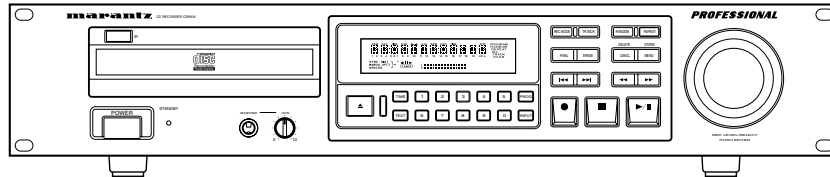


Service Manual

CDR631 /F1B, /N1M, /U1B

CD Recorder

CDR631



REMARK : This service manual explains them by extracting specifications designed for the model CDR631 only. The explanation for CD-R module "MAR770" (Loader : CDL4009' + CD-R Main board) is not mentioned on this service manual.

The CD-R module information is described in the service manual of CD-R modules <MAR770/MAR775>.

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Please use this service manual with referring to the user guide (D.F.U.) without fail.

修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

marantz®

CDR631

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Using superior design and selected high grade components, **MARANTZ** company has created the ultimate in stereo sound. Only original **MARANTZ** parts can insure that your **MARANTZ** product will continue to perform to the specifications for which it is famous.

Parts for your **MARANTZ** equipment are generally available to our National Marantz Subsidiary or Agent.

ORDERING PARTS :

Parts can be ordered either by mail or by Fax.. In both cases, the correct part number has to be specified.

The following information must be supplied to eliminate delays in processing your order :

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature : any order form or Fax. must be signed, otherwise such part order will be considered as null and void.

USA

MARANTZ AMERICA, INC.
440 MEDINAH ROAD
ROSELLE, ILLINOIS 60172
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PHONE : 630 - 307 - 3100
FAX : 630 - 307 - 2687

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CENTRO DE INFORMACOES AO
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MARANTZ PROFESSIONAL PRODUCTS
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TECHNICAL AUDIO GROUP PTY, LTD
558 DARLING STREET,
BALMAIN, NSW 2041,
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PHONE : 61 - 2 - 9810 - 5300
FAX : 61 - 2 - 9810 - 5355

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LENBROOK INDUSTRIES LIMITED
633 GRANITE COURT,
PICKERING, ONTARIO L1W 3K1
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FAX : 905 - 831 - 6936

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MT. WAVERLEY VIC 3149
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746 - 754 MAHACHAI ROAD.,
WANGBURAPAPIROM, PHRANAKORN,
BANGKOK, 10200 THAILAND
PHONE : +66 - 2 - 222 9181
FAX : +66 - 2 - 224 6795

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#03-02 OLIVINE BUILDING
SINGAPORE 368357
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FAX : +65 858 6078

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WILDASH AUDIO SYSTEMS NZ
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WO KEE HONG ELECTRONICS SDN. BHD.
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NO. 33, JALAN SULTAN ISMAIL,
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MK ENTERPRISES LTD.
ROOM 604/605, ELECTRO-OFFICETEL, 16-58,
3GA, HANGANG-RO, YONGSAN-KU, SEOUL
KOREA
PHONE : +822 - 3232 - 155
FAX : +822 - 3232 - 154

SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard No. 813.

In case of difficulties, do not hesitate to contact the Technical
Department at above mentioned address.

1.Servicing the CDR631

1.1 INTRODUCTION:

The CDR631 is the professional version of a CD recorder, this means that the SCMS (Serial Copy Management System) is not included. The CDR631 can record on the Audio and CDRs PC.

The CDR631 is suitable for recording and playback of CD-R W discs (CD-Re Writable disc).

Playback & Recording and Disc

Disc Player/Recorder	CD	CDR				CD-RW				SCMS
		Consumer Disc		Professional Disc		Consumer Disc		Professional Disc		
		Finalized	non Finalized	Finalized	non Finalized	Finalized	non Finalized	Finalized	non Finalized	
Audio CD Player Current products Ex:CD-17	P	P	no	P	no	no	no	no	no	-
Audio CD Player CD-RW playback Ex:CD-17MK II	P	P	no	P	no	P	no	P	no	-
CD-RW Recorder For Professional Ex:CDR630/631/640	P	P	P/R	P	P/R	P/R	P/R	P/R	P/R	no
CD-RW Recorder For Consumer Ex:DR6000/6050	P	P	P/R	P	P	P/R	P/R	P	P	YES

Consumer : For Digital Audio

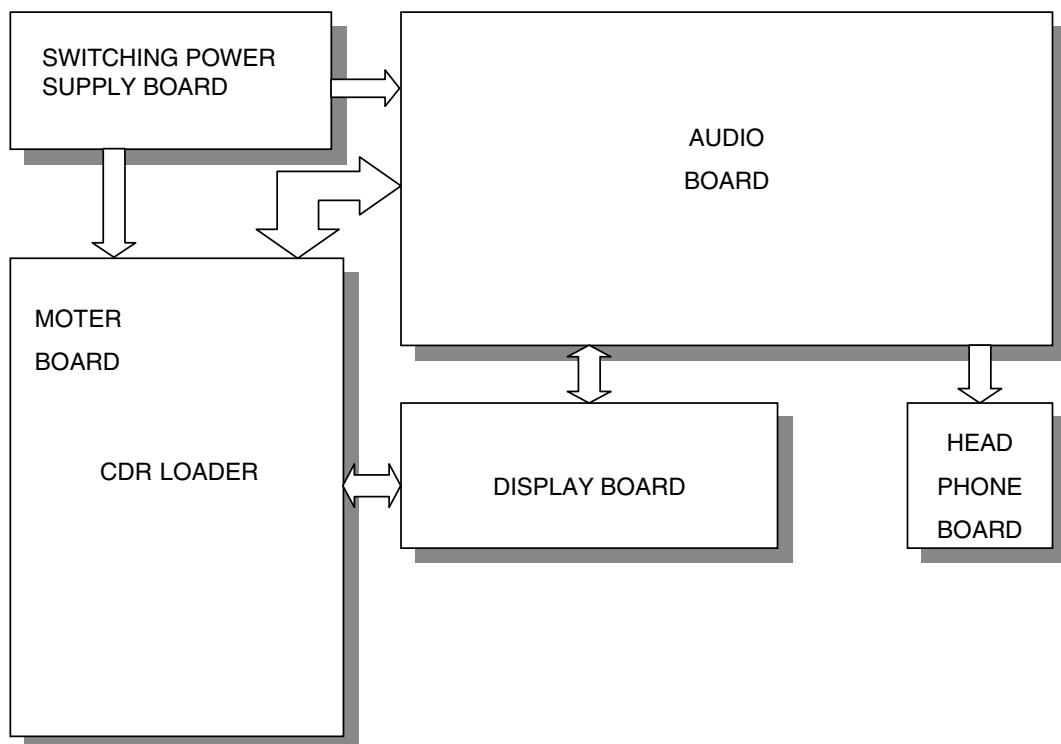
Professional : For General use (Including PC)

P : Playback

R : Recording

1.2 OPENING THE PRODUCT :

The product can be opened by removing the top cover (8 screws). Once the product is opened one can have access to the several PCB's and the main module. To have access to the Display PCB, the Headphone PCB first the front cover has to be removed.



Below the several PCB's and it function and service policy will be discussed:

1.2.1 CDR loader (CDR main module CDL4009 or MAR770):

This complete CDR loader is considered as not repairable in the field. therefore this module will be repaired centrally. A module exchange procedure will be set up for this purpose. The module can be removed from the product by removing 4 screws and the transformer (see demounting the CDR module on page 1-7), and loosening the connectors.

This module is the complete CD recorder, it contains the following parts:

CD Mechanism (CDM4009'). Underneath this mechanism a PCB is mounted which is adjusted to the mechanism (laser current settings are stored in EEPROM).

Loader Assy. This mechanical assy takes care for the tray control.

Main PCB. This PCB takes care that the (analog or digital) signal to be recorded is converted into a suitable signal which can be recorded on the disc.

Digital signals with an other sampling frequency than 44.1kHz will be converted in the sample rate converter (DASP) to 44.1kHz.

Analog signals will be first converted into a digital converter by the AD converter.

This PCB also takes care that the signal from the CD (playback) is converted into a suitable digital signal (or analog via the DA converter).

The main microprocessor controls the several functions of this PCB.

1.2.2 Switching Power Supply Board.

This PCB contains the Power Supply, which delivers the several voltages for each PCB in the CDR631. On this Power Supply a fuse (Primary side) are mounted on this PCB. The power SW is joined to the Power bottom on the front panel. All parts are available as spare parts.

1.2.3 Audio Board.

This PCB contains the audio part, which takes care that the signal from CDR main module is converted into an analog signal via DA converter and outputs the analog signal. This PCB contains the output and input connectors also. All parts are available as spare parts.

1.2.4 Display Board.

This PCB contains the Display, which informs the user about the status of the recording/playback process and it also takes care for scanning the keys on the front panel. The information from the keys is fed via a I²C connection to the main microprocessor on the CDR loader module. Information which needs to be displayed is also fed via this I²C line from the main microprocessor on the CDR loader module to the display controller.

The parts for this PCB are available as service parts so this PCB can be repairable up to component level.

1.2.5 Headphone Board.

This PCB contains the headphone socket and potentiometer which controls the headphone volume. All parts are available as spare parts.

IMPORTANT

In case of replace the CD-R module "MAR770", the initialization is necessary. Please initialize the CD-R module with following orders.

1. Press the POWER button (POWER ON) while depressing FINALIZE button and REC MODE button together.
2. FL Display shows;
WAIT → PGM PROTOCOL → PGM PORT END
3. Press the POWER button (POWER OFF).

Then the CD-R module set up to CDR631 own status.

2 TECHNICAL SPECIFICATIONS

GENERAL

System	Compact disc digital audio
Number of channels	2 (stereo)
Applicable discs	CD, CD-R , CD-RW
Power Requirement	
F version	AC 100 V 50 / 60 Hz
N version	AC 100 - 240 V 50 /60 Hz
U version.	AC 120 V 60 Hz
Power Consumption	19 W
Operating Temperature	5 °C - 35 °C
Dimension (MAX)	
Width	483 mm
Height	100 mm
Depth	340 mm
Weight	4.7 kg

AUDIO

Frequency Response	20 Hz - 20 kHz
Playback S/N	108 dB
Playback Dynamic Range	95 dB
Playback Total Harmonic Distortion	92 dB
Recording S/N (analog)	96 dB
Recording Dynamic Range (analog)	92 dB
Recording Total Harmonic Distortion (analog)	88 dB
Analog Output Voltage	2 Vrms
Digital Coaxial Output	0.5 V (p-p) / 75 ohms
Digital Optical Output	- 20 dB
Headphones	0 - 5 Vrms / 8 - 2000 ohms
Recording values for line input	
Digital Coaxial Input (automatic sample rate conversion)	11 - 56 kHz
Digital Optical Input (automatic sample rate conversion)	11 - 56 kHz
Digital XLR Input (automatic sample rate conversion)	11 - 56 kHz
Analog Input Sensitivity (Unbalanced)	500 mVrms / 50 kohms
Analog Input Sensitivity (Balanced)	0 dBu to +22 dBu / 50 kohms (default setting : +16 dBu / 50 kohms)

Specifications subject to change without prior notice.

3. WARNINGS

(GB) WARNING

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

(F) ATTENTION

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



(D) WARNUNG

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

(NL) WAARSCHUWING

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

(I) AVVERTIMENTO

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

(GB)

AVAILABLE ESD PROTECTION EQUIPMENT :

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

(GB)

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

(F)

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

SAFETY



(D)

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

(NL)

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

(I)

Le norme di sicurezza estigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati. Componenti di sicurezza sono marcati con

U : VERSION



N : VERSION



(GB) DANGER:

Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spårén är urkopplad. Betrakta ej strålen.

(DK) Advarsel !

Usynlig laserstrålning ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for strålning.

(SF) Varoitus !

Avatussa laitteessa ja suojauslaituksen ohitettaessa olet alltiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

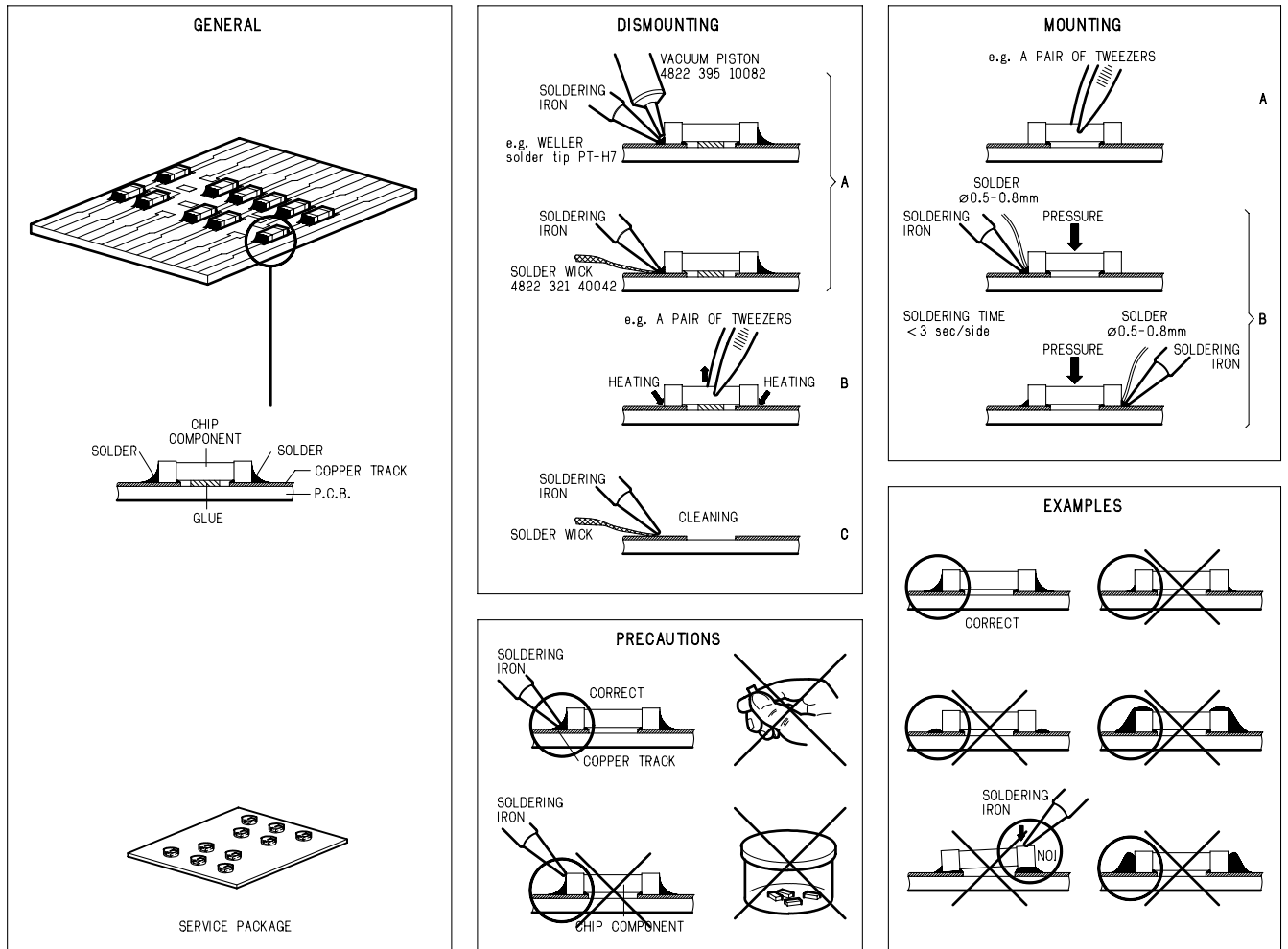
(GB)

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

(F)

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

4. SERVICE HINTS AND TOOLS



SERVICE TOOLS

“The tools listed below are standard test tools that can be used for repairing and testing Marantz CD Players & Recorders. Unless otherwise stated in the text, these tools are not mandatory for servicing Marantz CD Players & Recorders”

Audio signals disc	4822 397 30184
Disc without errors (SBC444)+	
Disc with DO errors, black spots and fingerprints (SBC444A)	4822 397 30245
Disc (65 min 1kHz) without no pause	4822 397 30155
Max. diameter disc (58.0 mm)	4822 397 60141
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204
Hexagon socket screw button (No. 1.5)	

5. Diagnostic Software

5.1 Electrical service diagnostics

ELECTRICAL SERVICE DIAGNOSTICS

(software versions, test for defective components)

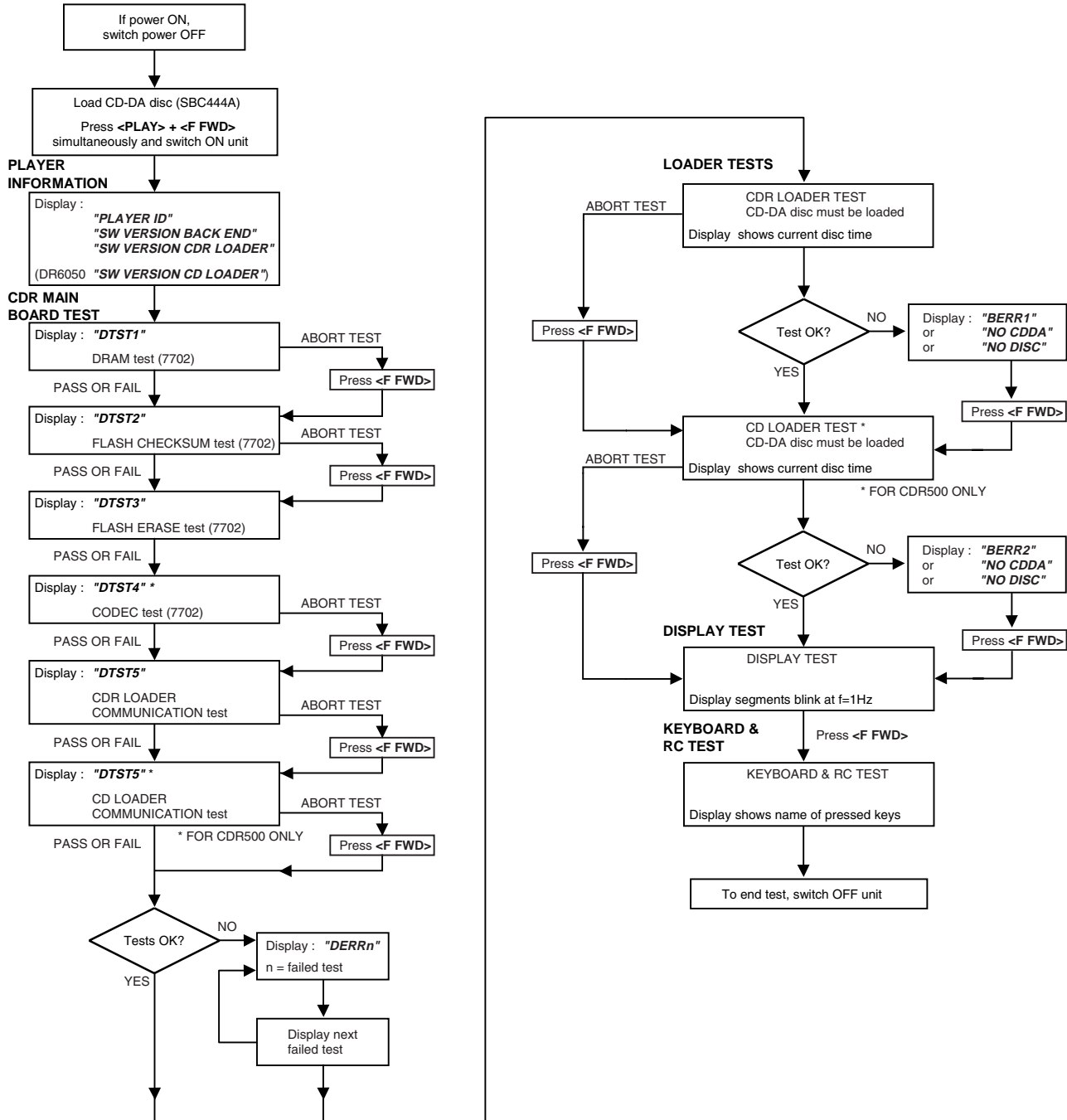


Figure 5-1

5.1.1 Description

The intention of the electrical service diagnostics is to show the software versions present in the player and to direct the dealer towards defective internal units. The units are : the CDR main board, the CDR loader, the CD loader in case of a CDR500 and the keyboard/display board. A sequence of tests is executed automatically. Some of the tests can be aborted or skipped without the result being taken into account. External tools or disassembly of the unit is not necessary to get the diagnostic information. Pressing keys [PLAY/PAUSE] and [F FWD] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test.

5.1.2 Requirements to perform the test

- Working keyboard to start up the test.
- Working local display to check the output messages.
- A CD-DA disc with a minimum of 3 tracks in all trays to perform the disc test.

5.1.3 Description of the tests

Player information

In this part of the test the following important information can be checked without removing the cover :

- Recorder ID.
- SW-version back end of player.
- SW-version CDR loader.
- SW-version CD loader (only for CDR500).

CDR main board test

As soon as the CDR main board tests are finished, all failure messages (if any) will be displayed sequentially by pressing the [F FWD] key. The message "DERRn" will be displayed with n indicating the faulty test number.

If one of the tests is aborted with the [F FWD] key, no error message will be displayed for this test. The flash data erase test ("DTST3") can not be aborted !

The CDR main board test consists out of :

DRAM test

Display : "DTST1". The DRAM used for buffer management is tested by writing, reading and verifying test patterns.

