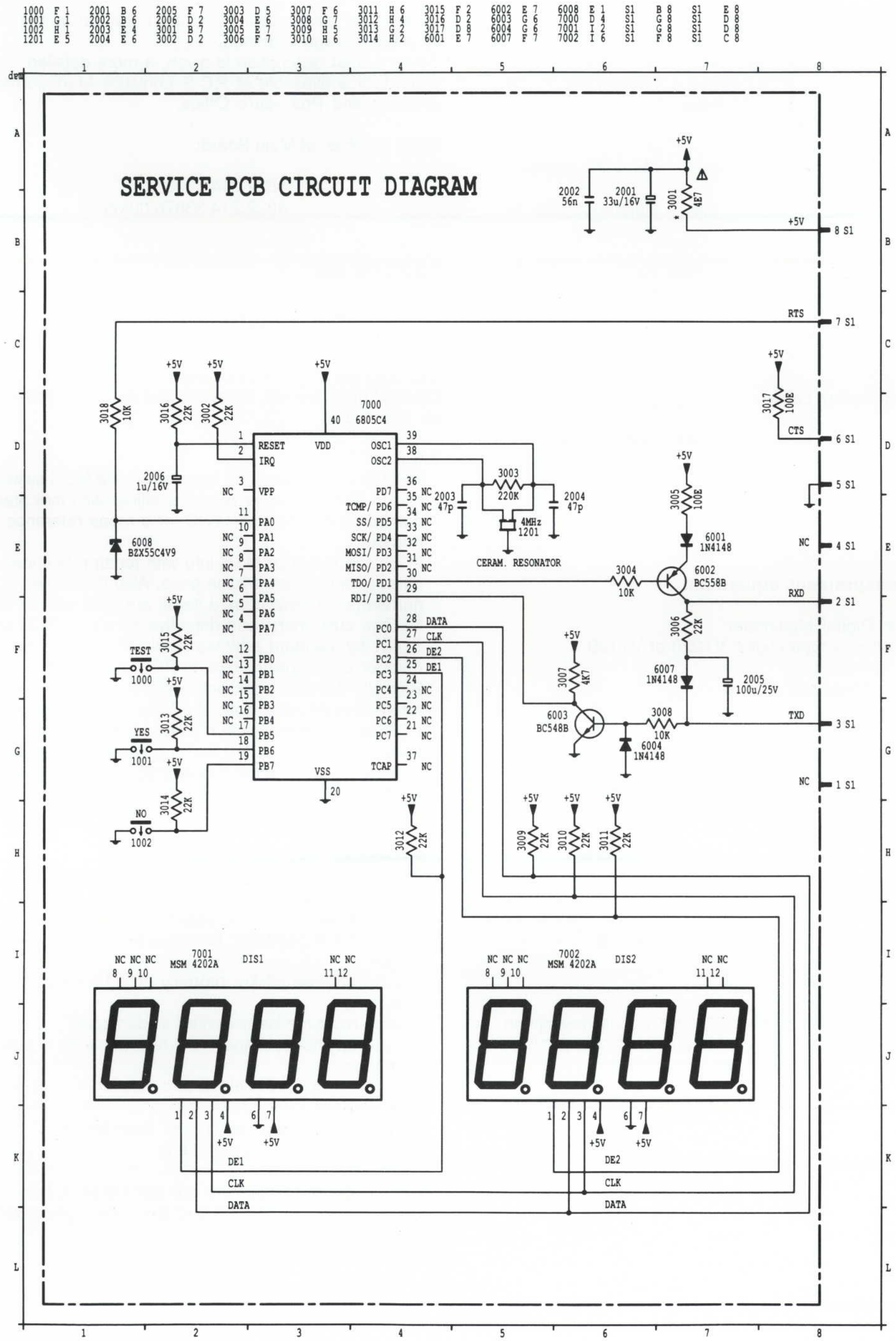
Special attention should be paid in regions having a dry atmosphere and when the floor is covered with a nylon carpet or such.

3.4 SERVICE TOOLS

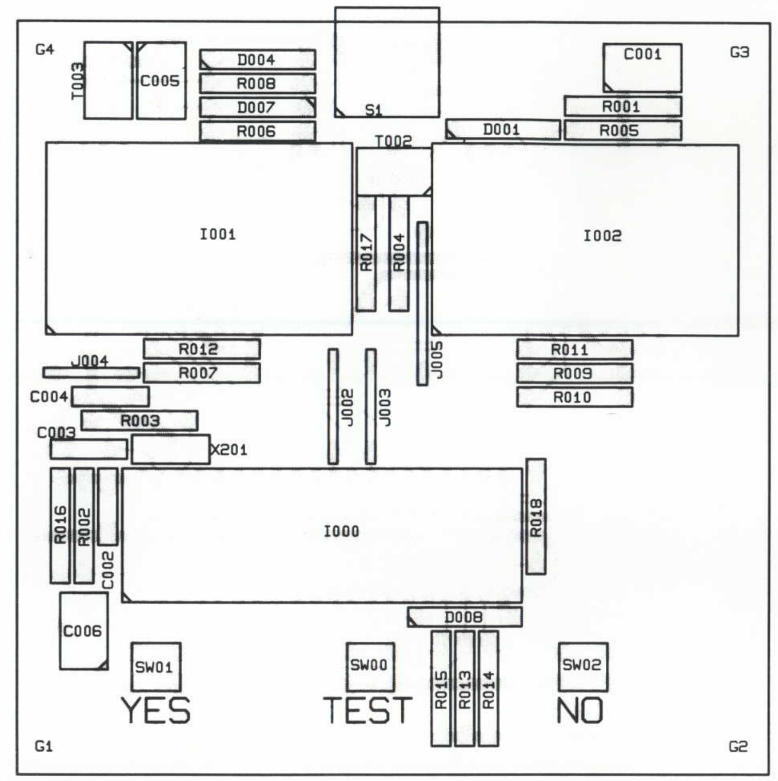
3.4.1 Service PCB (Low Level Test)

Code number	Name/Description	Application
4822 214 52007	Service PCB	Low Level Test
4822 321 61677	Cable	Connect Low Level PCB to Mainboard

3.4.1.1 Circuit diagram



3.4.1.2 Layout



3.4.1.3 Parts list

ITEM	DESCRIPTION		CODENUMBER
1000	Tact switch		4822 276 10974
1001	Tact switch		4822 276 10974
1002	Tact switch		4822 276 10974
1201	Ceram.resonator		4822 242 72527
2001	33	µF/16V	4822 124 20688
2002	56	nF	4822 121 41154
2003	47	pF	4822 122 31072
2004	47	pF	4822 122 31072
2005	100	µF/25V	4822 124 20701
2006	1	µF/63V	4822 124 20722
3001	4,7	Ω	See standardized list
3002	22	KΩ	
3003	220	KΩ	
3004	10	KΩ	
3005	100	Ω	
3006	22	KΩ	
3007	4,7	KΩ	
3008	10	KΩ	
3009	22	KΩ	
3010	22	KΩ	

ITEM	DESCRIPTION		CODENUMBER
3011	22	KΩ	
3012	22	KΩ	
3013	22	KΩ	
3014	22	KΩ	
3015	22	KΩ	
3016	22	KΩ	
3017	100	Ω	
6001	1N4148		4822 130 30621
6002	BC558B		4822 130 44197
6003	BC548B		4822 130 30621
6005	BZX55 C4V7		4822 130 34174
6006	BAT85		4822 130 31983
6007	1N1448		4822 130 30621
7000	MC68HC705C4		4822 900 10272
7001	MSM 4202A		4822 130 90474
7002	MSM 4202A		4822 130 90474
S1	miniDIN 8pins		4822 267 31289

3.4.2 Test discs

Codenumber	Name/description	Application
4822 397 30096	Testdisc 5 (music) Testdisc 5A (music + dropouts and fingerprints)	Reference disc for playability and adjustments of CDM
4822 397 30155	test disc with 1 KHz continous signal, 70 minutes.	life test in case of intermittent faults
4822 397 30184	Audio signals	Measure specs.
4822 701 11922	Skew disc 0,6	Reference disc for playability
4822 701 11923	Excentricity disc 150	Reference disc for playability
Launch disc	CD-I demo disc	

3.4.3 Extension cable

Codenumber	Name/description	Application
4822 322 40066	FLEX Cable	For CDM 9
4822 267 50676	FLEX Cable connector	extention

3.4.4 Measurement equipment

Electronic Digital Multimeter
Display terminal type Digital VT220 or VT100
Digital oscilloscope
Analog oscilloscope
Timer/counter

3.4.5 Pointing devices

4822 218 10401	Remote Control	22ER9051
4822 691 30297	Mouse (Black)	22ER9011
4822 691 30298	Trackball	22ER9013
4822 691 30293	Roller Controler	22ER9012

3.4.6 (de)Mounting tool

Torx screw drivers 4822 395 50145

3.5 Circuit Description

For circuit description, See CDI 205 circuit description. This is available under code number 4822 725 24107.

3.6 THE CENTRAL REPAIR PROCEDURE

3.6.1 Mainboard

The mainboard contains functions like MMC as well as peripheral functions, like Servo, Audio and Video processing. In case of a defect of the MMC function the complete board must be sent for repair to PCS. In case of a defect in the peripheral functions this must be repaired locally. The different functions are indicated on the PCB by means of marked lines.
Below a brief description is given, a more detailed procedure is available at P.C.S Logistics Management, systems and Procedure Office.

Code Number of Main Board:

4822 214 52033/17
4822 214 33876/00/05/11

3.6.2 LCD unit

Code number : 4822 130 91193
In case of a defect LCD unit the complete unit must be sent back for repair to PCS.
The LCD unt may not be opened.
Opened units are not accepted and the return pricewill not be credited.

3.6.3

- NSO or Customer: send telex or on-line MSH system info to PCS customer relations officer with indicated number(s) and service 12NC for a repair reference number.
- PCS: send telex or MSH info with repair reference number and return invoice price. Also the same number(s) of new/repaied items are sent with invoice.
- NSO or customer: send defective item(s) to PCS at SDM1 by standard address label with repair reference number and return invoice to PCS -price center.
- Remark: the difference between the invoice price and return invoice price gives the 'repair price' for the NSO.
- PCS: send defective item tofactory and stock.
- Experience has learned that the status of the particular products and packaging needs your local attention. Products wil be returned in case of unacceptable conditions.

3.6.4 Repair Procedure Conditions:

- HANDLE WITH CARE IN AN ESD PROTECTED ENVIROMENT.
- Defective items must be sent back to PHILiPS CONSUMER SERVICE for repair forwarded by Address sticker.
- Put the address sticker properly on a free area of the box.
- Boards must not be reworked or damaged.
- Re-use original package order new package in case of damages.
- Remove additional stickers and labeling if re-using the original box.
  Service codenumber on sticker must be equal to codenumber on repairable item.

!!! If the above conditions are not fulfilled, hen boards are not accepted and the return price will not be credited !!!

4 DEMOUNTING AND SERVICE POSITIONS

4.1 Servicing the MAIN board PM06

4.1.1

Remove the FMV connector cover 055B/056B. Remove the 5 screws on the bottom-side of the player then remove 2 screws on the right hand side of the player.
Screw 3 is a Longer type.

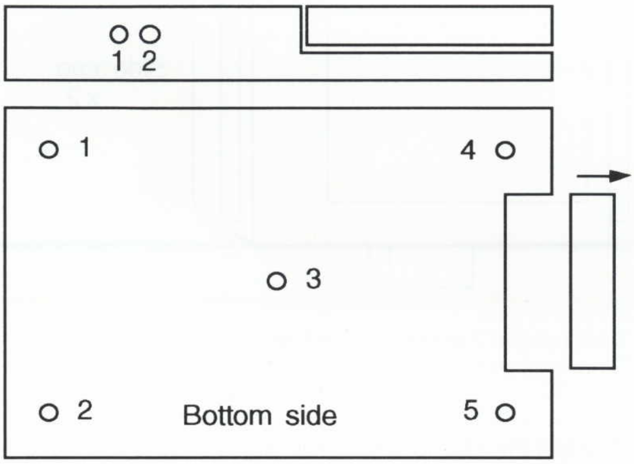


Fig 4.1

Lift the top cover from the bottom-side. Then place the top cover on the right hand side and dismount the flex wire from connector J402 and connector JF01.
Also disconnect the connector J502 then the top cover can be taken off.

4.1.2 Remove CDM

Remove 4 screws of the CDM.
Disconnect flex wire J801 and disconnect J802.
Remove sheet 036B, then remove 2 screws on the mainboard and 2screws on the power plug PP06.
Then the main board PM06 can be removed.

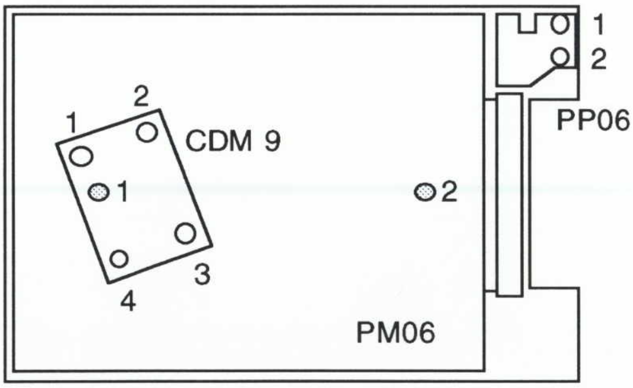


Fig 4.2

Caution : Demounting of Flex Foil CDM 9
- Remove the "flex foil" from the connector(s) on the PCB by lifting the upper part of the connector and taking the flex foil out. (see Fig 4.4)
- After disconnection of the "flex foil" short-circuit the by means of a paperclip or conductive clip.

Note :
Since laser, monitor diode and photodiodes are very sensitive to electrostatic discharges, careless handling during servicing may reduce life expectancy drastically.For this reason care should be taken that during servicing the potentials of the aids and yourself are equal to that of the screening of the set.

4.1.3 Connect the CDM with an extention frex wire.

This extention wire can be made yourself by soldering a frex connector J801 on the extention flex wire. This wire can be ordered with service code number 4822 322 40066.

Connect the motor wire to J802 and position the CDM next to the front side of the mainboard.

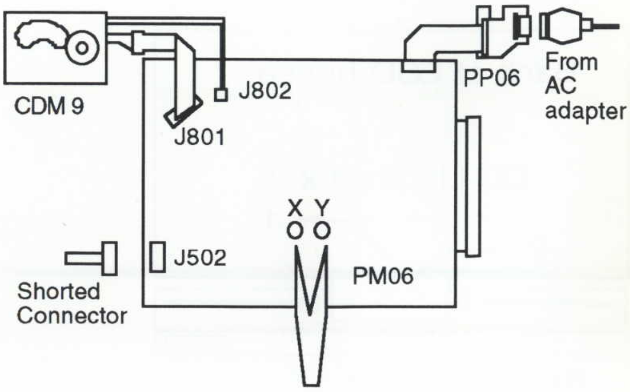


Fig 4.3

Both side of the mainboard can be reached by turn over the mainboard.
Mounting must be done in the reversed way.

4.1.4 Operate without top cover

When the CD Lid is removed the player can still be operated with the remote control.
First interconnect pin 5 and pin 6 of connector J502. This can be done by connecting a female onnector to J502 with pin 5 and pin 6 short circuited. Connect the AC adapter to the PP06 PCB. Second interconnect point X and Y on the mainboard for switching on the player. (near the JF01)

4.1.5 Playing

For player a disc in this service position place a disc on the turntable and place a magnetic clamper pos.058B on the disc.

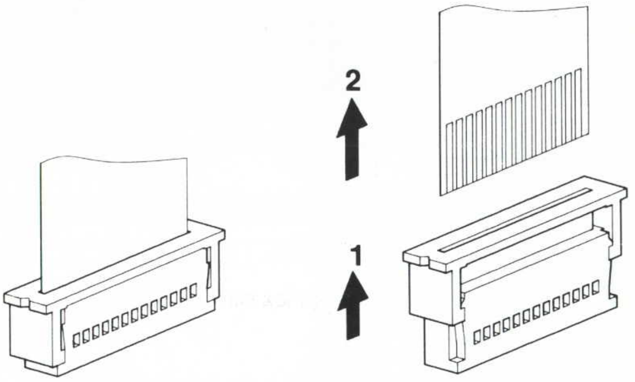
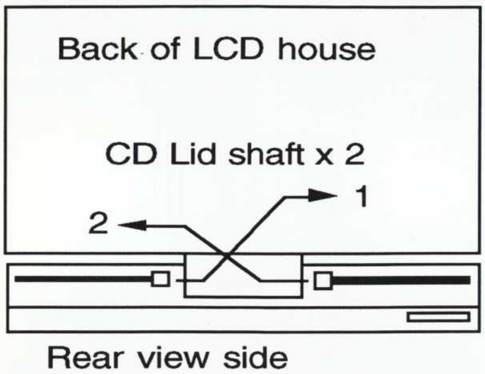


Fig 4.4

4.2 Servicing the CD-Lid

First Remove top cover 4.1.1

4.2.1 Remove the CD-Lid
Put the LCD unit in the vertical position.
Now the shafts can be reached from behind.
Remove the shafts by means of a pair of tweezers.



Then the CD-Lid can be removed carefully.

Be **Careful** with Flex wire of CD Lid when inserting the CD Lid shaft 1.

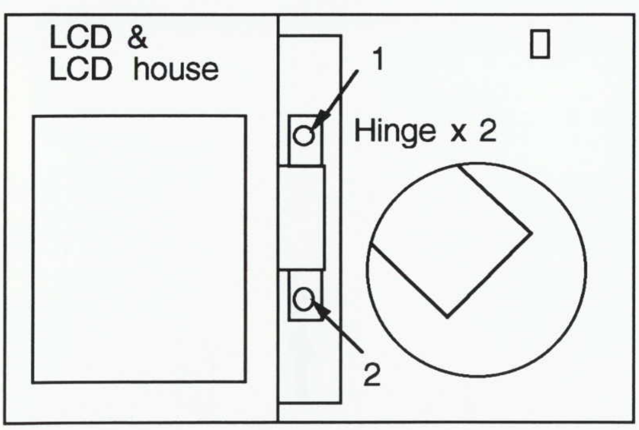
4.2.2
The CD-Lid is a complete service part only the clamper pos.058B and the clamper bracket pos. 002B are also service parts.

4.3 Servicing the LCD screen unit

4.3.1
The LCD unit cannot be repaired locally but must be sent for repair. See: Repair procedure

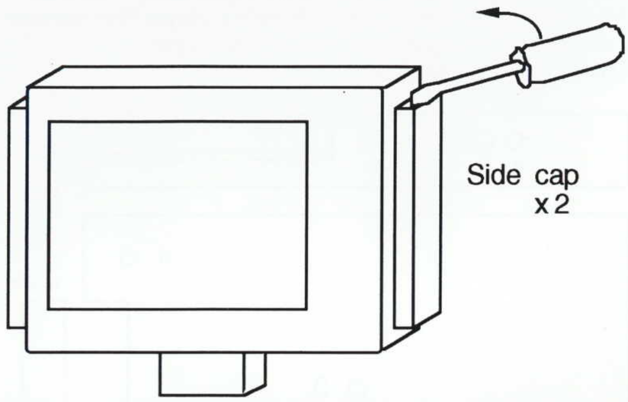
WARNING !!!
1. The LCD Screen Unit may Not Be Opened.
2. Do Not Touch the Surface of the LCD Glass.

4.3.2 Remove the LCD house.
Remove two screws from the two Hinges.



Then remove the LCD house cafully. (Flex wire)

4.3.3
Remove the LCD-screen unit from the LCD housing.
Remove side caps pos.046B(R) and pos.047B(L) by means of a screw-driver.



Then remove 2 screws on each side of the LCD house.
Then remove two screws holding the Hinges from behind.
The LCD house can be opened now and the LCD-screen unit can be taken out.
Mounting the LCD-screen unit must be done in the opposite way.

5 SERVICE SOFTWARE

5.1 THE LOW LEVEL MMC TEST

Scope
This test is standard implemented in the boot software of CD-RTOS. It doesn't need a lot of hardware to run. When debugging or servicing an MMC panel this test is very useful.

General
This test is developed for service and low level hardware debugging purposes only. It is meant to be used with the service pcb as described in TOOLS (please refer to section 3.5 SERVICE TOOLS). The test executed with the service pcb is called the **"pcb low level test"**.
The test executed with the VT100 terminal is called the **"terminal low level test"**. Since this service pcb display has just 8 digits, only the most important information will be displayed to the user. For the VT100 terminal this is never a problem.
This test consists out of the following items:

a. Display header and release number.
b. VSC
c. ROM
d. NVRAM
e. DRAM
f. CDIC
g. SLAVE processor (68HC05)

5.1.1 Tools
In this test the service pcb acts as some kind of a 'micro terminal'. This means that the service pcb is able to display some alphabetical and numerical characters. Some characters because it uses 7-segment displays

The three keys available are:
TEST ; test all display leds.
Yes ; Send an ASCII 'Y'.
No ; Send an ASCII 'N'.

The communication parameters are fixed at: 9600 baud
8 data bits
1 stopbit
no parity

The microcontroller is programmed with software available at IMS CDI software group.
The circuit diagram is on section 3.5.1.1

5.1.2 Testsquence
Table 1 below shows all the steps of the testprogram and what kind of tests are performed.

STEP	ACTION/TEST PERFORMED
00	VSC master/slave init
01	ROM
05	NVRAM
06	DRAM BANK0 & BANK1
07	DRAM BANK0
08	DRAM BANK1
09	CDIC
10	SLAVE
11	CLOCK CALIBRATION

Table 1: teststeps low level test

5.1.3 Low level test implementation
The low level test (short: lltest) is implemented in the boot part of the CD-RTOS software. The whole test occupies about 10k of ROM memory and is written in assembler.
The test runs without the use of any external RAM. It only uses internal CPU registers. As communication channel the 68070's UART is used. Before starting the normal player boot the following sequence is executed:
1. Initialize the 68070's UART : 9600 baud
   1 startbit
   8 databits
   1 stopbit
   no parity
   no handshake !
2. Clear the RXD buffer.
3. Wait 5 ms.
4. Read the RXD buffer.
5. If the character received was an ACK ($06) the start the pcb lltest
The UART is connected to I/O port 2

5.1.4 How to start up the low level test

With service pcb
To startup **the pcb low level testsoftware** the next sequence should be followed:
- Switch off the player.
- Connect service pcb to INPUT at the right hand side.
- Switch on the player.
- The service pcb display should now show 'CDI RLxx'. (with xx the release number)
- The pcb lltest is now ready to go.

With VT100 terminal
To startup **the terminal low level testsoftware** one should follow the next sequence:
- Switch off the player.
- Connect the terminal to the 68070's UART of the player.
- Switch on the player while pressing the SPACE-bar of the terminal.
- The terminal should now show the title of the terminal lltest.

5.1.5 PCB low level test
If the service pcb is connected to port 2 the pcb low level test is executed after power on. In table 1 a survey is given for all tests executed.

Display lltest release number:
When this lltest is entered, first the release number of the pcb lltest will be displayed.

Example: CDI RLxx

(RL stands for RELEASE, xx stands for release x.x).
The lltest is now waiting for an action from the user. The user should now press either the'Y' or 'N' button to continue the test.

STEP 0: VSC

STEP 0A: VSC MASTER

display: 0A

In this step some registers of the VSC MASTER are initialized. These registers are :

DCR2 register(set to independant
DCR register (disable display)
CSR register (set DTACK delay and DRAM type)

STEP 0B: VSC SLAVE

display: 0B

In this step some registers of the VSC SLAVE are initialized. These registers are:

DCR2 register(set to independant DCA)
DCR register (disable display)
CSR register (set DTACK delay and DRAM type)

STEP 1: ROM

In this step the contents of the ROM is checked.
Following tests are done on the ROM:
1. Display release number of this ROM. (test A)
3. Check if the parity of the ROM is OK. (test C)
Address range:
— The ROM chips used for this memory map are :
  1 X 4Mbit.
  On the MINI MMC the clock and calendar chip used is the SGS-Thomson MK48T08B. It is visible in the memory map.

Nr.of Bytes Words	UPPER — — — LOWER	MAPPED ADDRESS SPACE	UNMAPPED ADDRESS SPACE	FUNCTION
512kB	UP&LO	00 0000 - 07 FFFF	00 0000 - 07 FFFF	DRAM BANK1
512kB	UP&LO	08 0000 - 0F FFFF	08 0000 - 0F FFFF	DRAM BANK2
512kB	UNDEF	10 0000 - 17 FFFF	10 0000 - 17 FFFF	RESERVED
512kB	UP&LO	18 0000 - 1F FBFF	18 0000 - 1F FBFF	SYSTEM ROM
16B	LO	1F FC00 - 1F FFBF	1F FC01 - 1F FC1F	DUART (4)
16B*	UP&LO	1F FFC0 - 1F FFDF	1F FFC0 - 1F FFDF	VCS REGS SLAVE
16B*	UP&LO	1F FFE0 - 1F FFFF	1F FFE0 - 1F FFFF	VSC REGS MASTER
4B	LO	20 0000 - 20 7FFF	20 0001 - 20 0007	SLAVE
500kB	UNDEF	20 8000 - 27 FFFF	20 8000 - 27 FFFF	FREE SPACE
64kB	LO	28 0000 - 28 FFFF	28 0001 - 28 FFFF	FLOPPY (4)
460kB	UNDEF	28 0000 - 2F FFFF	28 0000 - 2F FFFF	FREE SPACE
8kW	UP&LO	30 0000 - 30 FFFF	30 0000 - 30 3FFE	CDI
910kB	UNDEF	31 0000 - 3E FFFF	31 0000 - 3E FFFF	FREE SPACE
2B	LO	3F 0000 - 3F 7FFF	3F 0001 - 3F 0003	KILLME/DMAMEM
8kB-8	UP	3F 8000 - 3F FBFF	3F 8000 - 3F BFFE	NVRAM (2)
8B	UP	3F BFF0 - 3F FBFF	3F BFF0 - 3F BFFE	CLOCK&CAL REGS
1kB	UNDEF	3F FC00 - 3F FFFF	3F FC00 - 3F FFFF	DO NOT ACCESS(3)
13MB	UNDEF	40 0000 - FF FFFF	40 0000 - FF FFFF	EXTENSION SPACE

Table of the memory map

(1) The effective memory space for SYSTEM ROM is 512kB-1k.
(2) The maximum available NVRAM space in this configuration is 31 kByte.
(3) This part of the memory map should not be accessed. The VSC registers are mapped here.
(4) When used.

I.. Explanation of items in tables
Nbr. of Bytes/Words :
The total available bytes or words. Words in this case means the part of the memory map is only accessable as a word.
kB = kilobytes
B = bytes
B* = bytes, but some addresses are only accessible as words.
kW = kilowords, only accessible as a word!

UPPER - LOWER:
This column gives an indication of how the device is accessible.
UP = only accessible as byte via the UPPER byte of the databus. (DATA8-DATA15)
LO = only accessible as byte via the LOWER byte of the databus. (DATA0-DATA7)
UP&LO = accessible via LOWER as well as UPPER byte of the databus. (the device uses the complete databus.
UNDEF = not defined.

MAPPED ADDRESS SPACE:
This column gives the total address range where the device described in FUNCTION is accessible. In this range the device can occur several times.

UNMAPPED ADDRESS SPACE:
Analogous as mapped address space, only the device can occur only ONE time.

FUNCTION: This column describes the device or register

STEP 1: ROM 10

STEP 1A: ID AND RELEASE NUMBER DISPLAY

display: 1A
IDxxRLyy

In this step the release number of this ROM is displayed for a moment.
(ID stands for IDentification, xx is the id number.
RL stands for RELEASE, yy stands for y.y)

STEP 1C: CHECKSUM

display: 1C

In this step the checksum of this ROM is calculated as described in " how is the checksum calculated ". If the checksum is not ok an error will be displayed.

display: 1C Er05

STEP 5: NVRAM
The nvram test is a non destructive test. This means that the original nvram contents is restored again.
Address range: Full nvram address range (see product spec)

display: 5

The following actions take place in the nvram test:
1. read byte from nvram and save it in a register
2. write a pattern (from ROM) to nvram
3. read byte from nvram and compare with pattern
4. if byte read is ok then continue with action 5 else give error message and stop testing

If error,

display: 5 Er09

5. write inverted pattern to nvram
6. read byte from nvram and compare with pattern
7. if byte read is ok then restore original byte else give error message and stop testing

If error,

display: 5 Er10

8. repeat this for every possible nvram address

STEP 6-8 :DRAM
The dram test is always a destructive test. The test is performed for both ram bank0 and bank1 as one large memory followed by a test for each bank separately.
On the displays following, the 'x' is a memory counter.
The counter is incremented every 128k. So for the full range it counts from 1 to 8.

Address range: full address range (see table)
Bank0 = lower RAM bank
Bank1 = upper RAM bank

STEP 6A : TEST THE FULL DRAM MEMORY
The following actions take place in this test:
1. fill the memory with the long word address as data.

   display: 6Afx

2. read the memory contents and compare with the address.

   display: 6Arx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 6ArxEr11

STEP 6B : TEST THE FULL DRAM MEMORY WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 6Bfx

2. read the memory contents and compare with the inverted address.

   display: 6Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 6BrxEr12

STEP 7A : TEST DRAM BANK0
The following actions take place in this test:
1. fill the memory with the long word address as data.

   display: 7Afx

2. read the memory contents and compare with the address.

   display: 7Arx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 7ArxEr13

STEP 10D : READ AND DISPLAY CD RELEASE NUMBER

display: 10D

In this step the following actions take place:
1. read the next byte from the slave
2. if the byte < > $00 then continue with step 3 else give an error and stop testing
   If error,

   display: 10D Er22

3. wait until a key is pressed.
4. read the next byte: this is a dummy read.

STEP	DESCRIPTION
0a	VSC master initialization
0b	VSC slave initialization
1a	ROM10 release number
1c	ROM10 checksum check
5	NVRAM test with rom data as data
6af	DRAM fill bank0&bank1 with address as data
6ar	DRAM read and compare data
6bf	DRAM fill bank0&bank1 with inverted add. as data
6br	DRAM read and compare data
7af	DRAM fill bank0 with address as data
7ar	DRAM read and compare
7bf	DRAM fill bank0 with inverted address as data
7br	DRAM read and compare data
8af	DRAM fill bank1 with address as data
8ar	DRAM read and compare
8bf	DRAM fill bank1 with inverted address as data
8br	DRAM read and compare data
9a	CDIC RAM test with address as data
9b	CDIC RAM test with inverted address as data
9c	CDIC register test
10a	SLAVE test: write request to slave
10b	SLAVE test: read echo from slave
10c	SLAVE test: read SLAVE release number from slave
10d	SLAVE test: read CD release number from slave

Table 1: PCB LLTEST steps overview

5.1.6 Terminal low level test

If a VT100 or compatible terminal is connected to the 68070's UART of the CDI player one is able to execute the terminal low level test. Due to the fact that almost every test is self explanatory only the major steps are described below. In this test it is only possible to skip every major step.

Display lltest header and release number

STEP 0: VSC
Both master and slave vsc are low level initialized sequentially. This is done the same as in the pcb low level test.

STEP 0: Writing to a user definable ram address
This test writes the powers of 2 to a (word) address. The result is read again and will be displayed. The address can be selected by the user (only word adresses). Pressing 'ESC' stops the test.
If one trys to write to unused space in the memory map, the program will NOT generate an error message.

STEP 01: ROM
For the ROM the following information is displayed and checked:
- Display the identification code for this ROM (ROM ID)
- Display the release number of this ROM
- Display the checksum of this ROM. The upper word of the checksum displayed is always '0000'.
  If the checksum is not ok then a specific error will be displayed. This error is the same as in the pcb low level test.

STEP 05: NVRAM
For the NVRAM test three different tests can be selected:
- The first is a non destructive nvram test as in the pcb low level test.
- The second test is a destructive nvram test with ROM data as test data.
- The third test is also a destructive test with the address as data.
- The third test has also some hidden functions. Pressing:
  w: writes continu the address as data to the nvram.
  r: reads continu the complete nvram (no display).
  d: displays the contents of 421 succeeding ram locations. The start address is given by the user.
  ESC stops these functions.

Remark: The error message is different from the pcb lltest.

See error table for more information.

Address range: Full nvram address range (see table of memory map)

STEP 06-08: DRAM
The dram test is always a destructive test. The test is performed for both ram bank0 and bank1 as one large memory followed by a test for each bank separately.
The following actions take place in the dram test:
1. fill the memory with the long word address as data.
2. read the memory contents and compare with the address.
3. if the long word read is ok then continue else give error message and stop testing.
4. write the inverted long word address as data to memory.
5. read the memory contents and compare with the inverted address.
6. if the long word read is ok then continue else give error message and stop testing.

This test has also some hidden functions. Pressing:
w: writes continu the long address as data to the dram.
r: reads continu the dram (no display).
d: displays the contents of 421 succeeding ram locations. The start address is given by the user.
ESC stops these functions.

Remark: the error message is different from the pcb lltest.

See error table for more information.

Address range: full address range (see product spec)
Bank0 = lower RAM bank
Bank1 = upper RAM bank

STEP 09: CDIC
cdic register2:
CDIC base address + $3FFA ; register2 contents after reset: $D7FE

See table of memory map for base address.

The cdic test consists out of three main parts:
1 test cdic ram with long word address as pattern
2 test cdic ram with inverted long word address as pattern
3 display cdic register and compare

STEP 7B : TEST DRAM BANK0 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 7Bfx

2. read the memory contents and compare with the inverted address.

   display: 7Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 7BrxEr14

STEP 8A : TEST DRAM BANK1
The following actions take place in this test:
1. fill the memory with the long word address as data.

   display: 8Afx

2. read the memory contents and compare with the address.

   display: 8Arx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8ArxEr15

STEP 8B : TEST DRAM BANK1 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 8Bfx

2. read the memory contents and compare with the inverted address.

   display: 8Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8BrxEr16

STEP 9: CDIC
This test only checks part of the CDIC ram, mainly because it is possible that during the test the CDIC destroys part of the ram contents.
address range: CDIC base address + $1400 to CDIC base address + $3C7F.
cdic register2: CDIC base address + $3FFA
register2 contents after reset: $C7FE

See table for base address.

STEP 9A :CDIC RAM TEST WITH ADDRESS AS DATA

display: 9A

The following actions take place in the CDIC RAM test:
1. Fill the memory with long word address as data.
2. Read and compare the data with the address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er17

STEP 9B :CDIC RAM TEST WITH INVERTED ADDRESS AS DATA

display: 9B

The following actions take place in the CDIC RAM test:
1. Fill the memory with inverted long word address as data.
2. Read and compare the data with the inverted address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er18

STEP 9C :CDIC REGISTER 2 TEST

display: 9C

The following actions take place in the CDIC REGISTER test:
1. Read register 2 and compare with fixed pattern. (Register 2 has a defined pattern after reset.)
2. If the register is ok then continue with next step else give an error and stop testing.
   If error,

   display: 9C Er19

STEP 10 SLAVE processor (68HC05)
This test checks the communication with the slave processor.
Additionally it displays the slave and cd processor release numbers. If the communication with the cd processor via SPI does not function, the cd release number will give a 0.0.

Address range: Slave base address + 6 (See table).

STEP 10A : WRITE REQUEST BYTE TO THE SLAVE

display: 10A

In this step a $F0 (request) is written to the slave.

STEP 10B : READ ACKNOWLEDGE FROM THE SLAVE

display: 10B

In this step the following actions take place:
1. wait about 2 sec to give the slave the time to acknowledge.
2. read the acknowledge.
3. if the acknowledge is $F0 then continue else give an error and stop testing.
   If error,

   display: 10B Er20

STEP 10C : READ AND DISPLAY SLAVE RELEASE NUMBER

display: 10C

In this step the following actions take place:
1. read the next byte from the slave
2. if the byte «gd» $00 then continue with step 3 else give an error and stop testing.
   If error,

   display: 10C Er21

3. wait until a key is pressed.
4. continue with next step

If in one of these tests an error occurs the test will be stopped and the error displayed.

This test has also some hidden functions. Pressing:
w: writes continu the long address as data to the cdic.
r: reads continu the complete cdic (no display).
d: displays the contents of 421 succeeding ram locations.
The start address is given by the user.
ESC stops these functions.

Address range:
CDIC base address + $1400 to CDIC base address + $3C80.

STEP 10: SLAVE processor (68HC05)
This lltest for the slave performs following actions:
1 Write $F0 to the slave processor.
2 Read byte from same address, the slave should respond with $F0.
3 If data is not $F0 then stop testing and display error code else continue with next action.
4 Read the next byte: this is the release number of the slave processor firmware. Display the release number. If the release number is $00 then an error will be displayed.
5 Read the next byte: this byte is the release number of the CD processor firmware. Display the release number. If the release number is $00 then an error will be displayed.
6 Read the next byte: this is a dummy read.

Address range: Slave base address + what is read in 6.

See table of memory map for base address.

STEP 11: CLOCK CALIBRATION
This step is not really a test. it is a software tool that can be used to trim the clock&calendar chip so that it runs within 1 minute acc. per month. If calibration is not needed, this step should be executed since a frequency counter is needed to complete this test successfully. If this test is entered accidently, just switch off the power and restart the lltest.
The clock calibration should be performed with an external frequency counter.

- Connect the probe of the counter to pin21 of IC7205 the signalis called CSCDICN.
- Start the test with the gate time of the frequency counter set to minimum 5 sec.
- The counter display should now show a frequency near to 512 Hz.
  If not, the chek if everything is set and connected properly.
  (range : 511,96724 to 512,03276)
- Press a key on the terminal to stop the measurement.
- Now fill in the measured value of the frequency. The lltest software will now calculate the proper value to be filled into the calibration register of the clock&calendar IC.
  The value of the frequency at pin21 of IC7205 will not be changed or influenced.
- The calibration is done now.

5.1.7 Error codes

When during a test an error occurs the user should be aware of following conventions:
- For the pcb low level test the error is displayed on the outermost righthand side of the display.

  Example: 1 Er11

  An survey for all error codes is given in table 2.

- For the terminal low level test the error is displayed on the outermost lefthand side of the terminal. In some cases (memory tests) the error code is replaced by a more meaningful error output.

  Example: ADDRESS DATA READ EXPECTED
  ERROR:00080000 F0080000 00080000 RETURN to continue,ESC to STOP

  Meaning: (assuming long word data is used); On address
  $80000 the data was $F0080000 and not $80000 as it should be. If the RETURN button is pressed, the next address will be read and checked. With this output it will be easier to debug the MMC board

- When an error has occurred the program will wait for a user intervention with following question:
  RESTART the test Yes or No?
  If the answer was 'Y' then the lltest software is executed again from the beginning.
  If the answer was 'N' then the next test is executed as if nothing happened.

ERROR	DESCRIPTION	DISPLAY
05	ROM checksum error	Er05
09	NVRAM error	Er09
10	NVRAM error (for inverted data)	Er10
11	DRAM error (bank0 & bank1)	Er11
12	DRAM error (bank0 & bank1, inverted data)	Er12
13	DRAM bank0 error	Er13
14	DRAM bank0 error (inverted data)	Er14
15	DRAM bank1 error	Er15
16	DRAM bank1 error (inverted data)	Er16
17	CDIC RAM error	Er17
18	CDIC RAM error (inverted data)	Er18
19	CDIC register error	Er19
20	SLAVE error (wrong echo from slave)	Er20
21	Invalid release number from slave	Er21
22	Invalid release number from cd proc	Er22

Table 2. Error codes overview

5.1.8 Release number, position and checksum storage

The release number,ID and checksum are always stored in the CDI ROM. Step 1 of the pcb lltest as well as the terminal lltest uses all this information to check if the ROM is ok.

Where are these bytes stored in the ROM's, where in the memory?
(ROM address range for the 4Mb: $00000-$7FBFF)
(MMC address range for the 1Mb: $180000-$1FFBFF)

ROM address	$7FBFF	–	LSByte of the checksum
	$7FBFE	–	MSByte of the checksum
	$7FBFD	–	Release number of this ROM (BCD coded)
	$7FBFC	–	Player ID (BCD coded)
MMC address	$1FFBFF	–	LSByte of the checksum of the ROM
	$1FFBFE	–	MSByte of the checksum of the ROM
	$1FFBFD	–	Release number of the ROM (BCD coded)
	$1FFBFC	–	Player ID (BCD coded)

Remark: The total ROM space is 512k minus 1k. This 1k can never be accessed in the MMC address space. It is used for the VSC's registers and chip selects.

5.1.9 How is the checksum calculated?
The checksum is calculated for every ROM separately. The checksum is the algebraic sum of all bytes in that ROM except the 2 bytes where the checksum is written. Only the LSWord of the sum is used. To calculate the real checksum of the ROM just add these 2 bytes to the LSWord of the sum.
The last 1024 bytes are always assumed to be all $FF.

ROM checksum = sum of all bytes of the address range $180000 to $1FFBFD + $FC00
ROM checksum displayed in STEP 1=
ROM checksum + (LSB + MSB) of this checksum.
This is also equal to the checksum of the complete ROM.

5.2 THE SERVICE SHELL

Introduction.
For service purposes the CD-I set has built-in software modules. These modules can be activated via the service shell by menu.
The modules are for the testing of :
- Video circuitry, by means of a colorbar testpatern
- CDM and servo circuitry
- Input / Output ports
- Audio circuitry

Testing the CDM, servo and audio cicuitry in the service shell is only possible with a CD-DA disc.

5.2.1 Starting the service shell
(1) Power OFF (2) Press two switches: ' Display ON/OFF ' and ' Action button 2 (Right side) ' (3) Power ON and release two switch if after Power ON

5.2.2 Layout info

SELECTABLE/NON SELECTABLE ITEMS
Each menu of the service shell consist of a number of boxes and text strings. Some of these boxes can be selected by moving the screen cursor above the box and clicking on one of the joystick buttons. Only the colored boxes can be selected. Clicking on one of the other boxes will have no effect.

(ERROR) MESSAGES ON THE SCREEN
The service shell will provide information and errors in a box at the top of the screen. To remove such a message and continue with the test a button must be clicked on the remote control joystick.

MENU STRUCTURE
When the service shell is started, the main menu appears with a number of boxes on it. Selecting some boxes will result in a submenu being displayed, other boxes may result in immediate action. Selecting the EXIT box will stop the service shell and restart the player. Selecting EXIT in a submenu will return you to the previous menu.

5.2.3 Subject dependent information

MAIN MENU
The main menu contains four test item boxes and the EXIT box. Selecting TEST IMAGE will give immediate action, the other three test items will display a submenu.

CD TEST
This menu has two information boxes at the top of the screen. Below it are three test items for the CD player and below these are three buttons that can be selected only during the CD drive test. When the menu is first entered only the three test item boxes can be selected. Subjects of the CD test are the cd drive itself, the X bus and a test on Digital Out.
When this menu is selected in the main menu, the communication channel with the CD processor will be checked first. A message will be displayed giving the result of this check (either O.K. or No response). After pressing one of the buttons (to remove the message) the cd menu will be displayed.

cd status		test mode
drive test	X bus	Dig Out
Arm in	Arm out	Next step
	EXIT	
	(error) message bar	

fig 3.2 CD test menu

The X bus test will result in immediate action. It checks the communication channel between the CDIC and CD processor that is normally used to send commands (seek, read etc) to the CD processor. The result is either O.K or No response.
The Dig. Out test will also give immediate action. It's purpose is to check wether the CDIC receives a Digital Out signal or not. The result of this test is O.K. or No Digital Out.
The CD drive test uses a different menu and will therefore be described in a separate paragraph.

CD DRIVE TEST
The CD drive test will perform the service loop as implemented in the Philips CD audio players. A disc is needed for this test. Results of this test will be displayed on the screen instead of a display. When the cd drive test is selected, the same screen will appear, but with other buttons highlighted. You cannot select the X bus and Dig Out test anymore. Selecting the EXIT button will return you to the cd menu. (X bus and Dig Out button highlighted again). The drive test consist of the following steps:

Mode 0
Software release number of the CD micro processor is displayed in the button at the left top of the screen (cd status button).Mode 0 is displayed in the button at the right top of the screen (mode button). During the cd drive test this button will display the current mode.
In mode 0, the ARM IN and ARM OUT buttons can be selected to move the cd lense inwards and outwards.
Selecting NEXT STEP will bring the player in mode 1.

Mode 1
In mode 1 the cd driveprocessor will try to focus. If it manages to do so (a disc must be present!), the message IN FOCUS will appear in the status button. Otherwise, the message NO FOCUS will appear in the status button after the cd driveprocessor has tried to focus 16 times (this may take a while). In that case (no focus found) the test will return to mode 0.
Selecting NEXT STEP will bring the player in mode 2.

Mode 2
The turntablemotor is rotating and controlled by the rough HF, moving the cd lense outside (by hand) will slow the disc down.
If an error occurs, the test will return to mode 0.
Selecting NEXT STEP in mode 2 will bring the player in mode 3.

Mode 3
You can select ARM IN and ARM OUT to make the cd lense jump inside or outside (small jumps). The laser will keep jumping while a button is pressed on the remote control.
If an error occurs, the test will return to mode 0.
NEXT STEP in mode 3 will bring the player in normal playing mode.

Normal playing mode
The player shell will be started and errors sent by the cd processor will be displayed in a box on the screen. You cannot return to the service shell otherwise than by resetting the player.

ERROR MESSAGES

display: A5 xx0000

xx = 2 : focus error
xx = 3 : radial error
xx = 5 : off error (TL stays low for 50 msec.)
xx = 6 : jump error
xx = 7 : subcode error, no valid subcode in 3 sec.
xx = 8 : TOC error: out of lead-in area while reading the TOC
xx = 30 : to many grooves to jump
xx = 31 : search time out
xx = 32 : bin. search error
xx = 33 : search index error
xx = 34 : search time error
xx = 37 : selection error

DUART TEST
This test is not relevant

APU/KEY TEST
This is a combined menu, the attenuation can be changed via this menu and the keys on remote control and player can be tested with it. There are three buttons for every attenuation path on the screen. Two of them can be selected (to increment/decrement) and one is used to display the current attenuation value for the path. There is also a MONO/STEREO button on the screen. In STEREO, two attenuation paths are disabled (left to right and right to left), in MONO all attenuation paths are enabled. Maximum attenuation is reached at the value 47 (no sound). A CD audio disc is needed for the attenuation test. The test routine will start playing the disc at initializiation.
When a key is pressed, a text will appear on the key button on the right side of the screen describing the button pressed. The text will disappear when the key is released.

LEFT/LEFT		RIGHT/RIGHT
– 00 +		– 00 +
LEFT/RIGHT		RIGHT/LEFT
– 00 +		– 00 +
STEREO/MONO		LAST KEY
STEREO	EXIT	
	(error) message bar	

fig 3.4 APU test menu

VIDEO TEST IMAGE
A colorbar will be displayed on the screen. Pressing a button after the screen has been filled completely will return you to the main menu. There are no error messages for this test.

What could be wrong if...
This paragraph will describe the meaning of the error messages given by the service shell and contains suggestions about possible errors. This paragraph must be updated with new information from testing and debugging players.

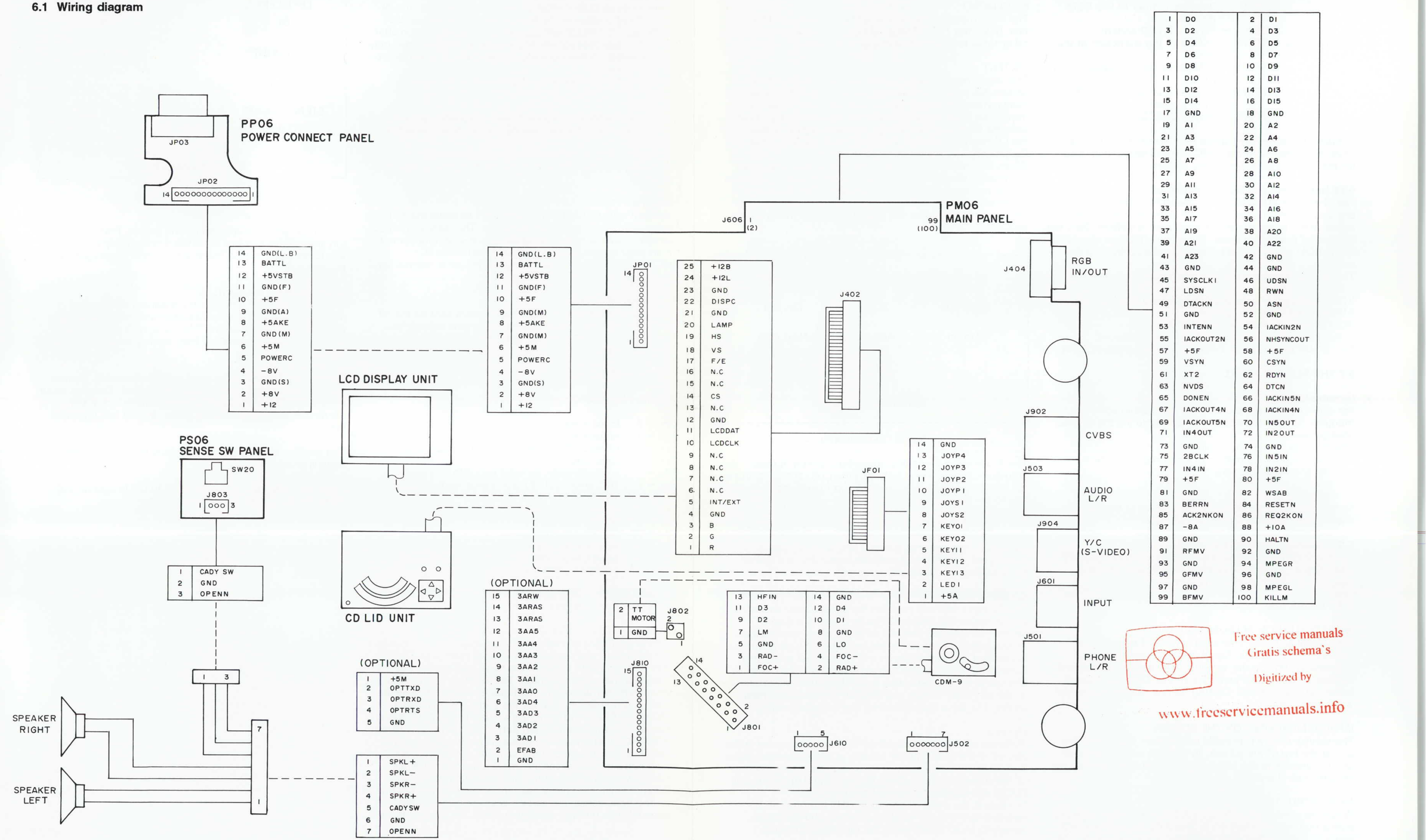
Service shell cannot be started with the testplug. Connections between port 1 and slave may be bad. Testplug could be wrong. Maybe the slave processor is defect. If the playershell cannot be started either, try the low level test first.

The key test will display the text ERROR if an unknown key code is received.

Disconnecting the clock from MMC to CD processor will make the CD player turn as fast as it can.

6 ELECTRICAL DRAWINGS

6.1 Wiring diagram



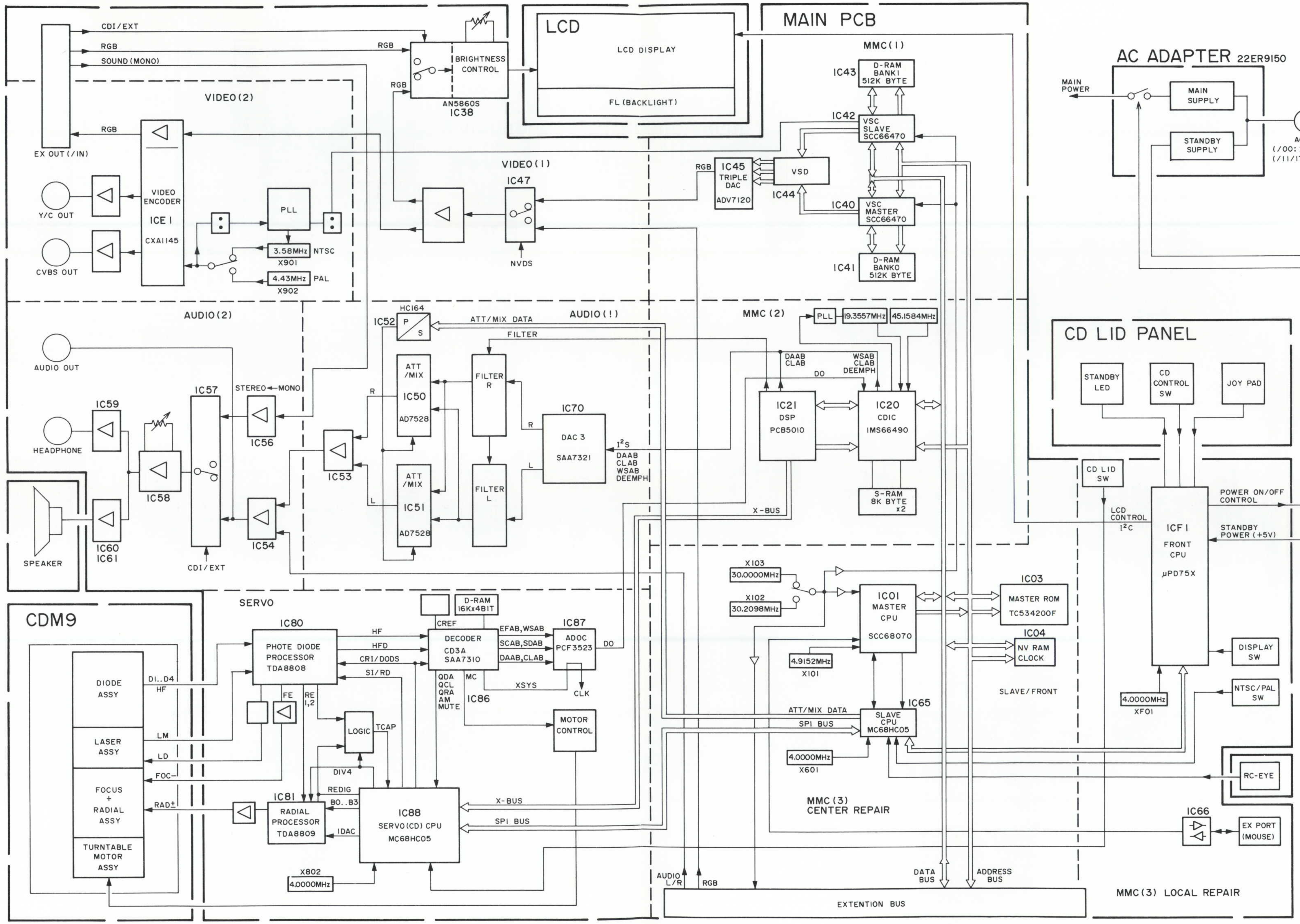
6.2 Alphabetical signal listing

ACK2N	: DMA REQUEST ACKNOWLEDGE (active low) (of channel 2)
ADEN	: (=ADENA) ADDRESS ENABLE NOT. When low,the address ADENA coming from the bus (68070) will be put through to CDIC
AM	: ADDITIONAL MUTE
ASN	: ADDRESS STROBE (active low,tristate) indicates when an address is valid on the bus for the system
AVN	: AUTOVECTORED INTERRUPTS (active low),can be used by an extension
B0..3	: input control bits for off-,catch-,play status and DAC output current for radial motor
BATTL	: Battery detect signal from Power in
BCDI	: Video signal from VSD (GCDI,RCDI)
BENC	: >> to encoder
BFMV	: >> from J606 (GENC,RENC)
BERRN	: >> BUS ERROR (active low,open drain)
BERR	: >>
BLANI	: (=BLAN1M) BLANKING OUTPUT (active low,tristate)of the VSC
BTU	: Video signal from J404 (GTU,RTU)
CBA,CBAA	: 68070 bus transiever latch (rising edge)
CDICDACKN	: (=ACK1N) DMA REQUEST ACKNOWLEDGE (active low)
CDICREQN	: (=REQ1N) DMA REQUEST (active low)
CDIEXT	: Interna(CDI)l/Extanal exchange signal of Audio/Video(Low=intanal)
CLAB	: (=CLAB2) bitclock for the SAA 7220 chip
CLK	: CLOCK (11,2896 Mc)
CLKDAC	: CLOCK DAC,the clock used to send seria data to the volume adjustment
CLK1	: the clock on which the DSP operates (7,5264 Mc)
CRI	: COUNTER RESET INHIBIT (low during a real trackloss or during excention of a jump command
COC	: COMMAND COMPLETED signal
COXN	: serial output clock for the X-bus
CPUASN	: the address strobe of the 68070 microprocessor
CPULDSN	: the lower data strobe of the 68070 microprocessor
CPUUDSN	: the upper data strobe of the 68070 microprocessor
CS	: CHIP SELECT
CSCDICN	: CHIP SELECT CDIC (active low) bus information is intended for or coming from CDIC
CSDAC1N	: (=CSDAC2N) (if selected,low) it means that data will be adjusted on that channel
CSNVRAMN	: CHIP SELECT NVRAM (active low) bus information is intended for or coming from the NVRAM
CSROMN	: Chip delect ROM (active low)
CSSLAVEN	: CHIP SELECT SLAVES (active low)
CSON	: (=CSONA) CHIP SELECT (active low) for the 8Kx8 SRAM'S
CSVSCMSN	: CHIP SELECT VSC MASTER AND SLAVE. When low the coming information is intended for the VSC'S
CSYN	: COMPOSITE SYNCHRONIZATION input from the VSC's (active low)
CSYENC	: >> to encoder
CTS2,M	: CLEAR TO SEND (active low) it indicates that the remote recieving device is ready
DAAB	: (DAAB2) serial data output of the X-bus I2S standard
DATA 0..15	: DATA LINES
DATADAC	: Data which will be send to the DAC('S) for volume adjustment
DDTACK	: DATA TRANSFER ACKNOWLEDGE to the 68070 bus
DEEMP	: DEEMPHASIS
DIRN	: DIRECTION CONTROL. Indecates the direction of data transfer through the transcievers
DISCLK	: DISPLAY CLOCK>>
DISDAT	: DISPLAY DATA >>only for CDI 2XX
DISPC	: LCD screen ON/OFF (ON=high)
DIV4	: DIVIDE BY 4 signal
DO	: DIGITAL OUT
DODS	: DROP-OUT DETECTOR SUPPRESSION
DONEN	: DONE (active low,open drain),operates in the DMA-mode
DOXN	: serial data output of the X-bus
DSPRWN	: Read (high) or write (low) from or to the Digital Signal Processor
DSN2N	: DATA STROBE (active low) of the DSP
DTACKN	: DATA TRANSFER ACKNOWLEDGE asserted by a peripheral
DTACKSLAVEN	: DATA TRANSFER ACKNOWLEDGE of the SLAVE processor (68HC05)
DTCN	: DATA TRANSFER COMPLETE (active low,open drain) operates in the DMA-mode
EFAB	: ERROR FLAG
FILTERN	: filter select when high:level C,when low:level A
FOC-	: >> focus out to CDM 9
FOC+	: >>
GN	: >>
GNA	: >> When low:the outputs and inputs of the trancievers (646) are enabled
GNB	: >>
HALTN	: active low,open drain,biderectional. If low together whith the resetn it couses the 68070 to enter the reset state.
HSLCD	: Hsync from LCD screen for external video
HSYN	: (active low) horizontal synchronisation input from the VSC
HVID 0 IN ....HVID 7 IN	: >> 8 bit pixel bus for channel 1
HVID 0 OUT ...HVID 7 OUT	: >> (VSC-master)
IACKIN2N	: >>
IACKIN4N	: >> Decoded interupt acknowledge (active low).
IACKIN5N	: >> Asserted during an interupt acknowledge
IACKOUT2N	: >> sequence to indicate to a peripheral that
IACKOUT4N	: >> this interupt request is bein serviced
IACKOUT5N	: >>
IACKOUT2	: >>
IACKOUT4	: >>
IACKOUT5	: >>
IDAC	: 1/2 bit DAC
IDTACKN	: data transfer acknowledge from 68070
IFDN2	: main channel word-flag to the DSP
INTENN	: >> when low,no extensions use the interupts,when high interrupt devices are daisy chained
INTENN2	: >>
INTENN3	: >>
INTENN4	: >>
IN2IN	: (=IN2OUT) >>
IN4IN	: (=IN4UT) >> Decoder interrupt priority inputs

IN5IN	: (=IN5OUT) >> (active low) IN2IN has the lower
IN2OUT	: >> and IN5IN has the higher priority
IN4OUT	: >> IN2IN = SLAVEPROCESSOR (6805),IN4IN =
IN5OUT	: >> CDIC (IMS66490),IN5IN = DUART (68681)
JOYP1..4	: Controler (Joy Pad) input
JOYS1,2	: Action sw input
KEYI1..3	: Key scan for Front switch
KEYO..3	:>>
LCDCLK	: LCD screen control by I2C
LCDDAT	:>>
LED1	: Power LED (red)
KILLM	: to mute audio outputs by power on and off
LADD1..23	: ADDRESS-BUS (active high,tristate) for direct addressing of 16 Mbyte of memory
LDSN	: LOWER DATA STROBE of the bus
LM	: LASER MONITOR diode input
LO	: LASER amplifier current OUTPUT
LRDN	: when low select,the ROM'S or NVRAM read the lower data byte
LVIDOIN LVID7IN	: >> 8 bit pixel-bus for channel 2 (VSCSLAVE)
LVIDOOUT ...LVID7OUT	: >>
MC	: MOTOR CONTROL signal
MISO	: MASTER IN SLAVE OUT
MOSI	: MASTER OUT SLAVE IN
MPEGL,R	: Audio signal from J606
MSMA0..8	: ADDRESS BUS between the DRAM'S of the VSC' MASTER and the VSC MASTER
MSMD0..15	: DATA BUS between the DRAM'S of the VSC' MASTER and the VSC MASTER
NRESET	: when low the video synthesizer (VSR) is in reset
NVDS	: digital output to control an external switch for TV overlays (active low)
PCLK1IN	: >> PIXEL CLOCK for channel 1
PCLK1OUT	: >>
PCLK2IN	: >> PIXEL CLOCK for channel 2
PCLK2OUT	: >>
PLOIN1	: input clock for CDIC (22,5792 Mc)
PLOIN2	: input clock for CDIC (19,3536 Mc)
POWERC	: Power ON/OFF control from ICF1(ON=high)
QCL	: Q-channel CLOCK
QDA	: Q-channel DATA
QRA	: Q-channel REQUEST INPUT/ACKNOWLEDGE OUTPUT
Q22	: output to PLL (22,5792 Mc) devided by 14
Q21	: output to PLL (19,3536 Mc) devided by 12
RAD+	: >> RADIAL OUT to CDM 9
RAD-	: >>
RD	: READY signal,starting up procedure finished
RDYN	: READY (active low) of the DMA channel
REDIG	: RADIAL ERROR DIGITAL
RESETCD	: when low resetsequence starts
RESETINN	: when low VSC is in reset
RESETN	: this is the reset for all other ic's
REQ2N	: DMA-request of the second channel
RSTOUT	: RESET OUT of the slave processor when high resetsequence starts
RTSUART	: REQUEST TO SEND from the slave processor to the UART of the 68070 processor
RTS2,M	: >> REQUEST TO SEND (active low)
RWN	: READ - WRITE (low is write) signal
RWN2	: READ - WRITE (low is write) signal from CDIC to the DSP
RWRAM	: READ - WRITE signal from the CDIC to the S-RAM'S
RXD2,M	: >> RECIEVE DATA RXD is data input
SI	: on - off control for laser supply and focus circuit
SLMA0..8	: VSC-slave memory address bus to the DRAM'S
SLMD0..15	: VSC-slave memory data bus to the DRAM'S SOXENN: SERIAL OUTPUT ENABLE FOR THE X-BUS (enabled when low)
SOXRQN	: SERIAL OUTPUT REQUEST FOR THE X-BUS (when low)
SOYENN2	: SERIAL OUTPUT ENABLE FOR THE Y-BUS (when low)
SPICLK	: SERIAL PERIPHERAL INTERFACE CLOCK
SPISS	: SERIAL PERIPHERAL INTERFACE SLAVE SELECT
STANDARD	: software choise between PAL and NTSC
STANDARDSW	: handware choise between PAL and NTSC
SOUND	: Audio signal (mono) of external
SWAB	: SUBCODING WORD CLOCK INPUT
SYSCLK	: >> SYSTEM CLOCK
SYSCLK1,2,A	: >>
TCAP	: input capture feature for the on-chip timer
TCMP	: output for the output compare feature of the on chip timer
TMOUT	: TRAY MOTOR OUT
TXD2,M	: >> TRANSMIT DATA TXD is data output
UDSN	: UPPER DATA STROBE (active when low)
URDN	: READ UPPER DATA BYTE (active when low)
UWRMN	: READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-MASTER
UWRN	: WRITE UPPER DATA BYTE (active when low)
UWRSN	: READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-SLAVE
VC	: output DC-motor (VOLTAGE CONTROL)
V-FLAG	: output to the DSP
VSCM-INTN	: when low,interrupt from VSC master to 68070 processor
VSCS-INTN	: when low,interrupt from VSC slave to 68070 processor
VSYN	: (active when low) VERTICAL SYNCHRONISATION INPUT from the VSC
WRPN1IN..2	: >> control input for channel 1 or 2 (active low)
WRPN1OUT.2	: >>
WSAB	: >> WORD SELECT FOR AB CHIP
WSAB2	: >>
XIN	: >> 11,2896/9,6768/4,8384 symmetrical clock
XIN2	: >>
X-TAL2	: the same as the system clock,coming out of the VSC'S
XT2	: the system clock devided by two
XT4	: >> the system clock devided by four
XT4IN	: >>
0AD..12AD	: >> ADDRESS BUS,between CDIC-SRAM'S and SYSTEM ADDRESS BUS BUFFERS
10ADA 12ADA	: >>
0D..15D	: DATA BUS between CDIC and DSP