Flash checksum test

Display : "DTST2". This test checks the checksum of the player's SW stored in the flash.

Flash data erase

Display : "DTST3". During this test, all temporary information (CDtxt) in the flash is erased.

CODEC (ADC/DAC) test

Display : "DTST4". This test checks the CODEC IC by writing, reading and verifying test patterns. The test is not applicable for CDR950.

CDR communication test

Display : "DTST5". The communication between the host processor (DASP) and the CDR loader via the DSA-R-bus is tested.

CD communication test

Display : "DTST6". The communication between the host processor (DASP) and the CD loader is tested. The test is only applicable for CDR500.

Loader tests

These tests determine if the CDR loader and the CD loader in case of a CDR500 work correctly. A CD-DA disc with a minimum of 3 tracks needs to be inserted in both loaders. A disc test is executed to check focus control, disc motor control, radial control and jump grooves control. The disc test is performed by audio play-back of 5 seconds at the beginning, middle and end of the disc.

CDR loader test

During the test, the current disc time is shown. In case of an error the message "BERR1" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

CD loader test

For CDR500 only. During the test, the current disc time is shown. In case of an error the message "BERR2" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

Display test

All segments will blink at a frequency of 1 Hz. Pressing the [F FWD] key will start the next test because the user has to check for himself if all segments work properly.

Keyboard and remote control tests

The test will give the user the ability to test every key without executing the function assigned to it. Therefore, the user needs to press every key on the keyboard and the remote control. The display will show the name of the key being pressed. Pressing more than one key at once will give an unpredictable result except for the service combinations : [PLAY/PAUSE] + [STOP], [PLAY/PAUSE] + [ERASE] + [RECORD], [PLAY/PAUSE] + [RECORD].

5.2 Mechanical service diagnostics

MECHANICAL SERVICE DIAGNOSTICS (test for defective components)

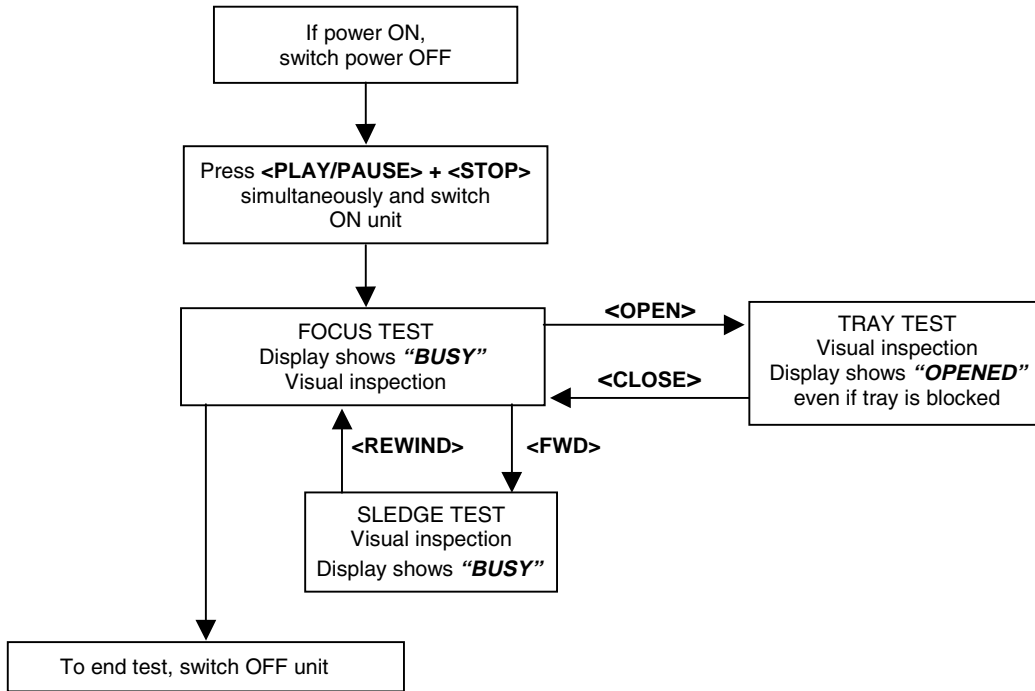


Figure 5-2

5.2.1 Description

No external tools are required to perform this test. The cover needs to be removed because the user has to check the movements of the tray, focus and sledge visually. Pressing keys [PLAY/PAUSE] and [STOP] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test. In case of a CDR500, one can check the CD loader mechanics in the same way by pressing the above key combination on the CD player keys.

pressing [F FWD]. One has to stop these tests pressing [REWIND] before it is possible to close the tray again. Depending on the action the display reads "OPEN", "OPENED", "CLOSE" or "BUSY".

5.2.2 Requirements to perform the test

- Working keyboard to cycle through the tests and to start up the test.
- Working local display to check the output messages.

5.2.3 Description of the tests

Focus control test

The focussing lens is continuously moving up and down. The display reads "BUSY".

Sledge control test

After pressing [F FWD] the sledge continuously moves up and down. Pressing [REWIND] stops the sledge at the position it is in and the focus control test resumes. The display reads "BUSY".

Tray control test

This test starts from within the focus control test routine. Pressing [OPEN/CLOSE] moves the tray in or out. In the tray open position one can initiate focus and sledge tests by

5.3 DC-erase service mode

DC ERASE SERVICE MODE (erasure of complete CD-RW)

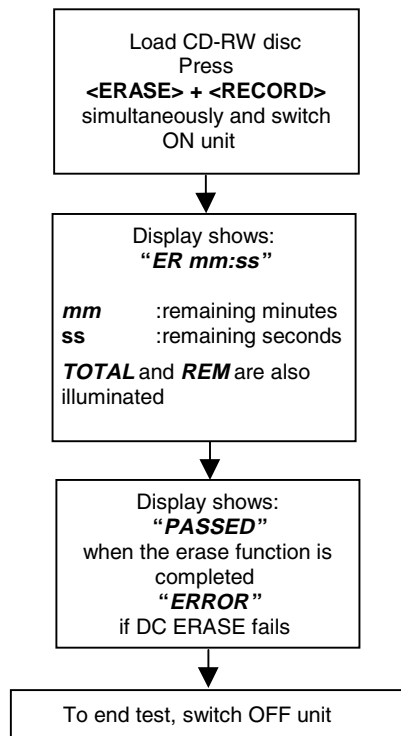


Figure 5-3

5.3.1 Description

This test is initiated by pressing [ERASE] and [RECORD] simultaneously while switching on the unit. The player will erase a complete CD-RW disc (including PMA and ATIP lead out area) at speed N=2. The display shows the countdown of the remaining time required for the operation to complete. The format is "ER mm:ss", where "mm" are the remaining minutes and "ss" the remaining seconds. After completion the message "PASSED" is shown, and the player has to be switched off and on again to start up in normal operating mode. Switching off the unit before completion of the test, leaves the disc in an unpredictable state. In such case only a complete DC-erase procedure can recover the CD-RW disc.

5.3.2 Requirements to perform the test

- Functional CDR player.
- A CD-RW audio disc must be present in the tray.

6. Faultfinding Trees

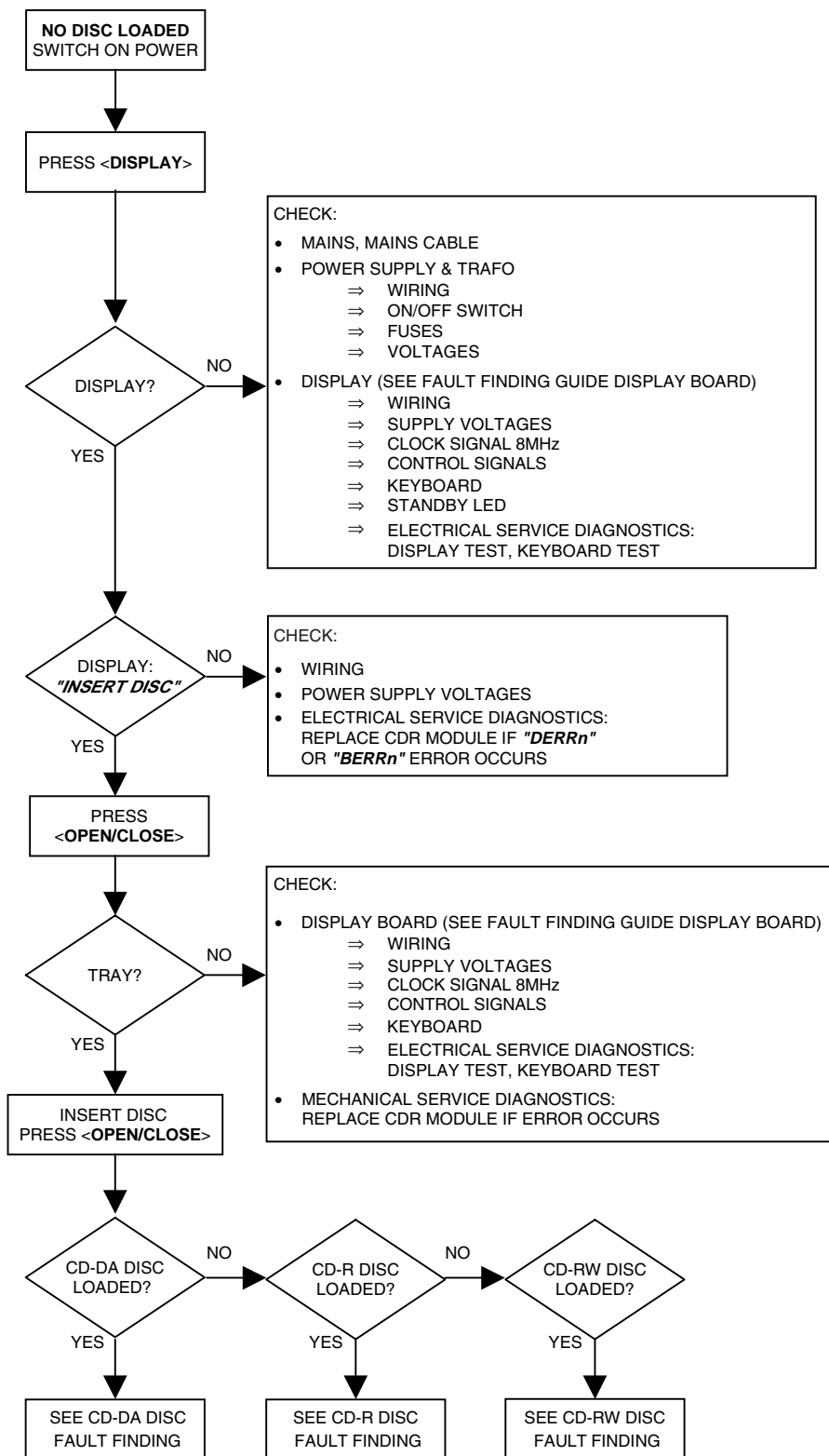


Figure 6-1

Faultfinding Trees

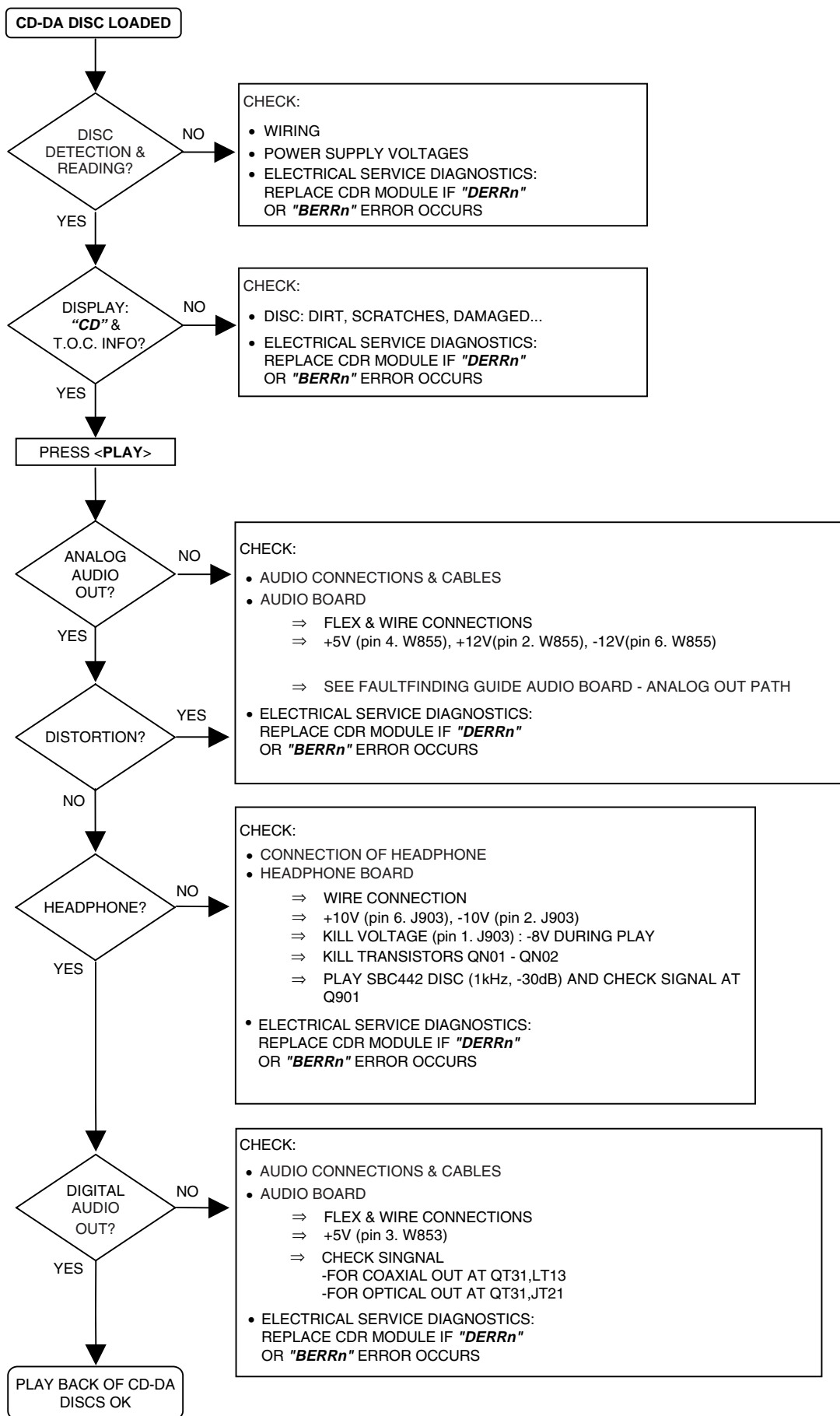


Figure 6-2

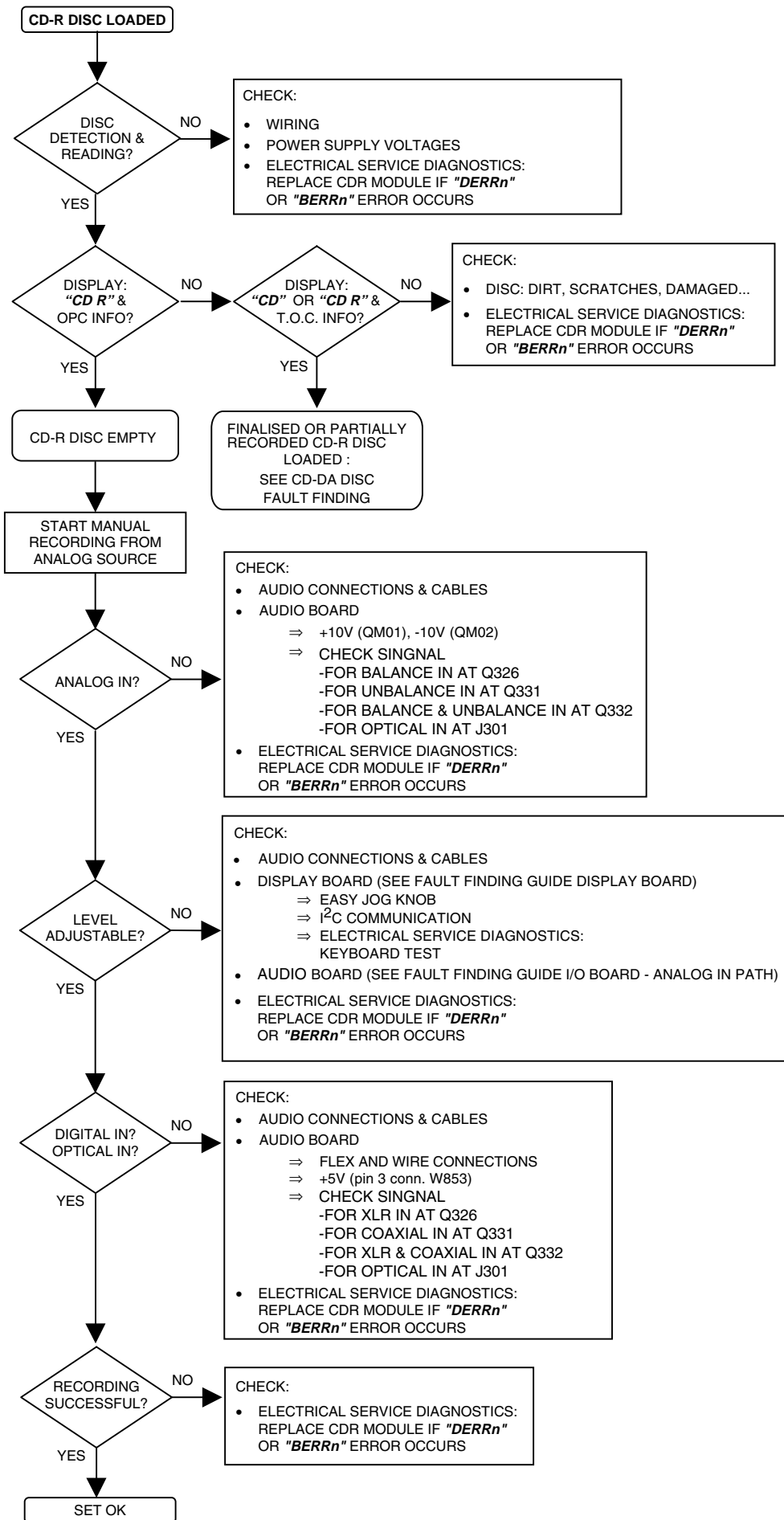


Figure 6-3

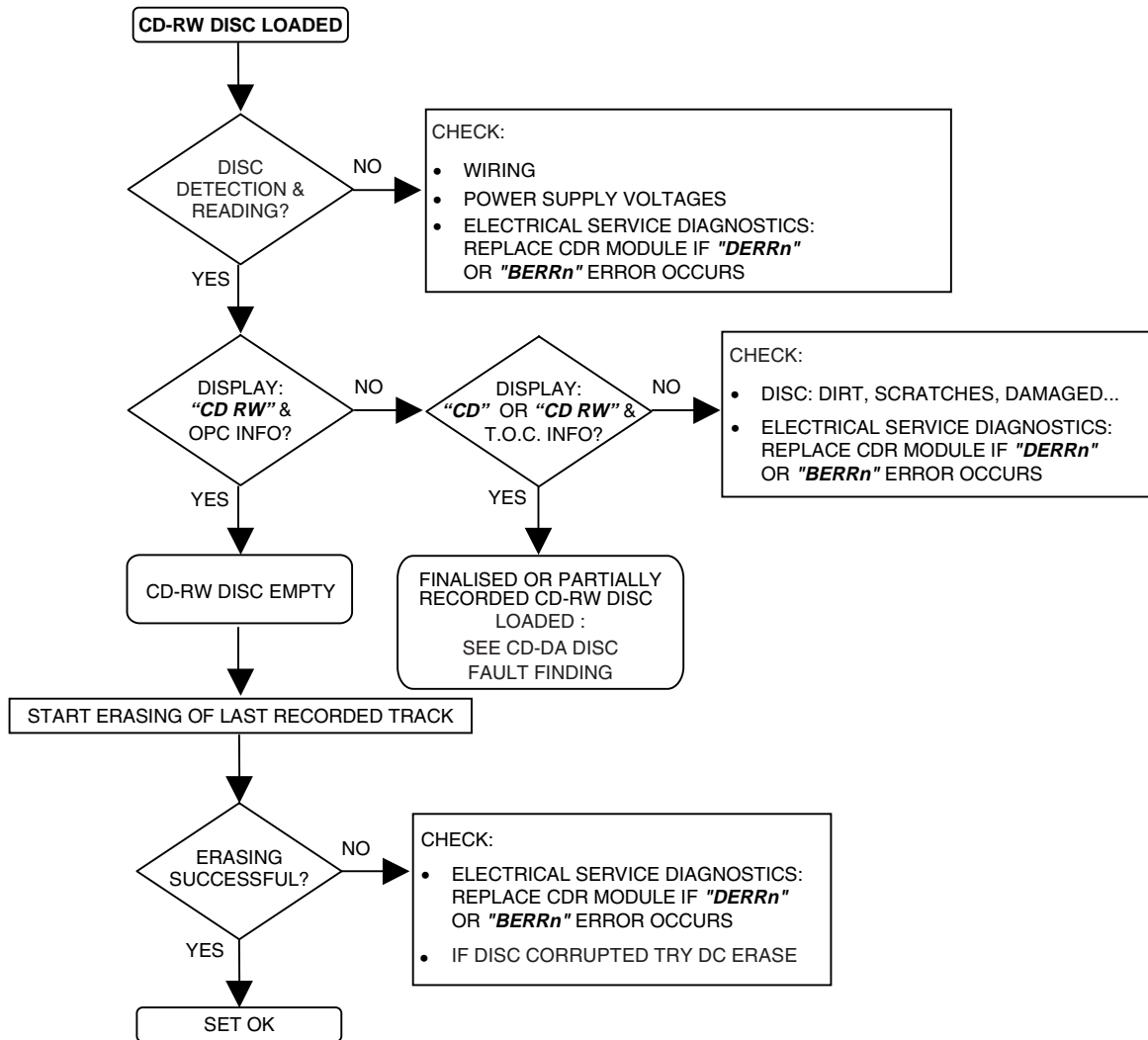


Figure 6-4

7. Faultfinding Guide

7.1 Display Board

7.1.1 Description of display board

General description

The display board has three major parts : the FTD (Fluorescent Tube Display), the display controller TMP87CH74F and the keyboard. The display controller is controlled by the DASP master processor on the CDR main board. The communication protocol used is I2C. So all the information between DASP and display controller goes via the SDA or I2C DATA and SCL or I2C CLK lines. Communication is always initiated by the DASP on the CDR main board. Unlike the previous generations of CDR players, the interrupt generated by the display controller at key-press or reception of remote control is not used. Instead, the DASP polls the display controller for these events.