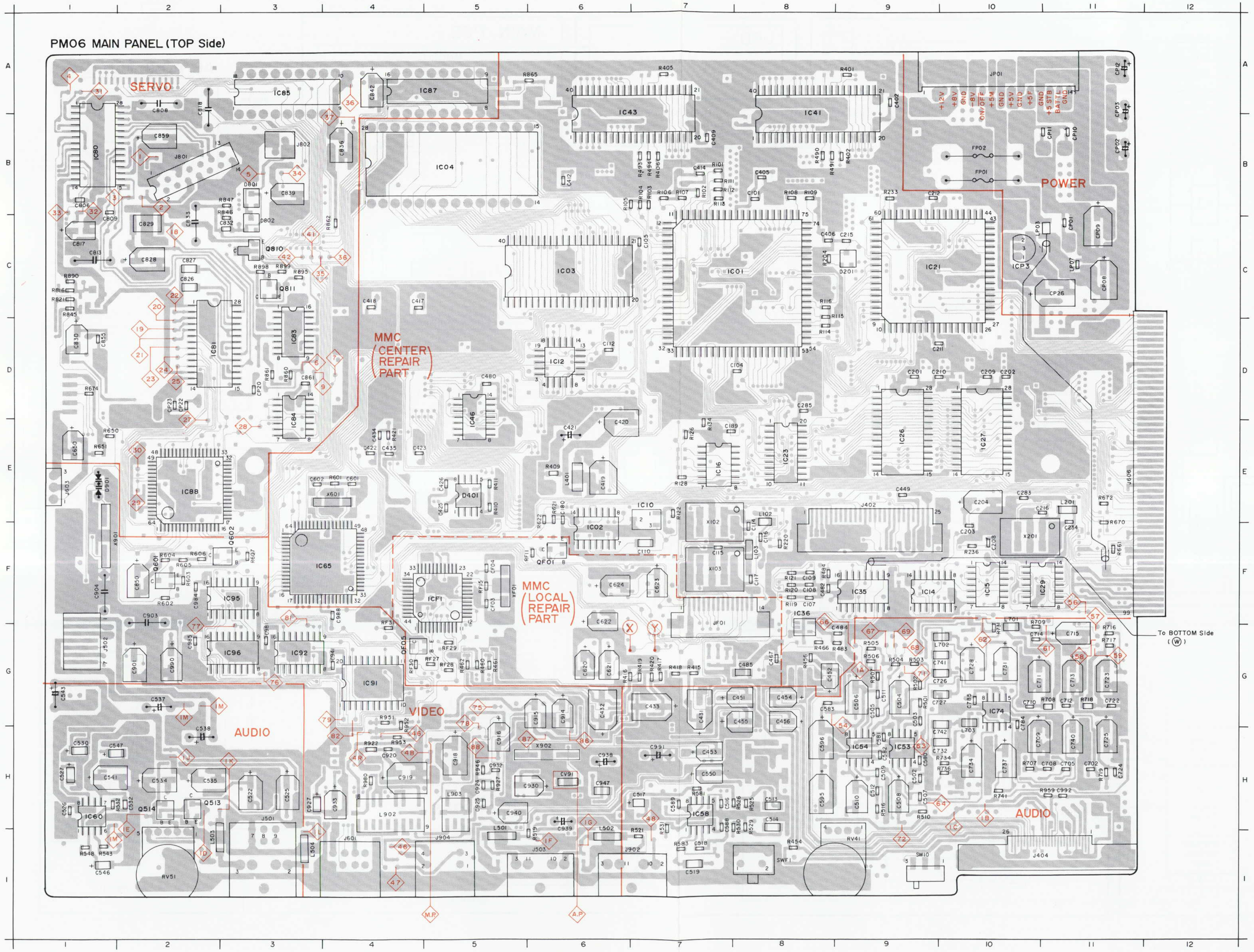
0DA..15DA : DATA BUS between CDIC-SRAM'S and SYSTEM DATA BUS TRANCIEVERS
2BCLK : CLOCK for the 2B-chip
12A..15A : ADDRESS BUS between CDIC and DSP

6.3 Block diagram



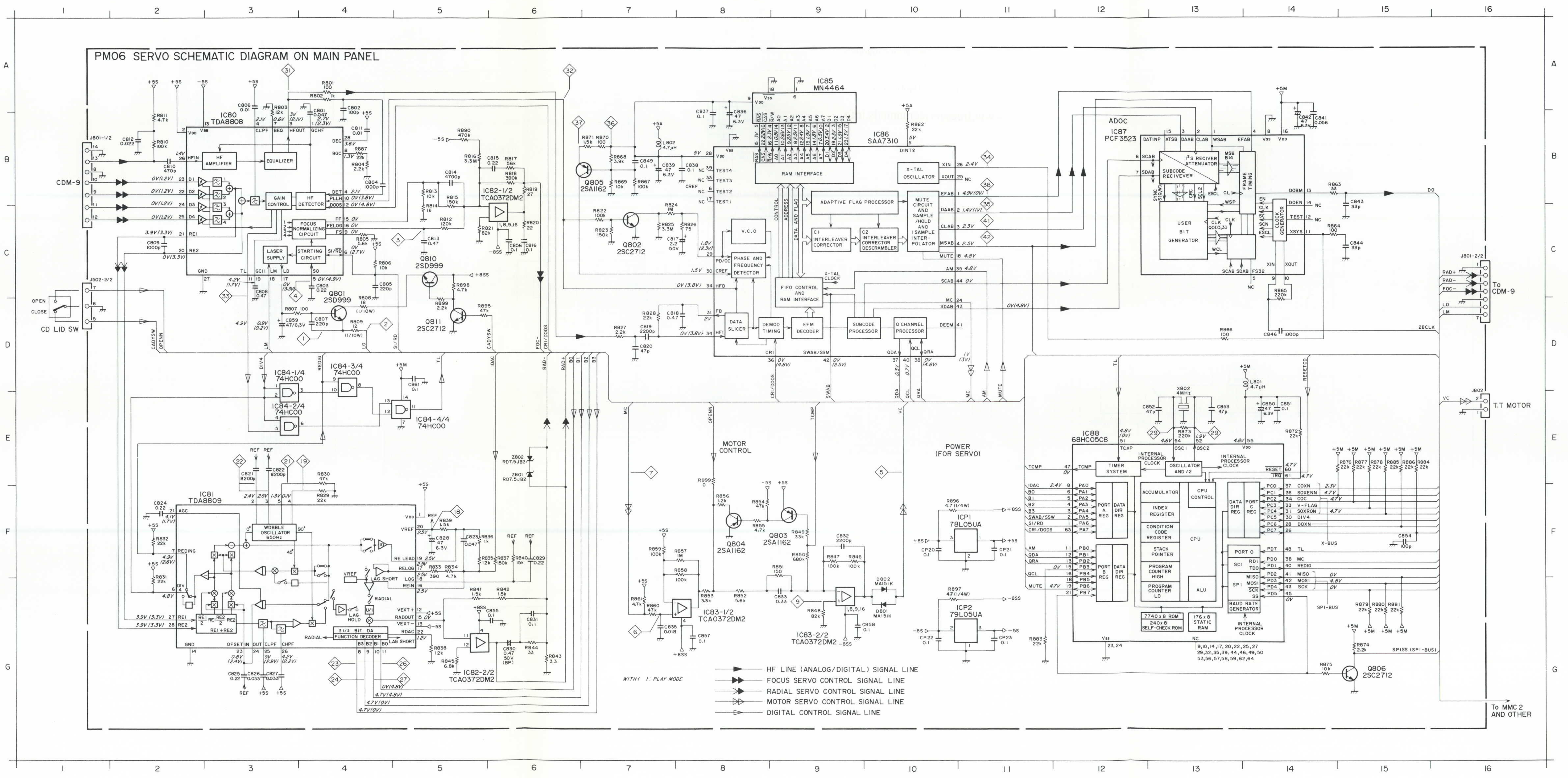
6.4 MAIN Panel
6.4.1 PCB Layout (Top side)

PM06 MAIN PANEL (TOP Side)



C101	B8	C530	H1	C859	B2	J603	E1	R494	B7
C104	D8	C532	H2	C861	D3	J606	E11	R501	G9
C105	F8	C534	H2	C901	G2	J801	B2	R502	G9
C107	F8	C535	H2	C903	F2	J802	B3	R503	G9
C108	F8	C537	G2	C904	F1	J902	I5	R504	G9
C109	F8	C538	H2	C914	G6	J904	I5	R505	G9
C110	F7	C541	H1	C915	G6	JP01	A10	R506	G9
C112	D6	C543	G1	C916	H5	L102	E8	R507	G9
C114	F8	C546	I1	C918	H5	L103	F8	R510	H9
C115	F7	C547	H1	C919	H4	L201	E11	R516	H9
C116	F8	C550	H7	C920	H4	L401	E6	R519	I6
C117	F8	C580	H9	C924	H5	L501	I5	R521	I7
C180	E6	C581	H9	C925	H5	L502	I6	R525	H8
C189	E7	C582	H9	C927	H3	L503	I2	R526	H8
C201	D9	C583	G8	C930	H6	L504	I3	R529	H8
C202	D10	C588	H7	C932	H5	L701	G10	R530	H8
C203	F10	C589	H7	C933	H4	L702	G10	R531	H7
C204	E10	C595	H8	C938	H6	L703	H10	R532	H1
C208	F10	C596	H8	C939	H6	L902	H4	R543	I1
C209	D10	C601	E4	C940	H5	L903	H5	R548	I1
C210	D10	C602	E3	C941	G4	LP03	C11	R581	H7
C211	D10	C620	G6	C981	G3	LP07	C11	R583	I7
C212	B9	C621	G6	C984	E2	Q505	G4	R601	E4
C215	C9	C622	F6	C985	G2	Q513	H2	R602	F2
C216	E11	C623	F7	C988	F4	Q514	H2	R603	F2
C234	E11	C624	F6	C990	G2	Q601	F2	R604	F2
C283	E10	C650	E1	C991	H7	Q602	F3	R605	F2
C285	D8	C702	H12	C992	H11	Q810	C3	R606	F3
C402	A9	C705	H12	CF03	F5	Q811	C3	R607	F3
C405	B8	C708	H12	CF04	F5	QF01	F6	R621	E6
C406	C8	C709	H10	CP01	C11	R101	B7	R716	G11
C409	B7	C710	G10	CP02	B11	R102	B7	R717	G11
C412	B6	C711	G10	CP03	A11	R103	B7	R718	G11
C414	B7	C712	G11	CP08	C11	R104	B7	R719	H11
C417	C4	C713	G11	CP09	C11	R105	B6	R731	G10
C418	C4	C714	G10	CP10	B11	R106	B7	R734	H10
C419	E6	C715	G1	CP11	B11	R107	B7	R736	H10
C420	E6	C722	G11	CP12	A11	R108	B8	R741	H10
C421	E6	C723	G11	CP20	D3	R109	B8	R816	C1
C422	E4	C724	H11	CP22	D2	R111	B7	R821	C1
C423	E4	C725	H11	CP23	D2	R112	B7	R845	C1
C425	E5	C726	G10	CP26	C11	R113	B7	R846	B3
C426	E5	C727	G10	CV91	H6	R114	D8	R847	B3
C431	G7	C728	G10	D201	C9	R115	C8	R860	D3
C432	G6	C731	G10	D401	E5	R116	C8	R861	D3
C433	G7	C732	H10	D801	B3	R119	F8	R862	C4
C434	E4	C734	H10	D802	C3	R120	F8	R865	A6
C435	E4	C737	H10	D901	E1	R121	F8	R890	C1
C449	E9	C740	H11	FP01	B10	R122	E7	R895	C3
C451	G8	C741	G10	FP02	B10	R126	E7	R898	C3
C452	G8	C742	G10	IC01	C8	R128	E7	R899	C3
C453	H7	C784	G10	IC02	F6	R134	E7	R922	H4
C454	G8	C785	G10	IC03	C6	R204	C8	R927	H5
C455	G8	C806	B1	IC04	B5	R220	F8	R946	H5
C456	G8	C808	A2	IC10	E7	R233	B9	R951	G4
C467	G8	C809	B1	IC12	D6	R401	A9	R952	G4
C480	D5	C813	C1	IC14	F9	R402	B9	R953	H4
C482	F8	0817	C1	IC15	F10	R405	A7	R959	H11
C484	G9	C818	A2	IC16	E7	R236	F10	R986	H4
C485	F8	C826	C2	IC21	C9	R406	B7	RF11	F6
C502	H9	C827	C2	IC23	E8	R409	E6	RF15	F5
C503	G9	C828	C2	IC26	E9	R410	E5	RF27	G5
C504	G9	C829	C2	IC27	E10	R411	E5	RF28	G5
C505	G9	C830	D1	IC29	F11	R415	G7	RF29	G5
C506	G9	C832	C3	IC35	F9	R416	G6	RF30	G4
C507	H9	C833	C2	IC36	F8	R417	G7	RV41	H9
C508	H9	C836	B4	IC41	A8	R418	G7	RV51	I2
C510	H9	C839	B3	IC43	A6	R419	G7	SW10	I9
C511	G9	C842	A4	IC46	E5	R420	G7	SWF1	I8
C512	H9	C850	F2	IC53	H9	R421	E4		
C513	H8	C855	D1	IC54	H9	R454	I8	R622	E6
C514	H8	IC60	H1	IC58	H7	R456	G8	R650	E1
C516	H7	IC65	F4	IC92	G3	R460	G5	R651	E1
C517	H7	IC80	B1	IC95	F3	R461	G5	R661	F11
C518	I7	IC81	D2	IC96	G3	R462	G5	R670	E11
C519	I7	IC83	D3	ICF1	F5	R466	G8	R672	E11
C522	H3	IC84	D3	ICP3	C10	R483	G9	R674	D1
C525	H3	IC85	A3	J402	E9	R484	F8	R707	H10
C526	H1	IC87	A5	J404	I11	R490	B8	R708	G11
C527	H1	IC88	E2	J502	G1	R491	B8	R709	G10
		IC91	G4	J503	I6	R493	B7		
				J601	I3				

6.4.2 Servo Schematic Diagram



( ): BOTTOM SIDE PARTS

CP20 F10
(CP21)F11
CP22 G10
CP23 G11
(C801)A4
(C802)A4
(C803)C4
(C804)B4
(C805)C4
C806 A3

(C807)D4
C808 C3
C809 C2
(C810)B2
(C811)B4
(C812)B2
C813 C5
(C814)B5
(C815)B6
(C816)C6

C817 C8
C818 D8
(C819)D7
(C820)D7
(C821)E3
(C822)E3
(C823)F5
(C824)F1
(C825)G3
C826 G3

C827 G3
C828 F5
C829 F6
C830 G6
(C831)G6
C832 F9
C833 G9
(C835)G7
C836 B8
(C837)B8

(C838)B8
C839 B7
(C841)B14
C842 B14
(C843)C15
(C844)C15
(C846)D14
(C849)B7
C850 E14
(C851)E14

(C852)E13
(C853)E13
(C854)F15
C855 G6
(C856)C6
(C857)G8
(C858)G9
C859 D3
C861 D5
D801 G10

D802 G10
(ICP1)F11
(ICP2)G11
IC80 B3
IC81 F3
(IC82)G5
IC83 G8
IC83 G9
IC84 D3
IC84 D4

IC84 E5
IC84 D5
IC85 A9
(IC86)B10
IC87 B12
IC88 E12
J502 C1
J801 B1
J801 C16
J802 E16

(L801)D14
(L802)B7
(Q801)D4
(Q802)C7
(Q803)F9
(Q804)F8
(Q805)B7
Q806 G15
Q810 C5
Q811 D5

(R801)A4
(R802)A4
(R803)A3
(R804)B4
(R805)C4
(R806)C4
(R807)D3
(R808)D4
(R809)D4
(R810)B2

(R811)B2
(R812)C5
(R813)B5
(R814)C5
(R815)B5
R816 B5
(R817)B6
(R818)B6
(R819)B6
(R820)C6

R821 C5
(R822)C7
(R823)C7
(R824)C7
(R825)C7
(R826)C8
(R827)D7
(R828)D7
(R829)F4
(R830)E4

(R831)F2
(R832)F2
(R833)F5
(R834)F5
(R835)F5
(R836)F5
(R837)F6
(R838)G5
(R839)F5
(R840)F6

(R841)G5
(R842)G6
(R843)G6
(R844)G6
R845 G5
R846 F9
R847 F9
(R848)G9
(R849)F9
(R850)F9

(R851)F9
(R852)G8
(R853)G8
(R854)F8
(R855)F8
(R856)F8
(R857)F8
(R858)F8
(R859)F7
R860 G7

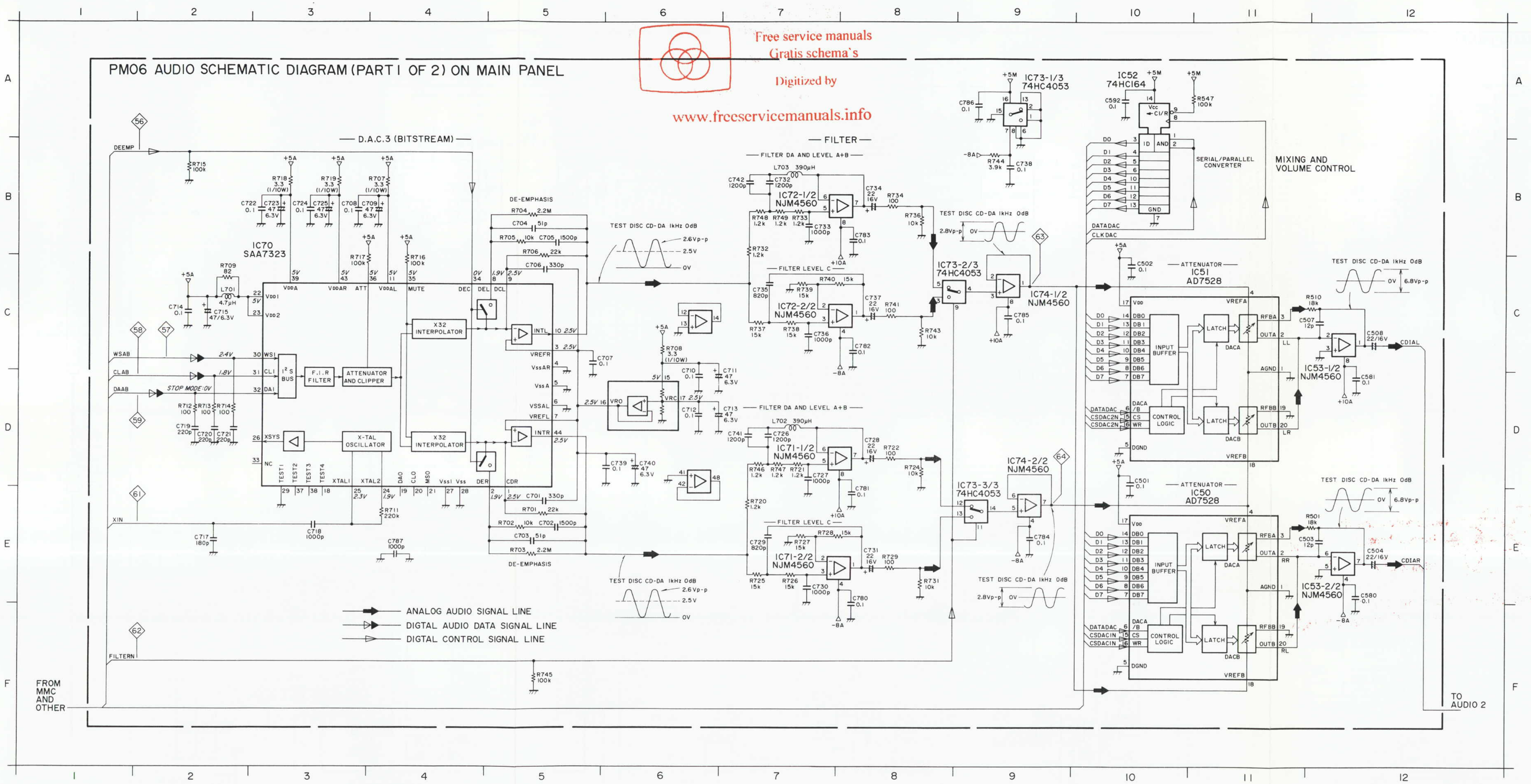
R861 G7
R862 A10
(R863)B14
(R864)C14
R865 C14
(R866)D13
(R867)B7
(R868)B7
(R869)B7
(R870)B7

(R871)B7
(R872)E14
(R873)E13
(R874)G15
(R875)G14
(R876)E15
(R877)E15
(R878)E15
(R879)G15
(R880)G15

(R881)G15
(R883)G11
(R884)E15
(R885)E15
(R886)E15
(R887)B4
R890 B5
R895 D5
(R896)F10
(R897)G10

R898 C5
R899 D5
(R999)E8
(X802)E13
(Z801)E6
(Z802)E6

6.4.3 Audio Schematic Diagram (Part 1)



( ): BOTTOM SIDE PARTS

(C501)D9
C502 C10
C503 E12
C504 E12
C507 C12
C508 C12
C580 E12
C581 D12
(C592)A10
(C701)E5

C702 E5
(C703)E5
(C704)B5
C705 B5
(C706)C5
(C707)C5
C708 B3
C709 B4
C710 D6
C711 D7

C712 D6
C713 D7
C714 C2
C715 C2
(C717)E2
(C718)E3
(C819)D2
(C720)D2
(C721)D2
C722 B3

C723 B3
C724 B3
C725 B3
C726 D7
C727 D7
C728 D8
(C729)E7
(C730)E7
C731 E8
C732 B7

(C733)B7
C734 B8
(C735)C7
(C736)C7
C737 C8
(C738)B9
(C739)D6
C740 D6
C741 D7
C742 B7

(C780)E8
(C781)E8
(C782)C8
(C783)B8
C784 E9
C785 C9
(C786)A9
(C787)E4
IC50 E11
IC51 C11

(IC52)A10
IC53 C12
IC53 E12
(IC70)C3
(IC71)D7
(IC71)E7
(IC72)B7
(IC72)C7
(IC73)A9
(IC73)C8

(IC73)E9
IC74 C9
IC74 D9
L701 C2
L702 D7
L703 B7
R501 E12
R510 C12
(R547)A11
(R701)E5

(R702)E5
(R703)E5
(R704)B5
(R705)B5
(R706)B5
R707 B4
R708 C6
R709 C2
(R711)E4
(R712)D2

(R713)D2
(R714)D2
(R715)B2
R716 C4
R717 C3
R718 B3
R719 B3
(R720)E7
(R721)D7
(R722)D8

(R724)D8
(R725)E7
(R726)E7
(R727)E7
(R728)E7
(R729)E8
R731 E8
(R732)B7
(R733)B7
R734 B8

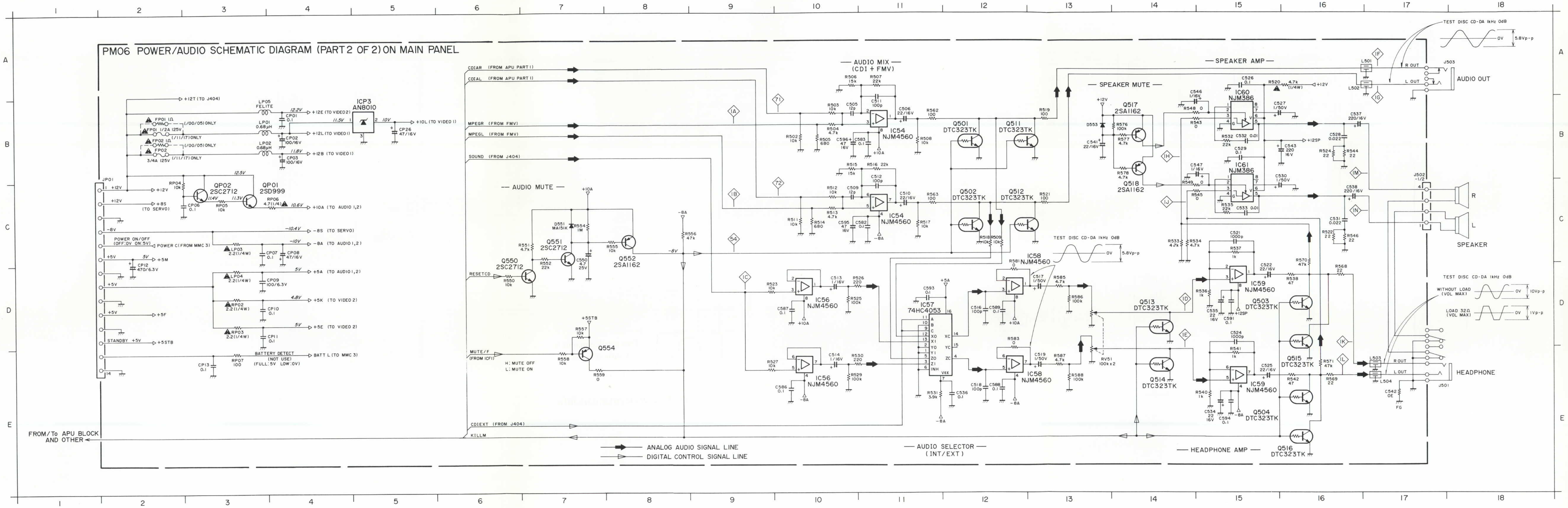
R736 B8
(R737)C7
(R738)C7
(R739)C7
(R740)C7
R741 C8
(R743)C8
(R744)B9
(R745)F5
(R746)D7

(R747)D7
(R748)B7
(R749)B7

6.4.4 Power/Audio Schematic Diagram (Part 2)

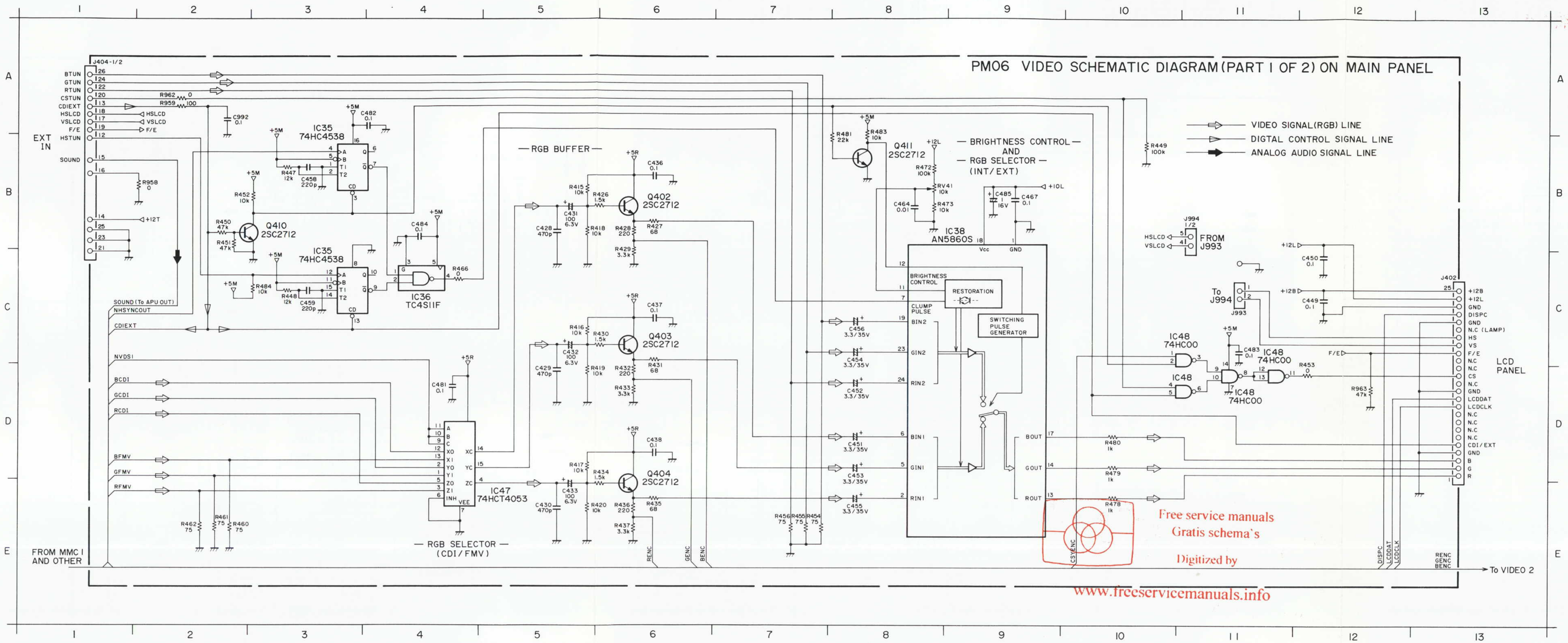
( ): BOTTOM SIDE PARTS

CP01 B4	(CP13)E3	C516 D12	C528 B16	C543 B16	(C591)D15	IC54 B11	IC61 B15	L502 A16	(Q512)C12	(Q554)E7	R503 B10	(R514)C10	(R524)B16	(R535)C15	(R546)C16	(R558)E7	(R578)B14
CP02 B4	CP26 B5	C517 D13	(C529)B15	C546 B14	(C593)D11	IC54 C11	JP01 B2	L503 E17	Q513 D14	RP01 B3	R504 B10	(R515)B10	R525 D10	(R536)D15	R548 B14	(R559)E7	R581 D12
CP03 B4	C505 B10	C518 E12	C530 C15	C547 B15	(C594)E15	(IC56)D10	J501 E17	L504 E17	Q514 E14	(RP02)D3	R505 B10	R516 B11	R526 D10	(R537)C15	(R549)C14	(R562)B11	R583 D12
(CP06)C3	C506 B11	C519 E13	(C531)C16	C550 C7	C595 C10	(IC56)E10	J502 C17	(QP01)C3	(Q515)E16	(RP03)D3	R506 A10	(R517)B11	(R527)E9	(R538)D16	(R550)D6	(R563)C11	(R585)D13
CP07 C3	C509 C10	(C521)C15	C534 E15	C582 C11	C596 B10	IC57 D11	J503 A18	(QP02)C3	(Q516)E16	(RP04)C2	R507 A11	(R518)C12	R529 E10	(R540)E15	(R551)C7	(R568)D16	(R586)D13
CP08 C4	C510 C11	C522 D15	C535 D15	C583 B11	(D551)C7	IC58 D13	(LP01)B3	(Q501)B12	(Q517)B14	(RP05)C3	(R508)B11	R519 B13	R530 E10	(R541)E15	(R552)C7	(R569)E16	(R587)E13
CP09 D3	C511 B11	(C524)D15	(C536)E12	(C586)E10	(D553)B13	IC58 E13	(LP02)B3	(Q502)C12	(Q518)C14	(RP06)C4	(R509)C12	(R520)A15	R531 E11	(R542)E16	(R554)C7	(R570)C16	(R588)E13
CP10 D3	C512 C11	C525 E15	C537 B16	(C587)D10	FP01 B2	(IC59)D15	LP03 C3	(Q503)D15	(Q550)C6	(RP07)E3	(R511)C10	R521 C13	R532 B15	R543 B14	(R555)C8	(R571)E16	
CP11 D3	C513 D10	C526 A15	C538 C16	C588 E12	FP02 B2	(IC59)E15	(LP04)D3	(Q504)E15	(Q551)C7	RV51 E13	(R512)C10	(R522)C16	(R533)C14	(R544)B16	(R556)C8	(R576)B14	
CP12 C2	C514 E10	C527 A15	C541 B13	C589 D12	ICP3 B5	IC60 B15	LP05 B3	(Q511)B12	(Q552)C8	R502 B10	(R513)C10	(R523)D9	(R534)C14	(R545)C14	(R557)D7	(R577)B14	
							L501 B3										



NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲. Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

6.4.5 Video Schematic Diagram (Part 1)



( ): BOTTOM SIDE PARTS

(C428)B5
(C429)D5
(C430)E5
C431 B5
C432 C5
C433 E5
(C436)B6
(C437)C6
(C438)D6
C449 C12

(C450)C12
C451 D8
C452 D8
C453 D8
C454 C8
C455 E8
C456 C8
(C458)B3
(C459)C3
(C464)B8

C467 B9
(C481)D4
C482 A4
(C483)C11
C484 B4
C485 B9
C992 A2
IC35 B3
IC35 C3
IC36 C4

IC38 B9
(IC47)E5
(IC48)C11
J402 C13
J404 A1
(J993)C11
(J994)B11
(Q402)B6
(Q403)C6
(Q404)D6

(Q410)B3
(Q411)B8
RV41 B8
R415 B5
R416 C5
R417 D5
R418 B5
R419 D5
R420 E5
(R426)B5

(R427)B6
(R428)B6
(R429)B6
(R430)C6
(R431)C6
(R432)D6
(R433)D6
(R434)D6
(R435)E6
(R436)E6

(R437)E6
(R447)B3
(R448)C3
(R449)B10
(R450)B2
(R451)B2
(R452)B2
(R453)C12
R454 E7
(R455)E7

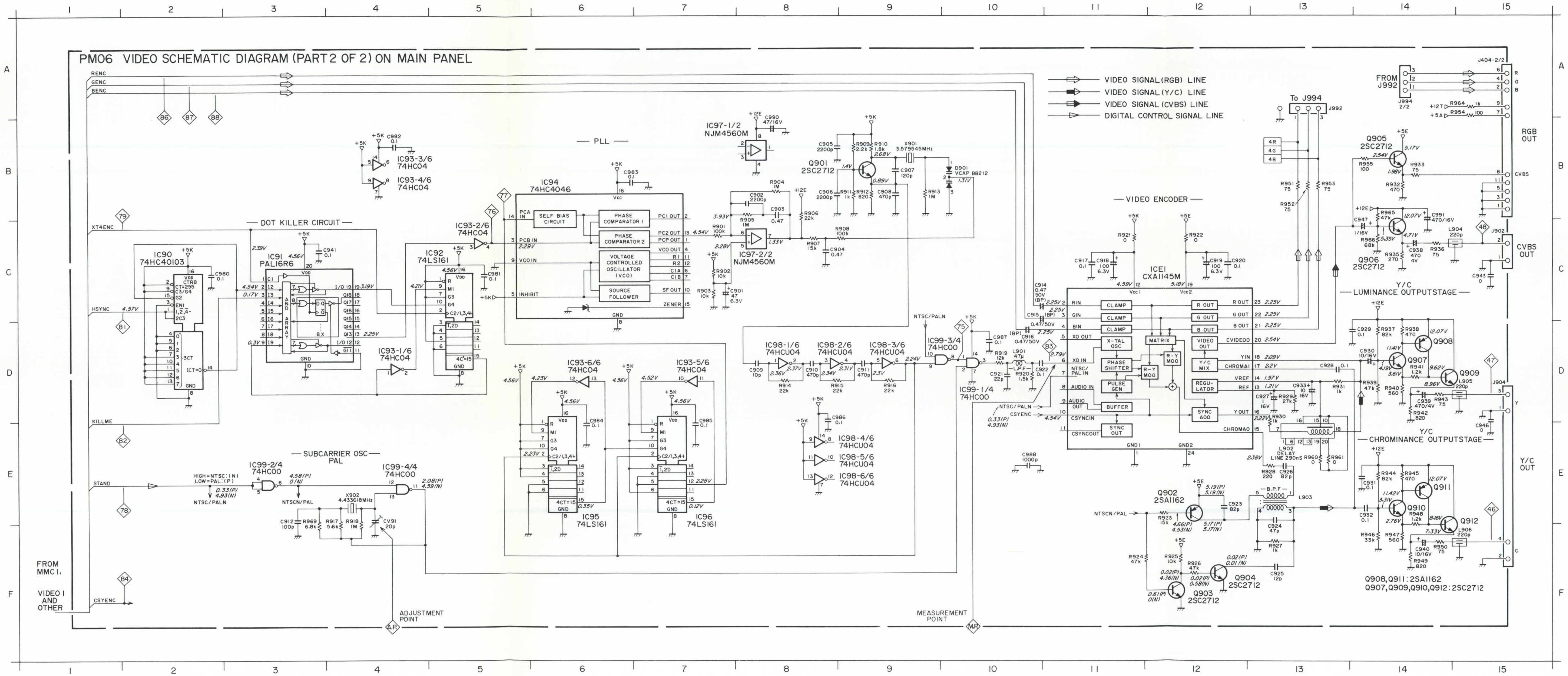
R456 E7
R460 E2
R461 E2
R462 E2
R466 C4
(R472)B8
(R473)B8
(R478)E10
(R479)D10
(R480)D10

(R481)B8
R483 A3
R484 C3
(R958)B2
R959 A2
R962 A2
R963 D12

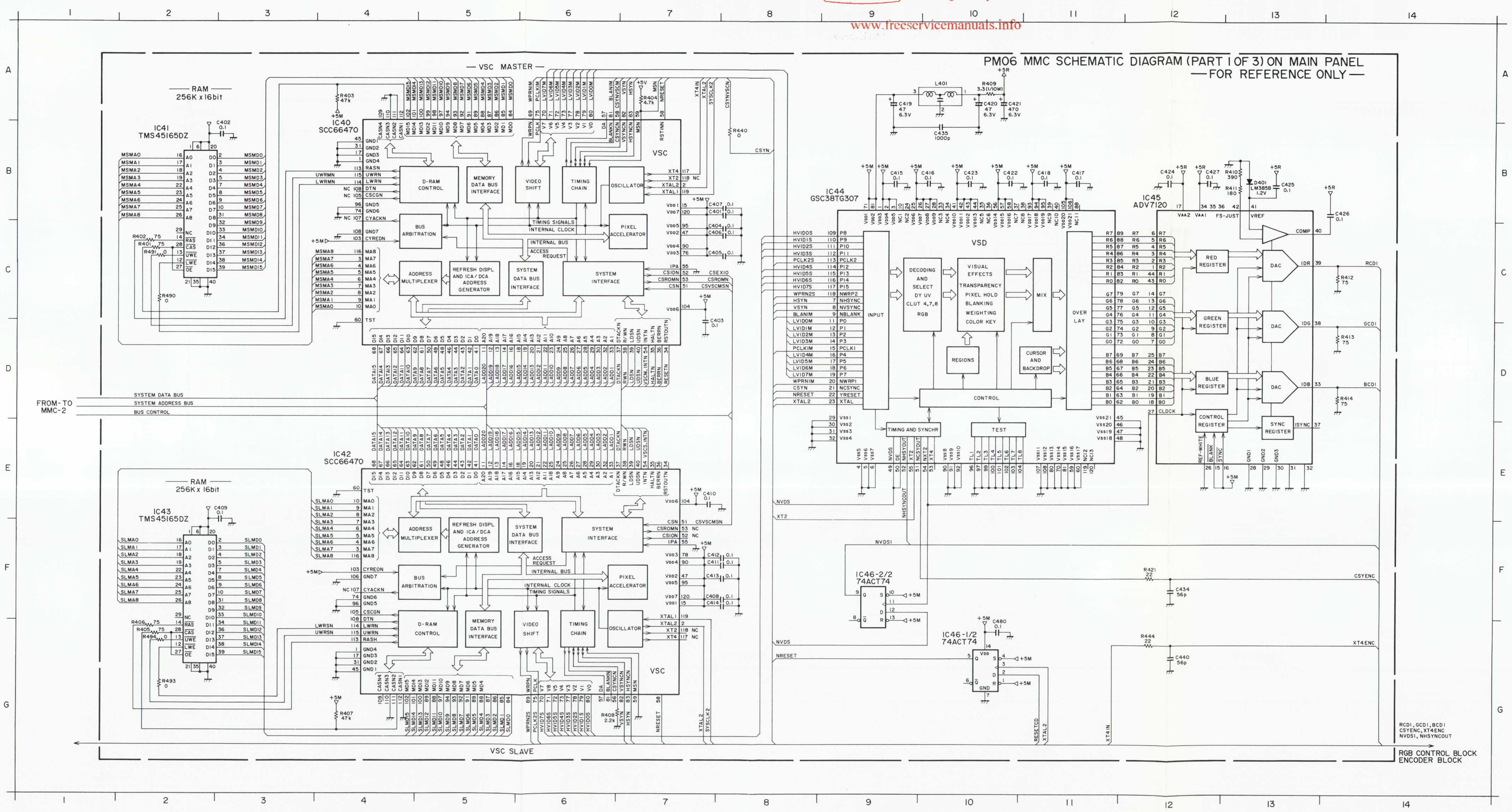
6.4.6 Video Schematic Diagram (Part 2)

( ): BOTTOM SIDE PARTS

CV91 E4	(C910)D8	(C921)D10	(C931)E14	C947 C14	C991 B14	(IC93)D7	(IC99)E3	(L905)C15	(Q908)D14	(R906)B8	(R916)D9	(R926)F12	(R937)D14	(R947)F14	(R961)E13
C901 C7	(C911)D9	(C922)D10	C932 E14	(C980)C2	D901 B10	(IC94)B6	(IC99)E4	(L905)D15	(Q909)D15	(R907)C8	(R917)E4	R927 F13	(R938)D14	(R948)E14	(R964)A15
(C902)B8	(C912)E3	(C923)E12	C933 D13	C981 C5	(ICE1)C12	IC95 E6	J404 A15	(L906)F15	(Q910)E14	(R908)C9	(R918)E4	(R928)E13	(R939)D14	(R949)F14	(R965)B14
C903 B8	C914 C10	C924 E13	C936 C14	(C982)B4	(IC90)C2	IC96 E7	J902 C15	(Q901)B8	(Q911)E14	(R909)B9	(R919)D10	(R929)D13	(R940)D14	(R950)F14	(R966)C14
C904 C8	C915 C10	C925 F13	C938 C14	(C983)B6	IC91 C3	(IC97)B7	J904 D15	(Q902)E12	(Q912)E15	(R910)B9	(R920)D10	(R930)D13	(R941)D14	R951 B13	(R969)E3
(C905)B8	C916 D10	(C926)E13	C939 D14	C984 D6	IC92 C5	(IC97)C8	J992 A13	(Q903)F12	(R901)C7	(R911)B9	(R921)C11	(R931)D13	(R942)D14	R952 B13	X901 B9
(C906)B8	(C917)C11	C927 D13	C940 F14	C985 D7	(IC93)B4	(IC98)D8	J994 A14	(Q904)F12	(R902)C7	(R912)B9	R922 C12	(R932)B14	(R943)D14	R953 B13	X902 E4
(C907)B9	C918 C11	(C928)D13	C941 C3	(C987)D10	(IC93)C5	(IC98)D9	(L901)D10	(Q905)B14	(R903)C7	(R913)B9	(R923)E12	(R933)B14	(R944)E14	(R954)A15	
(C908)B9	C919 C12	(C929)D14	(C943)C15	C988 E10	(IC93)D4	(IC98)E9	L902 E13	(Q906)C14	(R904)B8	(R914)D8	(R924)F11	(R935)C14	(R945)E14	R955 B14	
(C909)D8	C920 C12	C930 D14	(C946)E15	C990 B8	(IC93)D6	(IC99)C10	L903 E13	(Q907)D14	(R905)B8	(R915)D8	(R925)F12	(R936)C14	R946 F14	R960 E13	



6.4.7 MMC Schematic Diagram (Part 1)



( ): BOTTOM SIDE PARTS

(C401)B8
C402 B8
(C403)C7
C404 C8
C405 C8
C406 C8
(C407)B8
(C408)F8
C409 E3
(C410)E7

(C411)F8
C412 F8
(C413)F8
C414 F8
(C415)B9
(C416)B10
C417 B11
C418 B11
C419 A9
C420 A10

C421 A10
C422 B10
C423 B10
(C424)B12
C425 B12
C426 B14
(C427)B12
C434 F12
C435 B10
(C440)G12

C480 G10
D401 B13
(IC40)B4
IC41 B2
(IC42)E4
IC43 F2
(IC44)B9
(IC45)B12
IC46 F9
IC46 G10

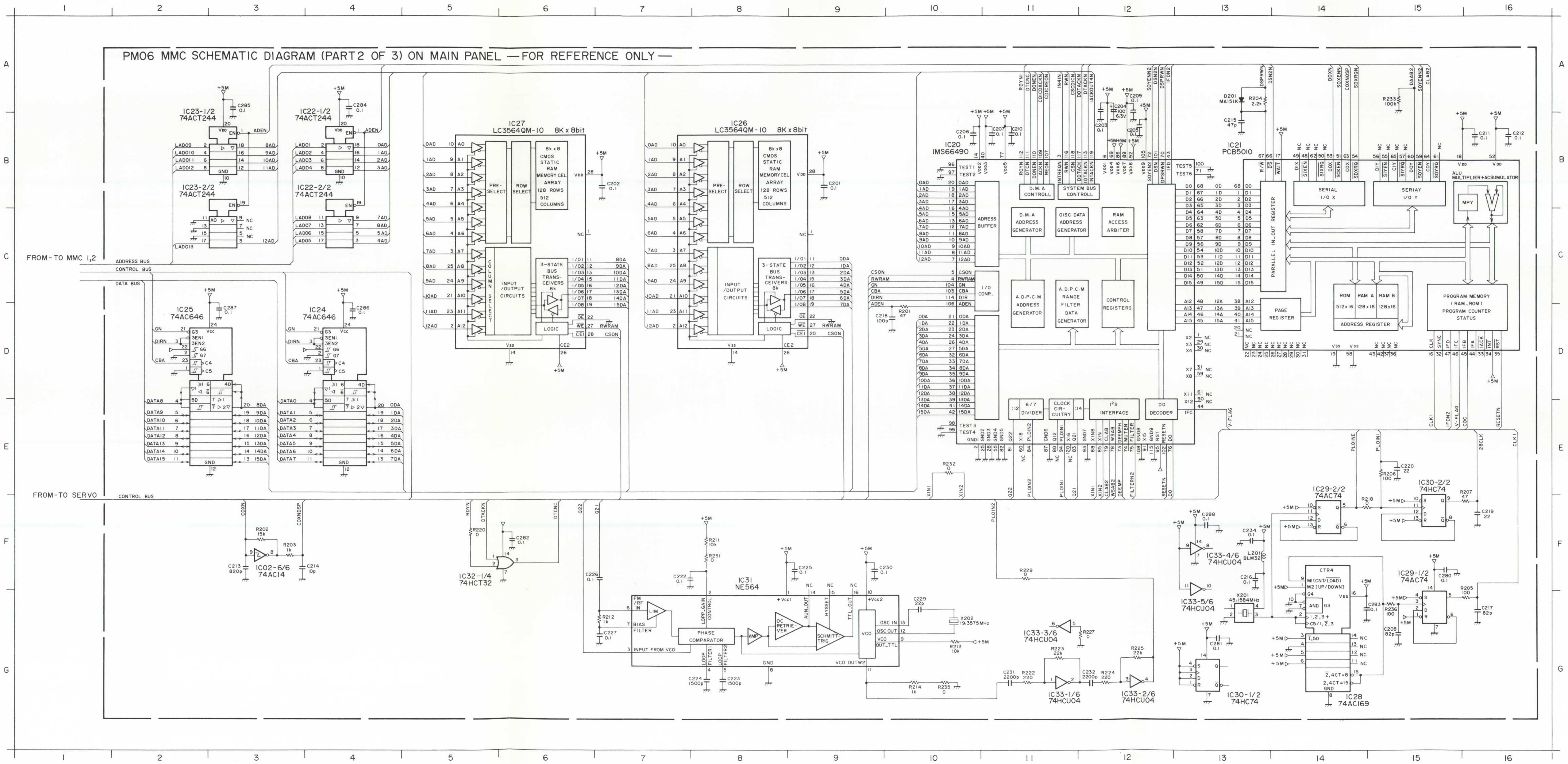
L401 A10
R401 C2
R402 C2
(R403)A4
(R404)A7
R405 G2
R406 G2
(R407)G4
(R408)G6
R409 A10

R410 B13
R411 B13
(R412)C14
(R413)D14
(R414)D14
R421 F12
(R440)B8
(R444)G12
R490 C2
R491 C2

R493 G2
R494 G2

6.4.8 MMC Schematic Diagram (Part 2)

( ): BOTTOM SIDE PARTS

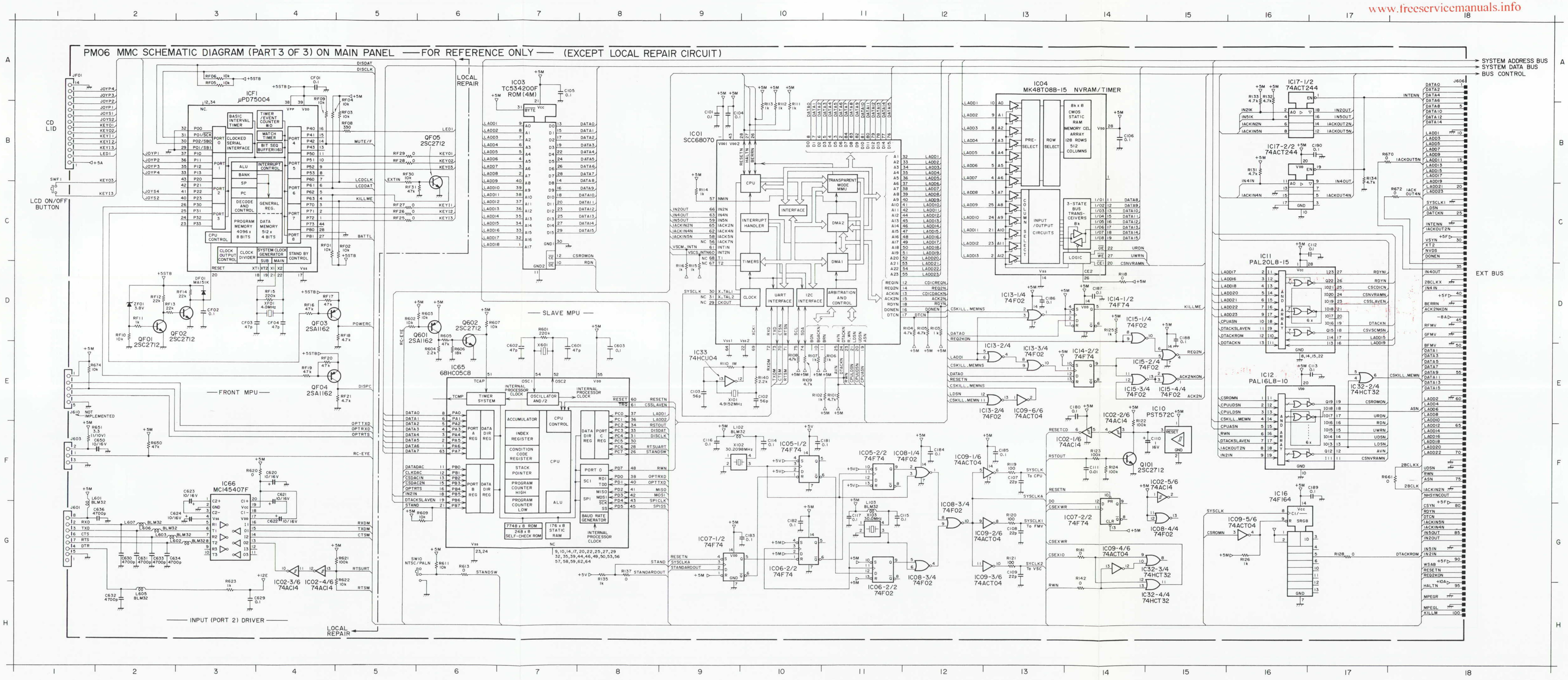


C201	B9
C202	B7
C203	A12
C204	A12
(C205)	B12
(C206)	B10
(C207)	B11
C208	G15
C209	A12
C210	B11
C211	B16
C212	B16
(C213)	F3
(C214)	F4
C215	B13
C216	F13
(C217)	G16
(C218)	D10
(C219)	F16
(C220)	E15
(C222)	F7
(C223)	G8
(C224)	G8
(C225)	F9
(C226)	F7
(C227)	G7
(C229)	G10
(C230)	F9
(C231)	G11
(C232)	G12
C234	F13
(C280)	F15
(C281)	G13
(C282)	F6
C283	G14
C284	A4
C285	A3
(C286)	D4
(C287)	D3
(C288)	F13
D201	A13
IC02	F3
(IC20)	B10
IC21	B13
(IC22)	A4
(IC22)	B4
IC23	A2
IC23	B2
(IC24)	D4
(IC25)	D2
IC26	B8
IC27	B6
(IC28)	G14
IC29	F14
IC29	F15
(IC30)	G13
(IC30)	F15
(IC31)	F8
(IC32)	F5
(IC33)	G13
(IC33)	G12
(IC33)	G13
(IC33)	F13
L201	F13
(R201)	D10
(R202)	F3
(R203)	F3
R204	A13
(R205)	G16
(R206)	E15
(R207)	F16
(R211)	F8
(R212)	G7
(R213)	G10
(R214)	G10
(R218)	F14
R220	F5
(R222)	G11
(R223)	G11
(R224)	G12
(R225)	G12
(R227)	G12
(R229)	F11
(R231)	F8
(R232)	E10
R233	A15
(R235)	G10
R236	G15
X201	G13
(X202)	G10

6.4.9 MMC Schematic Diagram (Part 3)

( ): BOTTOM SIDE PARTS

(CF01)A4	C107 F13	C117 G11	C189 F17	(C629)H4	IC01 B9	(IC06)H11	IC09 G14	IC16 G16	J606 A18	QF01 D2	(RF03)B5	(RF14)D3	(RF25)C5	R101 E11	R111 B10	R122 E14	(R137)G8	R607 D6	R661 F18	X601 E7
(CF02)D3	C108 G13	C180 E14	(C190)B17	(C630)G2	IC02 G4	IC07 G9	IC10 E15	(IC17)A16	J610 E1	QF02 D3	(RF04)B4	RF15 D4	(RF26)C5	R102 E10	R112 B10	(R123)F14	(R140)E10	(R609)G6	R670 B17	(ZF01)D2
CF03 D3	C109 G13	(C181)F11	C601 E7	(C631)G2	IC02 E4	IC07 G14	IC11 C16	(IC17)B16	L102 F2	QF03 D4	(RF05)A3	(RF16)D4	RF27 C5	R103 D12	R113 B10	(R124)F14	(R141)G14	(R611)G6	R672 C18	
CF04 D4	C110 F15	(C182)G10	C602 E7	(C632)H2	IC02 F2	IC08 F12	IC12 E16	(IC32)H15	L103 G11	QF04 E4	(RF06)A3	(RF17)D4	RF28 B5	R104 D12	R114 C9	(R125)D14	(R142)G14	(R613)G6	R674 E1	
C101 B9	(C111)F14	(C183)G10	(C603)E8	(C633)G2	IC02 F15	IC08 G12	(IC13)E13	(IC32)G15	(L601)G1	QF05 B6	(RF08)B5	(RF18)D5	RF29 B5	R105 D12	R115 D9	R126 G16	R601 D7	(R620)F3	SWF1 B1	
(C102)E10	C112 C17	(C184)F12	C620 F4	(C634)G2	IC03 A7	IC08 G15	(IC13)D13	(IC32)E17	(L602)G3	(Q101)F14	(RF09)B4	(RF19)E4	RF30 B5	R106 E11	R116 D9	R128 G17	R602 D5	R621 G5	SW10 G6	
(C103)E9	(C113)E17	(C185)F13	C621 F4	(C636)G2	IC04 A13	IC09 F12	IC14 E14	(IC33)E9	(L603)G2	Q601 D6	(RF10)D2	(RF20)E4	RF31 C5	R107 F10	(R118)D14	(R131)B16	R603 D6	R622 G5	XF01 D4	
C104 B9	C114 F10	(C186)D13	C622 G4	C650 F2	(IC05)F10	IC09 G16	IC15 D14	IC65 E6	(L605)H2	Q602 D6	RF11 D2	(RF21)E5		R108 E10	R119 F13	(R132)A16	R604 F6	(R623)H3	(X101)E9	
C105 A7	C115 G11	C187 D14	C623 F3	DF01 D3	(IC05)F11	IC09 G13	IC15 E14	(IC66)F3	(L606)G2	(RF01)C4	(RF12)D2			R109 E10	R120 G13	(R133)A16	R605 D6	R650 F2	X102 F9	
(C106)B14	C116 F9	(C188)D15	C624 F3	ICF1 A3	(IC06)G10	IC09 E13	IC15 E15	JF01 A1	(L607)G2	(RF02)C5	(RF13)D2			(R110)E9	R121 G13	R134 B17	R606 E6	R651 F1	X103 G11	
																(R135)G8				



C102	D4
C103	C4
C106	B9
C111	F7
C113	D7
C181	E6
C182	F6
C183	E5
C184	F5
C185	F4
C186	F3
C188	F3
C190	D5
C205	E2
C206	F3
C207	E4
C213	F6
C214	E6
C217	F3
C218	E2
C219	F3
C220	F3
C222	D6
C223	D6
C224	D5
C225	D5
C226	D6
C227	D6
C229	D5
C230	D6
C231	D4
C232	D5
C280	F2
C281	F2
C282	E4
C284	D5
C286	C4
C287	C3
C288	C4
C401	A4
C403	A4
C407	B3
C408	A6
C410	A6
C411	A7
C413	C6
C415	D7
C416	E7
C424	F7
C427	E8
C428	G5
C429	G6
C430	G6
C436	G6
C437	G7
C438	G6
C440	A4
C450	F3
C458	F4
C459	F4
C464	I4
C481	G7
C483	F4
C501	G3
C515	I8
C521	H10
C524	H11
C528	G11
C529	H12
C531	H11
C533	H11
C536	H6
C542	I10
C586	H5
C587	H5
C591	H10
C592	G4
C593	H5
C594	H11
C603	E9
C629	H9
C630	I9
C631	I9
C632	I9
C633	I9
C634	I9
C636	I9
C701	H2
C703	H2
C704	H2
C706	H2
C707	H2
C717	G2
C718	G2
C719	G2
C720	G2
C721	G2
C729	G3
C730	G2
C733	H3
C735	H3
C736	H3
C739	H2
C780	G3
C781	G3
C782	H3
C783	H3

C787	G2
C801	A12
C802	B12
C803	B11
C804	B12
C805	B12
C807	B11
C810	B11
C811	A11
C812	A11
C814	C11
C815	C12
C816	C11
C819	B10
C820	B11
C821	C10
C822	C10
C823	C10
C824	D10
C825	C11
C831	D12
C835	D10
C837	B9
C838	B9
C841	A8
C843	A8
C844	A8
C846	A7
C849	A9
C851	E11
C852	E11
C853	E11
C854	E10
C856	D11
C857	C10
C858	D9
C902	G11
C905	F12
C906	F12
C907	F12
C908	E12
C909	G8
C910	G9
C911	G9
C912	H7
C917	H8
C921	H8
C922	H8
C923	H8
C926	H8
C928	H8
C929	H7
C931	H7
C943	I7
C946	I9
C980	G9
C982	F10
C983	G10
C987	G7
C988	G8
CF01	F9
CF02	F8
CP06	C1
CP13	C3
CP21	D10
D551	H5
D553	H12
DF01	F8
IC05	F6
IC06	F6
IC07	F5
IC08	F5
IC09	F5
IC13	F3
IC17	E5
IC20	E3
IC22	E5
IC24	D3
IC25	D3
IC28	E2
IC30	F2
IC31	D5
IC32	F5
IC33	C5
IC38	G5
IC40	B4
IC47	G8
IC48	F4
IC50	G4
IC51	H4
IC51	H4
IC52	G4
IC56	H5
IC57	H6
IC59	H11
IC61	H11
IC66	G6
IC70	G2
IC71	G3
IC72	G3
IC73	G3
IC82	D12
IC86	B9
IC90	G9
IC93	F10
IC94	G10
IC97	G11
IC98	G9
IC99	G8
ICE1	H8
ICP1	D10
ICP2	D11

J992	G9
J993	D4
J994	F3
L601	H9
L602	H9
L603	H9
L605	H9
L606	H9
L607	H9
L801	F11
L802	B9
L901	H8
L904	I6
L905	I8
L906	I8
LP01	B2
LP02	B2
LP04	C2
LP05	C2
Q101	F6
Q402	G5
Q403	G6
Q404	G6
Q410	G4
Q411	G4
Q501	G4
Q502	H4
Q503	H10
Q504	H10
Q511	H4
Q512	H4
Q515	H10
Q516	H10
Q517	I12
Q518	H12
Q550	H5
Q551	H5
Q552	H5
Q554	H5
Q801	B11
Q802	B11
Q803	C10
Q804	B10
Q805	A9
Q806	F10
Q901	E12
Q902	H8
Q903	H8
Q904	H8
Q905	H6
Q906	H6
Q907	H7
Q908	H7
Q909	I7
Q910	H8
Q911	H7
Q912	I7
QF02	F8
QF03	F8
QF04	F8
QP01	C2
QP02	C2
R110	C4
R118	B8
R123	F7
R124	F7
R125	F3
R131	F6
R132	E6
R133	E6
R135	F9
R137	F9
R140	D4
R141	E5
R142	F4
R201	E2
R202	F6
R203	E6
R205	F3
R206	F3
R207	F3
R211	D5
R212	D6
R213	D5
R214	D5
R218	F2
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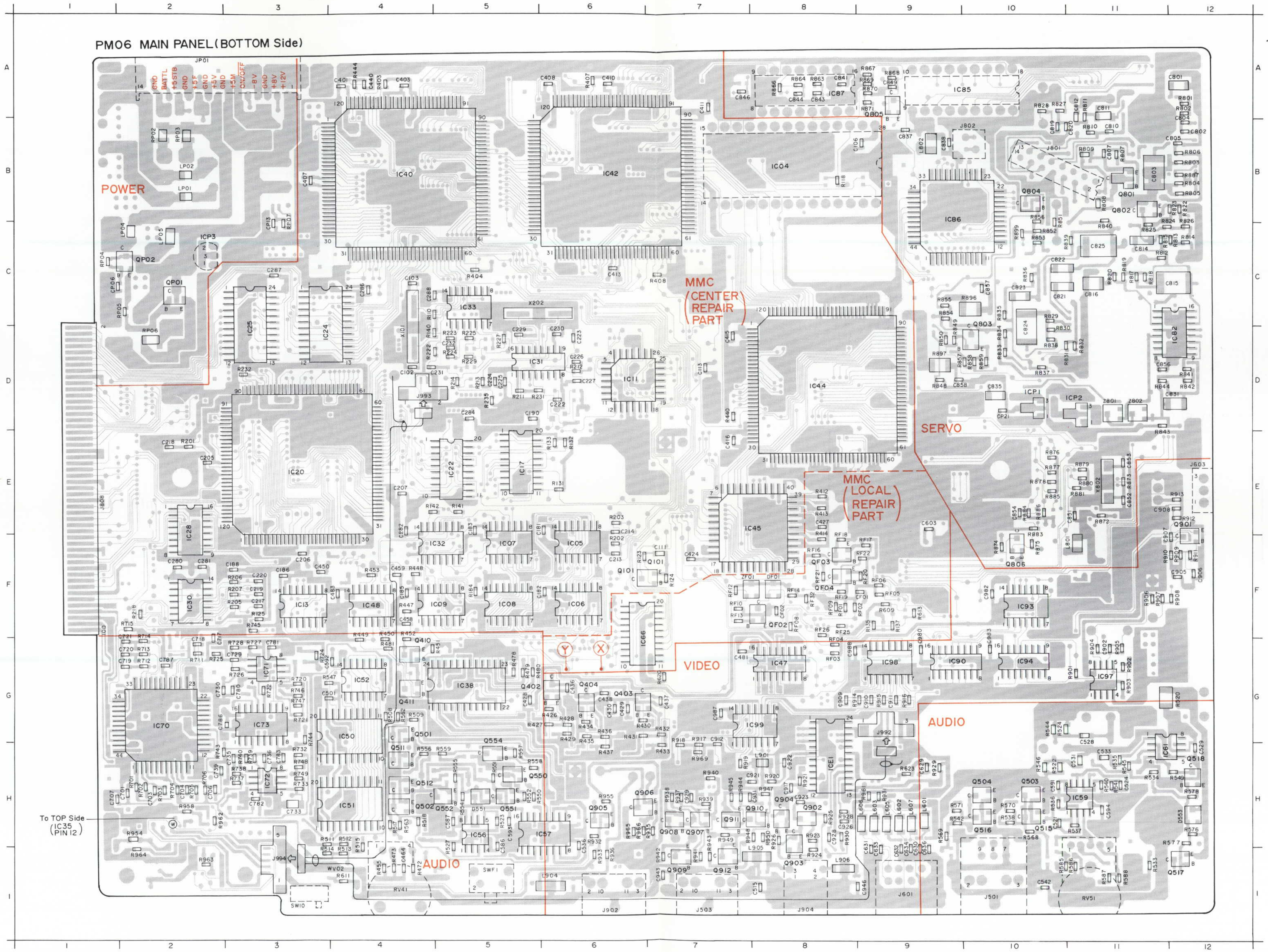
R229	D5
R231	D5
R232	D3
R235	D5
R403	A4
R404	C5
R407	A6
R408	C7
R412	E8
R413	E8
R414	E8
R426	G6
R427	G5
R428	G6
R429	G6
R430	G6
R431	G6

R432	G7
R433	H7
R434	G6
R435	G6
R436	G6
R437	H6
R440	D7
R444	A4
R447	F4
R448	F4
R449	F4
R450	F4
R451	G5
R452	F4
R453	F4
R455	I4
R472	I4
R473	I4
R478	G5
R479	G5
R480	G5
R481	G4
R508	G4
R509	G4
R511	H3
R513	I4
R514	I3
R515	I4
R517	H4
R518	H4
R520	G12
R522	G10
R523	H5
R524	G10
R527	I5
R533	I11
R534	H11
R535	H11
R536	H10
R537	H11
R538	H10
R540	H11
R541	H11
R542	H9
R544	G10
R545	H11
R546	H10
R547	G3
R549	H12
R550	H5
R551	H5
R552	H5
R554	H5
R555	H5
R556	H4
R557	H5
R228	H5
R559	H4
R562	G4
R563	H4
R568	H10
R569	H9
R570	H10
R571	H9
R576	H12
R577	H12
R578	H12
R585	I11
R586	I11
R587	I11
R588	I11
R609	F9
R611	I4
R613	F9
R620	G7
R623	H9
R701	H2
R702	H2
R703	H2
R704	H2
R705	H2
R706	H2
R711	G2
R712	G2
R713	G2
R714	G2
R715	G2
R720	G3
R721	G3
R722	G3
R724	G3
R725	G2
R726	G3
R727	G3
R728	G3
R732	H3
R733	H3
R737	H3
R738	H3
R739	H3
R740	H3
R743	H2
R744	G3
R745	F3
R746	G3
R747	G3
R748	H3
R749	H3