Display controller TMP87CH74F

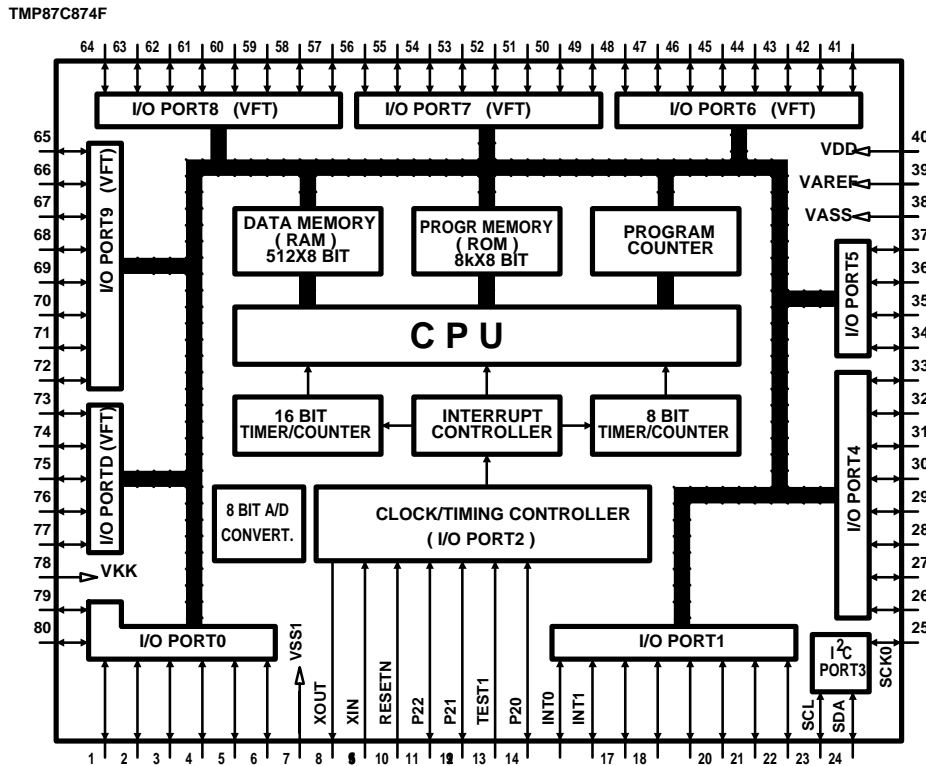
TMP87CH74F (QY01) is a high speed and high performance 8-bit single chip microprocessor, containing 8-bit A/D conversion inputs and a VFT (Vacuum Fluorescent Tube) driver.

In this application, its functions are :

- slave microprocessor.
- FTD driver.
- generates the square wave for the filament voltage required for an AC FTD.
- generates the grid and segment scanning for the FTD.
- generates the scanning grid for the key matrix.
- input for remote control.

All the communication runs via the serial bus interface I2C. The display controller uses an 8Mhz resonator as clock driver.

BLOCK DIAGRAM



PIN DESCRIPTIONS

INT0	external interrupt input 0
INT1	external interrupt input 1
RESETN	reset signal input, active low
SCL	I2C-bus serial clock input/output
SDA	I2C-bus serial data input/output
TEST	test pin, tied to low
VAREF	analog reference voltage input
VASS	analog reference ground
VDD	+5V
VKK	VFT driver power supply
VSS	ground
XIN, XOUT	resonator connecting pins for high-frequency clock

Figure 7-1

7.1.2 Test instructions

Supply voltages

The display board receives several voltages via connector JY01.

- VFTD : -34V \pm 5% measured at pin 2 of conn. JY52.
- VDC1-VDC2 : 4V1 \pm 10% measured between pin 1 and 3 of conn. JY52.
- +5V : +5V \pm 5% measured at pin 10 of conn. JY52.

Voltages VFTD, VDC1 and VDC2 are produced in the Switching Power Supply Board and sent to the display board via the CDR main board. The +5V voltage is produced on the CDR main board as D5V.

Clock signal

As clock driver for the display controller, a resonator of 8 Mhz (XY01) is used. The signal can be measured at pins 8 and 9 of the display controller : 8 Mhz \pm 5%.

Control signals

RESETN

The reset signal comes via pin 4 of conn. JY52 from the DASP master processor on the CDR main board (SYS_RESET). The reset is low active. It should be kept low during power up for at least 3 machine cycles with supply voltage in operating range and a stable clock signal (1 machine cycle = $12 \times 1/F_c$ (8 Mhz sec.)). During normal operation, the reset should be high (3V3). The high signal is 3V3 because the DASP operates on 3V3.

I2C DATA/I2C CLK

These lines connect to the DASP master processor via respectively pin 5 and pin 7 of conn. JY52. When there is no communication, they should have the high level (+5V). The oscillogram below gives an indication of how these signals should look like.

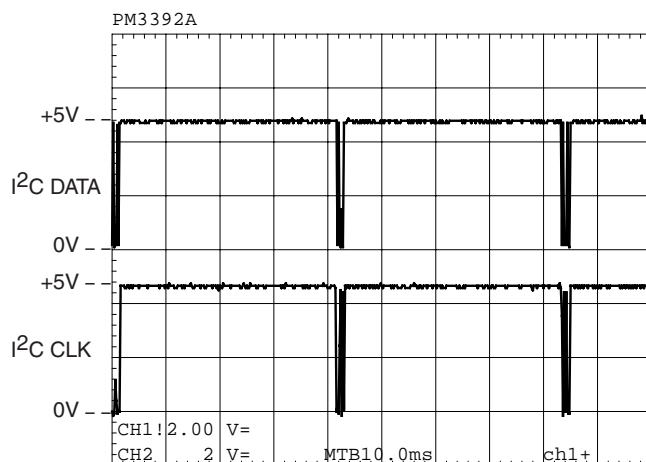


Figure 7-2 "I2C SIGNALS"

FTD drive lines

Filament voltage

Should measure 4.3V \pm 10% (=VDC1-VDC2) between pins 1-2 and pins 52-53 of FTD(VY01).

Grid lines

Level and timing of all grid lines, G1-->G15, can be checked either at the FTD itself or at the display controller. Grid lines G13, G14 and G15 each have an extra current amplifier in line : QY04 for G13, QY03 for G14 and QY02 for G15. A typical grid line signal shows in the oscillogram below.

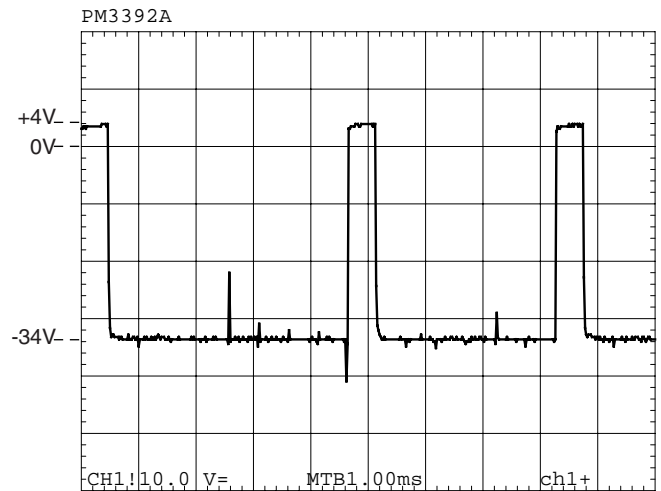


Figure 7-3 "OSD"

Segment lines

Level and timing of all segment lines, P-->P21, can be checked either at the FTD itself or at the display controller. The data on these segment lines however, depends on the characters displayed. The oscillogram below shows a segment line with data. A segment line without data maintains a -30V level.

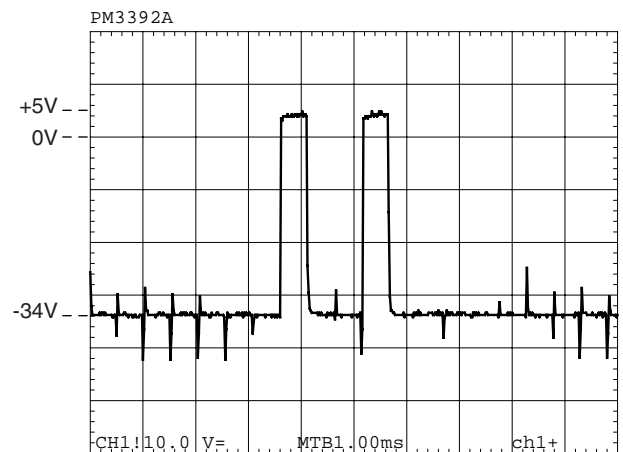


Figure 7-4 "SEGMENT LINE"

Key matrix lines

The lines connected to pins 18, 19, 20, 34, 35, 36 and 37 of the display controller act as matrix scanners. Without a key pressed, they maintain a low level. As soon as a key is pressed, the scanning line connected to that key puts out a scanning signal, which should look like the oscillogram below. This scanning signal goes via the pressed key to I/O port 7 of the display controller (pins 28 to 33). The display controller can now determine which key has been pressed. Without a key pressed, pins 28 to 33 of the display controller maintain a high level (+5V).

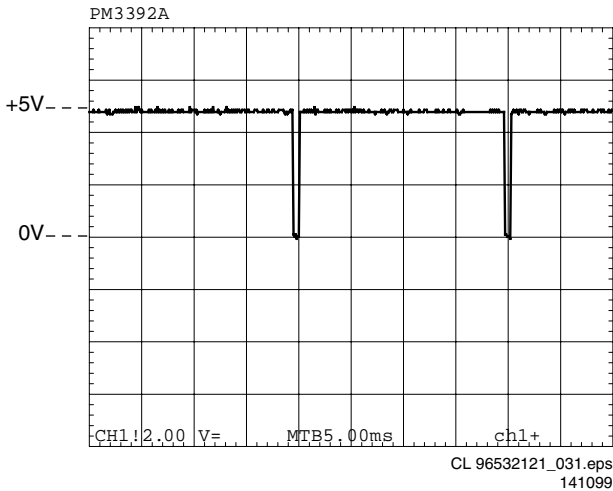


Figure 7-5 KEY MATRIX SCAN LINE

Easy jog knob

Rotary operation

The easy jog knob (SY26) incorporates a whole heap of user control possibilities in just one knob. Without the knob being operated, pin 1 and 3 of the knob (and thus pin 16 and 17 of the display controller), maintain the +5V level. Turning the knob clockwise briefly connects pin 1 to GND followed by pin 3.

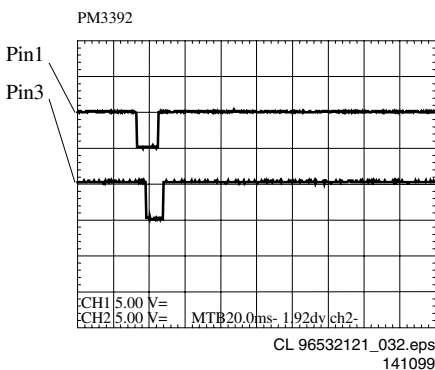


Figure 7-6 TURN CLOCKWISE

Turning the knob anti-clockwise briefly connects pin 3 to GND followed by pin 1.

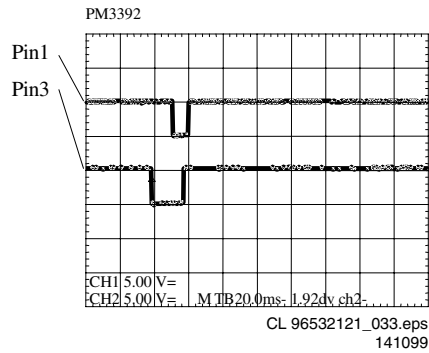


Figure 7-7 TURN ANTI-CLOCKWISE

The pulses created this way arrive at pin 16 and 17 of the display controller. The first pulse to arrive tells the controller the direction of the rotation. Counting the pulses reveals the amount of rotation. Combining and decoding this information, the display controller will execute the appropriate task.

Push button operation

This button connects to the key matrix lines and thus the operation is identical to the ordinary keys. Without being pressed, pin 4 of the easy jog maintains the low level, pin 5 the high level. When pressed the scanning signal goes through the closed contact of pins 4 and 5, and can be checked at both pins.

IR receiver - remote control

In the CDR631 the IR receiver ZY01 is mounted on the IR board. In all versions the IR receiver connects to the display controller. The signal coming from the receiver can be checked at pin 22 of the display controller. This signal is normally high (+5V). When the remote control is being operated, pulses mixed in with the +5V can be measured. The oscillogram gives an indication of how the signal looks like with the RC being operated.

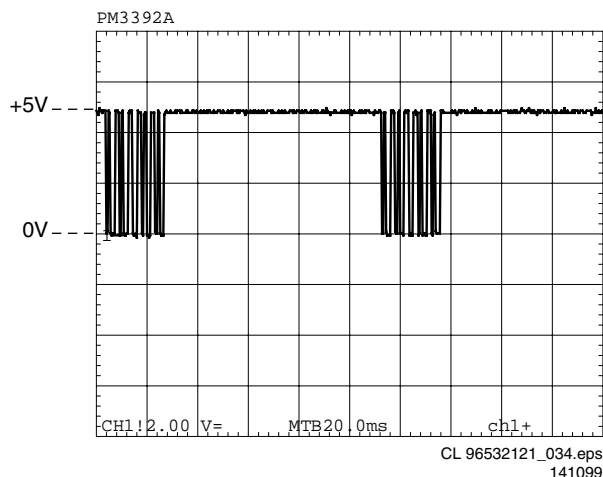


Figure 7-8 IR RECEIVER SIGNAL

7.1.3 Display board troubleshooting guide

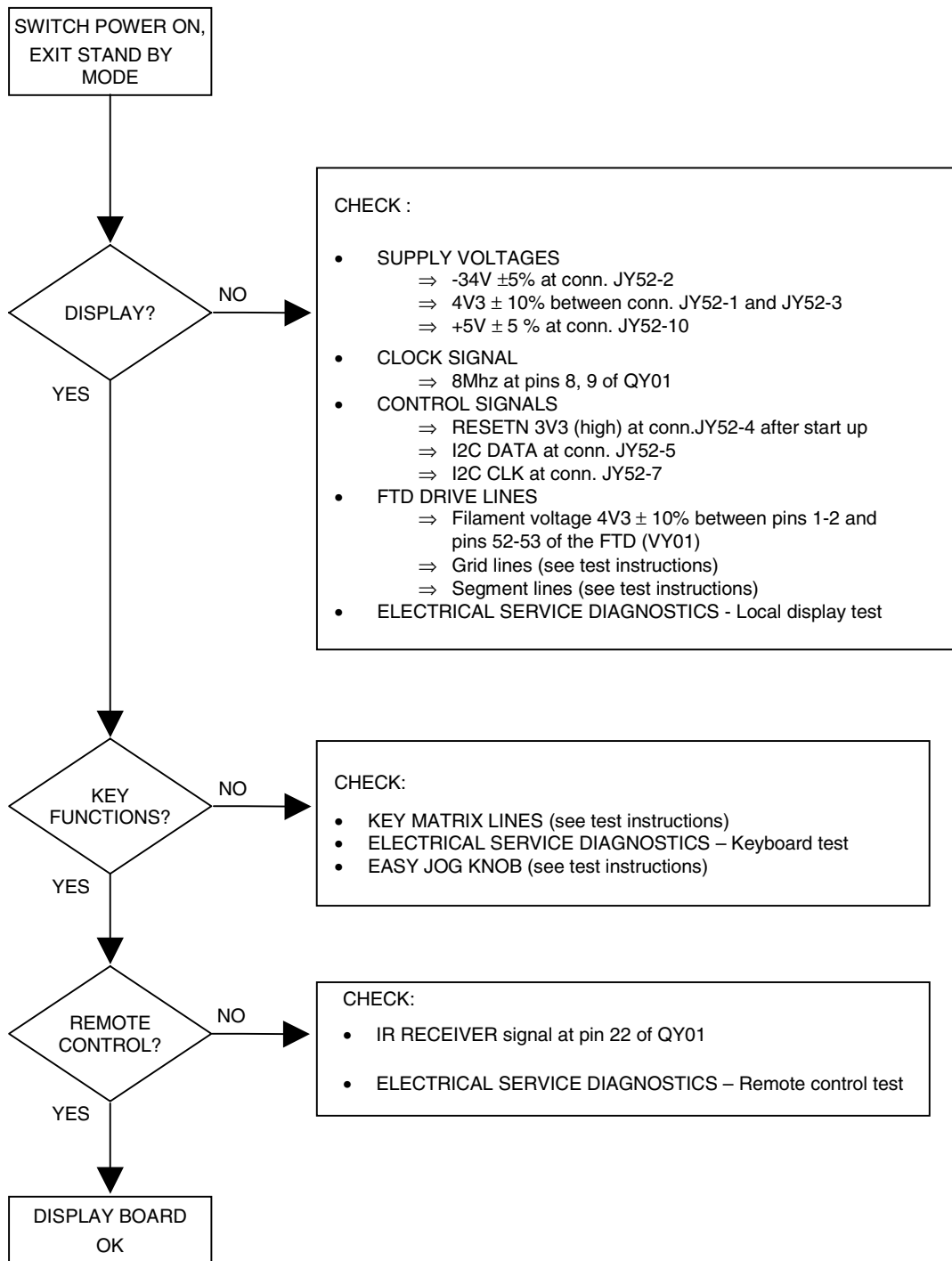


Figure 7-9

7.2 Audio Board

The Audio board for the CDR631 is a full high performance AD/DA panel, acting as an interface to the outside world. Key components are DS1807, ADC AK5351 and DAC AK4393.

Pin description

No.	Pin Name	I/O	PIN / FUNCTION																				
1	AINR+	I	Right channel analog positive input pin																				
2	AINR-	I	Right channel analog negative input pin																				
3	VREF	O	Voltage Reference output pin (VA-2.6V) Normally connected to VA with a 0.1uF ceramic capacitor in parallel with a 10uF electrolytic capacitor.																				
4	VA		Analog section Analog Power Supply, +5V																				
5	AGND		Analog section Analog Ground																				
6	AINL+	I	Left channel analog positive input pin																				
7	AINL-	I	Left channel analog negative input pin																				
8	TST1		Test pin Should be left floating. (Pull- down pin)																				
10	TST2		Test pin Should be left floating. (Pull- down pin)																				
11	TST3		Test pin Should be left floating. (Pull- down pin)																				
14	TST4		Test pin Should be left floating. (Pull- down pin)																				
9	HPFE	I	High Pass Filter Enable pin (Pull- up pin) "H": ON "L": OFF																				
12	VD		Digital section Digital Power Supply pin, +5V																				
13	DGND		Digital section Digital Ground pin																				
16	PD	I	Power Down pin "L" brings the device into power-down mode. Must be done once after power-on.																				
17	MCLK	I	Master Clock input pin CMODE="H" : 384fs CMODE="L" : 256fs																				
18	SCLK	I/O	Serial Data Clock pin Data is clocked out at the falling edge of SCLK. Slave mode: 64fs clock is input usually. Master mode: SCLK outputs a 64fs clock. SCLK stays low during the power-down mode(PD="L").																				
19	LRCK	I/O	L/R Channel Clock Select pin Slave mode: An fs clock is fed to this LRCK pin. Master mode: LRCK output an fs clock. LRCK goes "H" at SMODE2="L" and "L" at SMODE2="H" during reset when SMODE1 "H".																				
20	FSYNC	I/O	Frame Synchronization Signal pin Slave mode: When "H", data bits are clocked out on SDATA. As I ² S slave mode ignores FSYNC it should hold "L" or "H". Master mode: FSYNC outputs 2fs clock. Stay low during the power-down mode(PD="L").																				
21	SDATA	O	Serial Data Output pin Data are output with MSB first, in 2's complement format. After 20 bits are output it turns to "L". It also remains "L" at a power- down mode(PD="L").																				
22	CMODE	I	Master Clock Selection pin "L": MCLK=256fs "H": MCLK=384fs																				
23	SMODE1	I	Serial Interface Mode Select pin																				
15	SMODE2	I	Defines the directions of LRCK, SCLK and FSYNC pins and Output Data Format. SMODE2 is pull- down pin.																				
			<table border="1"> <thead> <tr> <th>SMODE1</th> <th>SMODE2</th> <th>MODE</th> <th>LRCK</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>L</td> <td>Slave mode: MSB justified</td> <td>: H/L</td> </tr> <tr> <td>H</td> <td>L</td> <td>Master mode Similar to I²S</td> <td>: H/L</td> </tr> <tr> <td>L</td> <td>H</td> <td>Slave mode: I²S</td> <td>: L/H</td> </tr> <tr> <td>H</td> <td>H</td> <td>Master mode: I²S</td> <td>: L/H</td> </tr> </tbody> </table>	SMODE1	SMODE2	MODE	LRCK	L	L	Slave mode: MSB justified	: H/L	H	L	Master mode Similar to I ² S	: H/L	L	H	Slave mode: I ² S	: L/H	H	H	Master mode: I ² S	: L/H
SMODE1	SMODE2	MODE	LRCK																				
L	L	Slave mode: MSB justified	: H/L																				
H	L	Master mode Similar to I ² S	: H/L																				
L	H	Slave mode: I ² S	: L/H																				
H	H	Master mode: I ² S	: L/H																				
24	VB		Substrate Power Supply, +5V																				

7.2.1 Analog-in path

Description

The via BALANCE in connected analog-in L and R signals are pre-amplified by opamp Q761-Q763, and the via UNBALANCE in connected analog-in L and R signals are pre-amplified by opamp Q705, Q706, these signals is selected by Analog SW Q701 after which they are presented to an adjustable amplifier made out of DS1807 and opamp Q703 - Q708. The level of the incoming. Analog signal is adjusted by means of control lines "I²C" coming from the DASP on the CDR main board and switching the mux/demux. The analog signal is then presented to the A/D converter A5351 (QA01) where they are converted from analog to I²S-bus data format. The I²S-bus is connected via connector J601 and flex to the DASP on the CDR main board. The ADC uses the CL11-clock (11.2896 MHz), coming from the DASP on the CDR main board.