R801	A12
R802	A12
R803	B12
R804	B12
R805	B12
R806	B12
R807	B11
R808	B11
R809	B11
R810	B11
R811	A11
R812	C11
R813	C12
R814	C12
R815	C11
R817	C11
R818	C11
R819	C11
R820	C11
R822	B12
R823	B12
R824	B12
R825	C11
R826	B12
R827	A10
R828	A10
R829	C10
R830	D10
R831	D11
R832	D11
R833	D10
R834	D10
R835	C10
R836	C10
R837	D10
R838	D10
R839	C11
R840	C11
R841	D12
R842	D12
R843	D11
R844	D11
R848	D9
R849	D9
R850	D9
R851	B10
R852	C10
R853	C10
R854	C9
R855	C9
R856	B10
R857	D9
R858	D10
R859	D10
R863	A8
R864	A8
R866	A8
R867	A9
R868	A9
R869	A9
R876	A9
R871	A9
R872	E11
R873	E11
R874	F10
R875	F10
R876	E10
R877	E10
R878	E10
R879	E11
R880	E11
R881	E11
R883	E10
R884	E10
R885	E10
R886	E10
R887	B12
R896	C10
R897	D9
R899	C10
R901	G11
R902	G11
R903	G11
R904	G11
R905	G11
R906	F11
R907	F11
R908	F12
R909	F12
R910	F11
R911	F12
R913	E12
R914	G9
R915	G9
R917	G7
R918	G7
R919	H7
R920	H8
R921	H8
R923	H8
R925	H8
R926	H8
R928	H8
R929	H9
R930	H8
R931	H9
R932	H6
R933	I6
R936	I6
R937	H7

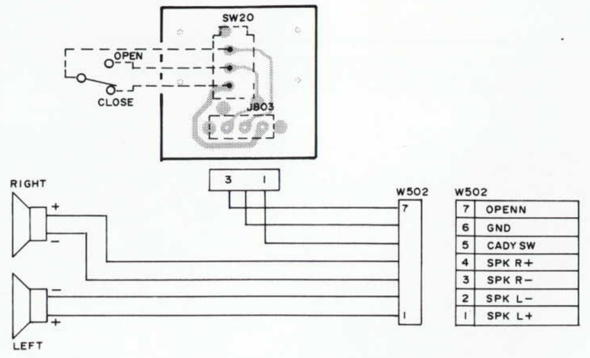
R938	H7
R939	H7
R940	H7
R941	I7
R942	I7
R943	I7
R944	H7
R945	H7
R947	H8
R948	H8
R949	H7
R950	H8
R954	H2
R955	H6
R958	H2
R961	H9
R962	H2
R963	I2
R964	I2
R965	H6
R966	H6
R969	H7
RF01	F8
RF02	F9
RF03	F8
RF04	G8
RF05	F9
RF06	F9
RF08	F8
RF09	F8
RF10	F7
RF12	F7
RF13	F7
RF14	F8
RF16	F8
RF17	F9
RF18	E9
RF19	F8
RF20	F9
RF22	F9
RF25	F8
RF26	F8
RP02	B2
RP03	B2
RP04	C1
RP05	C2
RP06	D2
RP07	C3
Z801	D11
Z802	D11
ZF01	F7
X101	D4
X202	C5
X802	E11

6.4.10 PCB Layout (Bottom side)



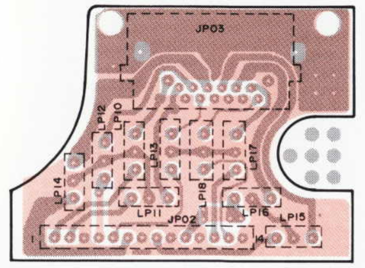
6.5 Other Panel (PS06,PP06,PI06,CD Lid)

CD LID SW PANEL(PS06)



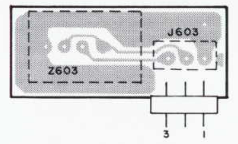
	W502
7	OPENN
6	GND
5	CADY SW
4	SPK R+
3	SPK R−
2	SPK L−
1	SPK L+

POWER CONNECT PANEL(PP06)



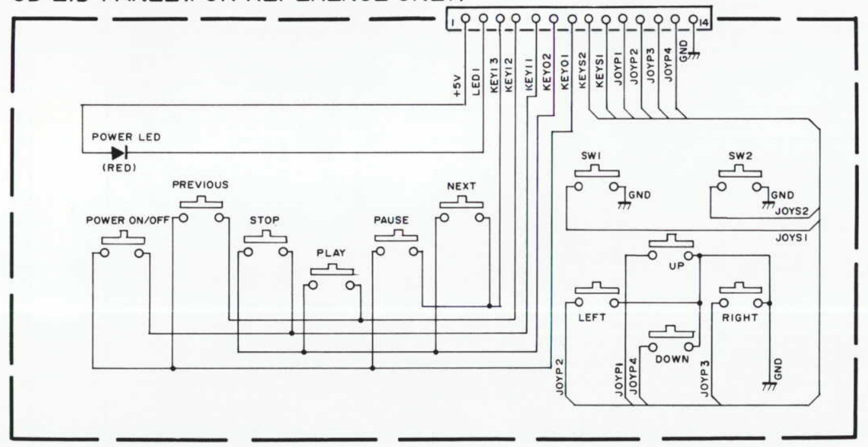
	JP02
14	GND
13	BATTL
12	+5 STB
11	GND
10	+5 F
9	GND
8	+5AKE
7	GND
6	+5M
5	POWERC
4	−8V
3	GND
2	+8V
1	+12V

REMOTE IR PANEL(PI06)



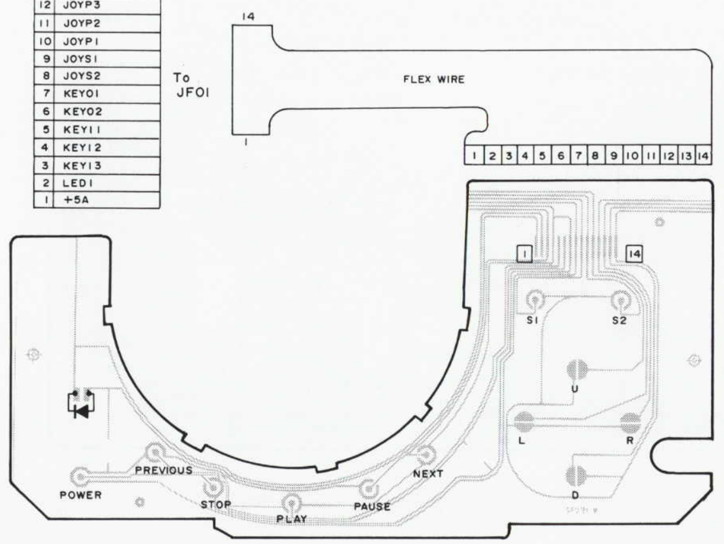
	J603
1	GND
2	+5V
3	IR IN

CD LID PANEL(FOR REFERENCE ONLY)



14	GND
13	JOYP4
12	JOYP3
11	JOYP2
10	JOYP1
9	JOYS1
8	JOYS2
7	KEY01
6	KEY02
5	KEY11
4	KEY12
3	KEY13
2	LED1
1	+5A

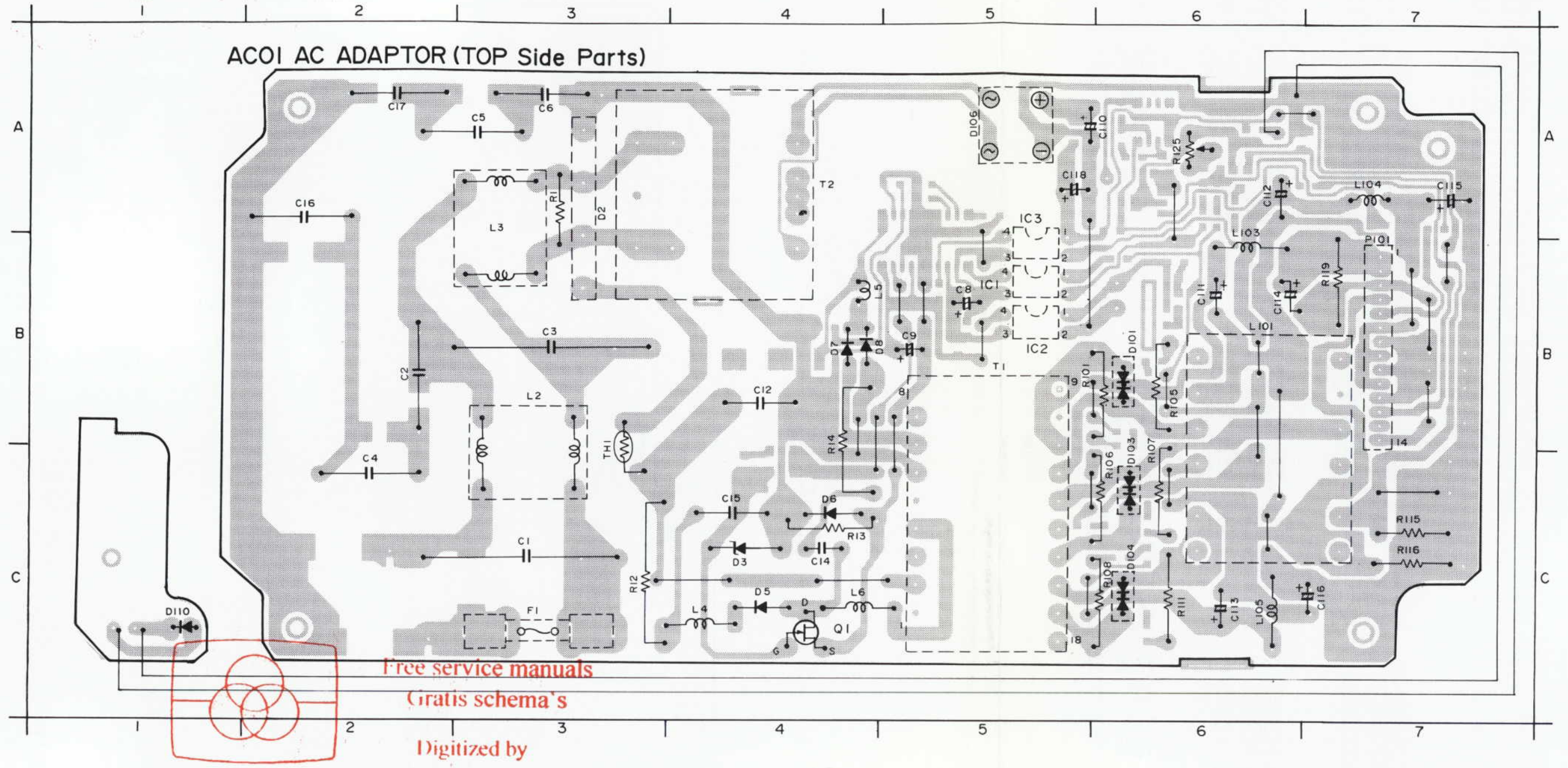
To JF01



6.6 Power Supply Unit

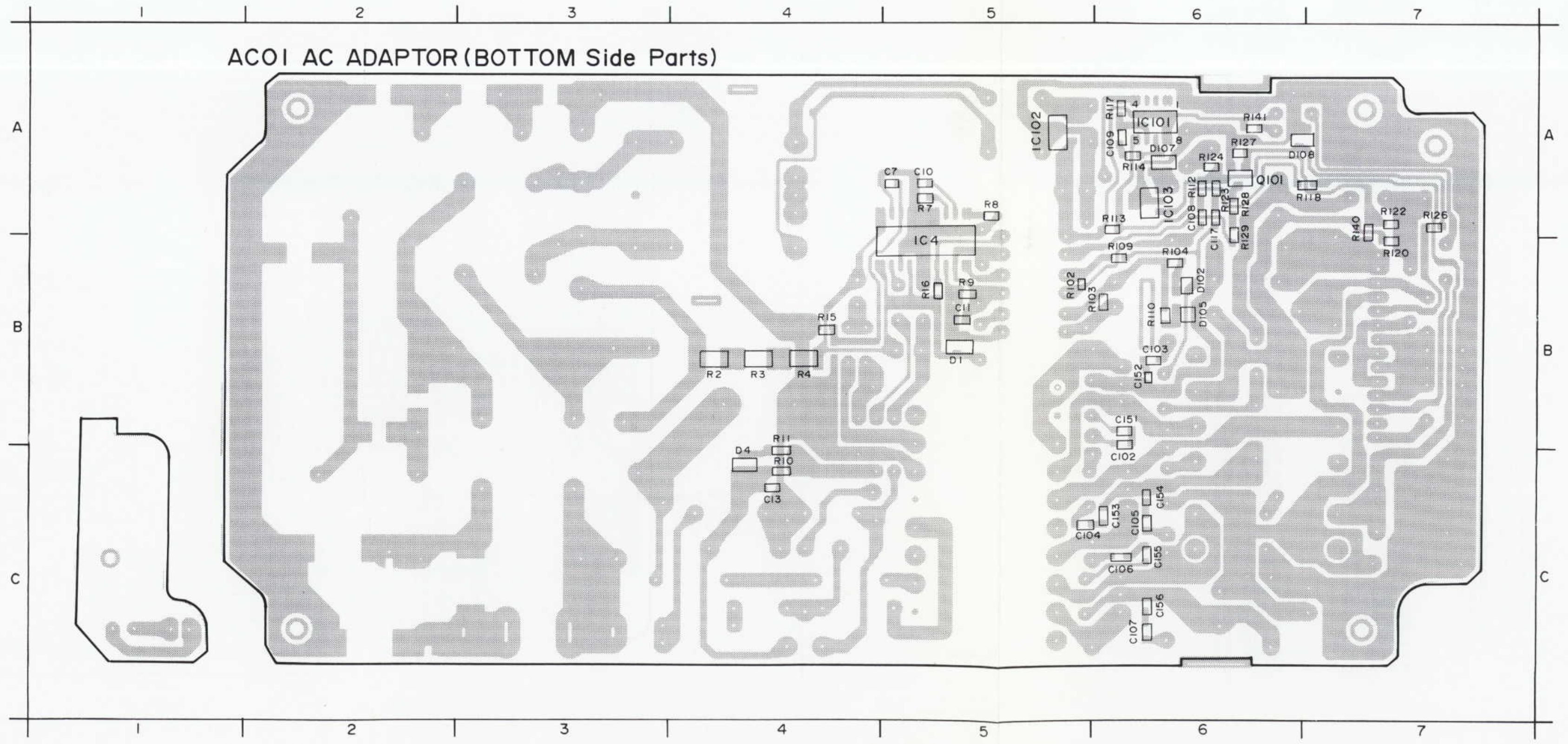
6.6.1 PCB Layout

ACO1 AC ADAPTOR (TOP Side Parts)



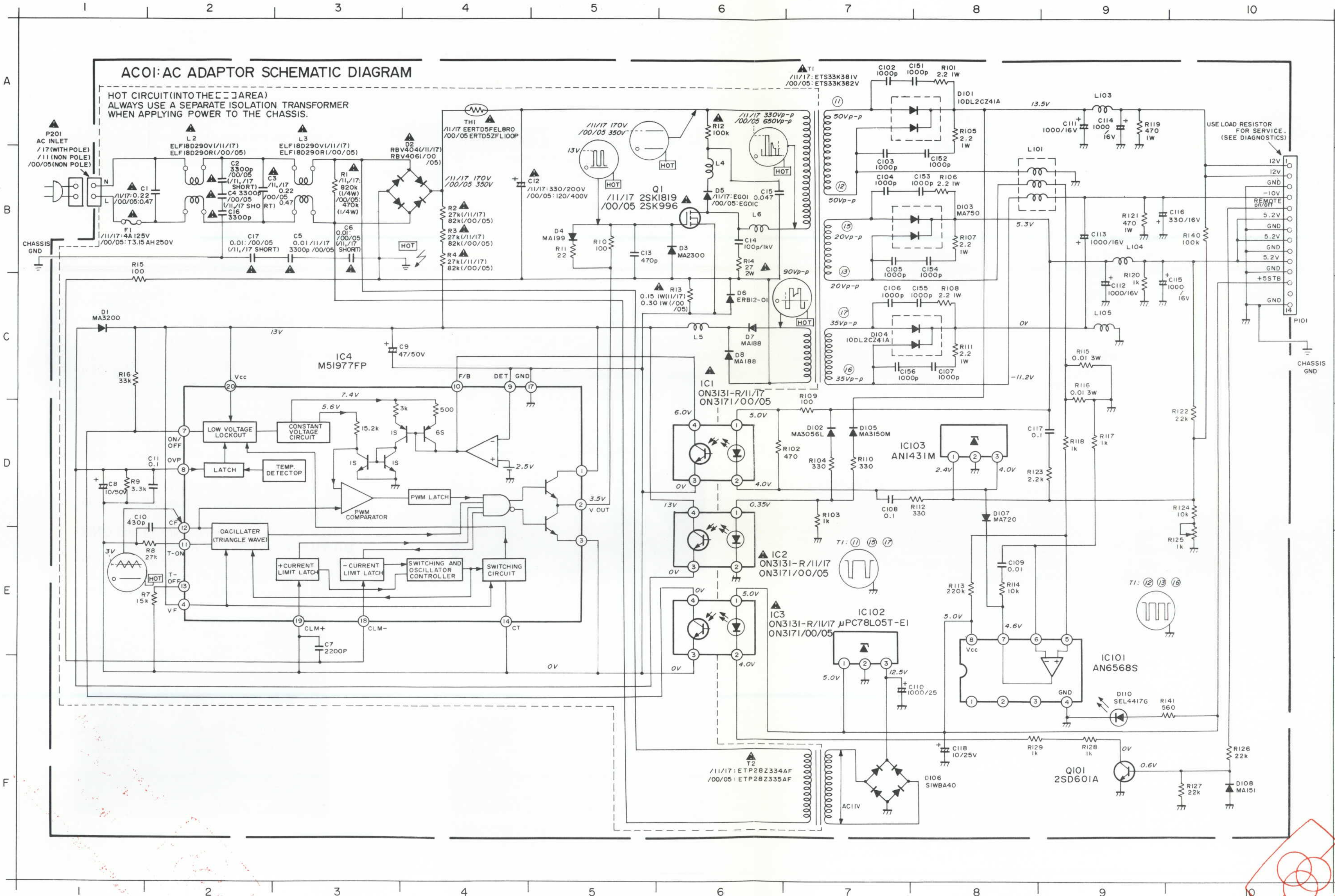
C1	C3	C15	C4	C118	A5	D106	A5	L6	C4	R101	B6
C2	B2	C16	A2	D2	A3	D111	C1	L101	B6	R105	B6
C3	B3	C17	A2	D3	C4	F1	C3	L103	B6	R106	C6
C4	C2	C110	A5	D5	C4	IC1	B5	L104	A7	R107	C6
C5	A3	C111	B6	D6	C4	IC2	B5	L105	C6	R108	C6
C6	A3	C112	A6	D7	B4	IC3	A5	P101	B7	R111	C6
C8	B5	C113	C6	D8	B4	L2	B3	Q1	C4	R115	C7
C9	B5	C114	B6	D101	B6	L3	A3	R1	A3	R116	C7
C12	B4	C115	A7	D103	C6	L4	C4	R12	C3	R119	B7
C14	C4	C116	C7	D104	C6	L5	B4	R13	C4	R125	A6
								R14	B4	T1	B5
										T2	A4
										TH1	C3

ACO1 AC ADAPTOR (BOTTOM Side Parts)



C7	A5	C108	A6	D4	C4	R2	B4	R104	B6	R123	A6
C10	A5	C109	A6	D102	B6	R3	B4	R109	B6	R124	A6
C11	B5	C117	A6	D105	B6	R4	B4	R110	B6	R126	A7
C13	C4	C151	B6	D107	A6	R7	A5	R112	A6	R127	A6
C102	C6	C152	C6	D108	A6	R8	A5	R113	A6	R128	A6
C103	B6	C153	C6	IC4	B5	R9	B5	R114	A6	R129	B6
C104	C5	C154	C6	IC101	A6	R10	C4	R117	A6	R140	A7
C105	C6	C155	C6	IC102	A5	R11	B4	R118	A7	R141	A6
C106	C6	C156	C6	IC103	A6	R15	B4	R120	B7		
C107	C6	D1	B5	Q101	A6	R16	B5	R122	A7		
						R102	B5				
						R103	B6				

6.6.2 Schematic Diagram



( ): BOTTOM SIDE PARTS

C1	B2
C2	B2
C3	B2
C4	B2
C5	B3
C6	B3
(C7)	E3
C8	D1
C9	C3
(C10)	E2
(C11)	D2
C12	B4
(C13)	B5
C14	B6
C15	B6
C16	B2
C17	B2
(C102)	A7
(C103)	B7
(C104)	B7
(C105)	B7
(C106)	C7
(C107)	C8
(C108)	D7
(C109)	E8
C110	F7
C111	A9
C112	C9
C113	B9
C114	A9
C115	C9
C116	B9
(C117)	D9
C118	F8
(C151)	A8
C152	B8
C153	B8
C154	B8
(C155)	C8
(C156)	C7
(D1)	C1
D2	B4
D3	B6
(D4)	B5
D5	B6
D6	C6
D7	C6
D8	C6
D101	A8
(D102)	D7
D103	B8
D104	C8
(D105)	D7
D106	F7
(D107)	D8
(D108)	F10
D110	F9
F1	B1
IC1	C6
IC2	E6
IC3	E6
(IC4)	C3
(IC101)	F9
(IC102)	E7
IC103	D8
L2	B2
L3	B3
L4	B6
L5	C6
L6	B6
L101	B8
L103	A9
L104	B9
L105	C9
P101	C10
P201	A1
Q1	B6
(Q101)	F9
R1	B3
(R2)	B4
(R3)	B4
(R4)	B4
(R7)	E2
(R8)	E2
(R9)	D1
(R10)	B5
(R11)	B5
R12	A6
R13	C6
R14	B6
(R15)	C1
(R16)	C1
R101	A8
(R102)	D6
R103	D7
(R104)	D7
R105	A8
R106	B8
R107	B8
R108	C8
(R109)	D7
(R110)	D7
R111	C8
(R112)	D8
(R113)	E8
(R114)	E8
R115	C9
R116	C9
(R117)	D9
(R118)	D9
R119	A9
(R120)	C9
R121	B9
(R122)	D10
(R123)	D9
(R124)	D10
R125	E10
(R126)	F10
(R127)	F10
(R128)	F9
(R129)	F8
(R140)	B10
(R141)	F10
T1	A7
T2	F7
TH1	A4

/11/17 Model

CAUTION: FOR CONTIUED PROTECTION AGAINST FIRE HAZARD. REPLACE ONLY WITH THE SAME TYPE 4A 125V FUSE.

ATTENTION: POUR UNE PROTECTION CONTINUE LES AISQUES D'INCEIE N'UTILJSER QUE DES FUSIBLE DE MÉME TYPE 4A 125V

4A 125V

/00/05 Model

CAUTION: FOR CONTIUED PROTECTION AGAINST FIRE HAZARD. REPLACE ONLY WITH THE SAME TYPE T3.15AH 250VFUSE.

ATTENTION: POUR UNE PROTECTION CONTINUE LES AISQUES D'INCEIE N'UTILJSER QUE DES FUSIBLE DE MÉME TYPE T3.15AH 250V

NOTE ON SAFETY :

Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

7 DIAGNOSTICS

7.1 Troubleshooting and repair

General Sequence:

1. Power ON/OFF (controled by Front CPU, ICF1)
   (1) ICF1 power voltage (+5STB; standby power)
   (2) ICF1 clock signal
   (3) ICF1 keyscan signal (during pressed switch)
   (4) ICF1 Power control signal (POWERC)
   (5) +5M voltage
2. Power Voltage
   (1) ICF1 Power control signal (POWERC)
   (2) +5M (for MMC)
   (3) other voltage
3. Low Level Test (Operating is same as CDI205)
4. Service Shell (Operating is same as CDI205)
   How to activated of Service Shell for CDI360
   (1) Power OFF
   (2) Press two switches: Display ON/OFF and Action button 2
   (3) Power ON
   and release two switch if after Power ON
5. Measurement Each Circuit

7.1.1 Power supply unit

Preparation

- Load Resistor and Power ON/OFF switch
Switching power supply is needed load resistor when servicing. And this power supply is needed Power ON/OFF switch for standby circuit.

1. Load Resistor
For service purposes you only have to connect the two load resistance to the +5M and +5F (+5V).
Use two 5.1 ohm, 10W resistor, code number 4822 053 34518.

2. Power ON/OFF switch
For service purposes you only have to connect a switch between +5STB and Power ON/OFF.

CAUTION.
- Never turn on the power supply if no load resistor has been connected.
- Safety regulations require that the set under repair should be restored to its original state and that components identical to the ones specified should used.
- For reasons of safety, components. For code number refer to the parts list of electrical components.

7.2 Mainboard

7.2.1 Power voltage

JP01 (after Power ON)

Pin	Name	Voltage	Power lines of separated
1	+12V	+12V	+12E,+12L,+12B,+10L +10A,+12V(SP)
2	+8S	+12V	+8S
3	GND	0V	
4	-8V	-10.4V	-8S,-8A
5	Power ON/OFF	5V	
6	+5M	+5V	+5M
7	GND	0V	
8	+5V	+5V	+5A,+5K,+5E
9	GND	0V	
10	+5F	+5V	+5F
11	GND	0V	
12	+5STB	+5V	+5STB
13	BATTL	+5V	
14	GND	0V	

Power lines

+12E	Video 2
+12L	Video 1 (for LCD panel)
+12B	Video 1 (for LCD backlight)
+10L	Video 1 (for LCD brightness control)
+10A	Audio 1 and 2
+12V(SP)	Audio 2 (for speaker amp)
+8S (+5S)	Servo
-8S (-5S)	Servo
+5M	MMC,etc. (for digital circuit)
+5A	Audio
+5K	Video 2 (for digital circuit)
+5E	Video 2 (for Analog circuit)
+5F	MMC (for Extention socket)
+5STB	MMC (for ICF1,Front uCOM)

7.2.2 Measurements Servo circuit

In the circuit diagrams and on the drawings of the panels measuring points are marked with : .
Some times signals to be measured are pointed as for example : IC80 pin1.
All DC signals are measured with an universal electronic voltmeter.
All AC signals are measured with an oscilloscoop

7.2.2.1 Lasercurrent.

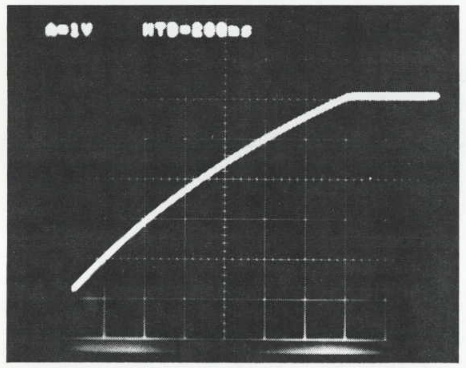
The lasercurrent is adjusted in the CDM9 and is a factory adjustment. After replacing a defective CDM the laser current does not need to be adjusted.
Play track 1 of testdisc 5, the voltage accross measuring point 1 and point 2
should be : 0.7 V / DC +/-10 %.

7.2.2.2 Focus signal.

Play track 1 of testdisc 5, the voltage accross measuring point 3 and GND
should be : + 400 mV / DC +/-10%.

7.2.2.3 Starting signal.

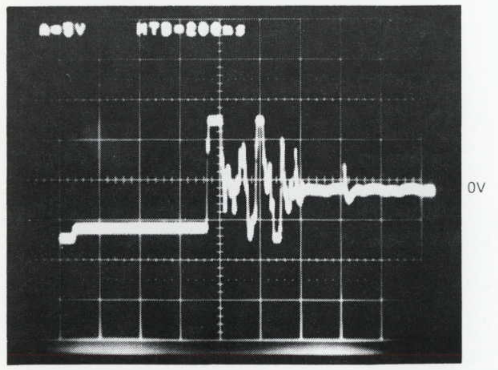
Insert a disc and measure accross measuring point 4 and GND. After pushing the play button the next picture appears on the oscilloscoop :



The signal is triggered by the Si/RD signal on IC80 pin6.

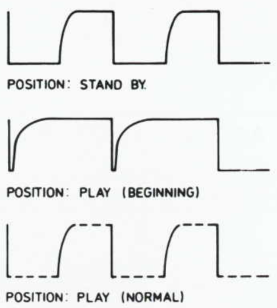
7.2.2.4 Motorcontrol signals.

Insert testdisc 5.
Measure accross IC83 pin3 and GND, after pushing the play button the next picture should appear on the oscilloscope.

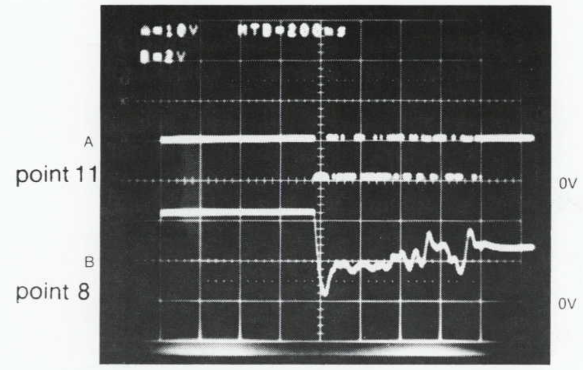


After a while, when playing track 1, the voltage should be:
- 1.7 V DC +/-10%
Play track 1 of testdisc 5, the voltage across measuring point 6 and ground should be: 3.2V DC +/-10%

Signal accross measuring point 7 and GND should be :

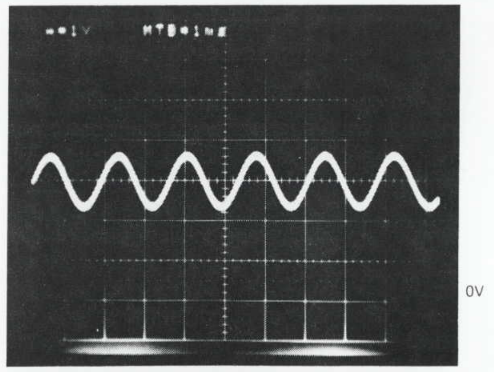


Insert test disc 5. Accross measuring point 8 and GND the next picture should appear on the oscilloscope after pushing the play button



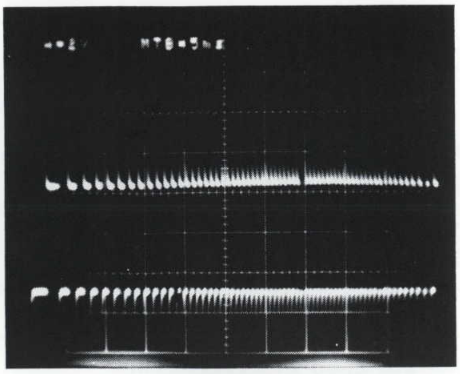
7.2.2.5 Radial error circuit signals.

Voltage accross measuring point 18 and GND :
2,6 V / DC +/- 10%.
Voltage accross measuring point 19 and GND :
110 mV / DC +/- 10% in PLAY mode.
Voltage accross measuring point 21 and GND :
1,2 V / DC +/- 10% in PLAY mode.
Voltage accross measuring point 22 and GND :



Voltage accross measuring points 23,24,26 and 27 denpending on playing mode, 0 V if LOW or 5V if HIGH

For measuring point 28 and 33 put the player in the service shell on CD drive test mode 2. The voltage accross point 28 and GND should be :



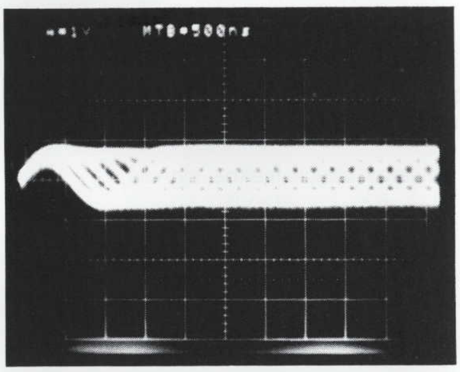
0V

7.2.2.6 Clock signal IC88

Measuring point 29 : clock signal f = 4MHz.

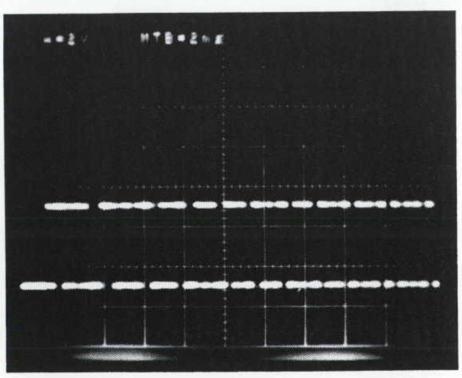
7.2.2.7 Decoder signals

Play track 1 of testdisc 5.
The signal accross measuring point 31 and GND should be:



0V

Insert testdisc 5 and put the player in the service shell on CD drive test mode 2.
The signal accross measuring point 32 should be :

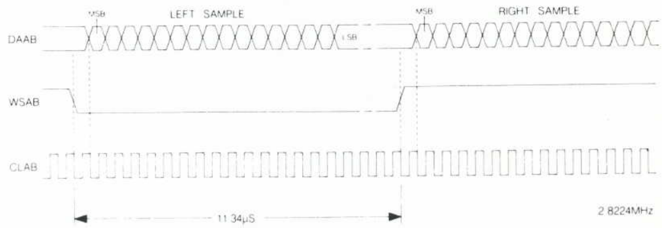


0V

Measuring point 34 : clock signal f = 11.289.600 Hz.
Voltage accross measuring point 37 and 37 :
775 mV /DC +/- 10%

Measuring points 38 : LOW. If the blackdot track of testdisc 5A is played then pulses activity should be measured on this point.

Measuring point 39,41 and 42 :



7.2.2.8 Video signals

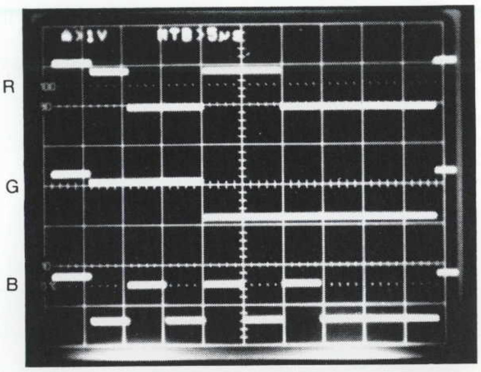
Put the player in the service shell on testimage (colorbar).

Measuring point 43 and 44 :

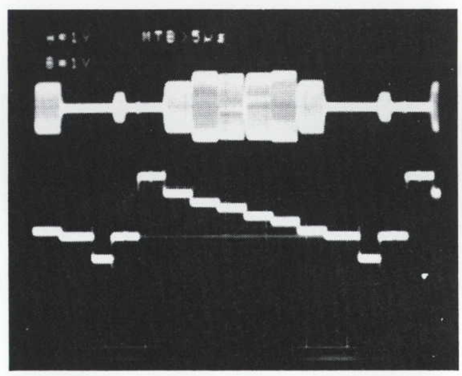
R

G

B



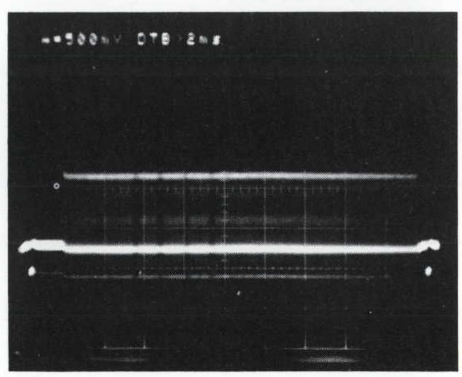
Measuring point 46 :



-0V
C

-0V
Y

Measuring point 47 :

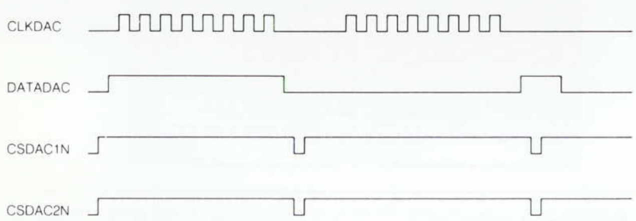


7.2.3 Measurments Audio circuit
Select the submenu "MMC slave" of the Service Shell, see section 5.2. With this menu we can check besides the remote control functions also the audio functions L-R and mono/streo. This audio function can only be checked when an audio-disc is inserted. When any disturbances occur, the following checks/measuerments can be performed (2 % 8).

Required test discs:
Use an arbitrary Digital Audio disc in the service shell, submenu MMC slave.
Test disc no.5-5A (4822 397 30096 - SBC 426)
Use launch disc or arbitrary CD-I disc which contains audio levels A-B-C and/or CD-DA
Audio signals disc (4822 397 30184 - SBC 429)

7.2.3.1 Slave processor data
Check whether the signals appear on test/measurments points 66 % 69 from the slave processor.

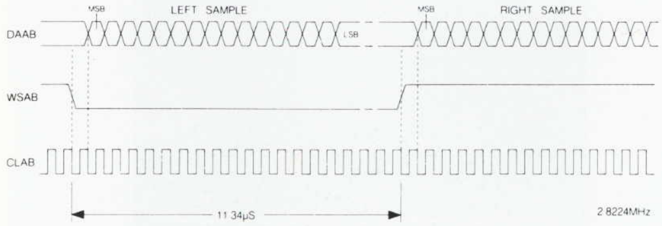
66 - CLKDAC
67 - DATADAC
68 - CSDAC1N
69 - CSDAC2N



There signals are very hard to recognize on an oscilloscope during the normal application. Only in the service shell and controlling the attenuators you can observe activity.
If there is any activity on one of the lines 66 % 69 one can suppose that the information of this signals are oke. This is also to be considered for the data lines D0 % D7.

If no disturbances, check the data outputs D0 % D7 of IC52.

7.2.3.2 I2S signals
Ckeck whether the signals, given below, appear on the testpoints 57 - 58 - 59.
Time base related only to CD-DA.



7.2.3.3 Xin clock signal
(testpoint 61)

Play a CD-DA track.
The frequency of the Xin signal must be :
11.2896 MHz (CD-DA)

Play CD-I audio.
9.767 MHz for CD-I level A and CD-I level B.
4.838 MHz for CD-I level C.

7.2.3.4 DEEMP signal
(testpoint 56)
Insert test disc 5 or 5A and during track 14 (recorderd without pre-emphasis) the signal DEEMP should be low. (0V)
During track 15 (recorded with pre-emphasis) this signal DEEMP should be high (+5V).

7.2.3.5 FILTERN signal
(testpoint 62)
Insert CD-I disc which contains audio levels A-B-C and/or Digital audio.
This signal FILTERN should be high (+5V). In case a track is played back with audio level C (speech).
The signal FILTERN should be low (0V), in case of level A or B or DA.

7.2.3.6 KILL signal
(test point 54)
This KILL signal must be +5V during reset. In normal/play position this signal is -8V.

7.2.3.7 Performance check APU
Position digital audio
- Insert Audio signals test disc 1, SBC 429.
- Play track no.1. (1kHz sinus signal L + R 0dB)
- The level on testpoint 63 and 64 should be: 0.9Vrms +/- 2dB

If this level deviates check firstthe signals

FILTERN	62	step 6
KILL	54	step 7
Xin	61	step 4

- The level on testpoint 71 and 72 should be: 2 Vrms +/- 3dB.

Position audio level C
- Insert CD-I disc
- Play track with audio .level C, 1kHz L + R, 0dB.
- The level on testpoint 63 and 64 should be: 0.9V rms +/- 3dB

If this level deviates check first the signals

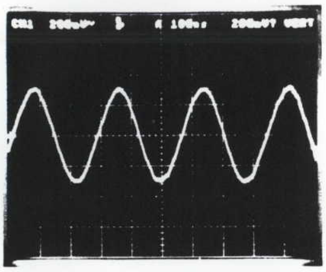
FILTERN	62	step 6
KILLM	54	step 7

- The level on test point 71 and 72 should be: 2Vrms +/-3dB.

7.2.4 Measurements & adjustments Video 2 circuit
(Video Encoder)

Required test equipment.
- Electronic voltmeter
- Oscilloscope
- Frequency counter

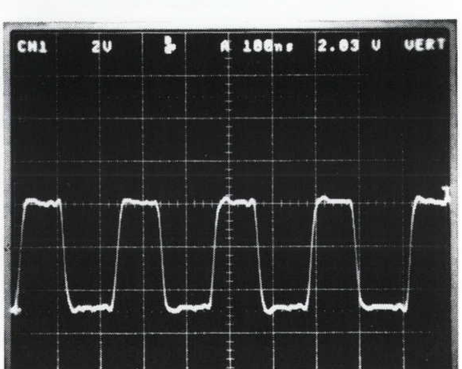
7.2.4.1 Check of NTSC subcarrier .
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 525, NTSC.
- Connect frequency counter to testpoint 83 , (Pin 6 ICE1) and turn on the player.
- The frequency on testpoint 83 should be; 3 579 545 Hz. +/- 50 Hz.
- The amplitude on testpoint 83 should be in between; 400 mV and 1000 mVpp



- Now check if the lock signal on testpoint 76, (pin 3 of IC94) meets 39335 Hz +/- 8 Hz. and the divided VCO output signal on testpoint 77 , (pin 14 of IC 94) meets also meets 39335 Hz +/- 8 Hz.

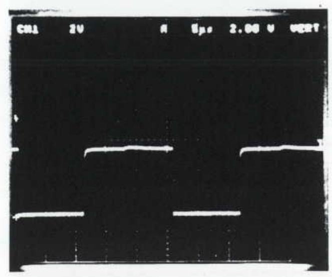
7.2.4.2 Check of PAL subcarrier .
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL.
- Connect frequency counter to testpoint 83 ,(Pin 6 IC ICE1) and turn on the player.
- The frequency on testpoint 83 should be; 4 433 618 Hz. +/- 50 Hz.
- The amplitude on testpoint 83 should be in between; 400 mV and 1000 mVpp
- If the frequency of this signal deviates, perform alignment of trimmer CV91.

Adjustment PAL sub carrier oscillator.
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL .
- Connect frequency counter to testpoint 83 and turn on the player.
- Adjust with trimmer CV91, the frequency on testpoint 83 at 4 433 618 Hz. +/- 50 Hz.



7.2.4.3 Check of Phase Locked Loop. (NTSC Only)
- Check if the lock signal for NTSC on testpoint 76 , (pin 3 of IC94) meets 39335 Hz +/- 8 Hz.
  If this frequency deviates check: XT4, HSYNC, and KILLM.

- Check if the divided VCO outputsignal on testpoint 77 , (pin 14 of IC94) meets 39335 Hz +/- 8 Hz.

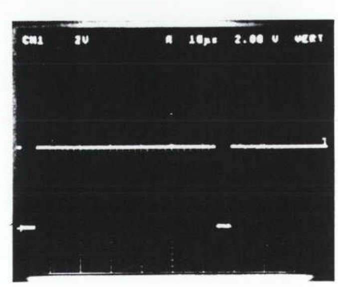


7.2.4.4 Check of XT4, System clock divided by 4 (NTSC Only)
The divided by 4 system clock frequency on testpoint 79 , should be: 7 552 450 Hz .
If this clocksignal deviates check the IC40 pin117.

7.2.4.5 Check of standard control signal SW
In case of NTSC (525) the control signal SW on testpoint 78, should be high (+ 5 V).
In case of PAL (625) this signal sould be low (0 V)
If this signal deviates check the IC65 26pin

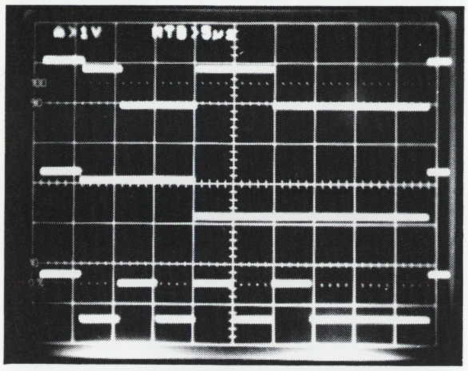
7.2.4.6 Check of KILLM signal. (NTSC Only)
This KILLM signal (active Low) on testpoint 82, (pin 3 of IC91) should be low (0 V) incase of Non interlaced video.

7.2.4.7 Check of HSYNC signal. (NTSC Only)
The horizontal synchronisation signal for NTSC standard is given on the photograph below. Testpoint 81, (pin 1 IC90)

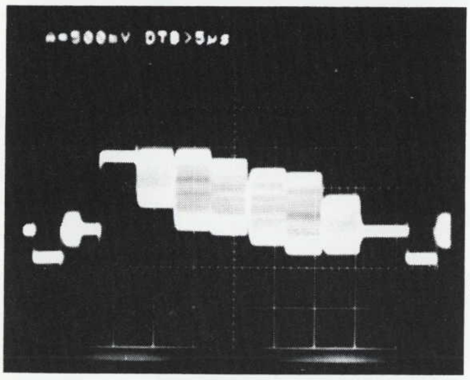


7.2.4.8 Check of RGB input signals

On the given photo below the signals are given for R - G - B in case of NTSC. On Testpoints 86 87 88.

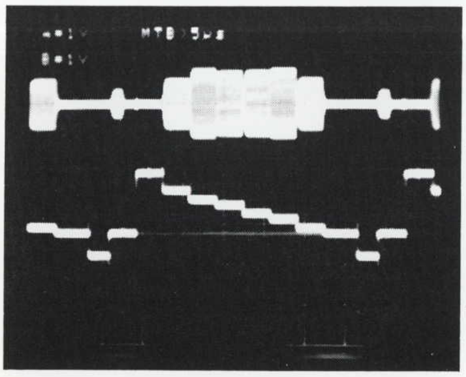


Check of Output signals for CVBS - Y / C.



CVBS signals
Testpoint 89

	PAL-CVBS	NTSC-CVBS
- Video signal	1000 mVpp	1000 mVpp
- White level	710 mVpp	710 mVpp
- sync	290 mVpp	290 mVpp
- Burst	290 mVpp	290 mVpp



Y/C signals
Testpoint 91/92

	NTSC- Y/C Sign.	Testpoint 91/92
- Video signal	1000 mVppl	1000 mVpp
- White level	710 mVpp	710 mVpp
- sync	290 mVpp	290 mVpp
- Chroma	300 mVpp	300 mVpp

7.2.5 Measurements MMC circuit

Required equipment:
Multimeter
Display terminal type Digital VT220 or VT100
Digital oscilloscope
Analog oscilloscope
Timer/counter

7.2.5.1 Clock signals:
Carry out measurements just after hardware reset. This is dine each time after pressing Power ON/OFF switch, or interconnect point X and Y without CD Lid. (see the section 4.1.4)

System clock = 30.2098 MHz +/- 600 Hz (NTSC)
30.0000 MHz +/- 1500 Hz (PAL)

- Changed by PAL/NTSC switch

This system clock must be present at the following points:
IC01 pin 30
IC40 pin 119
IC42 pin 119

At IC01pin 29 Clock divided by two must be present for
NTSC 15.1049 MHz (=30.2098 : 2)
PAL 15.000 MHz (=30.000 : 2).

At IC01 pin 69 the UART clock of 68070 must be present.
Frequency 4.9152 MHz +/- 250 Hz

At IC65 pin 54 clock of '68HC05' must be present.
Frequency 4.000 MHz +/- 100 Hz

At IC20 pin94 the clock of the CDIC must me present.
Frequency 22.5792 MHz +/- 1100 Hz.
At IC21 pin16 the DSP clock must be present.
Frequency 7.5264MHz +/- 380 Hz

At IC87 pin9 the '2B-clock' must be present.
Frequency 11.2896 MHz +/- 560 Hz

Carry out measurements at IC40 pin117. Clock of 'XT4' must be present. For
Frequency 7.55245 +/- 150 Hz for NTSC
7.5000 +/- 380 Hz for PAL

The frequency at IC88 pin37 'COXN' must be 75kHz +/- 25kHz.

7.2.5.2 Reset circuitry:
Power ON and measure the 'RESETCD' time
This 'low' time must be 140ms +/- 20 ms

Also measure the RESETCD time (low!) if the button is released. The signal
RESETCD must be low for 140ms +/- 20ms.

IC7201 pin 28 RESETN; low time = 250 ms +/- 20 ms

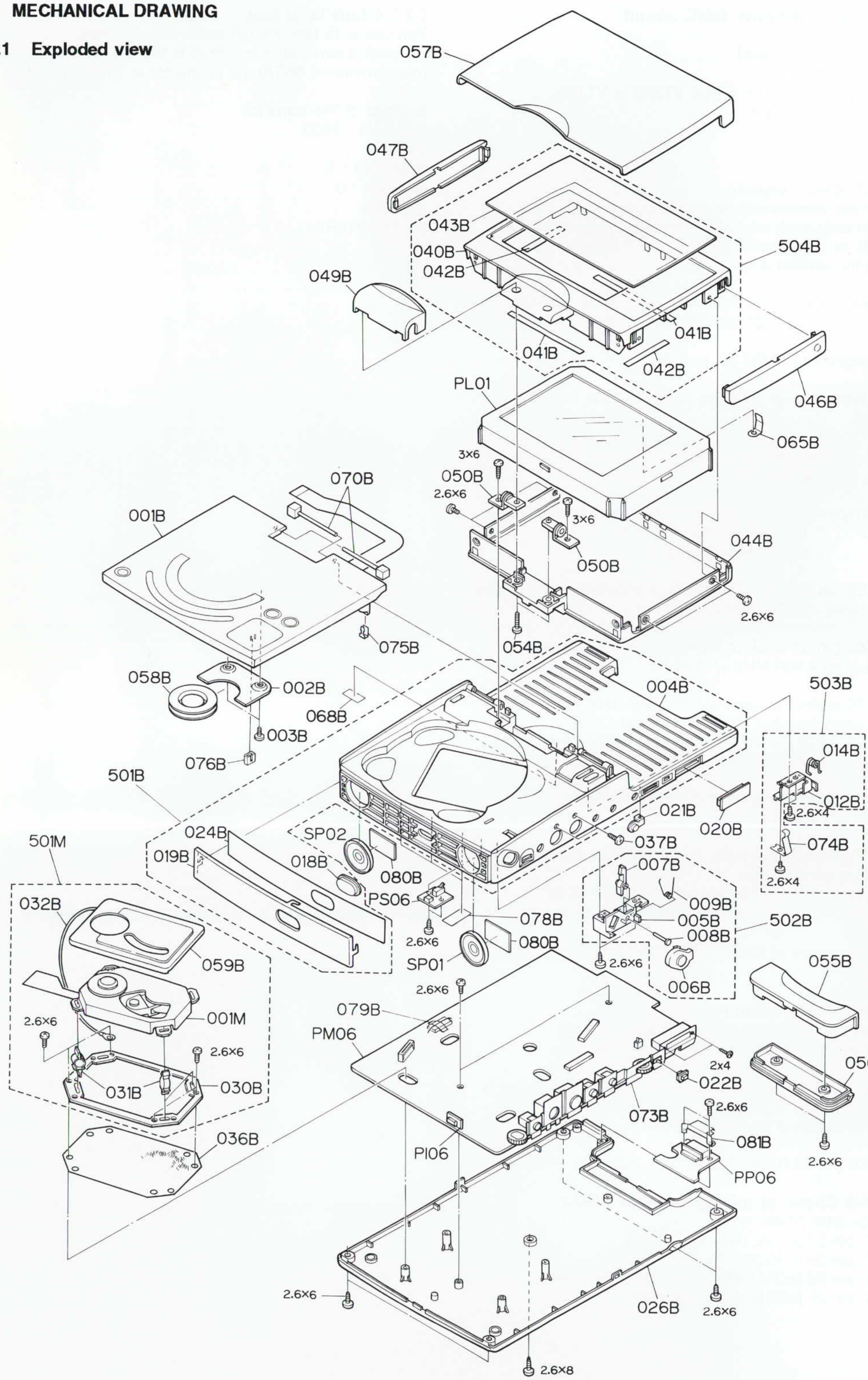
7.2.5.3 Check of microprocessor 68070.
Check after power on:
IC01, pin 27 (= HALTN) = high (+5V)
IC01, pin 28 (= RESETN) = high (+5V)
IC01, pin 24 (=DTACKN) = changing high/low
IC01, pin 26 (=BERRN) = high (+5V)

7.2.5.4 Low level test
Purpose is to test the hardware with software.
Connect a terminal,or test PCB to the UART of microprocessor 68070 via connector at INPUT (port2).

Settings of the terminal:
Baudrate : 9600
start bit : 1
data bists : 8
stop bits : 0
no parity
no handshake

8 MECHANICAL DRAWING

8.1 Exploded view



9 PARTS LIST

9.1 Exploded view parts list

Positionnbr	Servicecode	Description
001B	4822 444 30461	CD COVER WITH KEYS
002B	4822 402 61464	CLAMPER BRACKET
003B	4822 502 13203	SCREW CLAMP BRACKET
020B	4822 444 60883	RGB CONN. COVER
021B	4822 410 62344	LCD ON/OFF BUTTON
022B	4822 410 62343	PAL/NTSC BUTTON
026B	4822 444 50694	BOTTOM CASE ASSY
036B	4822 444 60884	COSMETIC CDM COVER
037B	4822 502 21292	F.H.M. SCREW 2.6x5
044B	4822 444 50693	LCD BOTTOM CASE
046B	4822 444 40611	R SIDECAP LCD CASE
047B	4822 444 40612	L SIDECAP LCD CASE
049B	4822 444 60879	LCD HINGE COVER
050B	4822 417 11179	LCD HINGE
054B	4822 502 30701	SCREW HINGE COVER
055B	4822 444 60881	FMV TOP COVER
056B	4822 444 50692	FMV BOTTOM COVER
057B	4822 444 60882	COVER HOOD
058B	4822 532 21464	CLAMPER
070B	4822 535 93367	HOLDER ASSY
076B	4822 462 71896	LID CAP
501B	4822 444 60886	MAIN CASE ASSY
502B	4822 256 92004	EJECT HOLDER ASSY
503B	4822 402 61467	OPEN BRACKET ASSY
504B	4822 444 30462	LCD TOP CASE ASSY
501M	4822 693 91593	CDM 9 ASSY
PL01	4822 130 91193	LCD UNIT
PP06	4822 214 52034	POWER CONNECT PCB
SP01	4822 240 30598	SPEAKER
SP02	4822 240 30598	SPEAKER

9.2 Electrical parts list

AUDIO

C501	4822 126 11687	GRM39F104Z16 0.1μF
C502	4822 126 11687	GRM39F104Z16 0.1μF
C503	4822 126 11663	12pF 50V
C504	4822 124 11075	22μF/ 16V
C505	4822 126 11663	12 pF 50V CHIP
C506	4822 124 11075	22μF/ 16V
C507	4822 126 11663	12 pF 50V
C508	4822 124 11075	22μF/ 16V
C509	4822 126 11663	12 pF 50V
C510	4822 124 11075	22μF/ 16V
C511	4822 122 33744	100pF (GR39) 50V
C512	4822 122 33744	100pF (GR39) 50V
C513	4822 122 32672	1μF/16V TANTAL
C514	4822 122 32672	1μF/16V TANTAL
C515	4822 116 82487	0Ω ±5% 1/16W
C516	4822 122 33744	100pF (GR39) 50V
C517	4822 122 32672	1μF/16V TANTAL
C518	4822 122 33744	100pF (GR39) 50V
C519	4822 122 32672	1μF/16V TANTAL
C521	4822 126 11681	1000pF (GR39) 50V
C522	4822 124 11075	22μF/ 16V
C524	4822 126 11681	1000pF (GR39) 50V
C525	4822 124 11075	22μF/ 16V
C526	4822 126 11687	GRM39F104Z16 0.1μF
C527	4822 122 32672	1μF/16V TANTAL
C528	4822 122 32701	0.022μF 50V
C529	4822 126 11687	GRM39F104Z16 0.1μF
C530	4822 122 32672	1μF/16V
C531	4822 122 32701	0.022μF 50V
C532	4822 122 32667	0.01μF Z 50V
C533	4822 122 32667	0.01μF Z 50V
C534	4822 124 11075	22μF/ 16V
C535	4822 124 11075	22μF/ 16V
C536	4822 126 11687	GRM39F104Z16 0.1μF
C537	4822 124 80412	220μF/16V
C538	4822 124 80412	220μF/16V
C541	4822 124 11075	22μF/16V
C542	4822 116 82487	0Ω ±5% 1/16W
C543	4822 124 80412	220μF/16V
C546	4822 122 32672	1μF/16V
C547	4822 122 32672	1μF/16V
C550	4822 124 10773	4.7μF/ 25V
C580	4822 126 11687	GRM39F104Z16 0.1μF
C581	4822 126 11687	GRM39F104Z16 0.1μF
C582	4822 126 11687	GRM39F104Z16 0.1μF
C583	4822 126 11687	GRM39F104Z16 0.1μF
C586	4822 126 11687	GRM39F104Z16 0.1μF
C587	4822 126 11687	GRM39F104Z16 0.1μF
C588	4822 126 11687	GRM39F104Z16 0.1μF
C589	4822 126 11687	GRM39F104Z16 0.1μF
C591	4822 126 11687	GRM39F104Z16 0.1μF
C595	4822 124 41842	47μF/16V
C596	4822 124 41842	47μF/16V

C704	4822 126 12494	GR39 51pF CH 50V
C705	4822 126 12495	1500pF (GR39) 50V
C706	4822 126 12493	330pF ±5% J CG
C707	4822 126 11687	GRM39F104Z16 0.1μF
C708	4822 126 11687	GRM39F104Z16 0.1μF
C709	4822 124 11131	47μF/6.3V
C710	4822 126 11687	GRM39F104Z16 0.1μF
C711	4822 124 11131	47μF/6.3V
C712	4822 126 11687	GRM39F104Z16 0.1μF
C713	4822 124 11131	47μF/6.3V
C714	4822 126 11687	GRM39F104Z16 0.1μF
C715	4822 124 11131	47μF/6.3V
C718	4822 126 11681	1000pF (GR39) 50V
C719	4822 126 11682	220pF (GR39) 50V
C720	4822 126 11682	220pF (GR39) 50V
C721	4822 126 11682	220pF (GR39) 50V
C722	4822 126 11687	GRM39F104Z16 0.1μF
C723	4822 124 11131	47μF/6.3V
C724	4822 126 11687	GRM39F104Z16 0.1μF
C725	4822 124 11131	47μF/6.3V
C726	4822 123 30365	1200pF J 16V ECWU1C
C727	4822 123 30364	1000pF J 16V ECWU1C
C728	4822 124 11075	22μF/ 16V
C729	4822 126 12502	820pF ±10% 50V
C730	4822 126 11681	1000pF (GR39) 50V
C731	4822 124 11075	22μF/ 16V
C732	4822 123 30365	1200pF J 16V
C733	4822 123 30364	1000pF J 16V
C734	4822 124 11075	22μF/ 16V
C735	4822 126 12502	820pF ±10% 50V
C736	4822 126 11681	1000pF (GR39) 50V C
C737	4822 124 11075	22μF/ 16V 50V C
C738	4822 126 11687	GRM39F104Z16 0.1μF
C739	4822 126 11687	GRM39F104Z16 0.1μF
C740	4822 124 11131	47μF/6.3V
C741	4822 123 30365	1200pF J 16V ECWU1C
C742	4822 123 30365	1200pF J 16V ECWU1C
C780	4822 126 11687	GRM39F104Z16 0.1μF
C781	4822 126 11687	GRM39F104Z16 0.1μF
C782	4822 126 11687	GRM39F104Z16 0.1μF
C783	4822 126 11687	GRM39F104Z16 0.1μF
C784	4822 126 11687	GRM39F104Z16 0.1μF
C785	4822 126 11687	GRM39F104Z16 0.1μF
C786	4822 126 11687	GRM39F104Z16 0.1μF
C787	4822 126 11681	1000pF (GR39) 50V CH

R502	4822 051 30103	10kΩ ± 5% 1/16W
R503	4822 051 30103	10kΩ ± 5% 1/16W
R504	4822 051 30472	4.7kΩ ± 5% 1/16W
R505	4822 051 30684	680Ω ± 5% 1/16W
R506	4822 051 30153	15kΩ ± 5% 1/16W
R507	4822 051 30223	22kΩ ± 5% 1/16W
R508	4822 051 30103	10kΩ ± 5% 1/16W
R509	4822 051 30103	10kΩ ± 5% 1/16W
R511	4822 051 30103	10kΩ ± 5% 1/16W
R512	4822 051 30103	10kΩ ± 5% 1/16W
R513	4822 051 30472	4.7kΩ ± 5% 1/16W
R514	4822 051 30684	680Ω ± 5% 1/16W
R515	4822 051 30153	15kΩ ± 5% 1/16W
R516	4822 051 30223	22kΩ ± 5% 1/16W
R517	4822 051 30103	10kΩ ± 5% 1/16W
R518	4822 051 30103	10kΩ ± 5% 1/16W
R519	4822 051 30101	100Ω ± 5% 1/16W
R520	4822 117 10146	# 4.7Ω J 1/4W RF
R521	4822 051 30101	100Ω ± 5% 1/16W
R522	4822 111 91459	22Ω ±5% 1/10W
R523	4822 051 30103	10kΩ ± 5% 1/16W
R524	4822 111 91459	22Ω ± 5% 1/10W
R525	4822 051 30104	100kΩ ± 5% 1/16W
R526	4822 051 30221	220Ω ± 5% 1/16W
R527	4822 051 30103	10kΩ ± 5% 1/16W
R529	4822 051 30104	100kΩ ± 5% 1/16W
R530	4822 051 30221	220Ω ± 5% 1/16W
R531	4822 051 30392	3.9kΩ ± 5% 1/16W
R532	4822 051 30223	22kΩ ±5% 1/16WW
R533	4822 051 30472	4.7kΩ ±5% 1/16WW
R534	4822 051 30472	4.7kΩ ±5% 1/16W
R535	4822 051 30223	22kΩ ±5% 1/16W
R536	4822 051 30102	1kΩ ± 5% 1/16W
R537	4822 051 30102	1kΩ ± 5% 1/16W
R538	4822 051 30479	47Ω ± 5% 1/16W
R540	4822 051 30102	1kΩ ± 5% 1/16W
R541	4822 051 30102	1kΩ ± 5% 1/16W
R542	4822 051 30479	47Ω ±5% 1/16W
R543	4822 116 82487	0Ω 1/16W
R544	4822 111 91459	22Ω ± 5% 1/10W
R545	4822 116 82487	0Ω 1/16W
R546	4822 111 91459	22Ω ±5% 1/10W
R547	4822 051 30104	100kΩ ± 5% 1/16W
R548	4822 116 82487	0Ω 1/16W
R549	4822 116 82487	0Ω 1/16W
R550	4822 051 30103	10kΩ ± 5% 1/16W
R551	4822 051 30472	4.7kΩ ± 5% 1/16W
R552	4822 051 30223	22kΩ ± 5% 1/16W
R554	4822 051 30105	1MΩ ± 5% 1/16W
R555	4822 051 30103	10kΩ ± 5% 1/16W
R556	4822 051 30473	47kΩ ±5% 1/16W
R557	4822 051 30103	10kΩ ± 5% 1/16W
R558	4822 051 30103	10kΩ ± 5% 1/16W
R559	4822 116 82487	0Ω ±5% 1/16W
R562	4822 051 30101	100Ω ±5% 1/16W

R563	4822 051 30101	100Ω ± 5% 1/16W
R568	4822 051 30229	22Ω ± 5% 1/16W
R569	4822 051 30229	22Ω ± 5% 1/16W
R570	4822 051 30473	47kΩ ±5% 1/16W
R571	4822 051 30473	47kΩ ±5% 1/16W
R576	4822 051 30104	100kΩ ±5% 1/16W
R577	4822 051 30472	4.7kΩ ± 5% 1/16W
R578	4822 051 30472	4.7kΩ ± 5% 1/16W
R581	4822 116 82487	0Ω ± 5% 1/16W
R583	4822 116 82487	0Ω ± 5% 1/16W
R585	4822 051 30472	4.7kΩ ± 5% 1/16W
R586	4822 051 30104	100kΩ ± 5% 1/16W
R587	4822 051 30472	4.7kΩ ± 5% 1/16W
R588	4822 051 30104	100kΩ ± 5% 1/16W
R701	4822 051 30223	22kΩ ± 5% 1/16W
R702	4822 051 30103	10kΩ ± 5% 1/16W
R703	4822 051 30225	2.2MΩ ± 5% 1/20W
R704	4822 051 30225	2.2MΩ ± 5% 1/20W
R705	4822 051 30103	10kΩ ± 5% 1/16W
R706	4822 051 30223	22kΩ ± 5% 1/16W
R707	4822 117 10145	# 3.3Ω ±5% 1/10W
R708	4822 117 10145	# 3.3Ω ±5% 1/10W
R709	4822 051 30829	82Ω ± 5% 1/16W
R711	4822 051 30224	220kΩ ± 5% 1/16W
R712	4822 051 30101	100Ω ± 5% 1/16W
R713	4822 051 30101	100Ω ± 5% 1/16W
R714	4822 051 30101	100Ω ± 5% 1/16W
R715	4822 051 30104	100kΩ ± 5% 1/16W
R716	4822 051 30104	100kΩ ± 5% 1/16W
R717	4822 051 30104	100kΩ ± 5% 1/16W
R718	4822 117 10145	# 3.3Ω ±5% 1/10W
R719	4822 117 10145	# 3.3Ω ±5% 1/10W
R720	4822 116 83207	1.2kΩ ± 5% 1/16W
R721	4822 116 83207	1.2kΩ ± 5% 1/16W
R722	4822 051 30101	100Ω ± 5% 1/16W
R724	4822 051 30103	10kΩ ± 5% 1/16W
R725	4822 051 30153	15kΩ ± 5% 1/16W
R726	4822 051 30153	15kΩ ± 5% 1/16W
R727	4822 051 30153	15kΩ ± 5% 1/16W
R728	4822 051 30153	15kΩ ± 5% 1/16W
R729	4822 051 30101	100Ω ± 5% 1/16W
R731	4822 051 30103	10kΩ ± 5% 1/16W
R732	4822 116 83207	1.2kΩ ± 5% 1/16W
R733	4822 116 83207	1.2kΩ ± 5% 1/16W
R734	4822 051 30101	100Ω ± 5% 1/16W
R736	4822 051 30103	10kΩ ± 5% 1/16W
R737	4822 051 30153	15kΩ ± 5% 1/16W
R738	4822 051 30153	15kΩ ± 5% 1/16W
R739	4822 051 30153	15kΩ ± 5% 1/16W
R740	4822 051 30153	15kΩ ± 5% 1/16W
R741	4822 051 30101	100Ω ± 5% 1/16W
R743	4822 051 30103	10kΩ ± 5% 1/16W
R744	4822 051 30392	3.9kΩ ± 5% 1/16W
R745	4822 051 30104	100kΩ ± 5% 1/16W
R746	4822 116 83207	1.2kΩ ± 5% 1/16W