ADC AK5351

Description

The AK5351 is a stereo, 20-bit oversampling ADC based on Sigma Delta technology intended primarily for digital audio bandwidth applications. It supports the I²S-bus data format. The device can be used in either slave or master mode. In this application it is used in slave mode receiving it's clock from the DASP on the CDR main board.

Block diagram

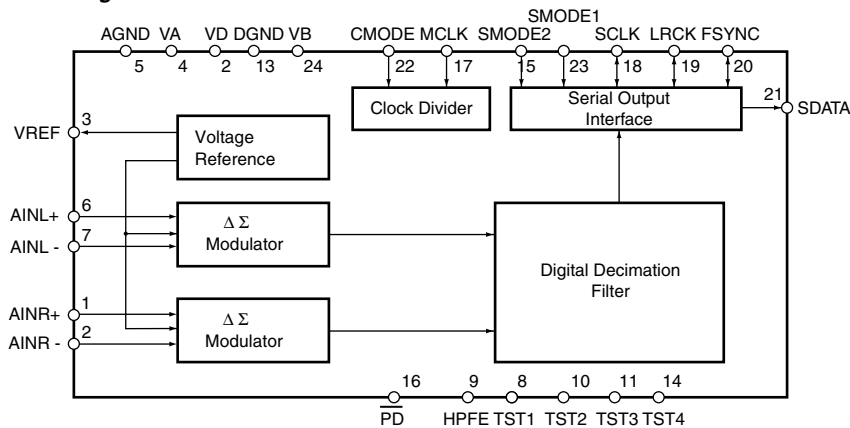


Figure 7-10

Figure 7-11

**Addressable Dual Audio Taper Potentionmeter :
DS1807**

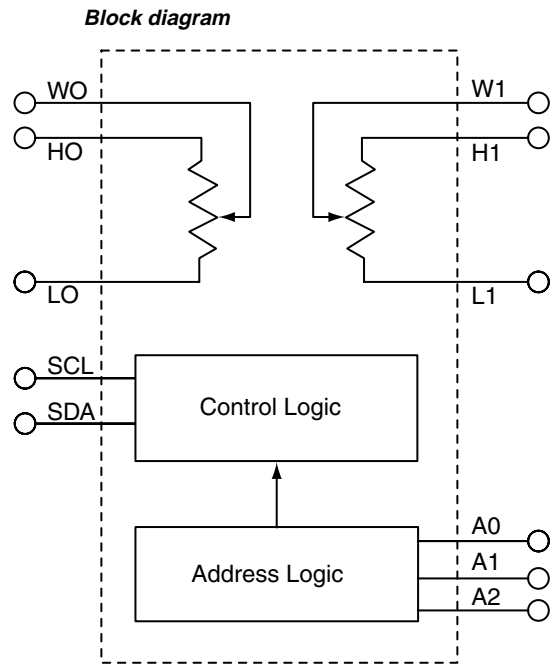


Figure 7-12

Pin description

PIN	DESCRIPTION
L0, L1	Low End of Resistor
H0, H1	High End of Resistor
W0,W1	Wiper Terminal of Resistor
VCC	3V/5V Power Supply Input
A0..A2	Chip Select Inputs
SDA	Serial Data I/O
SCL	Serial Clock Input
GND	Digital Ground
AGND	Analog Ground
NC	No connection

Figure 7-14

7.2.2 Analog-out path

Description

The I2S-bus data format being the digital output signal, goes from the DASP on the CDR main board via flex and connector J601 to the I/O board. Here it is presented to the D/A converter AK4393. The DAC's analog outputs pass an amplification and filtering circuit (opamp Q603, Q604). After the analog-out L and R signals are sent to the headphone connector on the headphone board, analog out UNBALANCE connectors on the AUDIO board. The DAC uses the CL11-clock (11.2896 MHz), coming from the DASP on the CDR main board.

DAC AK4393

Description

The AK4393 is a high performance, single-chip stereo, audio DAC delivering 101dB dynamic range sample rate.

Block diagram

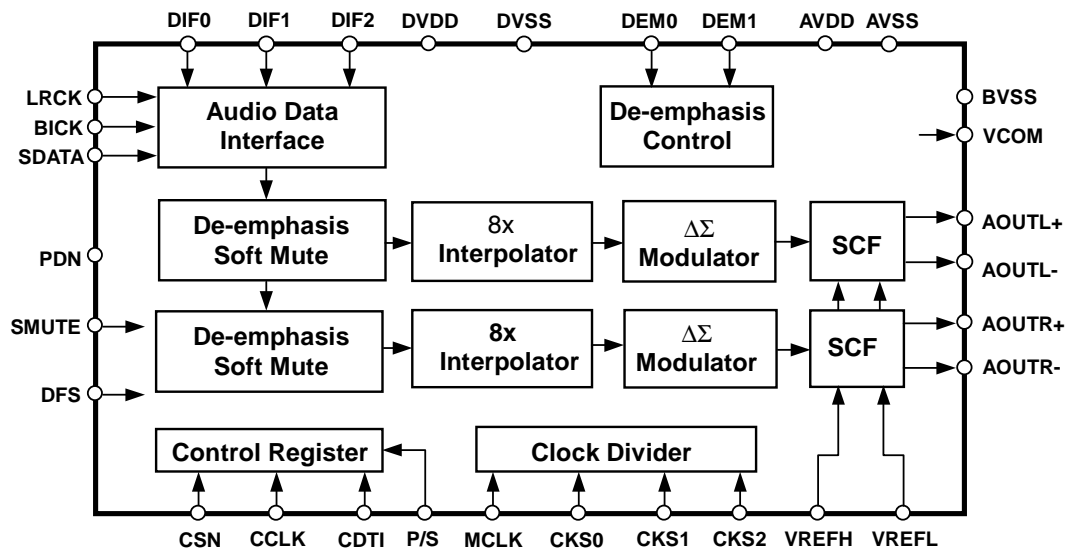


Figure 7-15

Pin configuration and description

No.	Pin Name	I/O	Function
1	DVSS	-	Digital Ground Pin
2	DVDD	-	Digital Power Supply Pin, 3.3V or 5.0V
3	MCLK	I	Master Clock Input Pin
4	PDN	I	Power-Down Mode Pin When at "L", the AK4393 is in power-down mode and is held in reset. The AK4393 should always be reset upon power-up.
5	BICK	I	Audio Serial Data Clock Pin The clock of 64fs or more than is recommended to be input on this pin.
6	SDATA	I	Audio Serial Data Input Pin 2's complement MSB-first data is input on this pin.
7	LRCK	I	L/R Clock Pin
8	SMUTE	I	Soft Mute Pin in parallel mode When this pin goes "H", soft mute cycle is initiated. CSN I Chip Select Pin in serial mode
9	DFS	I	Double Speed Sampling Mode Pin (Internal pull-down pin) "L": Normal Speed , "H": Double Speed
10	DEM0	I	De-emphasis Enable Pin in parallel mode
	CCLK	I	Control Data Clock Pin in serial mode
11	DEM1	I	De-emphasis Enable Pin in parallel mode
	CDTI	I	Control Data Input Pin in serial mode
12	DIF0	I	Digital Input Format Pin
13	DIF1	I	Digital Input Format Pin
14	DIF2	I	Digital Input Format Pin
15	BVSS	-	Substrate Ground Pin, 0V
16	VREFL	I	Low Level Voltage Reference Input Pin
17	VREFH	I	High Level Voltage Reference Input Pin
18	AVDD	-	Analog Power Supply Pin, 5.0V
19	AVSS	-	Analog Ground Pin, 0V
20	AOUTR-	O	Rch Negative analog output Pin
21	AOUTR+	O	Rch Positive analog output Pin
22	AOUTL-	O	Lch Negative analog output Pin
23	AOUTL+	O	Lch Positive analog output Pin
24	VCOM	O	Common Voltage Output Pin, 2.6V
25	P/S	I	Parallel/Serial Select Pin (Internal pull-up pin) "L": Serial control mode, "H": Parallel control mode
26	CKS0	I	Master Clock Select Pin
27	CKS1	I	Master Clock Select Pin
28	CKS2	I	Master Clock Select Pin

Note: All input pins except internal pull-up/down pins should not be left floating.

Figure 7-16

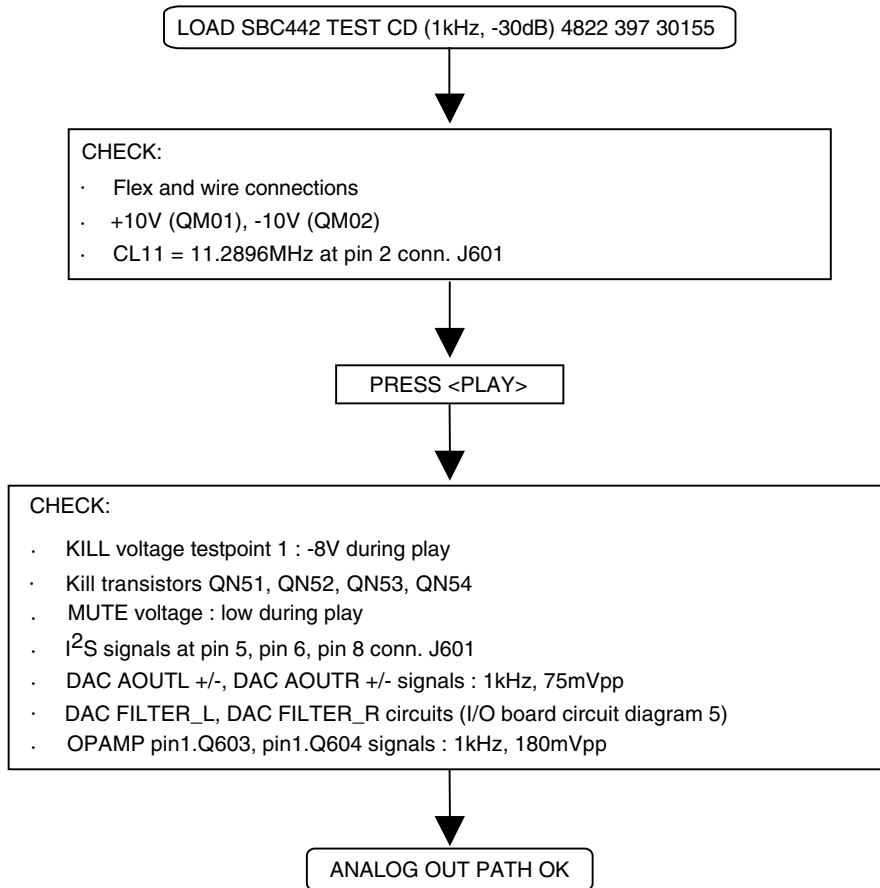


Figure 7-17

7.2.3 Digital in/out paths

There is a cinch digital-in paths and an optical path taking the digital signals pretty much straight to the DASP on the CDR main board. The optical-out and the digital-out path take the signal from the DASP on the CDR main board to their respective output connectors on the I/O board.

7.3 Headphone board

The L and R analog signals coming from the analog output on the I/O board pass an adjustable amplifier (opamp Q901) after which they are passed on to the headphone connector. The amplification is adjusted by means of a potentiometer positioned at the front of the CDR player.

7.4 Power Supply Unit P816

7.4.1 Description of P816

MOSFET Q825 is used as a power switch controlled by the controller Q810. When the switch is closed, energy is transferred from mains to the transformer. This energy is supplied to the load when the switch is opened. Through control of the switch-on time, the energy transferred in each

cycle is regulated so that the output voltages are independent of load or input voltage variations. The controlling device MC44603 is an integrated pulse width modulator. A clock signal initiates power pulses at a fixed frequency. The termination of each output pulse occurs when a feedback signal of the inductor current reaches a threshold set by the error signal. In this way the error signal actually controls the peak inductor current on cycle-by-cycle basis.

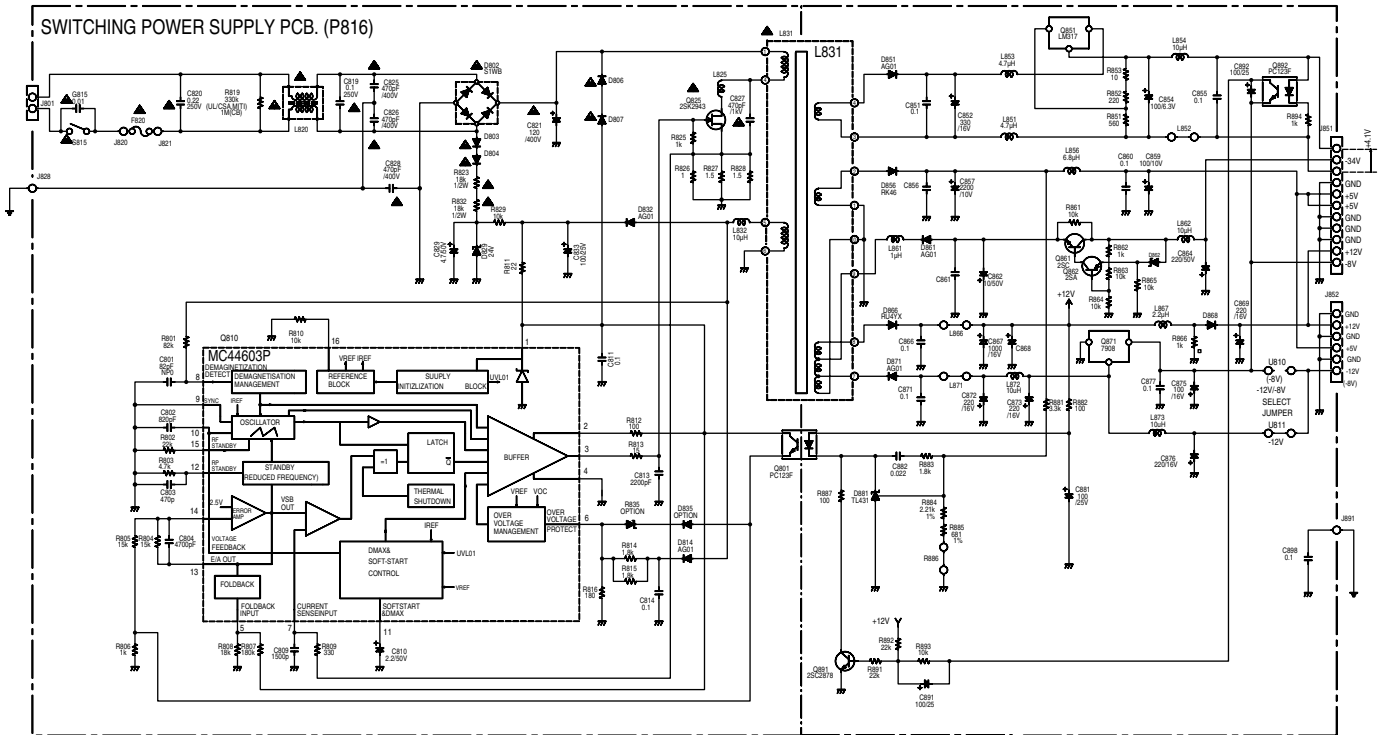
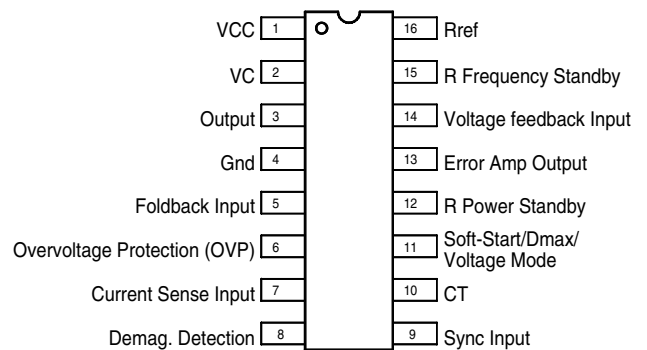


Figure 7-18 'Blockdiagram P816'

Description of controller MC44603

The MC44603 is an enhanced high performance controller that is specifically designed for off-line and DC-to-DC converter applications. This device has the unique ability of automatically changing operating modes if the converter output is overloaded, unloaded or shorted. The MC44603 has several distinguishing features when compared to conventional SMPS controllers. These features consist of a foldback facility for overload protection, a standby mode when the converter output is slightly loaded, a demagnetization detection for reduced switching stresses on transistor and diodes, and a high current totem pole output ideally suited for driving a power MOSFET. It can also be used for driving a bipolar transistor in low power converters. It is optimised to operate in discontinuous mode but can also operate in continuous mode. Its advanced design allows use in current mode or voltage mode control applications.

Pin connections



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Figure 7-19

Pin	Name	Description
1	VCC	This pin is the positive supply of the IC. The operating voltage range after start-up is 9.0 to 14.5 V.
2	VC	The output high state (VOH) is set by the voltage applied to this pin.
3	Output	peak currents up to 750 mA can be sourced or sunk, suitable for driving either MOSFET or bipolar transistors.
4	Gnd	The groundpin is a single return, typically connected back to the power source.
5	Foldback Input	The foldback function provides overload protection.
6	Overvoltage Protection	When the overvoltage protection pin receives a voltage greater than 2.5V, the device is disabled and requires a complete restart sequence.
7	Current Sense Input	A voltage proportional to the current flowing into the power switch is connected to this input.
8	Demagnetisation Detection	A voltage delivered by an auxiliary transformer winding provides to the demagnetisation pin an indication of the magnetisation state of the flyback transformer. A zero voltage detection corresponds to complete core saturation.
9	Synchronisation Input	The synchronisation input pin can be activated with either a negative pulse going from a level between 0.7V and 3.7V to Gnd or a positive pulse going from a level between 0.7V and 3.7V up to a level higher than 3.7V. The oscillator runs free when Pin 9 is connected to Gnd.
10	C _T	The normal mode oscillator frequency is programmed by the capacitor CT choice together with the Rref resistance value. CT, connected between Pin 10 and Gnd, generates the oscillator sawtooth.
11	Soft-Start/Dmax/Voltage-Mode	A capacitor, resistor or a voltage source connected to this pin limits the switching duty-cycle. This pin can be used as a voltage mode control input. By connecting Pin 11 to Ground, the MC44603 can be shut down.
12	RP Standby	A voltage level applied to the RP Standby pin determines the output power level at which the oscillator will turn into the reduced frequency mode of operation (i.e. standby mode). An internal hysteresis comparator allows to return in the normal mode at a higher output power level.
13	E/A Out	The error amplifier output is made available for loop compensation.
14	Voltage Feedback	This is the inverting input of the Error Amplifier. It can be connected to the switching power supply output through an optical (or other) feedback loop.
15	RF Standby	The reduced frequency or standby frequency programming is made by the RF Standby resistance choice.
16	Rref	Rref sets the internal reference current. The internal reference current ranges from 100µA to 500µA. This requires that $5.0k\Omega \leq Rref \leq 25k\Omega$.

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Figure 7-20

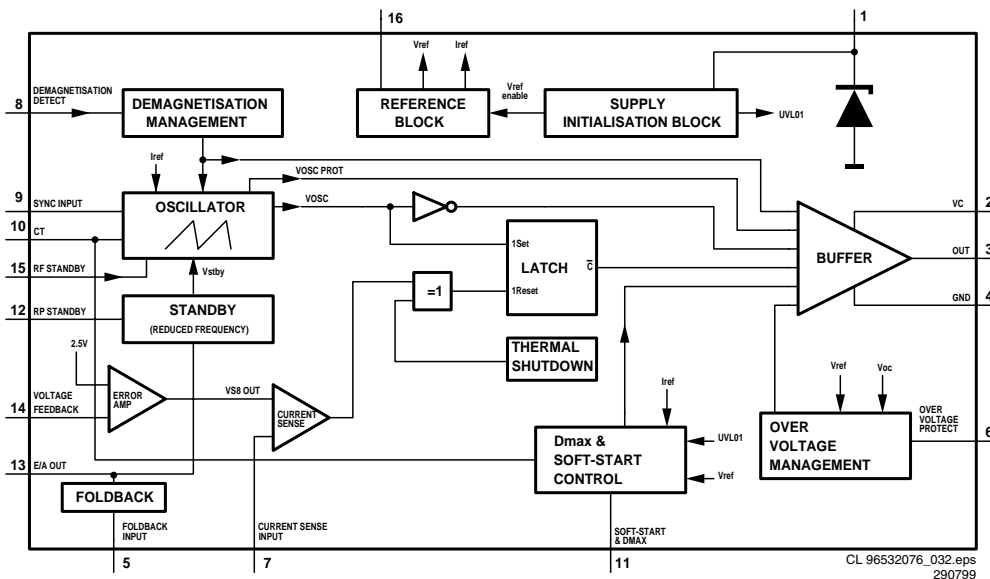


Figure 7-21

Operating description of MC44603

The input voltage V_{cc} (pin 1) is monitored by a comparator with hysteresis, enabling the circuit at 14.5V and disabling the circuit below 7.5V. The error amplifier compares a voltage V_{fb} (pin 14) related to the output voltage of the power supply, with an internal 2.5V reference. The current sense comparator compares the output of the error amplifier with the switch current I_{sense} (pin 7) of the power supply. The output of the current sense comparator resets a latch, which is set every cycle by the oscillator. The output stage is a totem pole, capable of driving a MOSFET directly.