R747	4822 116 83207	1.2kΩ ± 5% 1/16W
R748	4822 116 83207	1.2kΩ ± 5% 1/16W
R749	4822 116 83207	1.2kΩ ± 5% 1/16W
RV51	4822 100 11944	RK10J12T T6 K2 M3 1O
L701	4822 157 63234	4.7µH
L702	4822 157 70271	390µH J
L703	4822 157 70271	390µH J
D551	4822 130 32635	MA-151K TAPEING
D553	4822 130 32635	MA-151K TAPEING
Q501	4822 130 63187	DTC323TK
Q502	4822 130 63187	DTC323TK
Q503	4822 130 63187	DTC323TK
Q504	4822 130 63187	DTC323TK
Q511	4822 130 63187	DTC323TK
Q512	4822 130 63187	DTC323TK
Q513	4822 130 63187	DTC323TK
Q514	4822 130 63187	DTC323TK
Q515	4822 130 63187	DTC323TK
Q516	4822 130 63187	DTC323TK
Q517	4822 130 42733	2SA1162 GR
Q518	4822 130 42733	2SA1162 GR
Q550	4822 130 43398	2SC2712 GR
Q551	4822 130 43398	2SC2712 GR
Q552	4822 130 42733	2SA1162 GR
Q554	4822 130 42733	2SA1162 GR
IC50	4822 209 31905	AD7528 MIX/ATTN
IC51	4822 209 31905	AD7528 MIX/ATTN
IC52	4822 209 62764	74HC164F TAPING
IC53	4822 209 83357	NJM4560M
IC54	4822 209 83357	NJM4560M
IC56	4822 209 83357	NJM4560M
IC57	4822 209 62503	74HC4053
IC58	4822 209 83357	NJM4560M
IC59	4822 209 83357	NJM4560M
IC60	4822 209 61666	NJM386M FLAT PACK
IC61	4822 209 61666	NJM386M FLAT PACK
IC70	4822 209 63997	SAA7323GP DAC3
IC71	4822 209 83357	NJM4560M
IC72	4822 209 83357	NJM4560M
IC73	4822 209 62503	74HC4053
IC74	4822 209 83357	NJM4560M

VIDEO

C428	4822 126 11568	470pF (GR39) 50V
C429	4822 126 11568	470pF (GR39) 50V
C430	4822 126 11568	470pF (GR39) 50V
C431	4822 124 10772	100µF/6.3V
C432	4822 124 10772	100µF/6.3V
C433	4822 124 10772	100µF/6.3V
C435	4822 126 12516	1000pF 50V
C436	4822 126 11687	GRM39F104Z16 0.1µF
C437	4822 126 11687	GRM39F104Z16 0.1µF
C438	4822 126 11687	GRM39F104Z16 0.1µF
C449	4822 126 11687	GRM39F104Z16 0.1µF
C450	4822 126 11687	GRM39F104Z16 0.1µF
C451	4822 124 11336	3.3µF/35V
C452	4822 124 11336	3.3µF/35V
C453	4822 124 11336	3.3µF/35V
C454	4822 124 11336	3.3µF/35V
C455	4822 124 11336	3.3µF/35V
C456	4822 124 11336	3.3µF/35V
C458	4822 126 11668	220 pF (GR39) 50V
C459	4822 126 11668	220 pF (GR39) 50V
C464	5322 122 34098	0.01µF 50V
C467	4822 126 11687	GRM39F104Z16 0.1µF
C481	4822 126 11687	GRM39F104Z16 0.1µF
C482	4822 126 11687	GRM39F104Z16 0.1µF
C483	4822 126 11687	GRM39F104Z16 0.1µF
C484	4822 126 11687	GRM39F104Z16 0.1µF
C485	4822 122 32672	1µF/16V
C901	4822 124 11131	47µF/6.3V
C902	4822 126 11566	2200pF (GR39) 50V
C903	4822 121 42668	0.47µF,J,50V
C904	4822 121 42668	0.47µF,J,50V
C905	4822 126 11566	2200pF (GR39) 50V
C906	4822 126 11566	2200pF (GR39) 50V
C907	4822 122 33751	120pF (GR39) 50V
C908	4822 126 11568	470pF (GR39) 50V
C909	4822 122 33741	10pF (GR39) 50V
C910	4822 126 11568	470pF (GR39) 50V
C911	4822 126 11568	470pF (GR39) 50V
C912	4822 122 33744	100pF (GR39) 50V
C914	4822 124 11333	B.P 0.47µF 50V (MV)
C915	4822 124 11333	B.P 0.47µF 50V (MV)
C916	4822 124 11333	B.P 0.47µF 50V (MV)
C917	4822 126 11687	GRM39F104Z16 0.1µF
C918	4822 124 10772	100µF/6.3V
C919	4822 124 10772	100µF/6.3V
C920	4822 126 11687	GRM39F104Z16 0.1µF
C921	4822 122 33761	22pF (GR39) 50V
C922	4822 126 11687	GRM39F104Z16 0.1µF
C923	4822 122 33788	82pF (GR39) 50V
C924	4822 122 33777	47pF (GR39) 50V
C925	4822 126 11663	12 pF 50V
C926	4822 122 33788	82pF (GR39) 50V
C927	4822 122 32672	1µF/16V
C928	4822 126 11687	GRM39F104Z16 0.1µF
C929	4822 126 11687	GRM39F104Z16 0.1µF

C930	4822 124 11074	10µF/ 16V
C931	4822 126 11687	GRM39F104Z16 0.1µF
C932	4822 126 11687	GRM39F104Z16 0.1µF
C933	4822 124 11074	10µF/ 16V
C938	4822 124 23561	470µF/4V
C939	4822 124 23561	470µF/4V O=8 H=7
C940	4822 124 11074	10µF/16V
C941	4822 126 11687	GRM39F104Z16 0.1µF
C943	4822 116 82487	0Ω ±5% 1/16W
C946	4822 116 82487	0Ω ±5% 1/16W
C947	4822 122 32672	1µF/16V TANTAL
C980	4822 126 11687	GRM39F104Z16 0.1µF
C981	4822 126 11687	GRM39F104Z16 0.1µF
C982	4822 126 11687	GRM39F104Z16 0.1µF
C983	4822 126 11687	GRM39F104Z16 0.1µF
C984	4822 126 11687	GRM39F104Z16 0.1µF
C985	4822 126 11687	GRM39F104Z16 0.1µF
C986	4822 126 11687	GRM39F104Z16 0.1µF
C987	4822 126 11687	GRM39F104Z16 0.1µF
C988	4822 126 11681	1000pF 50V GR39
C990	4822 124 41842	47µF/ 16V
C991	4822 124 21852	470µF/ 16V
C992	4822 126 11687	GRM39F104Z16 0.1µF
CV91	4822 125 60188	TZC03P200A110 20pF

R415	4822 051 30103	10kΩ ± 5% 1/16W
R416	4822 051 30103	10kΩ ± 5% 1/16W
R417	4822 051 30103	10kΩ ± 5% 1/16W
R418	4822 051 30103	10kΩ ± 5% 1/16W
R419	4822 051 30103	10kΩ ± 5% 1/16W
R420	4822 051 30103	10kΩ ± 5% 1/16W
R426	4822 051 30152	1.5kΩ ± 5% 1/16W
R427	4822 116 83218	68Ω ± 5% 1/16W
R428	4822 051 30221	220Ω ± 5% 1/16W
R429	4822 051 30332	3.3kΩ ±5% 1/16W
R430	4822 051 30152	1.5kΩ ± 5% 1/16W
R431	4822 116 83218	68Ω ± 5% 1/16W
R432	4822 051 30221	220Ω ± 5% 1/16W
R433	4822 051 30332	3.3kΩ ±5% 1/16W
R434	4822 051 30152	1.5kΩ ± 5% 1/16W
R435	4822 116 83218	68Ω ± 5% 1/16W
R436	4822 051 30221	220Ω ± 5% 1/16W
R437	4822 051 30332	3.3kΩ ±5% 1/16W
R447	4822 116 83208	12kΩ ±5% 1/16W
R448	4822 116 83208	12kΩ ± 5% 1/16W
R449	4822 051 30104	100kΩ ± 5% 1/16W
R450	4822 051 30473	47kΩ ± 5% 1/16W
R451	4822 051 30473	47kΩ ± 5% 1/16W
R452	4822 051 30103	10kΩ ± 5% 1/16W
R453	4822 116 82487	0Ω ±5% 1/16W
R454	4822 051 30759	75Ω ± 5% 1/16W
R455	4822 051 30759	75Ω ± 5% 1/16W
R456	4822 051 30759	75Ω ± 5% 1/16W
R460	4822 051 30759	75Ω ± 5% 1/16W

R461	4822 051 30759	75Ω ± 5% 1/16W
R462	4822 051 30759	75Ω ± 5% 1/16W
R466	4822 116 82487	0Ω ± 5% 1/16W
R472	4822 051 30104	100kΩ ±5% 1/16W
R473	4822 051 30103	10kΩ ± 5% 1/16W
R478	4822 051 30102	1kΩ ± 5% 1/16W
R479	4822 051 30102	1kΩ ± 5% 1/16W
R480	4822 051 30102	1kΩ ± 5% 1/16W
R481	4822 051 30223	22 kΩ ±5% 1/16W
R483	4822 051 30103	10kΩ ±5% 1/16W
R484	4822 051 30103	10kΩ ±5% 1/16W
R901	4822 051 30104	100kΩ ± 5% 1/16W
R902	4822 051 30103	10kΩ ± 5% 1/16W
R903	4822 051 30103	10kΩ ± 5% 1/16W
R904	4822 051 30105	1MΩ ± 5% 1/16W
R905	4822 051 30105	1MΩ ± 5% 1/16W
R906	4822 051 30223	22kΩ ± 5% 1/16W
R907	4822 051 30153	15kΩ ± 5% 1/16W
R908	4822 051 30104	100kΩ ± 5% 1/16W
R909	4822 051 30222	2.2kΩ ± 5% 1/16W
R910	4822 116 83211	1.8kΩ ± 5% 1/16W
R911	4822 051 30102	1kΩ ± 5% 1/16W
R912	4822 116 83219	820Ω ± 5% 1/16W
R913	4822 051 30105	1MΩ ± 5% 1/16W
R914	4822 051 30223	22kΩ ± 5% 1/16W
R915	4822 051 30223	22kΩ ± 5% 1/16W
R916	4822 051 30223	22kΩ ± 5% 1/16W
R917	4822 116 83215	5.6kΩ ± 5% 1/16W
R918	4822 051 30105	1MΩ ± 5% 1/16W
R919	4822 116 83208	12kΩ ± 5% 1/16W
R920	4822 051 30152	1.5kΩ ± 5% 1/16W
R921	4822 116 82487	0Ω ±5% 1/16W
R922	4822 116 82487	0Ω ±5% 1/16W
R923	4822 051 30153	15kΩ ± 5% 1/16W
R924	4822 051 30473	47kΩ ± 5% 1/16W
R925	4822 051 30103	10kΩ ± 5% 1/16W
R926	4822 051 30473	47kΩ ± 5% 1/16W
R927	4822 051 30102	1kΩ ± 5% 1/16W
R928	4822 051 30221	220Ω ± 5% 1/16W
R929	4822 051 30273	27kΩ ± 5% 1/16W
R930	4822 051 30102	1kΩ ± 5% 1/16W
R931	4822 051 30102	1kΩ ± 5% 1/16W
R932	4822 051 30471	470Ω ± 5% 1/16W
R933	4822 051 30759	75Ω ± 5% 1/16W
R935	4822 116 83213	270Ω ±5% 1/16W
R936	4822 051 30759	75Ω ± 5% 1/16W
R937	4822 116 83222	82kΩ ± 5% 1/16W
R938	4822 051 30471	470Ω ± 5% 1/16W
R939	4822 051 30473	47kΩ ±5% 1/16W
R940	4822 051 30561	560Ω ±5% 1/16W
R941	4822 116 83207	1.2kΩ ± 5% 1/16W
R942	4822 116 83219	820Ω ±5% 1/16W
R943	4822 051 30759	75Ω ± 5% 1/16W
R944	4822 116 83222	82kΩ ± 5% 1/16W
R945	4822 051 30471	470Ω ± 5% 1/16W

R946	4822 051 30333	33kΩ ±5% 1/16W
R947	4822 051 30561	560Ω ±5% 1/16W
R948	4822 116 83207	1.2kΩ ± 5% 1/16W
R949	4822 116 83219	820Ω ±5% 1/16W
R950	4822 051 30759	75Ω ± 5% 1/16W
R951	4822 051 30759	75Ω ± 5% 1/16W
R952	4822 051 30759	75Ω ± 5% 1/16W
R953	4822 051 30759	75Ω ± 5% 1/16W
R954	4822 111 90893	100Ω ±5% 1/10W
R955	4822 051 30101	100Ω ± 5% 1/16W
R958	4822 116 82487	0Ω ± 5% 1/16W
R959	4822 051 30101	100Ω ±5% 1/16W
R960	4822 116 82487	0Ω ± 5% 1/16W
R961	4822 116 82487	0Ω ± 5% 1/16W
R962	4822 116 82487	0Ω ± 5% 1/16W
R963	4822 051 30473	47kΩ ± 5% 1/16W
R964	4822 051 30102	1kΩ ±5% 1/16W
R965	4822 051 30473	47kΩ ±5% 1/16W
R966	4822 051 30683	68 kΩ ±5% 1/16W
R969	4822 051 30682	6.8kΩ ±5% 1/16W

L901	4822 157 70272	47µH 10% CHIP INDUCT
L902	4822 320 40294	4FT 290nS DELAY LINE
L903	4822 153 70057	4FUS FOR MULTI STAND

D901	4822 130 31129	BB212 V-CAP DOUBLE D

Q402	4822 130 43398	2SC2712 GR
Q403	4822 130 43398	2SC2712 GR
Q404	4822 130 43398	2SC2712 GR
Q410	4822 130 43398	2SC2712 GR
Q411	4822 130 43398	2SC2712 GR
Q901	4822 130 43398	2SC2712 GR
Q902	4822 130 42733	2SA1162 GR
Q903	4822 130 43398	2SC2712 GR
Q904	4822 130 43398	2SC2712 GR
Q905	4822 130 43398	2SC2712 GR
Q906	4822 130 43398	2SC2712 GR
Q907	4822 130 43398	2SC2712 GR
Q908	4822 130 42733	2SA1162 GR
Q909	4822 130 43398	2SC2712 GR
Q910	4822 130 43398	2SC2712 GR
Q911	4822 130 42733	2SA1162 GR
Q912	4822 130 43398	2SC2712 GR

IC35	4822 209 31902	74HC4538 FLAT PACK
IC36	4822 209 31901	CHIP LOGIC TC4S11F
IC90	4822 209 30142	PC74HC40103T JEDEC F
IC91	4822 209 31911	TIBPAL16R6-25CDW SOP
IC92	4822 209 60898	74LS161 EIAJ FLAT
IC93	5322 209 73187	74HC04 EIAJ FLAT
IC94	4822 209 31931	74HC4046 JEDEC FLAT
IC95	4822 209 60898	74LS161 EIAJ FLAT
IC96	4822 209 60898	74LS161 EIAJ FLAT
IC97	4822 209 83357	NJM4560M
IC98	4822 209 61534	74HCU04 EIAJ FLAT
IC99	4822 209 31928	74HC00 EIAJ FLAT
ICE1	4822 209 31908	CXA1145M RGB ENCODER

MMC

Miscellaneous

DF01	4822 130 32635	MA-151K TAPEING
SW10	4822 277 21656	SSSS2-12-12 SMT NTSC
XF01	5322 242 73734	CSAC4.00MGC CERAMIC
X101	4822 242 81347	4.9152MHZ SMD-49 CH
X102	4822 242 81351	30.2098MHZ DSO49SJ C
X103	4822 242 81349	30.0000MHZ DSO49SJ C
X201	4822 242 81352	45.1584MHZ DSO49SJ C
X202	4822 242 81348	19.3575MHZ SMD-49 CH
X601	5322 242 73734	CSAC4.00MGC CERAMIC
X901	4822 242 81378	3.579545 MHZ XTAL SM
X902	4822 242 81379	4.433618 MHZ XTAL SM
Z603	4822 130 83197	GP1U58XP PHILIPS VER
ZF01	4822 130 83229	02CZ3.9X (TOSHIBA)

C101	4822 126 11687	GRM39F104Z16 0.1µF
C102	4822 122 33782	56pF (GR39) 50V
C103	4822 122 33782	56pF (GR39) 50V
C104	4822 126 11687	GRM39F104Z16 0.1µF
C105	4822 126 11687	GRM39F104Z16 0.1µF
C106	4822 126 11687	GRM39F104Z16 0.1µF
C107	4822 122 33761	22pF (GR39) 50V
C108	4822 122 33761	22pF (GR39) 50V
C109	4822 122 33761	22pF (GR39) 50V
C110	4822 122 32672	1µF/16V
C111	5322 122 34098	0.01µF 50V
C112	4822 126 11687	GRM39F104Z16 0.1µF
C113	4822 126 11687	GRM39F104Z16 0.1µF
C114	4822 126 11687	GRM39F104Z16 0.1µF
C115	4822 126 11687	GRM39F104Z16 0.1µF
C116	4822 126 11687	0.1µF 25V
C117	4822 126 11687	0.1µF 25V
C180	4822 126 11687	GRM39F104Z16 0.1µF
C181	4822 126 11687	GRM39F104Z16 0.1µF
C182	4822 126 11687	GRM39F104Z16 0.1µF
C183	4822 126 11687	GRM39F104Z16 0.1µF
C184	4822 126 11687	GRM39F104Z16 0.1µF
C185	4822 126 11687	GRM39F104Z16 0.1µF
C186	4822 126 11687	GRM39F104Z16 0.1µF
C187	4822 126 11687	GRM39F104Z16 0.1µF
C188	4822 126 11687	GRM39F104Z16 0.1µF
C189	4822 126 11687	GRM39F104Z16 0.1µF
C190	4822 126 11687	GRM39F104Z16 0.1µF
C201	4822 126 11687	GRM39F104Z16 0.1µF
C202	4822 126 11687	GRM39F104Z16 0.1µF
C203	4822 126 11687	GRM39F104Z16 0.1µF
C204	4822 124 10772	100µF/6.3V
C205	4822 126 11687	GRM39F104Z16 0.1µF
C206	4822 126 11687	GRM39F104Z16 0.1µF
C207	4822 126 11687	GRM39F104Z16 0.1µF
C208	4822 122 33788	82pF (GR39) 50V
C209	4822 126 11687	GRM39F104Z16 0.1µF
C210	4822 126 11687	GRM39F104Z16 0.1µF
C211	4822 126 11687	GRM39F104Z16 0.1µF
C213	4822 126 12502	820pF ± 10%
C212	4822 126 11687	GRM39F104Z16 0.1µF
C214	4822 122 33741	10pF (GR39)
C215	4822 122 33777	47pF (GR39)
C216	4822 126 11687	GRM39F104Z16 0.1µF
C217	4822 122 33788	82pF (GR39)
C218	4822 122 33744	100pF (GR39)
C219	4822 122 33761	22pF (GR39)
C220	4822 122 33761	22pF (GR39)
C222	4822 126 11687	GRM39F104Z16 0.1µF
C223	4822 126 12495	1500pF (GR39)
C224	4822 126 12495	1500pF (GR39)
C225	4822 126 11687	GRM39F104Z16 0.1µF
C226	4822 126 11687	GRM39F104Z16 0.1µF
C227	4822 126 11687	GRM39F104Z16 0.1µF
C229	4822 122 33761	22pF (GR39)
C230	4822 126 11687	GRM39F104Z16 0.1µF
C231	4822 126 11566	2200pF (GR39)
C232	4822 126 11566	2200pF (GR39)
C234	4822 126 11687	0.1µF 25V
C280	4822 126 11687	GRM39F104Z16 0.1µF
C281	4822 126 11687	GRM39F104Z16 0.1µF
C282	4822 126 11687	GRM39F104Z16 0.1µF
C283	4822 126 11687	GRM39F104Z16 0.1µF
C284	4822 126 11687	GRM39F104Z16 0.1µF
C285	4822 126 11687	GRM39F104Z16 0.1µF
C286	4822 126 11687	GRM39F104Z16 0.1µF
C287	4822 126 11687	GRM39F104Z16 0.1µF
C288	4822 126 11687	GRM39F104Z16 0.1µF
C401	4822 126 11687	GRM39F104Z16 0.1µF
C402	4822 126 11687	GRM39F104Z16 0.1µF
C403	4822 126 11687	GRM39F104Z16 0.1µF
C404	4822 126 11687	GRM39F104Z16 0.1µF
C405	4822 126 11687	GRM39F104Z16 0.1µF
C406	4822 126 11687	GRM39F104Z16 0.1µF
C407	4822 126 11687	GRM39F104Z16 0.1µF
C408	4822 126 11687	GRM39F104Z16 0.1µF
C409	4822 126 11687	GRM39F104Z16 0.1µF
C410	4822 126 11687	GRM39F104Z16 0.1µF
C411	4822 126 11687	GRM39F104Z16 0.1µF
C412	4822 126 11687	GRM39F104Z16 0.1µF
C413	4822 126 11687	GRM39F104Z16 0.1µF
C414	4822 126 11687	GRM39F104Z16 0.1µF
C415	4822 126 11687	GRM39F104Z16 0.1µF
C416	4822 126 11687	GRM39F104Z16 0.1µF
C417	4822 126 11687	GRM39F104Z16 0.1µF
C418	4822 126 11687	GRM39F104Z16 0.1µF
C419	4822 124 11131	47µF/6.3V
C420	4822 124 11131	47µF/6.3V
C421	5322 124 21349	470µF/6.3V
C422	4822 126 11687	GRM39F104Z16 0.1µF
C423	4822 126 11687	GRM39F104Z16 0.1µF
C424	4822 126 11687	GRM39F104Z16 0.1µF
C425	4822 126 11687	GRM39F104Z16 0.1µF
C426	4822 126 11687	GRM39F104Z16 0.1µF
C427	4822 126 11687	GRM39F104Z16 0.1µF

C434	4822 122 33782	56pF (GR39)
C440	4822 122 33782	56pF (GR39)
C480	4822 126 11687	GRM39F104Z16 0.1μF
C601	4822 122 33777	47pF (GR39)
C602	4822 122 33777	47pF (GR39)
C603	4822 126 11687	GRM39F104Z16 0.1μF
C620	4822 124 11074	10μF/ 16V
C621	4822 124 11074	10μF/ 16V
C622	4822 124 11074	10μF/ 16V
C623	4822 124 11074	10μF/ 16V
C624	4822 124 11074	10μF/ 16V
C629	4822 126 11687	GRM39F104Z16 0.1μF
C630	4822 126 11685	4700pF (GR39)
C631	4822 126 11685	4700pF (GR39)
C632	4822 126 11685	4700pF (GR39)
C633	4822 126 11685	4700pF (GR39)
C634	4822 126 11685	4700pF (GR39)
C636	4822 126 11685	4700pF (GR39)
C650	4822 124 11074	10μF/ 16V
CF01	4822 126 11687	GRM39F104Z16 0.1μF
CF02	4822 126 11687	GRM39F104Z16 0.1μF
CF03	4822 122 33777	47pF (GR39) 50V
CF04	4822 122 33777	47pF (GR39) 50V

R101	4822 051 30472	4.7kΩ ±5% 1/16W
R102	4822 051 30102	1kΩ ±5% 1/16W
R103	4822 051 30102	1kΩ ±5% 1/16W
R104	4822 051 30472	4.7kΩ ±5% 1/16W
R105	4822 051 30472	4.7kΩ ±5% 1/16W
R106	4822 051 30102	1kΩ ±5% 1/16W
R107	4822 051 30102	1kΩ ±5% 1/16W
R108	4822 051 30472	4.7kΩ ±5% 1/16W
R109	4822 051 30472	4.7kΩ ±5% 1/16W
R110	4822 051 30105	1MΩ ±5% 1/16W
R111	4822 051 30102	1kΩ ±5% 1/16W
R112	4822 051 30102	1kΩ ±5% 1/16W
R113	4822 051 30102	1kΩ ±5% 1/16W
R114	4822 051 30102	1kΩ ±5% 1/16W
R115	4822 051 30102	1kΩ ±5% 1/16W
R116	4822 051 30102	1kΩ ±5% 1/16W
R118	4822 116 82487	0Ω ±5% 1/16W
R119	4822 051 30101	100Ω ±5% 1/16W
R120	4822 051 30101	100Ω ±5% 1/16W
R121	4822 051 30101	100Ω ±5% 1/16W
R122	4822 051 30104	100kΩ ±5% 1/16W
R123	4822 051 30104	100kΩ ±5% 1/16W
R124	4822 051 30104	100kΩ ±5% 1/16W
R125	4822 051 30102	1kΩ ±5% 1/16W
R126	4822 051 30102	1kΩ ±5% 1/16W
R128	4822 116 82487	0Ω ±5% 1/16W
R131	4822 051 30472	4.7kΩ ±5% 1/16W
R132	4822 051 30472	4.7kΩ ±5% 1/16W
R133	4822 051 30472	4.7kΩ ±5% 1/16W
R134	4822 051 30472	4.7kΩ ±5% 1/16W

R135	4822 051 30102	1kΩ ±5% 1/16W
R137	4822 116 82487	0Ω ±5% 1/16W
R140	4822 051 30222	2.2kΩ ±5% 1/16W
R141	4822 116 82487	0Ω ±5% 1/16W
R142	4822 116 82487	0Ω ±5% 1/16W
R201	4822 051 30479	47Ω ±5% 1/16W
R202	4822 051 30153	15kΩ ±5% 1/16W
R203	4822 051 30102	1kΩ ±5% 1/16W
R204	4822 051 30222	2.2kΩ ±5% 1/16W
R205	4822 051 30101	100Ω ±5% 1/16W
R206	4822 051 30101	100Ω ±5% 1/16W
R207	4822 051 30479	47Ω+/-5% 1/16W
R211	4822 051 30103	10kΩ ±5% 1/16W
R212	4822 051 30102	1kΩ ±5% 1/16W
R213	4822 051 30103	10kΩ ±5% 1/16W
R214	4822 051 30102	1kΩ ±5% 1/16W
R218	4822 116 82487	0Ω ±5% 1/16W
R220	4822 116 82487	0Ω ±5% 1/16W
R222	4822 051 30221	220Ω ±5% 1/16W
R223	4822 051 30223	22kΩ ±5% 1/16W
R224	4822 051 30221	220Ω ±5% 1/16W
R225	4822 051 30223	22kΩ ±5% 1/16W
R227	4822 116 82487	0Ω ±5% 1/16W
R229	4822 116 82487	0Ω ±5% 1/16W
R231	4822 116 82487	0Ω ±5% 1/16W
R232	4822 116 82487	0Ω ±5% 1/16W
R233	4822 051 30104	100kΩ ±5% 1/16W
R235	4822 116 82487	0Ω ±5% 1/16W
R236	4822 051 30101	100Ω ±5% 1/16W
R401	4822 051 30759	75Ω ±5% 1/16W
R402	4822 051 30759	75Ω ±5% 1/16W
R403	4822 051 30473	47kΩ ±5% 1/16W
R404	4822 051 30472	4.7kΩ ±5% 1/16W
R405	4822 051 30759	75Ω ±5% 1/16W
R406	4822 051 30759	75Ω ±5% 1/16W
R407	4822 051 30473	47kΩ ±5% 1/16W
R408	4822 051 30222	2.2kΩ ±5% 1/16W
R409	4822 117 10145	# 3.3Ω ±5% 1/10W
R410	4822 051 30391	390Ω ±5% 1/16W
R411	4822 051 30181	180Ω ±5% 1/16W
R412	4822 051 30759	75Ω ±5% 1/16W
R413	4822 051 30759	75Ω ±5% 1/16W
R414	4822 051 30759	75Ω ±5% 1/16W
R421	4822 051 30229	22Ω ±5% 1/16W
R440	4822 116 82487	0Ω ±5% 1/16W
R444	4822 051 30229	22Ω ±5% 1/16W
R490	4822 116 82487	0Ω ±5% 1/16W
R491	4822 116 82487	0Ω ±5% 1/16W
R493	4822 116 82487	0Ω ±5% 1/16W
R494	4822 116 82487	0Ω ±5% 1/16W
R601	4822 051 30224	220kΩ ±5% 1/16W
R602	4822 051 30103	10kΩ ±5% 1/16W
R603	4822 051 30103	10kΩ ±5% 1/16W
R604	4822 051 30222	2.2kΩ ±5% 1/16W
R605	4822 051 30473	47kΩ ±5% 1/16W

R606	4822 116 83212	18kΩ ± 5% 1/16W
R607	4822 051 30103	10kΩ ± 5% 1/16W
R609	4822 051 30103	10kΩ ±5% 1/16W
R611	4822 051 30103	10kΩ ±5% 1/16W
R613	4822 116 82487	0Ω ± 5% 1/16W
R620	4822 116 82487	0Ω ± 5% 1/16W
R621	4822 051 30104	100kΩ ± 5% 1/16W
R622	4822 051 30103	10kΩ ± 5% 1/16W
R623	4822 051 30102	1kΩ ± 5% 1/16W
R650	4822 051 30473	47kΩ ± 5% 1/16W
R651	4822 117 10145	# 3.3Ω ±5% 1/10W
R661	4822 116 82487	0Ω ± 5% 1/16W
R670	4822 116 82487	0Ω ± 5% 1/16W
R672	4822 116 82487	0Ω ± 5% 1/16W
R674	4822 051 30103	10kΩ ±5% 1/16W
RF01	4822 051 30103	10kΩ ± 5% 1/16W
RF02	4822 051 30103	10kΩ ± 5% 1/16W
RF03	4822 051 30103	10kΩ ± 5% 1/16W
RF04	4822 051 30103	10kΩ ± 5% 1/16W
RF05	4822 051 30103	10kΩ ± 5% 1/16W
RF06	4822 051 30103	10kΩ ± 5% 1/16W
RF08	4822 051 30331	330Ω ± 5% 1/16W
RF09	4822 051 30103	10kΩ ± 5% 1/16W
RF10	4822 051 30103	10kΩ ± 5% 1/16W
RF11	4822 051 30102	1kΩ ± 5% 1/16W
RF12	4822 051 30223	22kΩ ± 5% 1/16W
RF13	4822 051 30223	22kΩ ± 5% 1/16W
RF14	4822 051 30223	22kΩ ± 5% 1/16W
RF15	4822 051 30224	220kΩ ± 5% 1/16W
RF16	4822 051 30473	47kΩ ± 5% 1/16W
RF17	4822 051 30473	47kΩ ± 5% 1/16W
RF18	4822 051 30472	4.7kΩ ± 5% 1/16W
RF19	4822 051 30473	47kΩ ± 5% 1/16W
RF20	4822 051 30473	47kΩ ± 5% 1/16W
RF21	4822 051 30472	4.7kΩ ± 5% 1/16W
RF22	4822 051 30103	10kΩ ±5% 1/16W
RF25	4822 116 82487	0Ω ±5% 1/16W
RF26	4822 116 82487	0Ω ±5% 1/16W
RF27	4822 116 82487	0Ω ±5% 1/16W
RF28	4822 116 82487	0Ω ±5% 1/16W
RF29	4822 116 82487	0Ω ±5% 1/16W
RF30	4822 051 30103	10kΩ ±5% 1/16W
RF31	4822 051 30473	47kΩ ±5% 1/16W
RF32	4822 051 30103	10kΩ ±5% 1/16W

L102	4822 158 60636	BLM32A07 FER BEADS C
L103	4822 158 60636	BLM32A07 FER BEADS C
L201	4822 158 60636	BLM32A07 FER BEADS C
L401	4822 157 70322	NFM61R10T102 COIL C
L601	4822 158 60636	BLM32A07 FER BEADS C
L602	4822 158 60636	BLM32A07 FER BEADS C
L603	4822 158 60636	BLM32A07 FER BEADS C
L604	4822 158 60636	BLM32A07 FER BEADS C
L605	4822 158 60636	BLM32A07 FER BEADS C
L606	4822 158 60636	BLM32A07 FER BEADS C
L607	4822 158 60636	BLM32A07 FER BEADS C

D201	4822 130 32635	MA151K
D401	4822 209 31965	LM385B-1.2 REF.-D 1.