Start up sequence of P816

t1: Charging the capacitors at V_{cc}
 C829 will be charged via R823 and R832, C833 and C811 via R829. The output is switched off during t1.
 t2: Charging of output capacitors
 When the input voltage of the IC exceeds 14.5V, the circuit is enabled and starts to produce output pulses. The current consumption of the circuit increases to about 17mA, depending on the external loads of the IC. At first, the capacitors at the V_{cc} pin will discharge because the primary auxiliary voltage, coming from winding 7-9 is below the V_{cc} voltage. At some moment during t2, the primary auxiliary voltage reaches the same level as V_{cc} . This primary auxiliary voltage now determines the V_{cc} voltage.
 t3: Regulation
 The output voltage of the power supply is in regulation.
 t4: Overload
 When the output is shorted, the supply voltage of the circuit will decrease and after some time drop below the lower threshold voltage. At that moment, the output will be disabled and the process of charging the V_{cc} capacitors starts again. If the output is still shorted at the next t2 phase, the complete start-and stop sequence will repeat. The power supply goes in a hiccup mode.

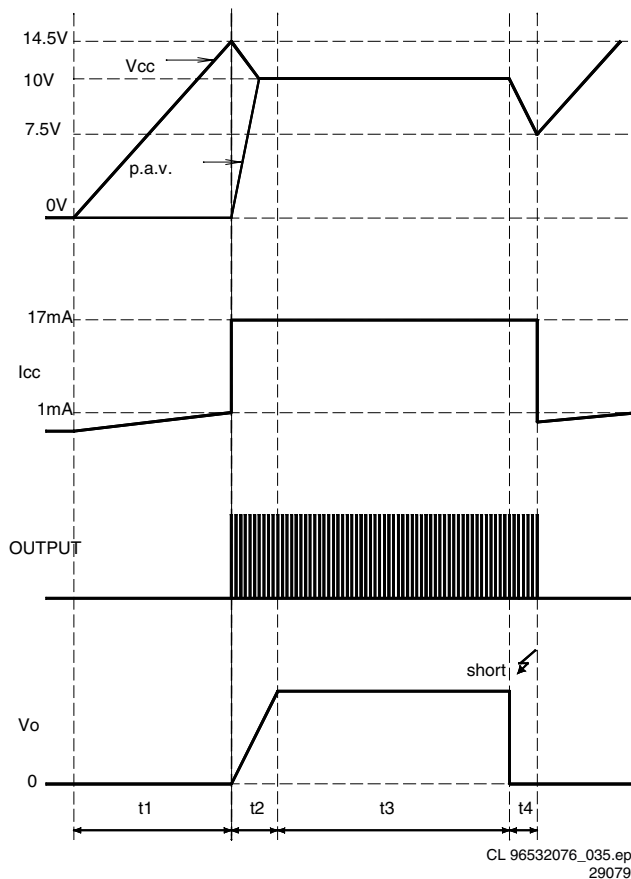


Figure 7-22 'Start-up sequence'

Regulation of P816

Figure 7-22 shows the most relevant signals during the regulation phase of the power supply. The oscillator voltage ramps up and down between V_1 and V_2 . The voltage at the current sense terminal is compared every cycle with the output of the error amplifier V_{comp} . The output

is switched off when the current sense level exceeds the level at the output of the error amplifier.

TimeON phase : A drain current will flow from the positive supply at pin 2 of the transformer through the transformer's primary winding, the MOSFET and Rsense to ground. As the positive voltage at pin 2 of the transformer is constant, the current will increase linearly and create a ramp dependent on the mains voltage and the inductance of the primary winding. A certain amount of energy is stored in the transformer in the form of a magnetic field. The polarity of the voltages at the secondary windings is opposite to the primary winding so that the diodes are non-conducting in this phase.

TimeDIODE phase : When the MOSFET is switched off, energy is no longer supplied to the transformer. The inductance of the transformer now tries to maintain the current which has been flowing through it at a constant level. The polarity of the voltage from the transformer therefore reverses. This results in a current flow through the transformer's secondary winding via the now conducting diodes, electrolytic capacitors and the load. This current is also ramp shaped but decreasing.

TimeDEAD phase : when the stored energy has been supplied to the load, the current in the secondary windings stops flowing. At this point, the drain voltage of the MOSFET will drop to the voltage of C821 with a ringing caused by the drain-source capacitance with the primary inductance.

The oscillator will start a next cycle which consists of the above described three phases. The time of the different phases depends on the mains voltage and the load.

TimeDEAD is maximum with an input of 400VDC and a minimum load. It will be zero with an input of 100VDC and an overload.

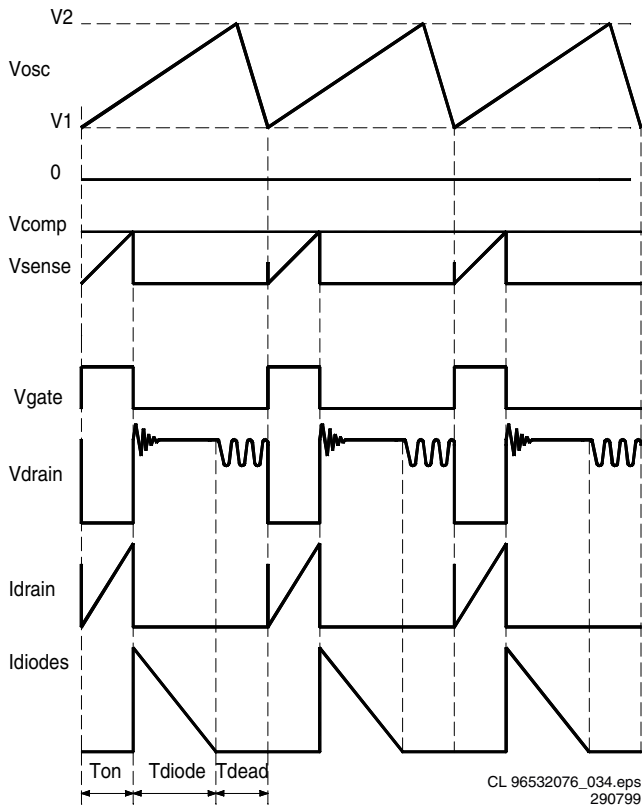
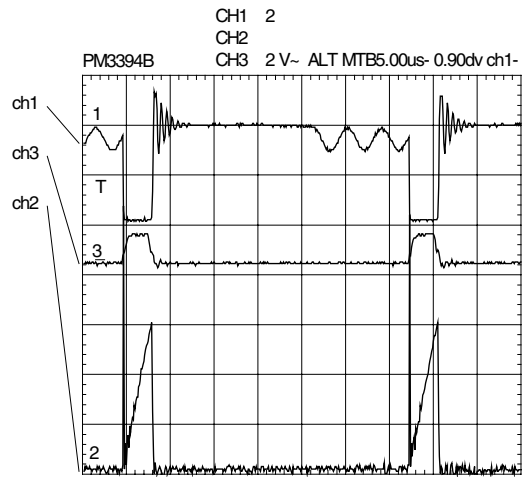
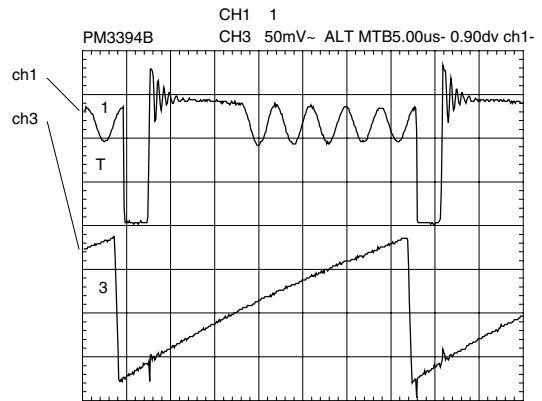


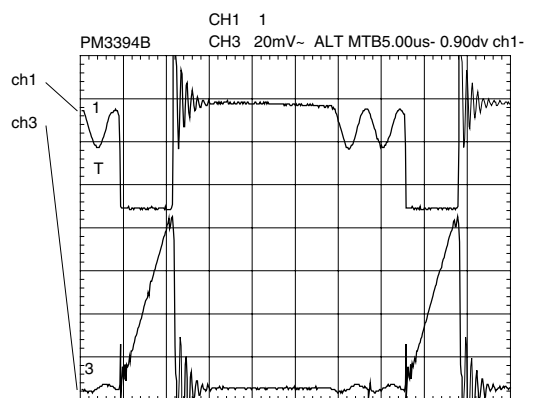
Figure 7-23 'Regulation'



ch1 : Drain voltage
ch2 : Drain current
ch3 : Gate voltage



ch1 : Drain voltage
ch2 : Oscillator voltage



ch1 : Drain voltage
ch3 : Sense voltage

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Figure 7-24 'Oscillograms'

Circuit description of P816

Input circuit

The input circuit consists of a lightning protection circuit and an EMI filter.

The lightning protection comprises R819.

The EMI filter is formed by C820, L820, C825 and C826.

It prevents inflow of noise into the mains.

Primary rectifier/smoothing

The AC input is rectified by rectifier bridge D802 and smoothed into C821. The voltage over C821 is approximately 300V.

It can vary from 100V to 390V.

Start up circuit and Vcc supply

This circuit is formed by R823, R834, C829, D828, R829, R811, C833 and C811.

When the power plug is connected to the mains voltage, the stabilised voltage over D829 (24V) will charge C833 via R829. When the voltage reaches 14.5V across C811, the control circuit of Q810 is turned on and the regulation starts. During regulation, Vcc of IC7110 will be supplied by the rectified voltage from winding 7-9 via L832, D832 and C833.

Control circuit

The control circuit exists of Q810, C802, C804, C807, C809, C810, R802, R803, R804, R807, R808, R809 and R810.

C802 and R810 define the frequency of the oscillator.

Power switch circuit

This circuit comprises MOSFET Q825, Rsense R826, R827 and R828, R825, C827, L825, R812 and R813. R825 is a pull-down resistor to remove static charges from the gate of the MOSFET.

Regulation circuit

The regulation circuit comprises opto-coupler Q801 which isolates the error signal from the control IC on the primary side and a reference component D881. The TL431(D881) can be represented by two components:

a very stable and accurate reference diode

a high gain amplifier

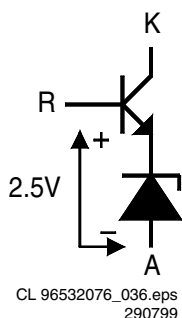


Figure 7-25 'TL 431'

TL431 will conduct from cathode to anode when the reference is higher than the internal reference voltage of about 2.5V. If the reference voltage is lower, the cathode current is almost zero. The cathode current flows through the LED of the opto-coupler. The collector current of the opto-coupler flows through R806, producing an error voltage, connected to voltage feedback pin 14 of Q810.

Demagnetisation

The auxiliary winding (7-9) voltage is used to detect magnetic saturation of the transformer core and connected via R801 to pin 8 of Q810. During the demagnetisation phase, the output will be disabled.

Overvoltage protection circuit

This circuit consist of D814, C814, R814, R815 and R816. When the regulation circuit is interrupted due to an error in the control loop, the regulated output voltage will increase (overvoltage). This overvoltage is sensed at the auxiliary winding 7-9.

When an overvoltage longer than 2.0 (s) is detected, the output is disabled until VCC is removed and then re-applied. The power supply will come in a hiccup mode as long as the error in the control loop is present.

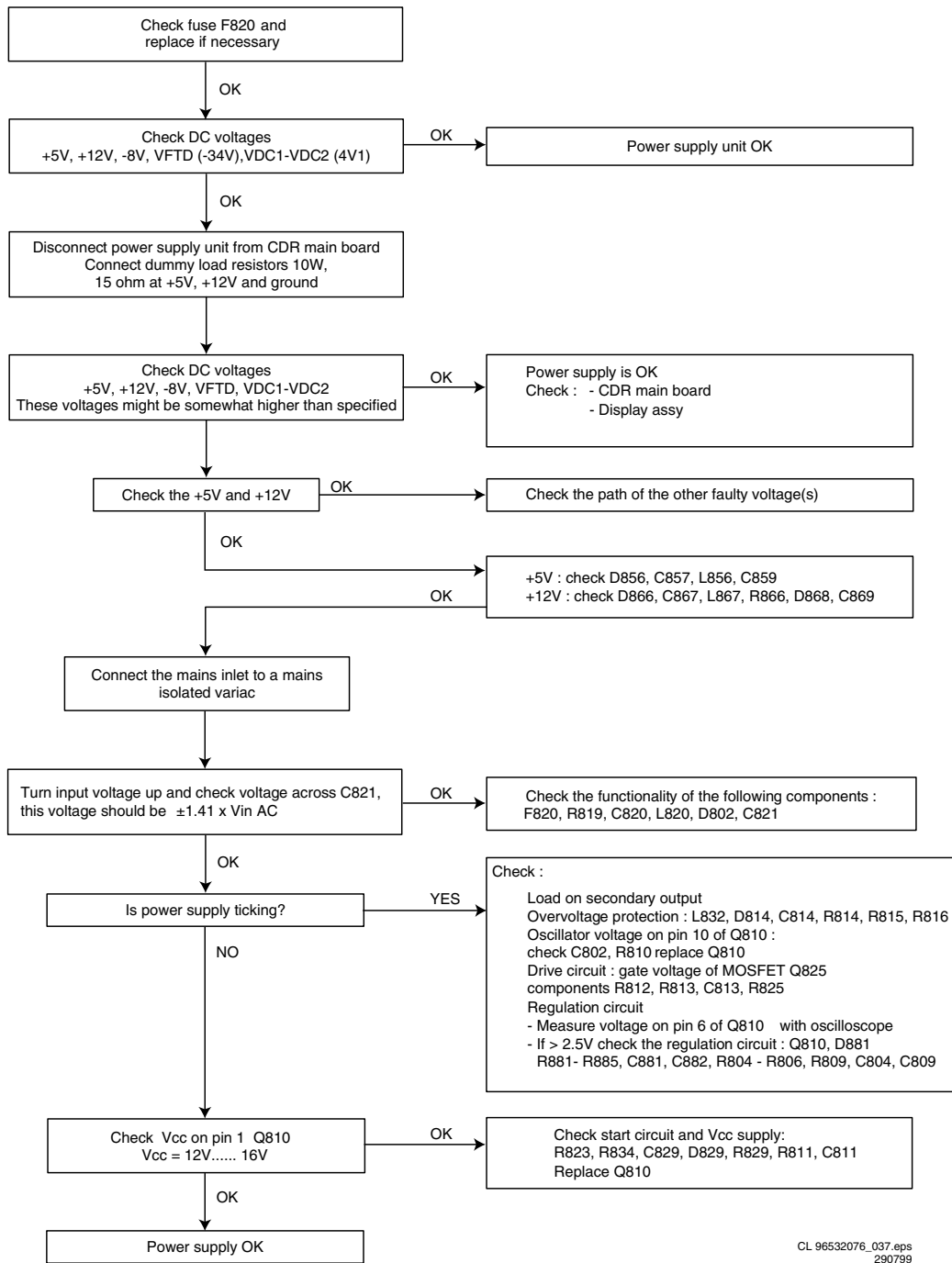
Secondary rectifier/smoothing circuit

There are 5 rectifier/smoothing circuits on the secondary side. Each voltage depends on the number of windings of the transformer.

The -8V supply is regulated by voltage regulator Q871.

On/off circuit

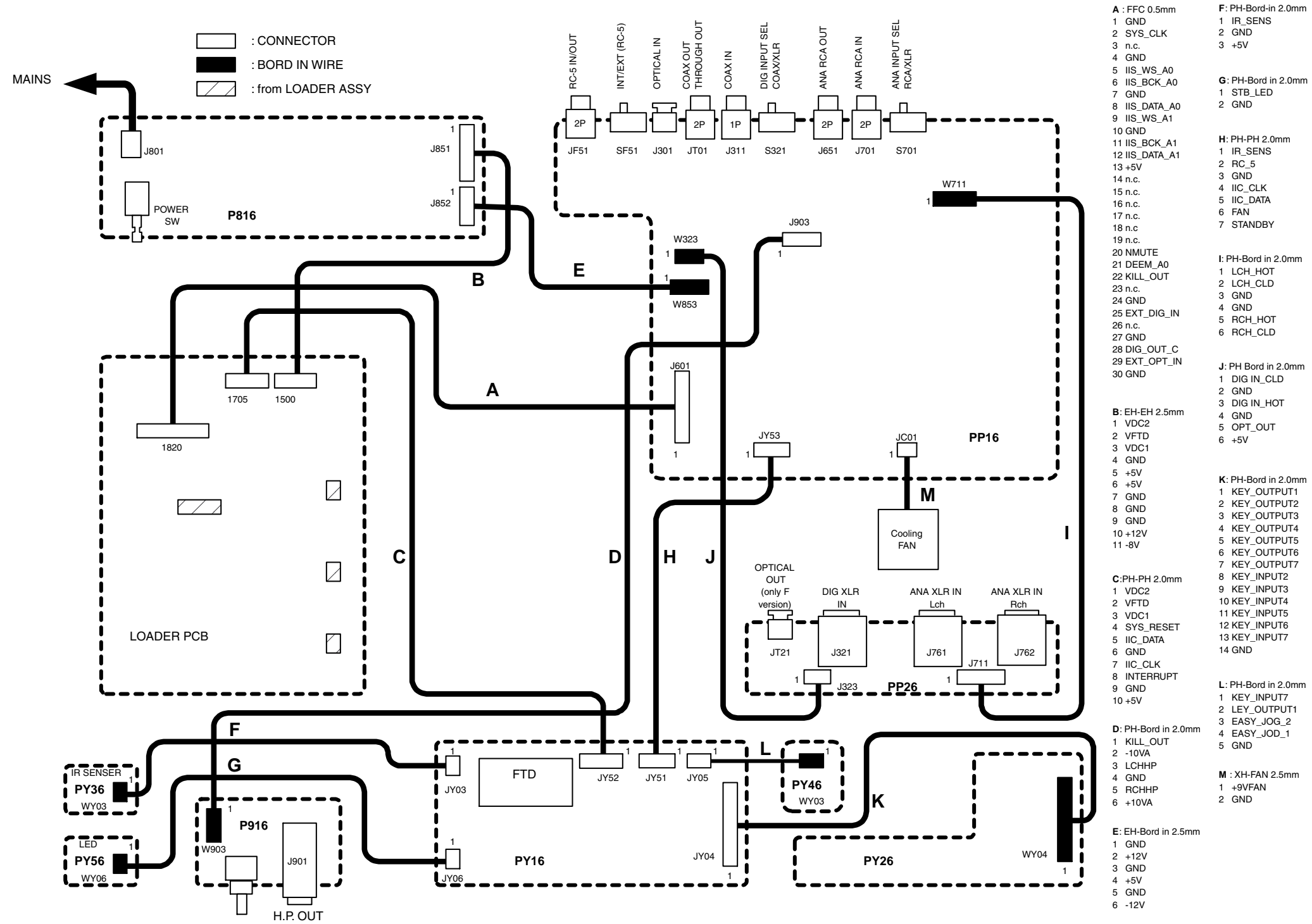
7.4.2 Troubleshooting P816



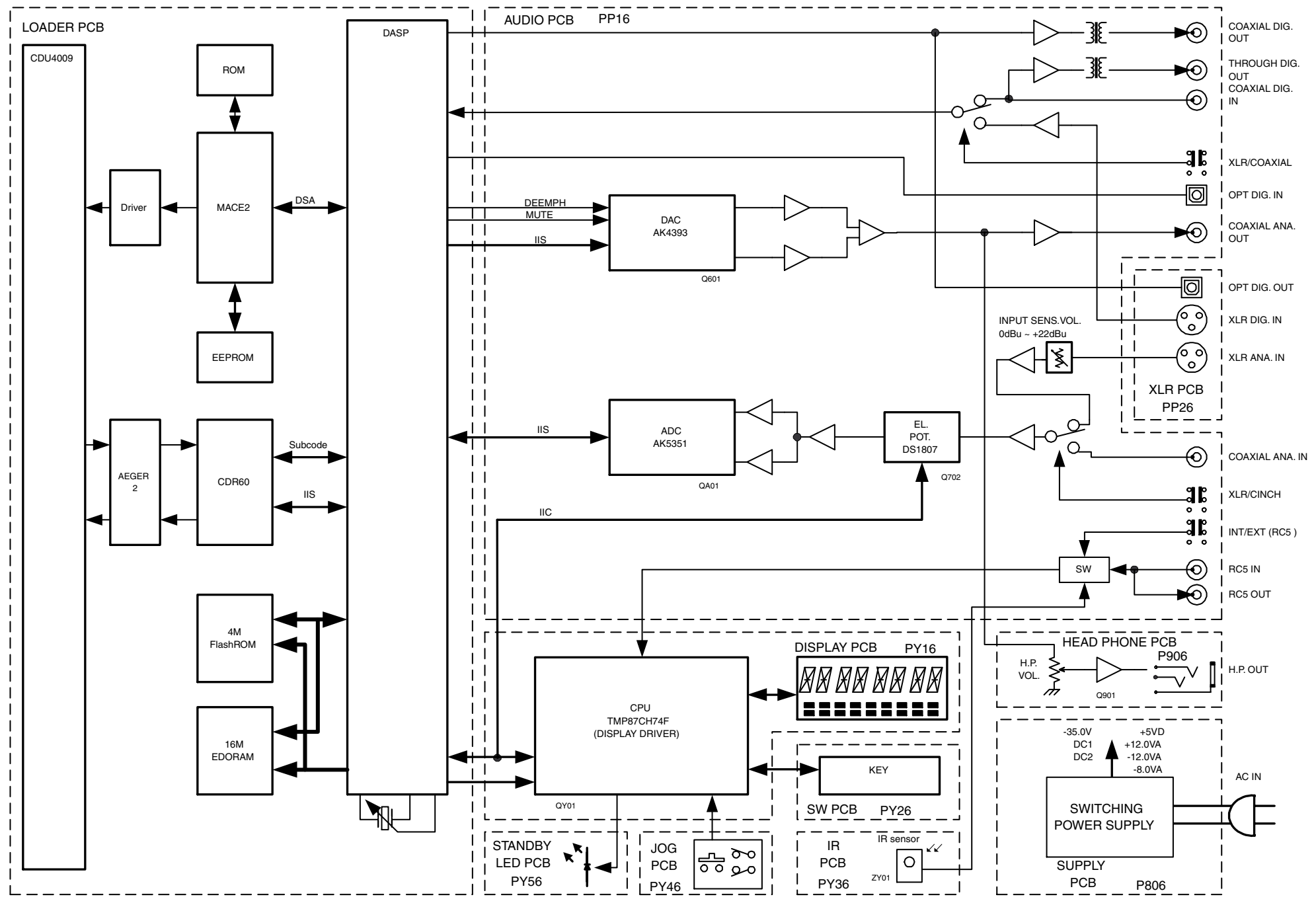
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290799