Q101	4822 130 43398	2SC2712 GR
Q601	4822 130 42733	2SA1162 GR
Q602	4822 130 43398	2SC2712 GR
QF01	4822 130 43398	2SC2712 GR
QF02	4822 130 43398	2SC2712 GR
QF03	4822 130 42733	2SA1162 GR
QF04	4822 130 42733	2SA1162 GR
QF05	4822 130 43398	2SC2712 GR

IC01		SCC68070 16/32 BIT C
IC02	4822 209 31941	74AC14 EIAJ FLAT TAP
IC03	4822 209 12533	TC534200F 4MBIT CMOS
IC04	4822 209 30554	MK48T08B-15 TIMEKEEP
IC05	4822 209 31938	74F74 EIAJ FLAT IC
IC06	4822 209 31938	74F74 EIAJ FLAT IC
IC07	4822 209 31938	74F74 EIAJ FLAT IC
IC08	4822 209 31948	74F02 EIAJ FLAT IC
IC09	4822 209 31945	74ACT04 EIAJ FLAT IC
IC10	4822 209 31951	PST572C 4.5V RESET I
IC11	4822 209 31956	TIBPAL20L8-15CFN PLC
IC12	4822 209 31955	TIBPAL16L8-10CFN PLC
IC13	4822 209 31948	74F02 EIAJ FLAT IC
IC14	4822 209 31938	74F74 EIAJ FLAT IC
IC15	4822 209 31948	74F02 EIAJ FLAT IC
IC16	4822 209 31939	74F164 EIAJ FLAT IC
IC17	4822 209 31947	74ACT244 EIAJ FLAT IC
IC20		IMS66490 CDIC
IC21		PCB5010 IMS1088-3 DS
IC22	4822 209 31947	74ACT244 EIAJ FLAT IC
IC23	4822 209 31947	74ACT244 EIAJ FLAT IC
IC24	4822 209 31944	74AC646 JEDEC FLAT IC
IC25	4822 209 31944	74AC646 JEDEC FLAT IC
IC26	4822 209 31972	LC3564QM-10 64K SRAM
IC27	4822 209 31972	LC3564QM-10 64K SRAM
IC28	4822 209 31943	74AC169 EIAJ FLAT IC
IC29	4822 209 31942	74AC74 EIAJ FLAT IC
IC30	4822 209 61494	74HC74 EIAJ FLAT IC

IC31	4822 209 31963	NE564D PHASE-LOCKED
IC32	4822 209 31966	74HCT32 EIAJ FLAT
IC33	4822 209 61534	74HCU04 EIAJ FLAT
IC38	4822 209 31964	AN5860S ANALOG SW FO
IC40		SCC66470 VSC
IC41	4822 209 31957	TMS4516S-80 256X16 B
IC42		SCC66470 VSC
IC43	4822 209 31957	TMS4516S-80 256X16 B
IC44		GSC38TG307CF31 MC444
IC45	4822 209 31949	ADV7120KP30 3-DAC PL
IC46	4822 209 31946	74ACT74 EIAJ FLAT
IC47	4822 209 31967	74HCT4053 JEDEC FLAT
IC48	4822 209 31928	CMOS 74HC00 FLAT TAP
IC65	4822 209 31968	MC68HC05C8 268K SERV
IC66	4822 209 31954	MC145407F 5V DRIVER/
ICF1	4822 209 31971	UPD75004GB-3B4 268K

POWER

Miscellaneous

Only for version /00/11/05

FP01	4822 117 10196	FUS.RES.1Ω10%1/16W
FP02	4822 117 10196	FUS.RES.1Ω10%1/16W

Only for version /17

FP01	4822 253 30423	FUSE 1/2A 125V
FP02	4822 253 30424	FUSE 3/4A 125V

CP01	4822 126 11687	GRM39F104Z16 0.1μF
CP02	4822 126 12341	100μF/16V L=7 D=6.3
CP03	4822 126 12341	100μF/16V L=7 D=6.3
CP06	4822 126 11687	GRM39F104Z16 0.1μF
CP07	4822 126 11687	GRM39F104Z16 0.1μF
CP08	4822 124 41842	47μF/ 16V
CP09	4822 124 10772	100μF/6.3V
CP10	4822 126 11687	GRM39F104Z16 0.1μF
CP11	4822 126 11687	GRM39F104Z16 0.1μF
CP12	4822 124 22048	220μF/6.3V L=7 D=6.3
CP13	4822 126 11687	GRM39F104Z16 0.1μF
CP20	4822 126 11687	GRM39F104Z16 0.1μF
CP21	4822 126 11687	GRM39F104Z16 0.1μF
CP22	4822 126 11687	GRM39F104Z16 0.1μF
CP23	4822 126 11687	GRM39F104Z16 0.1μF
CP26	4822 124 41842	47μF 16V

RP02	4822 117 10153	# 2.2Ω ±5% 1/4W
RP03	4822 117 10153	# 2.2Ω ±5% 1/4W
RP04	4822 051 30103	10kΩ ± 5% 1/16W
RP05	4822 051 30102	1kΩ ±5% 1/16W
RP06	4822 117 10146	# 4.7Ω J 1/4W
RP07	4822 051 30101	100Ω ±5% 1/16W

L501	4822 157 70322	NFM61R10T102CHIPCOIL
L502	4822 157 70322	NFM61R10T102CHIPCOIL
L503	4822 157 70322	NFM61R10T102CHIPCOIL
L504	4822 157 70322	NFM61R10T102CHIPCOIL
L904	4822 157 70332	NFM41R00C221CHIPCOIL
L905	4822 157 70332	NFM41R00C221CHIPCOIL
LP01	4822 157 70267	NL322522 0.68UH C
LP02	4822 157 70267	NL322522 0.68UH C
LP03	4822 117 10153	# 2.2Ω ±5% 1/4W
LP04	4822 117 10153	2.2Ω ±5% 1/16W C
LP05	4822 158 60636	BLM32A07 FER BEADS C
LP10	4822 242 73843	DSS306-91-F-223Z NOI
LP11	4822 242 73843	DSS306-91-F-223Z NOI
LP12	4822 242 73843	DSS306-91-F-223Z NOI
LP13	4822 242 73843	DSS306-91-F-223Z NOI
LP14	4822 242 73843	DSS306-91-F-223Z NOI
LP15	4822 242 73843	DSS306-91-F-223Z NOI
LP16	4822 242 73843	DSS306-91-F-223Z NOI
LP17	4822 242 73843	DSS306-91-F-223Z NOI
LP18	4822 242 73843	DSS306-91-F-223Z NOI

L906	4822 157 70332	NFM41R00C221

ICP1	4822 209 63385	NJM78L05UA CHIP REG
ICP2	4822 209 31903	NJM79L05UA -5V/0.1A
ICP3	4822 209 32034	AN8010 REG IC LEAD

SERVO

Miscellaneous

Z801	4822 130 32874	MA-3075-M
Z802	4822 130 32874	MA-3075-M

C801	4822 123 30373	0.047µF J 16V ECWU1C
C803	4822 123 30369	0.22µF
C811	4822 123 30366	0.01µF J 16V ECWU1C
C814	4822 123 30372	4700pF J 16V ECWU1C
C815	4822 123 30369	0.22µF 16V
C816	4822 123 30367	0.1µF J 16V ECWU1C
C821	4822 123 30374	8200pF J 16V ECWU1C
C822	4822 123 30374	8200pF J 16V ECWU1C
C823	4822 123 30373	0.047µF J 16V ECWU1C
C824	4822 123 30369	0.22µF 16V
C825	4822 123 30369	0.22µF 16
C826	4822 123 30371	0.033µF J 16V ECWU1C
C827	4822 123 30371	0.033µF J 16V ECWU1C
C829	4822 123 30369	0.22µF 16V
C830	4822 124 11333	B.P. 0.47µF 50V (MV)
C831	4822 123 30367	0.1µF J 16V ECWU1C
C835	4822 123 30368	0.018µF J 16V ECWU1C
C802	4822 122 33744	100pF (GR39)
C804	4822 126 11681	1000pF (GR39)
C805	4822 126 11668	220pF (GR39)
C806	5322 122 34098	0.01µF
C807	4822 126 11668	220pF (GR39) 50V
C808	4822 121 42668	0.47µF ±5% 50V
C809	4822 126 11681	1000pF (GR39) 50V
C810	4822 126 11568	470pF (GR39) 50V
C812	4822 122 32701	0.022µF 50V
C813	4822 121 42668	0.47µF ±5% 50V
C817	4822 124 11331	2.2µF/ 50V
C818	4822 121 42668	0.47µF ±5% 50V
C819	4822 126 11566	2200pF (GR39) 50V
C820	4822 122 33777	47pF (GR39) 50V
C828	4822 124 11131	47µF/6.3V
C832	4822 122 33127	2200pF 50V
C833	5322 121 42661	0.33µF ±5% 50V
C836	4822 124 11131	47µF/6.3V
C837	4822 126 11687	GRM39F104Z16 0.1µF
C838	4822 126 11687	GRM39F104Z16 0.1µF
C839	4822 124 11131	47UF/6.3V
C841	4822 126 11687	GRM39F104Z16 0.1µF
C842	4822 124 11131	47µF/6.3V
C843	4822 126 11671	33pF (GR39)
C844	4822 126 11671	33pF (GR39)
C846	4822 126 11681	1000pF (GR39)
C849	4822 126 11687	GRM39F104Z16 0.1µF
C850	4822 124 11131	47µF/6.3V
C851	4822 126 11687	GRM39F104Z16 0.1µF
C852	4822 122 33777	47pF (GR39)
C853	4822 122 33777	47pF (GR39)
C854	4822 122 33744	100pF (GR39)
C855	4822 126 11687	GRM39F104Z16 0.1µF
C856	4822 126 11687	GRM39F104Z16 0.1µF

C857	4822 126 11687	GRM39F104Z16 0.1µF
C858	4822 126 11687	GRM39F104Z16 0.1µF
C859	4822 124 11131	47µF/6.3V
C861	4822 126 11687	GRM39F104Z16 0.1µF

R801	4822 051 30101	100Ω ± 5% 1/16W
R802	4822 051 30102	1kΩ ± 5% 1/16W
R803	4822 116 83208	12kΩ ± 5% 1/16W
R804	4822 051 30222	2.2kΩ ± 5% 1/16W
R805	4822 116 83215	5.6kΩ ± 5% 1/16W
R806	4822 051 30103	10kΩ ± 5% 1/16W
R807	4822 051 30101	100Ω ± 5% 1/16W
R808	4822 117 10152	# 18Ω ±5% 1/10W
R809	4822 117 10151	# 12Ω ±5% 1/10W
R810	4822 051 30104	100kΩ ± 5% 1/16W
R811	4822 051 30472	4.7kΩ ± 5% 1/16W
R812	4822 116 83209	120kΩ ± 5% 1/16W
R813	4822 051 30103	10kΩ ± 5% 1/16W
R814	4822 051 30102	1kΩ ± 5% 1/16W
R815	4822 051 30154	150kΩ ± 5% 1/16W
R816	4822 051 30335	3.3MΩ ± 5% 1/16W
R817	4822 116 83216	56kΩ ± 5% 1/16W
R818	4822 051 30394	390kΩ ± 5% 1/16W
R819	4822 051 30279	27Ω ± 5% 1/16W
R820	4822 051 30229	22Ω ± 5% 1/16W
R821	4822 116 83222	82kΩ ± 5% 1/16W
R822	4822 051 30104	100kΩ ± 5% 1/16W
R823	4822 051 30154	150kΩ ± 5% 1/16W
R824	4822 051 30105	1MΩ ± 5% 1/16W
R825	4822 051 30335	3.3MΩ ± 5% 1/16W
R826	4822 051 30759	75Ω J 1/16W
R827	4822 051 30222	2.2kΩ ± 5% 1/16W
R828	4822 051 30223	22kΩ ± 5% 1/16W
R829	4822 051 30223	22kΩ ± 5% 1/16W
R830	4822 051 30473	47kΩ ± 5% 1/16W
R831	4822 051 30223	22kΩ ± 5% 1/16W
R832	4822 051 30223	22kΩ ± 5% 1/16W
R833	4822 051 30391	390Ω ± 5% 1/16W
R834	4822 051 30472	4.7kΩ ± 5% 1/16W
R835	4822 116 83208	12kΩ ± 5% 1/16W
R836	4822 051 30102	1kΩ ± 5% 1/16W
R837	4822 051 30154	150kΩ ± 5% 1/16W
R838	4822 116 83208	12kΩ ± 5% 1/16W
R839	4822 051 30152	1.5kΩ ± 5% 1/16W
R840	4822 051 30153	15kΩ ± 5% 1/16W
R841	4822 051 30152	1.5kΩ ± 5% 1/16W
R842	4822 051 30152	1.5kΩ ± 5% 1/16W
R843	4822 051 30338	3.3Ω ± 5% 1/16W
R844	4822 051 30339	33Ω ± 5% 1/16W
R845	4822 051 30682	6.8kΩ ± 5% 1/16W
R846	4822 051 30104	100kΩ ± 5% 1/16W
R847	4822 051 30104	100kΩ ± 5% 1/16W
R848	4822 116 83222	82kΩ ± 5% 1/16W
R849	4822 051 30333	33kΩ ± 5% 1/16W
R850	4822 051 30684	680kΩ ± 5% 1/16W
R851	4822 051 30154	150kΩ ± 5% 1/16W
R852	4822 116 83215	5.6kΩ ± 5% 1/16W
R853	4822 051 30332	3.3kΩ ± 5% 1/16W
R854	4822 051 30473	47kΩ ± 5% 1/16W
R855	4822 051 30472	4.7kΩ ± 5% 1/16W
R856	4822 116 83207	1.2kΩ ± 5% 1/16W
R857	4822 051 30105	1MΩ ± 5% 1/16W
R858	4822 051 30104	100kΩ ± 5% 1/16W
R859	4822 051 30104	100kΩ ± 5% 1/16W
R860	4822 051 30473	47kΩ ± 5% 1/16W
R861	4822 051 30472	4.7kΩ ± 5% 1/16W
R862	4822 051 30223	22kΩ ± 5% 1/16W
R863	4822 051 30339	33Ω ± 5% 1/16W
R864	4822 051 30101	100Ω ± 5% 1/16W
R865	4822 051 30224	220kΩ ± 5% 1/16W
R866	4822 051 30101	100Ω ± 5% 1/16W
R867	4822 051 30104	100kΩ ± 5% 1/16W
R868	4822 051 30392	3.9kΩ ± 5% 1/16W
R869	4822 051 30103	10kΩ ± 5% 1/16W
R870	4822 051 30101	100Ω ± 5% 1/16W
R871	4822 051 30152	1.5kΩ ± 5% 1/16W
R872	4822 051 30223	22kΩ ± 5% 1/16W
R873	4822 051 30224	220kΩ ± 5% 1/16W
R874	4822 051 30222	2.2kΩ ± 5% 1/16W
R875	4822 051 30103	10kΩ ± 5% 1/16W
R876	4822 051 30223	22kΩ ± 5% 1/16W
R877	4822 051 30223	22kΩ ± 5% 1/16W
R878	4822 051 30223	22kΩ ± 5% 1/16W
R879	4822 051 30223	22kΩ ± 5% 1/16W
R880	4822 051 30223	22kΩ ± 5% 1/16W
R881	4822 051 30223	22kΩ ± 5% 1/16W
R883	4822 051 30223	22kΩ ± 5% 1/16W
R884	4822 051 30223	22kΩ ± 5% 1/16W
R885	4822 051 30223	22kΩ ± 5% 1/16W
R886	4822 051 30223	22kΩ ± 5% 1/16W
R887	4822 051 30223	22kΩ ± 5% 1/16W
R895	4822 051 30473	47kΩ ± 5% 1/16W
R896	4822 117 10146	# 4.7Ω J 1/4W RF
R897	4822 117 10146	# 4.7Ω J 1/4W RF
R898	4822 051 30472	4.7kΩ ± 5% 1/16W
R899	4822 051 30222	2.2kΩ ±5% 1/16W
R890	4822 051 30474	470 kΩ ±5%1/16W
R999	4822 116 82487	0Ω ± 5% 1/16
RV80	4822 100 11789	20kΩ EVM1S,TMC3K

L801	4822 157 63234	NL322522-4R7M 4.7µH
L802	4822 157 63234	NL322522-4R7M 4.7µH

D801	4822 130 32635	MA-151K TAPEING
D802	4822 130 32635	MA-151K TAPEING

Q801	4822 130 43954	2SD999
Q802	4822 130 43398	2SC2712 GR
Q803	4822 130 42733	2SA1162 GR
Q804	4822 130 42733	2SA1162 GR
Q805	4822 130 42733	2SA1162 GR
Q806	4822 130 43398	2SC2712 GR
Q810	4822 130 43954	2SD999
Q811	4822 130 43398	2SC2712 GR
QP01	4822 130 43954	2SD999
QP02	4822 130 43398	2SC2712 GR

IC80	4822 209 30436	TDA8808 HF AMP FLAT-
IC81	4822 209 30437	TDA8809 RADIAL SERVO
IC82	4822 209 31953	TCA0372DM2 SOP
IC83	4822 209 31953	TCA0372DM2 SOP
IC84	4822 209 31928	CMOS 74HC00 FLAT TAP
IC85	4822 209 73952	UPD41416C,MB81416.
IC86	4822 209 63453	SAA7310 DEMODULATOR
IC87	4822 209 30439	PCF3523P ADOC
IC88	4822 209 31969	MC68HC05C8 268K SERV

AC ADAPTER

Miscellaneous

AC01	4822 272 10326	180-265V 22ER9150/00
AC01	4822 272 10329	85-135V 22ER9150/17
AC01	4822 272 10329	AC ADAPTER 85-135V
AC02	4822 321 10914	# 14P DC CORD TPX13
AC03	4822 321 10915	AC MAINS CORD /11/17
AC03	4822 321 10939	AC MAINSCORD /17
AC03	4822 321 10932	AC MAINSCORD /00

Miscellaneous

003B	4822 502 13203	SCREW:CLAMPER BRACKE
010B	4822 502 13877	SCREW:EJECT HOLDER
011B	4822 502 13877	SCREW:O/C PCB
016B	4822 502 13314	SCREW:OPEN BRACKET
017B	4822 502 13314	SCREW:LEAF SPRING
030B	4822 402 61465	CDM BRACKET
031B	4822 402 61466	SUSPENTION:CDM-9
033B	4822 502 13877	SCREW:CDM BRACKET
034B	4822 502 13314	SCREW:DC PCB
035B	4822 502 13877	SCREW:MMC PCB
037B	4822 502 13877	I/O&S OUT
045B	4822 502 13877	SCREW:LCD CASE
048B	4822 502 13877	SCREW:CASE DOWN&UP
051B	4822 502 13103	SCREW:CASE DOWN&UP
053B	4822 502 30699	HINGE UNIT
059B	4822 462 71882	ORNAMENTAL COVER
065B	4822 281 50174	LCD CONTACTOR
066B	4822 466 62294	SPEAKER SHEET
067B	4822 281 50175	LID CONTACTOR
068B	4822 502 13877	FOR FMV CASE
075B	4822 281 50175	LID CONTACTSPRING
078B	4822 462 71897	SPEAK WIRE BUFFER
079B	4822 462 71897	CDM WIRE BUFFER
080B	4822 466 62294	SPEAKER SHEET
J402	4822 265 31052	006200-257-032800 FF
J404	4822 265 31047	TX20A-26RD2G1-A1L 26
J501	4822 265 31046	HSJ0924-01-1110 FOR
J502	4822 265 31049	CGP4707-0101 EP 7P L
J503	4822 267 31581	HSJ0922-01-1140 FOR
J601	4822 265 31054	TCS7184-01-201 EMI-P
J603	4822 267 31585	2.5MM PIN IMSA-6035B
J606	4822 265 31053	FCN-228J100-G/0-01 (
J801	4822 267 50676	14P JACK MOLEX 5597-
J802	4822 267 31584	MKS8082-6-0-202 STOC
J902	4822 267 31581	HSJ0922-01-1140 FOR
J904	4822 265 31055	TCS7144-01-201 EMI-P
J992	4822 265 31065	JACK1.25MM 3PIN CHIP
J993	4822 265 31064	JACK1.25MM 2PIN CHIP
JF01	4822 265 31051	006200-147-032800 14
JP01	4822 265 31048	S14B-PH-K-S
PI06	4822 214 52039	IR-JOINT-PCB
PM06	4822 214 33876	MAIN PCB /00/05
PM06	4822 214 52033	MAIN PCB/17
PS06	4822 214 52035	LID SWITCH PCB
S801	4822 271 30787	SIF-012H R66 4759 1-
W401	4822 321 61813	25PIN 330MM FLAT CAB
W502	4822 321 61812	CGP1207(7P)-EHR(3P)
WP01	4822 321 61808	PHR14-SAN14 80MM
WV02	4822 321 61845	5P TO 3P SHIELD WIRE
X802	5322 242 73734	CSAC4.00MGC CERAMIC

Service tools

J502	4822 267 31618	FEMALE CONNECTOR
TOOL	4822 395 50365	CHIP REPLACE JIG BIG
TOOL	4822 395 50366	CHIP REPLACEJIG SMAL
TOOL	4822 395 90612	CHIP IC REPLACE JIG
TOOL	4822 267 50676	CDM FLEX CONNECTOR
TOOL	4822 214 52007	LL TEST PCB
TOOL	4822 321 61677	LL TEST CABLE

22ER9150 :

Miscellaneous

JA31	4822 265 41293	LSJP0038 CONN.14P

CA02	4822 125 60192	ECKDNS332ME 3300pF
CA04	4822 125 60192	ECKDNS332ME 3300pF
CA06	4822 121 70275	ECQU2A103MY 0.01µF
CA07	4822 122 33127	ECUV1H222KBN 2200pF
CA08	4822 124 80448	ECEA1HGE100 10µF/50V
CA09	4822 124 80449	ECEA1HGE470 47µF/50V
CA10	4822 125 60193	ECUV1H431JCN 430pF
CA11	4822 126 12061	ECUV1E104KBN 0.1µF
CA13	5322 122 34099	ECUV1H471KBN 470pF/50
CA14	4822 125 60191	ECKD3A101KBN 100pF/1K
CA15	4822 121 70274	ECQE6473KFWN 0.047µF
CA17	4822 121 70275	ECQU2A103MY 0.01µF
CA32	4822 125 60194	MCUV2D102KRN 1000pF
CA33	4822 125 60194	MCUV2D102KRN 1000pF
CA34	4822 125 60194	MCUV2D102KRN 1000pF
CA35	4822 125 60194	MCUV2D102KRN 1000pF
CA36	4822 125 60194	MCUV2D102KRN 1000pF
CA37	4822 125 60194	MCUV2D102KRN 1000pF
CA38	4822 126 12061	ECUV1E104KBN 0.1µF
CA39	5322 122 34098	ECUV1H103KBN 0.01µF
CA40	4822 124 80447	ECEA1EGE102 1000µF
CA41	4822 124 80444	ECEA1CGE102 1000µF
CA42	4822 124 80444	ECEA1CGE102 1000µF
CA43	4822 124 80444	ECEA1CGE102 1000µF
CA44	4822 124 80444	ECEA1CGE102 1000µF
CA45	4822 124 80444	ECEA1CGE102 1000µF
CA46	4822 124 80445	ECEA1CGE331 330µF/16V
CA47	4822 126 12061	ECUV1E104KBN 0.1µF/25V
CA48	4822 124 80446	ECEA1EGE100 10µF/25V
CA81	4822 125 60194	MCUV2D102KRN 1000pF
CA82	4822 125 60194	MCUV2D102KRN 1000pF
CA83	4822 125 60194	MCUV2D102KRN 1000pF
CA84	4822 125 60194	MCUV2D102KRN 1000pF
CA85	4822 125 60194	MCUV2D102KRN 1000pF
CA86	4822 125 60194	MCUV2D102KRN 1000pF

RA07	4822 117 10207	ERJ6ENF1502V 15kΩ
RA08	4822 117 10209	ERJ6ENF2702V 27kΩ
RA09	4822 111 91076	ERJ6GEYJ332V 3.3kΩ
RA10	4822 117 10218	ERJ14YJ01H 100Ω
RA11	4822 117 10219	ERJ14YJ220H 22Ω
RA12	4822 117 10214	ERG3SJ104H 100kΩ
RA14	4822 117 10213	ERG2SJ270P 27Ω 2W
RA15	4822 111 90893	ER6GEYJ101V 100Ω
RA16	4822 111 90913	ERJ6GEYJ333V 33kΩ
RA31	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA32	4822 111 91192	ERJ6GEYJ471V 470Ω
RA33	4822 111 90894	ERJ6GEYJ102V 1kΩ
RA34	4822 111 91191	ERJ6GEYJ331V 330Ω
RA35	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA36	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA37	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA38	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA39	4822 111 90893	ERJ6GEYJ101V 100Ω
RA40	4822 111 91191	ERJ6GEYJ331V 330Ω
RA41	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA42	4822 111 91191	ERJ6GEYJ331V 330Ω
RA43	4822 117 10208	ERJ6ENF2203V 220kΩ SV
RA44	4822 117 10206	ERJ6ENF1002V 10kΩ SV
RA45	4822 111 92141	BPR3F 0.01 0.01Ω
RA46	4822 111 92141	BPR3F 0.01 0.01Ω
RA47	4822 117 10205	ERJ6ENF1001V 1kΩ
RA48	4822 117 10205	ERJ6ENF1001V 1kΩ
RA49	4822 117 10212	ERG1SJ471P 470Ω
RA50	4822 111 90894	ERJ6GEYJ102V 1kΩ
RA51	4822 117 10212	ERG1SJ471P 470Ω 1W
RA52	4822 111 90907	ERJ6GEYJ223V 22kΩ
RA53	4822 111 90906	ERJ6GEYJ222V 2.2kΩ
RA54	4822 111 90895	ERJ6GEYJ103V 10kΩ
RA55	4822 100 11983	EVN39C00YB13 1kΩ
RA56	4822 111 90907	ERJ6GEYJ223V 22kΩ
RA57	4822 111 90907	ERJ6GEYJ223V 22kΩ
RA58	4822 111 90894	ERJ6GEYJ102V
RA59	4822 111 90894	ERJ6GEYJ102V
RA70	4822 111 90896	ERJ6GEYJ104V 100kΩ
RA71	4822 116 83352	ERJ6GEYJ561V 560Ω

LA04	4822 157 70393	VLPS0005A/B/C COIL
LA05	4822 157 70394	VLQS7H392J COIL
LA06	4822 157 70393	VLPS0005A/B/C COIL
LA31	4822 157 70392	ETS29K484V COIL
LA033	4822 157 70393	VLPS0005A/B/C COIL
LA034	4822 157 70395	VLQS9A9ROM COIL
LA35	4822 157 70393	VLPS0005A/B/C COIL

DA01	4822 130 42657	MA3200 0.1A/20V
DA03	4822 130 83318	MA2300 0.4A/30V
DA04	4822 130 83321	MA199 0.2A/200V
DA06	4822 130 33617	ERB12-01 1A/100V
DA07	4822 130 83317	MA188 0.2A/200V
DA08	4822 130 83317	MA188 0.2A/200V
DA31	4822 130 83323	10DL2CZ41A 10A/200V
DA32	4822 130 83327	MA3056 0.1A/5.6V
DA33	4822 130 83324	MA750 10A/40V
DA34	4822 130 83323	10DL2CZ41A 10A/200V
DA35	4822 130 83328	MA3150 0.1A/15V
DA36	4822 130 83325	SIWBA40 1A/400V
DA37	4822 130 82452	MA720 0.5A/40V
DA38	4822 130 32635	MA151K 0.1A/40V
DA40	4822 130 83326	SEL4417G LED

QA31	4822 130 42671	2SD601A 0.1A/50V

ICA4	4822 209 62279	M51977FP SUPPLY IC
ICA5	4822 209 32136	AN6588S OP-AMP
ICA6	4822 209 32137	UPC78L05T POWER IC
ICA7	4822 209 32135	AN143M POWER REG IC

Only for 22ER9150/00 :

Miscellaneous

001V	4822 444 40646	LSKM0067+0068 CASE
FA01	4822 253 30426	FUSE 3.15A/250V
JA32	4822 265 20624	LSJP0037 AC INLET
THA1	4822 111 92137	ERT5ZFL100P 10Ω
TA01	4822 146 21717	ETS33K382V TRANS.
TA02	4822 146 21716	ETP28Z335AF TRANS.

CA01	4822 121 70276	ECQU2A47MV 0.47µF/250V
CA03	4822 121 70276	ECQU2A47MV 0.47µF/250V
CA05	4822 121 70275	ECQU2A103MY 0.01µF
CA12	4822 124 80451	MCES2DG121Q 120µF/400
CA16	4822 125 60192	ECKDNS332ME 3300pF

RA01	4822 117 10211	ERD25FJ474 470kΩ
RA02	4822 117 10217	ERJ12YJ823H 82kΩ
RA03	4822 117 10217	ERJ12YJ823H 82kΩ
RA04	4822 117 10217	ERJ12YJ823H 82kΩ
RA13	4822 117 10216	ERX1SJR30P 0.30Ω

LA02	4822 157 70391	ELF18D290R COIL
LA03	4822 157 70391	ELF18D290R COIL

DA02	4822 130 83319	RBV-406 4A/600V
DA05	4822 130 83316	EG01C

QA01	4822 130 63241	2SK996

ICA1	4822 209 32138	ON3731 PHOTO COUPLER
ICA2	4822 209 32138	ON3171 PHOTO COUPLER
ICA3	4822 209 32138	ON3171 PHOTO COUPLER

Only for 22ER9150/17 :

Miscellaneous

FA01	4822 253 30427	LSSF0015A40 4A/125V
THA1	4822 111 92142	ERTD5ZFL8ROP 80Ω
TA02	4822 146 21718	ETP28Z334AF TRANS.
JA32	4822 265 20625	LSJP0036 AC INLET
001V	4822 444 40647	LSKM00063+0062 CASE

CA01	4822 121 70278	EQU2A224MN 0.22µF
CA03	4822 121 70278	EQU2A224MN 0.22µF
CA05	4822 125 60195	VCKS0009 3300pF
CA16	4822 125 60195	VCKS0009 3300pF

RA01	4822 117 10226	ERD25FJ474 407kΩ
RA02	4822 117 10227	ERJ12YJ273H 27kΩ
RA03	4822 117 10227	ERJ12YJ273H 27kΩ
RA04	4822 117 10227	ERJ12YJ273H 27kΩ

LA02	4822 157 70401	ELF18D290V COIL
LA03	4822 157 70401	ELF18D290V COIL

DA02	4822 130 83319	RBV-406 4A/400V
DA05	4822 130 83329	EGO1 0.7A/400V

QA01	4822 130 63245	2SK1819 5A/450V

ICA1	4822 209 32156	ON3131 PHOTO COUPLER
ICA2	4822 209 32156	ON3131 PHOTO COUPLER
ICA3	4822 209 32156	ON3131 PHOTO COUPLER

PHILIPS SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Important

Proper service and repair is important to the safe, reliable operation of all Philips equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

Safety Checks

After the original service problem has been corrected, a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition, which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those units which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed according to the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length, and dress.
5. No lead or component should touch a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematic diagrams and/or exploded views.

   Replacement parts without the same safety characteristics may create shock, fire, or other hazards.
7. When servicing any unit, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug). Defeating this safety feature may create a potential hazard to the servicer and the user. Extension cords which do not incorporate the polarizing feature should never be used.

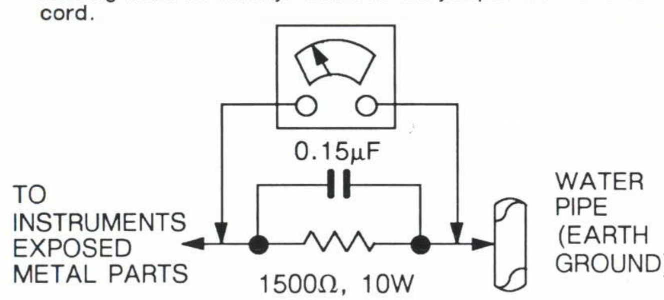
Fire and Shock Hazard (Continued)

9. After reassembly of the unit, always perform an ac leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also, check all metal control shafts (with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit is safe to operate without danger of electrical shock.

* Broken line: ▬ ▪ ▬ ▪ ▬ ▪ ▬ ▪ ▬ ▪

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled unit directly into the ac outlet.
2. Connect a 1.5k, 10W resistor paralleled by a 0.15uF. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms/volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed. (Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Parts Replacement

1. Many electrical and mechanical parts in Philips equipment have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards. Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.
2. All ICs and many other semiconductor parts are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce the life of the part drastically.

LASER NOTE:

DANGER – Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
CAUTION – The use of optical instruments with this product will increase eye hazard.