Figure 7-26

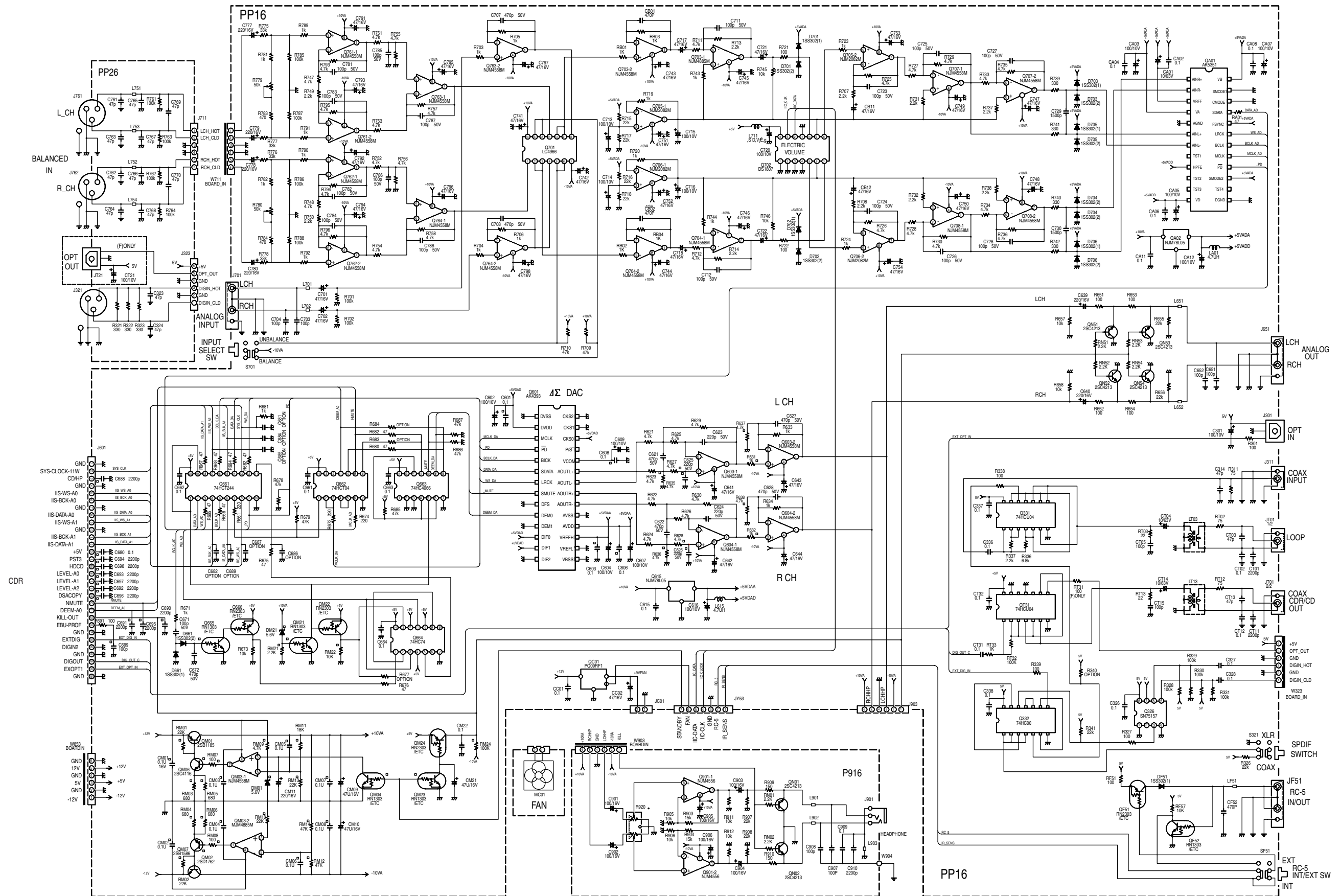
8. WIRING DIAGRAM



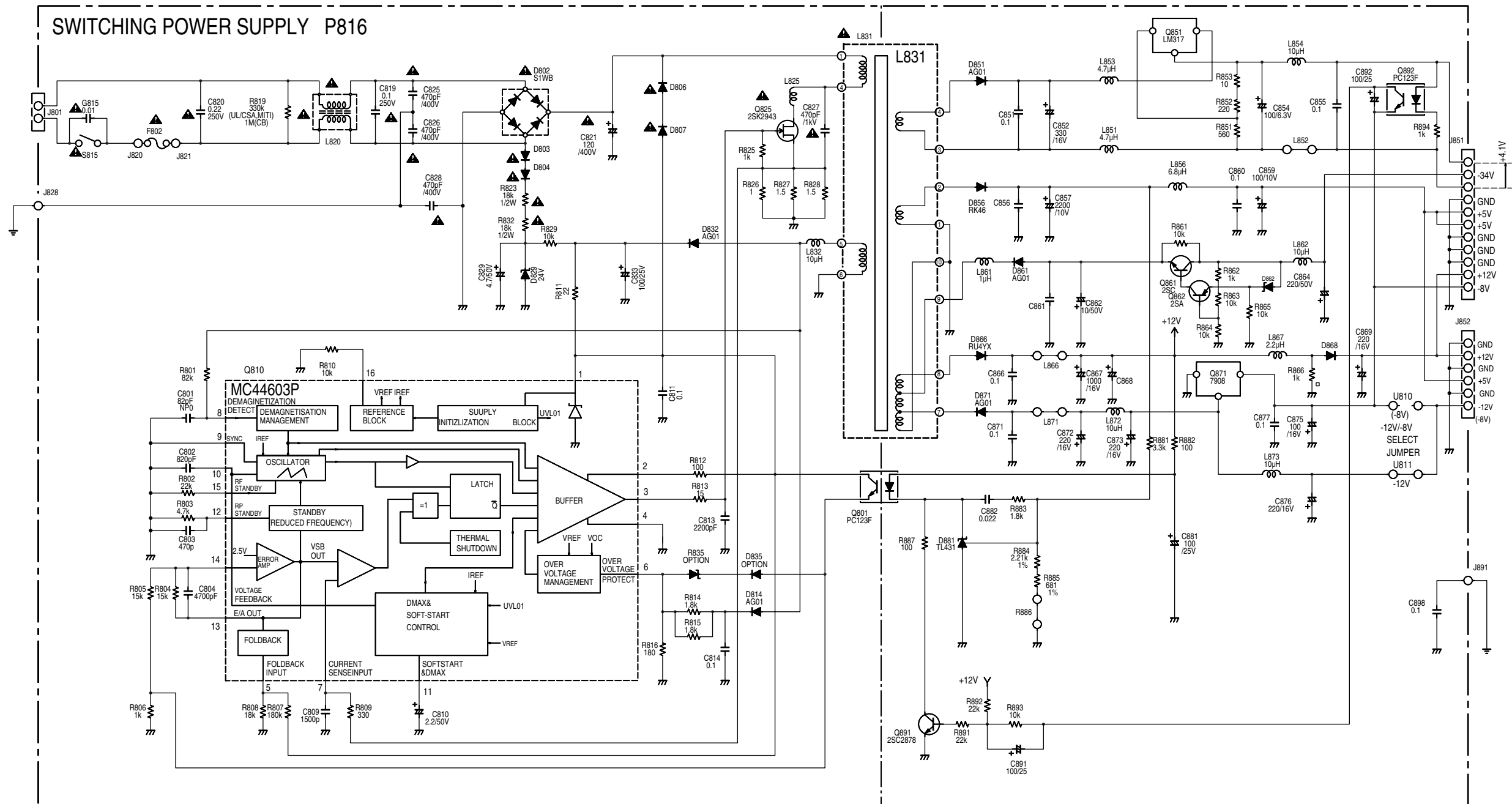
9. BLOCK DIAGRAM

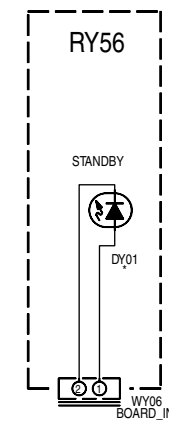
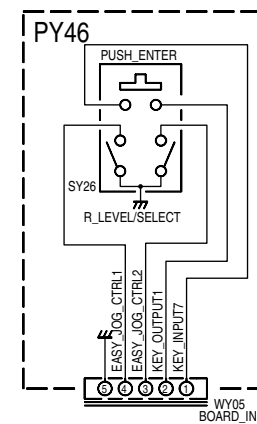
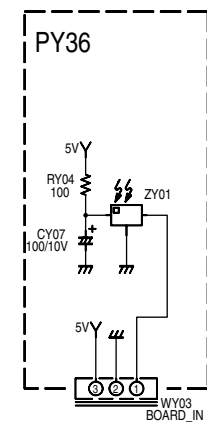
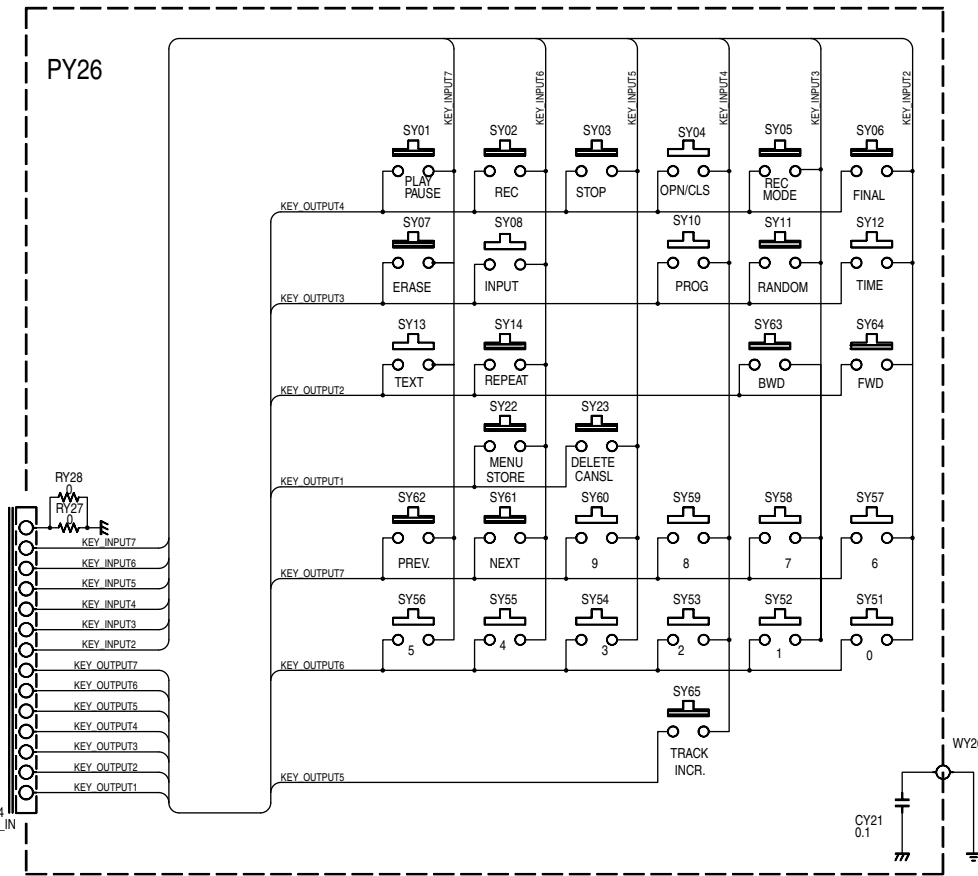
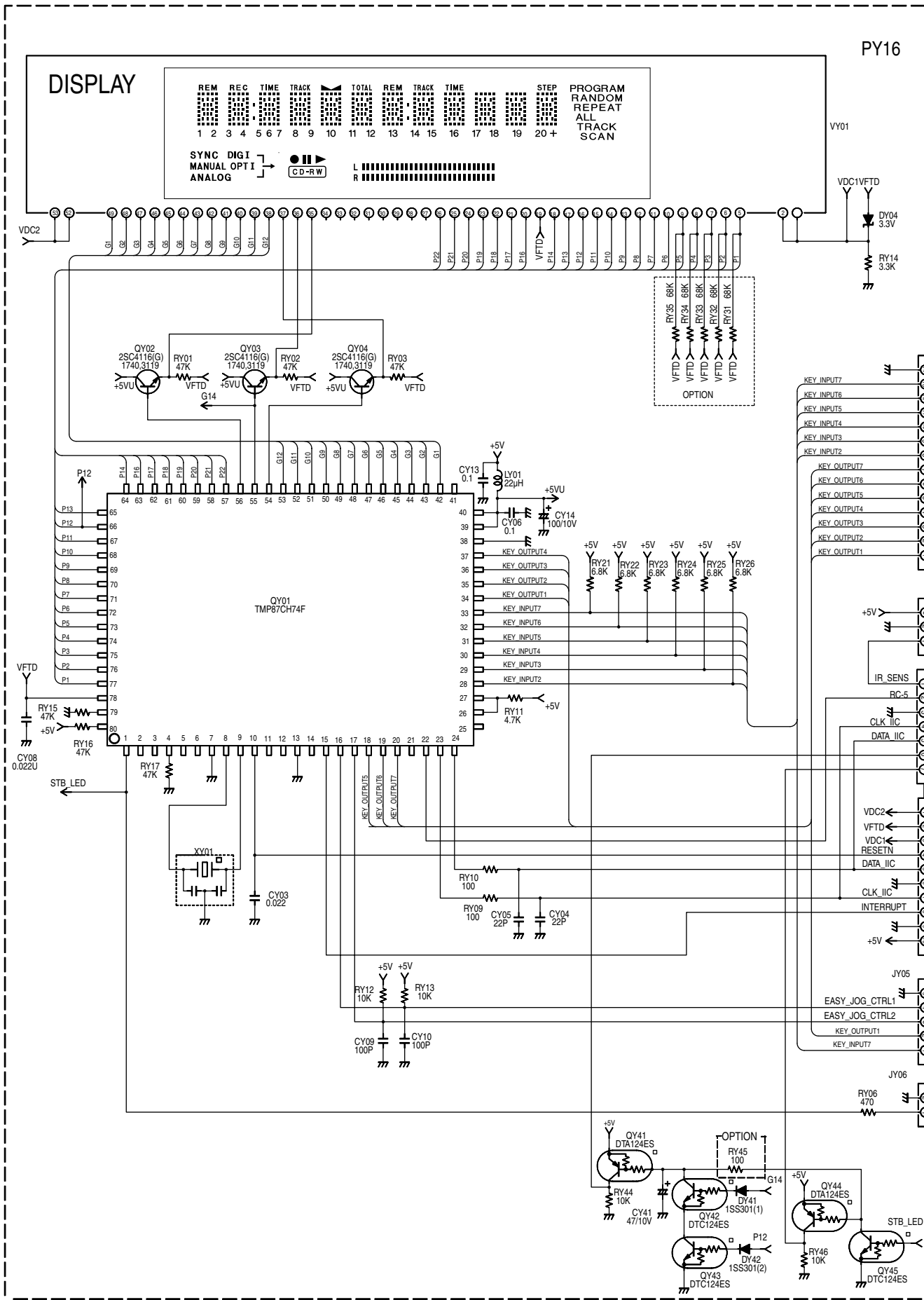


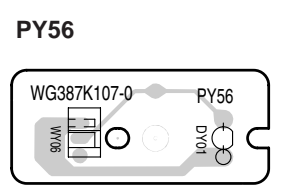
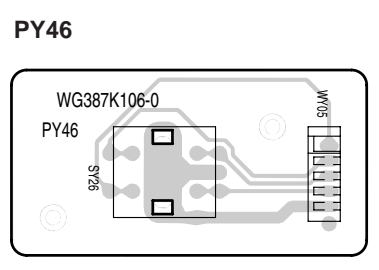
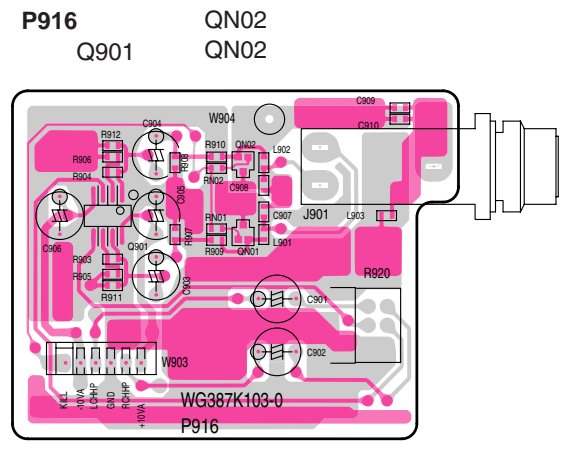
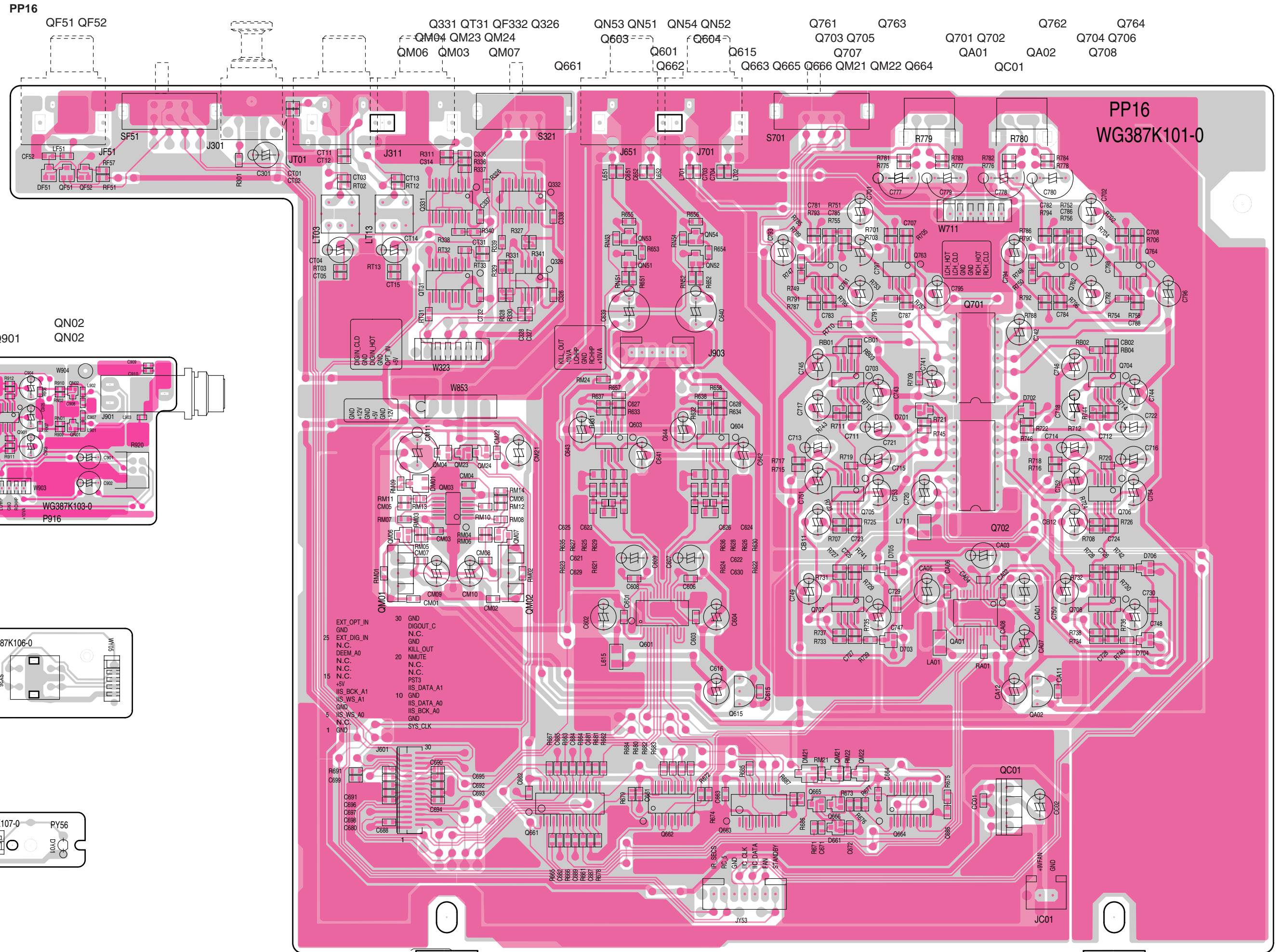
10. SCHEMATIC DIAGRAM AND PARTS LOCATION



SWITCHING POWER SUPPLY P816

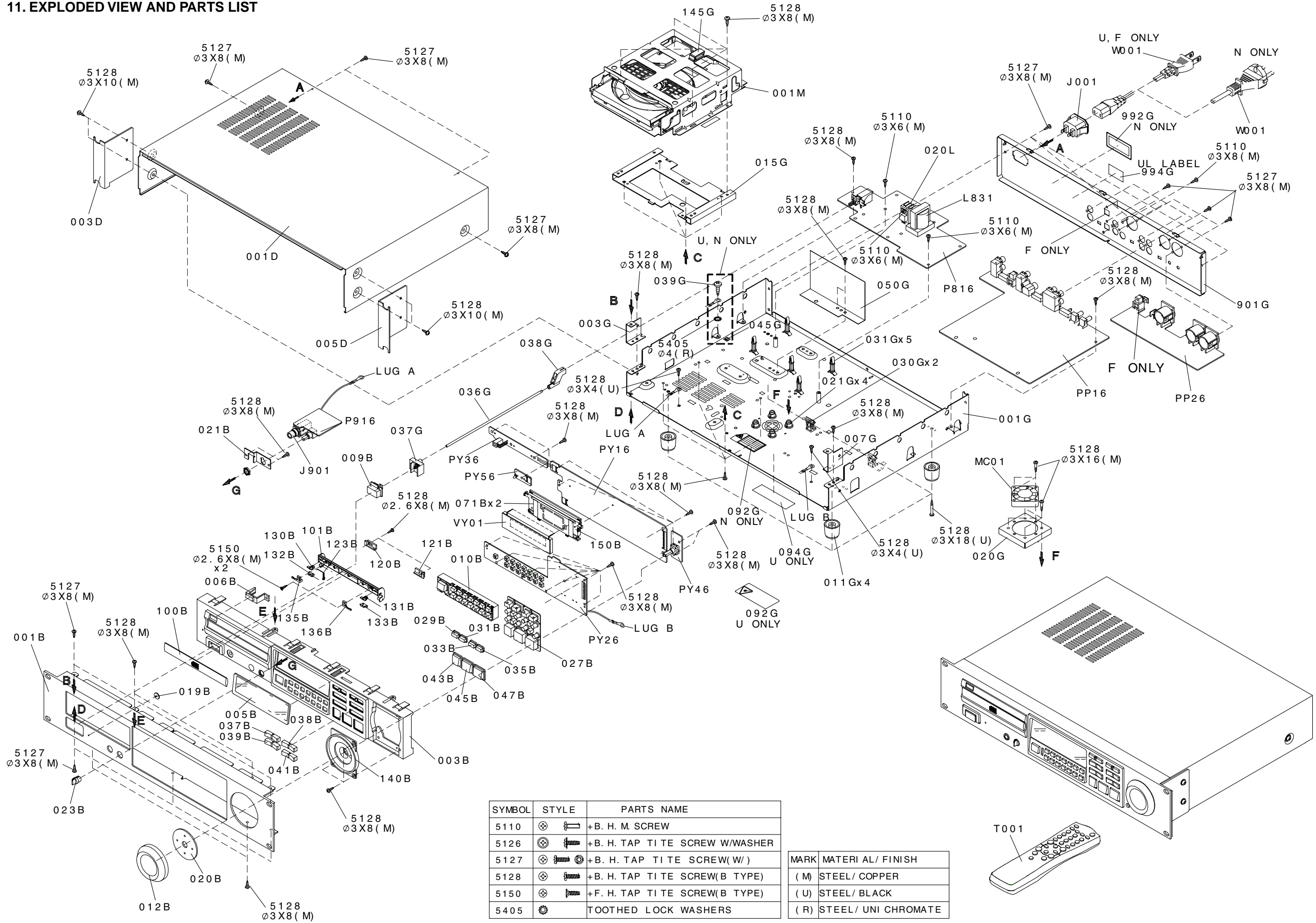






30	GND	DIGOUT_C
25	EXT_OPT_IN	N.C.
	EXT_DIG_IN	N.C.
	DEEM_A0	N.C.
20	N.C.	KILL_OUT
	N.C.	NMUTE
	N.C.	N.C.
	N.C.	N.C.
	N.C.	N.C.
15	+5V	PST3
	IIS_BCK_A1	IIS_DATA_A1
	IIS_WS_A1	IIS_DATA_A0
10	GND	IIS_DATA_A0
	GND	IIS_BCK_A0
5	IIS_WS_A0	GND
	N.C.	SYS_CLK
1	GND	

11. EXPLODED VIEW AND PARTS LIST



SYMBOL	STYLE	PARTS NAME
5110	⊕ ⊕	+B. H. M. SCREW
5126	⊕ ⊕	+B. H. TAP TITE SCREW W/WASHER
5127	⊕ ⊕	+B. H. TAP TITE SCREW(W/)
5128	⊕ ⊕	+B. H. TAP TITE SCREW(B TYPE)
5150	⊕ ⊕	+F. H. TAP TITE SCREW(B TYPE)
5405	⊕ ⊕	TOOTHED LOCK WASHERS

MARK	MATERI AL/ FINISH
(M)	STEEL/ COPPER
(U)	STEEL/ BLACK
(R)	STEEL/ UNI CHROMATE

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
001B	BLACK		FRONT PANEL BLACK	387K248010	001M			MECHANISM CD-R MODULE	387K304500
001B	GRAY	9965 000 07404	FRONT PANEL GRAY	387K248110				MAR770 SPICE 2.08+	
003B	BLACK		CHASSIS FRONT BLACK	387K105020					
003B	GRAY	9965 000 07405	CHASSIS FRONT GRAY	387K105120	▲ J001	F	996500001313	JACK 2P AC INLET M1910-H	YJ04002440
005B		9965 000 07406	WINDOW BLACK	387K158010	▲ J001	N1	9965 000 07428	JACK 3P AC INLET M1910-D	YJ04002450
006B		9965 000 07407	IR LENS	387K355010	▲ J001	U1	9965 000 07428	JACK 3P AC INLET M1910-D	YJ04002450
009B	BLACK		BUTTON POWER BLACK	371K270150	MC01		4822 361 11159	D.C MOTOR BRUSHLESS FAN	MM01200290
009B	GRAY	9965 000 01609	BUTTON POWER GRAY	371K270160				KD1204PFB2-8	
010B	BLACK		BUTTON 10KEY BLACK	371K270210					
010B	GRAY	9965 000 07408	BUTTON 10KEY GRAY	371K270310				PACKING	
012B	BLACK		KNOB JOG BLACK	372K154010	001T	F		USER MANUAL F	387K851110
012B	GRAY	9965 000 01723	KNOB JOG GRAY	372K154020	001T	N1	9965 000 07425	USER MANUAL N	387K851310
019B		9965 000 01393	LENS LED	312J355010	001T	U1		USER MANUAL U	387K851250
023B	BLACK	482241120336	KNOB FOR PHONE VOLUME BLACK	284T154310	T001		9965 000 05922	REMOTE CONTROLLER	ZK386K0010
023B	GRAY	9965 000 01611	KNOB FOR PHONE VOLUME GRAY	284T154050	▲ W001	F		RC6050DR	
027B		9965 000 01612	BUTTON RUBBER	371K270010	▲ W001	N1	9965 000 07362	MAINS CORD 2P FOR 12A 125V AC	ZC01801050
029B		9965 000 07409	BUTTON REC MODE KEY	371K270220	▲ W001	U1		MAINS CORD 3P FOR N 10A 250V AC	ZC02003190
031B		9965 000 07410	BUTTON TR.INCR.KEY	371K270230	▲ W001	U1		MAINS CORD 3P FOR U 10A 125V AC	ZC01802110
033B		9965 000 07411	BUTTON RANDOM KEY	371K270240					
035B		9965 000 07412	BUTTON REPEAT KEY	371K270250					
037B		9965 000 07413	BUTTON FINAL ERASE KEY	371K270280					
038B		9965 000 07414	BUTTON CANCL MENU KEY	371K270290					
039B		9965 000 01619	BUTTON NEXT/PREV KEY	371K270080					
041B		9965 000 01620	BUTTON FF/FR KEY	371K270090					
043B		9965 000 07415	BUTTON REC KEY	371K270260					
045B		9965 000 07416	BUTTON STOP KEY	371K270270					
047B		9965 000 01623	BUTTON PLAY KEY	371K270120					
100B	BLACK		ESCUTCHEON BLACK	388K063010					
100B	GRAY	9965 000 07417	ESCUTCHEON GRAY	388K063110					
101B	BLACK		ARM ESCUTCHEON BLACK	388K002010					
101B	GRAY	9965 000 07418	ARM ESCUTCHEON GRAY	388K002110					
120B			HOLDER ESCUTCHEON ARM R	387K271010					
121B			HOLDER ESCUTCHEON ARM L	387K271020					
123B		9965 000 07419	SPRING ESCUTCHEON ARM	388K115010					
130B			CONTROL BOARD TRAY LID	386K127010					
131B			RELEASE PISTON LEFT	386K127020					
131B			CONTROL BOARD TRAY LID	386K127020					
131B			RELEASE PISTON RIGHT	386K127020					
132B			LOCK TRAY LID LEFT	386K102010					
133B			LOCK TRAY LID RIGHT	386K102020					
135B			STOPPER TRAY LID LOCK	386K114010					
136B			COVER LEFT	386K114020					
136B			STOPPER TRAY LID LOCK	386K114020					
140B	BLACK		COVER RIGHT	386K114020					
140B	GRAY	9965 000 07420	BUSHING REC LEVEL KNOB	387K259010					
140B			BUSH BLACK	387K259110					
140B			BUSHING REC LEVEL KNOB	387K259110					
150B			BUSH GRAY	370K271110					
150B			HOLDER FTD	370K271110					
001D	BLACK		LID TOP COVER BLACK	292J257050					
001D	GRAY		LID TOP COVER GRAY	292J257150					
003D	BLACK		BRACKET MOUNT L BLACK	371K160040					
003D	GRAY	9965 000 07421	BRACKET MOUNT L GRAY	371K160060					
005D	BLACK		BRACKET MOUNT R BLACK	371K160050					
005D	GRAY	9965 000 07422	BRACKET MOUNT R GRAY	371K160070					
011G		482246241771	LEG BLACK	229K057010	001S			NOT STANDARD SPARE PARTS	
037G		9965 000 07423	LINK POWER SW FRONT	387K121020	003S			PACKING CASE	387K801010
038G		9965 000 07424	LINK POWER SW REAR	387K121010	W011	U1	482232121438	CUSHION	371K809050
039G	N1,U1		SCREW SCREW FOR GND	371K010020	W012	U1	482232121438	RCA STEREO CORD 1M	ZD01000330
043G	N1,U1	482253211527	T.L. WASHER OR TOOTHED WASHER	54050400R0	W013	U1		WHITE RED	ZD01000330
								RCA STEREO CORD 1M	ZD01000330
								WHITE RED	ZD01000330
								RCA COAX CORD M BLACK	ZD01000520

12. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTORS

R***: 1) GD05 × × × 140, Carbon film fixed resistor, ±5% 1/4W

R***: 2) GD05 × × × 160, Carbon film fixed resistor, ±5% 1/6W

① — Resistance value

Examples ;

① Resistance value

0.1 Ω 001 10 Ω 100 1 kΩ 102 100 kΩ 104

0.5 Ω 005 18 Ω 180 2.7 kΩ 272 680 kΩ 684

1 Ω 010 100 Ω 101 10 kΩ 103 1 MΩ 105

6.8 Ω 068 390 Ω 391 22 kΩ 223 4.7 MΩ 475

Note : Please distinguish 1/4W from 1/6W by the shape of parts used actually.

CAPACITORS

C***: CERAMIC CAP.

3) DD1 × × × × 370, Ceramic capacitor
Disc type
Temp.coeff.P350 ~N1000, 50V

② — Capacity value
③ — Tolerance

Examples ;

② Tolerance (Capacity deviation)

±0.25 pF 0

±0.5 pF 1

±5% 5

* Tolerance of COMMON PARTS handled here are as follows :

0.5 pF ~ 5 pF ±0.25 pF

6 pF ~ 10 pF ±0.5 pF

12 pF ~ 560 pF ±5%

③ Capacity value

0.5 pF 005 3 pF 030 100 pF 101

1 pF 010 10 pF 100 220 pF 221

1.5 pF 015 47 pF 470 560 pF 561

C***: CERAMIC CAP.

4) DK16 × × × 300, High dielectric constant ceramic capacitor
Disc type
Temp.chara. 2B4, 50V



④ — Capacity value

Examples ;

④ Capacity value

100 pF 101 1000 pF 102 10000 pF 103

470 pF 471 2200 pF 222

C***: 5) ELECTROLY CAP. (), 6) FILM CAP. ()

5) EA × × × × × × 10, Electrolytic capacitor
One-way lead type, Tolerance ±20%

⑤ — Working voltage
⑥ — Capacity value

Examples ;

⑤ Capacity value

0.1 μF 104 4.7 μF 475 100 μF 107

0.33 μF 334 10 μF 106 330 μF 337

1 μF 105 22 μF 226 1100 μF 118

2200 μF 228

⑥ Working voltage

6.3V 006 25V 025

10V 010 35V 035

16V 016 50V 050

6) DF15 × × × 350 — Plastic film capacitor
DF15 × × × 310 — One-way type, Mylar ±5% 50V
DF16 × × × 310 — Plastic film capacitor
One-way type, Mylar ±10% 50V

⑦ — Capacity value

Examples ;

⑦ Capacity value

0.001 μF (1000 pF) 102 0.1 μF 104

0.0018 μF 182 0.56 μF 564

0.01 μF 103 1 μF 105

0.015 μF 153

NOTE : 1) The above CODES (R***, R***, C***, C*** and C***) are omitted on the schematic diagram in some case.

2) On the occasion, be confirmed the common parts on the parts list.

3) Refer to "Common Parts List" for the other common parts (R105, DD4, DK4).

NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows;

1. KOA Corporation

Part No. (MJI)	Type No. (KOA)	Description
NH05 × × × 140	RF25S × × × × ΩJ	(±5% 1/4W)
NH05 × × × 120	RF50S × × × × ΩJ	(±5% 1/2W)
NH85 × × × 110	RF73B2A × × × × ΩJ	(±5% 1/10W)
NH95 × × × 140	RF73B2E × × × × ΩJ	(±5% 1/4W)

* Resistance value Resistance value
(0.1 Ω – 10 kΩ)

2. Matsushita Electronic Components Co., Ltd

Part No. (MJI)	Type No. (MEC)	Description
NF05 × × × 140	ERD-2FCJ × × ×	(±5% 1/4W)
RF05 × × × 140	ERD-2FCG × × ×	(±2% 1/4W)
NF02 × × × 140		
RF02 × × × 140		

* Resistance value * Resistance value

Examples ;

* Resistance value

0.1 Ω 001 10 Ω 100 1 kΩ 102 100 kΩ 104

0.5 Ω 005 18 Ω 180 2.7 kΩ 272 680 kΩ 684



1 Ω 010 100 Ω 101 10 kΩ 103 1 MΩ 105

6.8 Ω 068 390 Ω 391 22 kΩ 223 4.7 MΩ 475


ABBREVIATION AND MARKS

ANT. : ANTENNA	BATT. : BATTERY
CAP. : CAPACITOR	CER. : CERAMIC
CONN. : CONNECTING	DIG. : DIGITAL
HP : HEADPHONE	MIC. : MICROPHONE
μ-PRO : MICROPROCESSOR	REC. : RECORDING
RES. : RESISTOR	SPK : SPEAKER
SW : SWITCH	TRANSF. : TRANSFORMER
TRIM. : TRIMMING	TRS. : TRANSISTOR
VAR. : VARIABLE	X'TAL : CRYSTAL

NOTE ON SAFETY :

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

安全上の注意 :

 がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			P816-SUPPLY CIRCUIT BOARD		R885		4822 050 26811	681Ω ±1% 1/6W JUMPER	GM11668100
			P816-CAPACITORS		R895				75060501P0
C801		4822 122 31237	CER. 82pF J CH 50V BLK	DD15820300	R***			P816-RESISTORS (COMMON)	
C810		4822 124 40763	ELECT. 2.2μF M 50V RA-2	OA22505020				CARBON FILM FIXED RES.	
C811		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010				5% 1/6W : R801-R808 R810	
C814		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010				R814 R815 R829 R851-R853	
▲ C819		9965 000 04979	FILM ECQUL 0.1μF 250V AC	DF17104630				R861-R866 R881 R883 R886	
▲ C820		9965 000 06376	FILM ECQUL 0.22μF 250V AC	DF17224570				R887 R891-R894	
▲ C821		9965 000 04981	ELECT 120μF 400V	EA12740070				P816-SEMICONDUCTORS	
▲ C825		9965 000 04980	CER. 470pF AC400V	DK17471520	▲ D802		4822 130 81248	DIODE S1WBA60 30A 600V	HD20031290
▲ C826		9965 000 04980	CER. 470pF AC400V	DK17471520	▲ D803		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
▲ C827		9965 000 06377	CER. 470P 1kV	DK16471560	▲ D804		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
▲ C828		9965 000 04980	CER. 470pF AC400V	DK17471520	▲ D806		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
C829		4822 124 80067	ELECT. 4.7μF M 50V RA-2	OA47505020	▲ D807		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
C833		4822 124 41535	ELECT. 100μF M 25V RA-2	OA10702520	▲ D814		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
C851		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	D829		4822 130 80116	ZENER DIODE 24V	HD32401000
C852		9965 000 06378	ELECT 330μF 16V LOW IMPEDANCE RJB	EF337016P0	▲ D832		9965 000 00388	DIODE AG01	HD20049080
C854		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	D835		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
C855		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	D836		4822 130 80318	ZENER DIODE 6.8V	HD30681000
C856		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	▲ D851		9965 000 00388	DIODE AG01	HD20049080
C857		9965 000 06379	ELECT 2200μF 10V LOW IMPEDANCE RJB	EF228010P0	▲ D856		4822 130 11074	DIODE RK46	HD20050080
C859		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	▲ D861		9965 000 00388	DIODE AG01	HD20049080
C860		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	D862		4822 130 34499	ZENER DIODE 20V	HD32001000
C861		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	▲ D866		9965 000 06383	DIODE RU4AM 600V 2.0A	HD20051080
C862		9965 000 06380	ELECT 10μF 50V LOW IMPEDANCE RJB	EF106050P0	D868		9965 000 00388	DIODE AG01 400V 0.7A	HD20049080
C864		4822 124 90366	ELECT. 220μF M 50V RA-2	OA22705020	▲ D871		9965 000 00388	DIODE AG01	HD20049080
C866		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	D881		9965 000 06384	IC TL431 SHUNT REGULATOR	HC33036590
C867		9965 000 06381	ELECT 1000μF 16V LOW IMPEDANCE RJB	EF108016P0	▲ Q801		4822 130 10431	PHOTO UNIT PC-123F2	HW10032320
C869		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620	▲ Q810		4822 209 90025	IC MC44603P	HC10111170
C871		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	▲ Q825		9965 000 00395	F.E.T. 2SK2943 900V 3A	HF22943000
C872		9965 000 06382	ELECT 220μF 16V LOW IMPEDANCE RJB	EF227016P0	▲ Q851		9965 000 06390	IC LM317 ADJ. REG.	HC31937590
C873		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620	Q861		4822 130 41947	TRS. 2SC2458 2SC1740S 2SC3199 ETC.	HT30001000
C875		4822 124 90354	ELECT. 100μF M 16V RA-2	OA10701620	Q862		4822 130 42715	TRS. 2SA1048 2SA933S 2SA1267 ETC.	HT10001000
C876		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620	▲ Q871		9965 000 01744	IC NJM7908FA	HC39908090
C877		4822 122 40617	CER. 0.1μF +80%-20% 50V DC	DD38104010	Q891		4822 130 43818	TRS. 2SC2878	HT328782A0
C881		4822 124 41535	ELECT. 100μF / 25V	OA10702520	Q892		4822 130 10431	PHOTO UNIT PC-123F2	HW10032320
C882		4822 122 30103	CER. 0.022μF 50V	DK18223310				P816-MISCELLANEOUS	
C891		4822 124 41535	ELECT. 100μF 25V	OA10702520	▲ F802	FB		FUSE	FS10200350
C892		4822 124 41535	ELECT. 100μF 25V	OA10702520	▲ F802	N1M	4822 070 32001	2A 125V UL CSA MITI EBT FUSE 2A 250V BS LISTED FUSE	FS10200850
C898		4822 122 40617	CER. 0.1μF 50V	DD38104010	▲ F802	U1B		2A 125V UL CSA MITI FBT	FS10200350
C***			P816-CAPACITORS (COMMON)		▲ G815			CER. DE1610F 103M-KH	DK17103900
			HIGH DIELECTRIC CONSTANT		▲ L820		4822 157 70398	CHOKE COIL LF-4D-223	LC22260130
			CER. CAPACITOR 10% 50V : C802-C804 C813		L825		4822 242 80418	LINE FILTER 22mH	FC90050130
			P816-RESISTORS		▲ L831		9965 000 06385	FERRITE BEAD BL02RN2-R62T2	TS12900010
R809		4822 111 31001	330Ω ±5% 1/6W	GG05331160	L832		9965 000 06386	MAINS TRANSF. ER2810SG SWITCHING .	LC11033900
R811		4822 052 10229	22Ω ±5% 1/6W	GG05220160	L851		9965 000 06387	CHOKE COIL 10μH J%	LC14723900
R812		4822 052 10101	100Ω ±5% 1/6W	GG05101160	L852			CHOKE COIL 4.7μH J%	75060501P0
R813		9965 000 06391	15Ω ±5% 1/6W	GG05150160	L853		9965 000 06387	JUMPER	LC14723900
R816		9965 000 05893	180Ω ±5% 1/6W	GG05181160	L854		9965 000 06387	CHOKE COIL 4.7μH J%	LC14723900
▲ R819	FB	482211682449	330kΩ K 1/2W ERC12GK334C	RC10334120	L856		9965 000 06388	CHOKE COIL 10μH J%	LC11033900
▲ R819	N1M	9965 000 00502	1MΩ 5% 1W RCR60 L15	RC05105010	L861		4822 157 62681	CHOKE COIL 1μH EL0405	LC11023900
▲ R819	U1B		2.2M Ω 1/2W ERC12UG	RC10225820	L862		9965 000 06386	CHOKE COIL 10μH J%	LC11033900
R823		4822 053 10183	18kΩ ±5% 1W	GA05183010	L866			JUMPER	75060501P0
R825		4822 052 10102	1kΩ ±5% 1/6W	GG05102160	L867		9965 000 06389	CHOKE COIL 2.2μH	LC12220190
R826		4822 116 82805	1Ω ±5% 1/6W	GG05010160	L871			JUMPER	75060501P0
R827		9965 000 06392	1.5Ω ±5% 1/6W	GG05015160	L872		9965 000 06386	CHOKE COIL 10μH J%	LC11033900
R828		9965 000 06392	1.5Ω ±5% 1/6W	GG05015160	L873		9965 000 06386	CHOKE COIL 10μH J%	LC11033900
R832		4822 053 10183	18kΩ ±5% 1W	GA05183010					
R882		4822 052 10101	100Ω ±5% 1/6W	GG05101160					
R884		4822 050 22212	2.21kΩ ±1% 1/6W	GM11622110					

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)
▲ S815		9965 000 05921	PUSH SWITCH ESB92S94B TV-5 1.5MM	SP01012480	CM22		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
			P916-HEAD PHONE CIRCUIT BOARD		CT01		4822 126 12339	CER. CHIP 2200pF	DK96222300
			P916-CAPACITORS		CT02		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
					CT03		4822 122 33777	CER. CHIP 47pF ±5% 50V	DD95470300
					CT04		4822 124 41134	ELECT. 10μF 63V RA-2	OA10606320
					CT05		4822 122 31765	CER. CHIP 100pF ±5% 50V	DD95101300
C901		4822 124 23052	ELECT 100μF 16V RC-2	EJ10701610	CT11		4822 126 12339	CER. CHIP 2200pF	DK96222300
C906					CT12		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
C907		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300	CT13		4822 122 33777	CER. CHIP 47pF ±0.5pF 50V	DD95470300
C908		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300	CT14		4822 124 41134	ELECT. 10μF 63V RA-2	OA10606320
C909		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	CT15		4822 122 31765	CER. CHIP 100pF ±5% 50V	DD95101300
C910		4822 126 12339	CER. CHIP 2200pF	DK96222300	CT31		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
			P916-RESISTORS		CT32		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
					C301		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
RN01		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	C314		4822 122 33777	CER. CHIP 47pF ±5% 50V	DD95470300
RN02		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	C326		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R903		4822 051 30153	CHIP 15kΩ ±5% 1/16W	NN05153610	C327		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R904		4822 051 30153	CHIP 15kΩ ±5% 1/16W	NN05153610	C328		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R905		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	C336		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R906		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	C337		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R907		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	C338		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R908		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	C601		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R909		4822 051 30151	CHIP 150Ω ±5% 1/16W	NN05151610	C602		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
R910		4822 051 30151	CHIP 150Ω ±5% 1/16W	NN05151610	C603		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R911		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	C604		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
R912		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	C606		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
R920		9965 000 00602	VAR. 10kΩ B RK09L12B0 D-CUT REVERSE	RM01031170	C607		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
			P9164-SEMICONDUCTORS		C608		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
					C609		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
QN01		4822 130 63601	CHIP TRS. 2SC4213	HX342132A0	C615		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
QN02		4822 130 63601	CHIP TRS. 2SC4213	HX342132A0	C616		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
Q901		4822 209 31378	IC NJM4556MB	HC10045090	C621		4822 126 11568	CER. CHIP 470pF	DK96471300
			P916-MISCELLANEOUS		C622		4822 126 11568	CER. CHIP 470pF	DK96471300
					C623				
J901	FB	4822 267 31126	JACK HLJ1520-01-3410	YJ01003020	}		4822 126 14124	MICA CHIP 220pF J	DF95221040
J901	N1M	4822 267 31126	JACK HLJ1520-01-3410	YJ01003020	C626		4822 126 11568	ECHU1H221JB5	DK96471300
J901	U1B	4822 267 31126	JACK HLJ1520-01-3410	YJ01003020	C627		4822 126 11568	CER. CHIP 470pF	DK96471300
L901					C628		4822 126 11568	CER. CHIP 470pF	DK96471300
}					C639		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620
L903		9965 000 05005	FERRITE BEADS BK1608HM102-T	FC90020120	C640		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620
			PP16-MAIN CIRCUIT BOARD		C641				
			PP16-CAPACITORS		}		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620
CA01		4822 124 41134	ELECT. 10μF 63V RA-2	OA10606320	C644				
CA02		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C651		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
CA03		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	C652		4822 122 31765	CER. CHIP 100pF ±5% 50V	DD95101300
CA04		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C661		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
CA05		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	C662		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
CA06		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C663		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
CA07		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	C664		4822 126 11687	CER. CHIP F104Z16 0.1μF	DK98104200
CA08		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C671		4822 122 31765	CER. CHIP 100pF ±5% 50V	DD95101300
CA11		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C672		4822 126 11568	CER. CHIP 470pF	DK96471300
CA12		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020	C680		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200
CB01		4822 126 11568	CER. CHIP 470pF	DK96471300	C688		4822 126 12339	CER. CHIP 2200pF	DK96222300
CB02		4822 126 11568	CER. CHIP 470pF	DK96471300	C690				
CB11		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620	}		4822 126 12339	CER. CHIP 2200pF	DK96222300
CB12		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620	C698				
CC01		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C699		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
CC02		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620	C701		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620
					C702		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620
CF52		4822 126 11568	CER. CHIP 470pF	DK96471300	C703		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
CM01					C704		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
}					C707		4822 126 11568	CER. CHIP 470pF	DK96471300
CM08		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	C708		4822 126 11568	CER. CHIP 470pF	DK96471300
CM09		4822 124 41539	ELECT. 47μF 16V	OA47601620	CT11		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
CM10		4822 124 41539	ELECT. 47μF 16V	OA47601620	C712		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300
CM11		4822 124 12404	ELECT. 220μF M 16V RA-2	OA22701620	C713				
CM21		4822 124 41539	ELECT. 47μF 16V	OA47601620	}		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
					C716				

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C717		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620	R621				
C718		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620	}		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
C720		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020	R630				
C721		4822 124 41539	ELECT. 47µF 16V	OA47601620	R631				
C722		4822 124 41539	ELECT. 47µF 16V	OA47601620	}		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
C723					R634				
}		4822 122 31765	CER. CHIP 100pF ±5% 50V	DD95101300	R635				
C728					}		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
C729		4822 126 13344	MICA CHIP 1500pF J	DF95152040	R638				
C730		4822 126 13344	MICA CHIP 1500pF J	DF95152040	R651				
C741					}		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
}		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620	R654				
C754					R655		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
C777					R656		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
}		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620	R657		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
C780					R658		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
C781					R661		4822 051 30221	CHIP 220Ω ±5% 1/16W	NN05221610
}		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300	R662				
C788					}		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
C791					R667				
}		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620	R671		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
C798					R672		4822 051 30221	CHIP 220Ω ±5% 1/16W	NN05221610
			PP16-RESISTORS		R673		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RA01		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610	R674		4822 051 30221	CHIP 220Ω ±5% 1/16W	NN05221610
RB01					R675		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
}		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	R676		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RB04					R678		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RF51		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R679		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RF57		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	R680		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RM01		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R681		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RM02		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R682		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RM03					R685		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
}		4822 051 30681	CHIP 680Ω ±5% 1/16W	NN05681610	R686		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RM06					R687		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RM07		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R691		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RM08		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R701		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RM09		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610	R702		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RM10		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R703				
RM11		4822 116 83819	CHIP 18kΩ ±5% 1/16W	NN05183610	}		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RM12		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610	R706				
RM13		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R707		4822 051 30222	CHIP 2.2kΩ ±1/16W	NN05222610
RM14		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610	R708		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
RM21		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	R709		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RM22		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	R710		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RM24		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610	R711		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RN51					R712		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	R713		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
					R714		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
RN54					R715				
RT02		4822 051 30759	CHIP 75Ω ±5% 1/16W	NN05750610	}		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RT03		4822 117 12139	CHIP 22Ω ±5% 1/16W	NN05220610	R718				
RT12		4822 051 30759	CHIP 75Ω ±5% 1/16W	NN05750610	R719		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RT13		4822 117 12139	CHIP 22Ω ±5% 1/16W	NN05220610	R720		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RT31	FB	4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R721		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RT32		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610	R722		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RT33		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	R723		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
					R724		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
R301		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R725				
R311		4822 051 30759	CHIP 75Ω ±5% 1/16W	NN05750610	}		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R326		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R730				
R327		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R731		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R328					R732		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
}		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610	R733				
R331					}		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R336		4822 051 30682	CHIP 6.8kΩ ±5% 1/16W	NN05682610	R736				
R337		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	R737		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R338		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R738		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610
R339		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610	R739				
R340		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	}		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
R341		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610	R742				

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R743		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	Q603		4822 209 17155	IC NJM2068MY	HC10102090
R744		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	Q604		4822 209 17155	IC NJM2068MY	HC10102090
R745		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	Q615		4822 209 71373	IC NJM78L05A	HC38105090
R746		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	Q661		9965 000 05912	IC 74HCT244AF	HC724400Q0
R747		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610	Q662		4822 209 91012	IC TC74HCT04AF	HC700405Q0
R748		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610	Q663		4822 209 12416	IC 74HC4066 AF	HC706600Z0
R749		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	Q664		4822 209 61494	IC 74HC74 FLAT	HC707400Z0
R750		4822 051 30222	CHIP 2.2kΩ ±5% 1/16W	NN05222610	Q665		4822 130 61553	DIG.TR.S.	BA21303000
R751								DTC124EU RN1303 UMT	
R758		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610	Q666		4822 130 42593	DIG.TR.S.	BA12303000
R775								DTA124EU RN2303 UMT	
R778		4822 051 30333	CHIP 33kΩ ±5% 1/16W	NN05333610	Q701		4822 209 83804	IC LC4966	HC10150030
R779		9965 000 07426	VAR. 50kΩ C RK09K111	RK05030950	Q702		9965 000 05884	IC DS1807 DIP	HC10100990
R780		9965 000 07426	VAR. 50kΩ C RK09K111	RK05030950	Q703		4822 209 71451	IC NJM4558M	HC10011090
R781		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	Q704		4822 209 71451	IC NJM4558M	HC10011090
R782		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	Q705		9965 000 05910	IC NJM2082M	HC10103090
R783		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610	Q706		9965 000 05910	IC NJM2082M	HC10103090
R784		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610	Q707		4822 209 71451	IC NJM4558M	HC10011090
R785					Q708		4822 209 71451	IC NJM4558M	HC10011090
R788		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610	Q761				
R789					Q764		4822 209 71451	IC NJM4558M	HC10011090
R792		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610	JF51		9965 000 07431	PP16-MISCELLANEOUS	
R793					JT01		9965 000 07432	TERMINAL 14X16 RCA 2L2P ORG NI FRONT-GND	YT02021090
R796		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610	J301		4822 218 11487	TERMINAL 14X14 RCA 2L2P BLK NI FRONT-GND	YT02021220
SF51		4822 277 21559	SLIDE SWITCH SLIDE SWITCH INT/EXT	SS02021150	J601		4822 265 10684	OPTICAL RECIVER GP1F32R	YJ15000150
					J651		996500005911	TERMINAL YKC21-3639	YT02011020
					J651		4822 267 31727	JACK 30FLT-SM1-TB	YJ07021230
DF51		4822 130 81324	CHIP DIODE 1SS302	HZ20018050	J651		4822 267 31727	TERMINAL 14X14 RCA 2L2P W/R NI FRONT-GND	YT02021210
DM01		4822 130 81169	CHIP DIODE 02CZ5.6Y	HZ30006050	J701		4822 267 31727	TERMINAL 14X14 RCA 2L2P W/R NI FRONT-GND	YT02021210
DM21		4822 130 81169	CHIP DIODE 02CZ5.6Y	HZ30006050	LA01		4822 157 63234	CHIP INDUCTANCE NL322522-4R7M	LU12472010
D661		4822 130 81324	CHIP DIODE 1SS302	HZ20018050	LF51		9965 000 05005	FERRITE BEADS BK1608HM102-T	FC90020120
D701		4822 130 81324	CHIP DIODE 1SS302	HZ20018050	LT03		4822 142 60422	PULSE TRANSF. TPS247MN-0386AN	TP41042030
D706					LT13		4822 142 60422	PULSE TRANSF. TPS247MN-0386AN	TP41042030
QA01		9965 000 05885	IC AK5351VF 20BIT A/D CONVERTER	HC10023480	L615		4822 157 63234	CHIP INDUCTANCE NL322522-4R7M	LU12472010
QA02		4822 209 71373	IC NJM78L05A	HC38105090	L651		9965 000 05005	FERRIT BEADSBK1608HM102- T	FC90020120
QC01		4822 209 17437	IC PQ09RF1	HC31909320	L652		9965 000 05005	FERRIT BEADSBK1608HM102- T	FC90020120
QF51		4822 130 42593	DIG.TR.S.	BA12303000	L701		9965 000 05005	FERRITE CORE BK1608HM102-T	FC90020120
QF52		4822 130 61553	DTA124EU RN2303 UMT DIG.TR.S.	BA21303000	L702		9965 000 05005	FERRITE CORE BK1608HM102-T	FC90020120
QM01		4822 130 62548	TRS. 2SB1185 E.F	HT211852B0	L711		4822 157 63234	CHIP INDUCTANCE NL322522-4R7M	LU12472010
QM02		4822 130 62549	TRS. 2SD1762 E.F	HT417622B0	S321		4822 277 21559	SLIDE SWITCH INT/EXT	SS02021150
QM03		4822 209 71451	IC NJM4558M	HC10011090	S701		4822 277 21559	SLIDE SWITCH INT/EXT	SS02021150
QM04		4822 130 61553	DIG.TR.S.	BA21303000	CT21	FB	4822 124 90353	PP26-XLR CIRCUIT BOARD	
QM06		4822 130 61541	DTA124EU RN1303 UMT	HX341162B0	C323		4822 122 33777	PP26-CAPACITORS	
QM07		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	C324		4822 122 33777	ELECT. 100µF M 10V RA-2	OA10701020
QM21					C761			CER. CHIP 47pF ±5% 50V	DD95470300
QM24		4822 130 61553	DIG.TR.S.	BA21303000	C761			CER. CHIP 47pF ±5% 50V	DD95470300
QN51		4822 130 63601	CHIP TRS. 2SC4213	HX342132A0	C770		4822 122 33777	CER. CHIP 47pF ±5% 50V	DD95470300
QN54									
QT31		4822 209 31568	IC CMOS 74HCU04 FLAT	HC700400Z0					
QY45		4822 130 61553	DIG.TR.S.	BA21303000					
Q326		5322 209 60472	IC SN75157PS	HC10070370					
Q331		4822 209 31568	IC CMOS 74HCU04 FLAT	HC700400Z0					
Q332		4822 209 30426	IC CMOS 74HC00 FLAT	HC700000Z0					
Q601		9965 000 07427	IC AK4393 DA CONVERTER	HC10027480					

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R321		4822 051 30331	PP26-RESISTORS CHIP 330Ω ±5% 1/16W	NN05331610	LY01		482215753873	PY16-MISCELLANEOUS CHIP INDUCTANCE	LU12104010
R322		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610				NL322522-101K	
R323		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610	VY01		9965 000 05916	DISPLAY UNIT FTD	HQ31208410
R761								BJ727GNK 15GRID X 22ANO.	
}		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610	XY01		9965 000 07430	SERAMIC VIB.	FQ08004070
R764								CSTCC8.00MG-TC 8.000MHz	
JT21	FB	4822 267 31369	PP26-MISCELLANEOUS OPT. CONNECTOR GP1F32T	YJ15000090				PY26-SWITCH	
			OPTICAL OUTPUT					CIRCUIT BOARD	
J321		9965 000 02540	JACK NC3FAH2	YJ01004340	CY21		4822 126 11687	PY26-CAPACITOR CER. CHIP 0.1μF +80%-20%	DK98104200
J761		9965 000 02540	4P CANON HOLZ	YJ01004340					
J762		9965 000 02540	JACK NC3FAH2	YJ01004340	RY27		4822 116 82487	PY26-RESISTORS CHIP 0 Ω	NN05000610
			4P CANON HOLZ		RY28		4822 116 82487	CHIP 0 Ω	NN05000610
L751									
}		9965 000 05005	FERRITE CORE	FC90020120	SY04		9965 000 01445	PY26-MISCELLANEOUS TACT SWITCH SKHMPW	SP01013320
L754			BK1608HM102-T		SY08		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
					SY10		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
					SY12		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
					SY13		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
					SY51		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
CY03		4822 126 11704	PY16-FTD CIRCUIT BOARD PY16-CAPACITORS CER. CHIP 0.022μF	DK98223300	}		9965 000 01445	TACT SWITCH SKHMPW	SP01013320
CY04		4822 122 33761	CER. CHIP 22pF ±5% CG 50V	DD95220300	SY60				
CY05		4822 122 33761	CER. CHIP 22pF ±5% CG 50V	DD95220300					
CY06		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200	CY07		4822 124 90353	PY36-IR CIRCUIT BOARD ELECT. 100μF M 10V RA-2	OA10701020
CY08		4822 126 11704	CER. CHIP 0.022μF	DK98223300	RY04		4822 051 30101	CHIP 100Ω ±5% 1/6W	NN05101610
CY09		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300	ZY01		9965 000 06833	PHOTO UNIT	HW10008210
CY10		4822 122 31765	CER. CHIP 100pF ±5%G 50V	DD95101300				IR SENSOR RPM6936-H4	
CY13		4822 126 11687	CER. CHIP 0.1μF +80%-20%	DK98104200					
CY14		4822 124 11432	TANTL.CHIP 100μF 10V	EY10701020				PY46-JOG CIRCUIT BOARD ROTARY SWITCH EC11B ROT	SR03030030
CY41		4822 124 41842	TANTL.CHIP 47μF 16V	EY47601620				ENCODER WITH PUSH. SW	
					SY26		9965 000 05915		
RY01		4822 117 12925	PY16-RESISTORS CHIP 47kΩ ±5% 1/16W	NN05473610				PY56- STANDBY LED	
RY02		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610				CIRCUIT BOARD	
RY03		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610	DY01		4822 130 11569	L.E.D. HLMF-K200 #2UL RED	HI10005340
RY06		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610					
RY09		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610					
RY10		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610					
RY11		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610					
RY12		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610					
RY13		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610					
RY14		4822 051 30332	CHIP 3.3kΩ ±5% 1/16W	NN05332610					
RY15		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610					
RY16		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610					
RY17		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610					
RY21									
}		4822 051 30682	CHIP 6.8kΩ ±5% 1/16W	NN05682610					
RY26									
RY44		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610					
RY46		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610					
DY04		9965 000 04970	PY16-SEMICONDUCTORS CHIP ZENER DIODE	HZ30014050					
			02CZ3.3X 3.3V						
DY41		4822 130 81324	CHIP DIODE 1SS302	HZ20018050					
DY42		4822 130 81324	CHIP DIODE 1SS302	HZ20018050					
QY01		9965 000 07429	MICROPROCESSOR	HU385KT00F					
			TMP87CH74F						
QY02		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0					
QY03		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0					
QY04		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0					
QY41		4822 130 42593	DIG.TR.S. DTA124EU RN2303	BA12303000					
QY42		4822 130 61553	DIG.TR.S. DTC124EU RN1303	BA21303000					
QY43		4822 130 61553	DIG.TR.S. DTC124EU RN1303	BA21303000					
QY44		4822 130 42593	DIG.TR.S. DTA124EU RN2303	BA12303000					