Service Manual

74 CD72/21B/22B/25B/52B/55B /21G/22G
Compact disc player

COMPACT disc DIGITAL AUDIO

CONTENTS

CLASS 1
LASER PRODUCT
3122 110 03420

marantz®

model CD-72MKII/CD-72MKIISE

First issue: 1993
4822 725 51032

PCS 70 945

MARANTZ DESIGN AND SERVICE

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 at our National Marantz Subsidiary or Agent.

MARANTZ EUROPE B.V.
P.O. Box 80002
Building SFF 2
5600 JB Eindhoven
The Netherlands
Phone : +31-40-732241
Fax : +31-40-735578

ORDERING PARTS

Parts can be ordered either by mail or by telex. 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 the part is required
5. Way of shipment
6. Signature: any order form or telex must be signed, otherwise such part order will be considered as null and void.

ADDRESSES

AUSTRALIA
MARANTZ AUSTRALIA
Figtree Drive
Australia Centre
Homebush, NSW 2140
AUSTRALIA

AUSTRIA
MARANTZ
Hietzinger Kai 137a
1130 Wien
Austria

BELGIUM
MARANTZ EUROPE B.V.
Div. Benelux
P.O.Box 80002
Building SFF 2
5600 JB Eindhoven
The Netherlands

CHILE
MARANTZ DIVISION OF
PHILIPS S.A.
Av.Santa Maria 0760
Casilla 2687
Santiago
Chile

DENMARK
MARANTZ
Horsvinget 5
2630 Tastrup
Denmark

FINLAND
MARANTZ
Kuortanegatan 1
00520
Helsingfors 52
Finland

FRANCE
MARANTZ FRANCE
4 Rue Bernard Palissy
92600 Asnières
France

GERMANY
MARANTZ GERMANY GmbH
Kleine Heide 12
Postfach 4802
Halle-Westfalen
Germany

GREAT BRITAIN
MARANTZ HiFi UK Ltd.
Kingsbridge House
Padbury Oaks
575-583 Bath Road
Longford Middlesex UB7 OEH,
U.K.

GREECE
ADAMCO ELECTR. SA
P.O.Box 21025
Hippocratus Str. 188
Athens 11471
Greece

ITALY
MARANTZ ITALIANA SPA
Piazza IV Novembre 3
20124 Milano
Italy

JAPAN
MARANTZ JAPAN INC.
35-1, 7-chome, Sagamiono
Sagamihara-shi, Kanagawa
Japan

KUWAIT
AL ALAMIAH ELECTRONICS
P.O.Box 8196
Salmiah
22052 Kuwait

NETHERLANDS
MARANTZ EUROPE B.V.
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P.O.Box 80002
Building SFF 2
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The Netherlands

NORWAY
MARANTZ
Postboks 7034
Assiden
3007 Drammen
Norway

PORTUGAL
COREL
Av. da Liberdade
211-2 Esq.
1200 Lisboa
Portugal

SAUDI ARABIA
AL ALAMIAH ELECTRONICS
P.O.Box 5954
University Street
Riyadh 11432
Saudi Arabia

SOUTH AFRICA
MARANTZ S.A.
10 Bond Street
Randburg 2194
P.O. Box 7703
Johannesburg 2000
South Africa

SPAIN
MARANTZ SPAIN
Martinez Villergas 2
Apartado 2065
Madrid 28027
Spain

SWEDEN
MARANTZ
Box 1324
17125 Solna
Sweden

SWITZERLAND
MARANTZ SWITZERLAND
Postfach
8010 Zürich-Müllingen
Switzerland

TRADING
MARANTZ TRADING
P.O.Box 20008
Building SFF 2
5600 JB Eindhoven
The Netherlands

All of the above locations are fully equipped to take care of your total service needs or can advice you. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

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

LASER RADIATION SAFETY

Protection of eyes from laser beam during servicing.
This set employs a laser. Therefore, be sure to carefully follow the instructions below when servicing.

1. **Laser Diode Properties**
   - Material: Al Ga As
   - Wave Length: 0.78μm
   - Emission Duration: Continous
   - Laser Output: Max. 0.11 mW

This output is the value measures at the objective lens surface on the light pen assembly.

2. During service, do not take the subchassis block apart and do not adjust the H F amp circuit. If there is a breakdown in the H F circuit (including laser diode), replace the entire subchassis block (including H F amp circuit board).

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

LASER WARNING LABELS
The labels shown below are affixed.
1) DHHS Protective housing label
   "DANGER – INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM."
2) DNHW Protective housing label and laser radiation sign label
   "CAUTION _ HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFETED."
   "ATTENTION _ RAYONNEMENT LASER DANGFEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE."

TECHNICAL SPECIFICATIONS

Audio Characteristics

Channels ..... 2 channels
D/A conversion ..... 1-bit linear/channel

Frequency Characteristics

Line output jack (FIXED) ..... 2 to 20,000 Hz, ± 0.2 dB
Line output jack (VARIABLE) ..... 2 to 20,000 Hz, ± 0.2 dB
Dynamic range ..... 98 dB
S/N ratio ..... 100 dB
Channel separation ..... 96 dB or more (1 kHz)
THD ..... 0.003 % (1 kHz)
Wow & flutter ..... Precision of quartz
Analog output jacks
Line output jacks (FIXED) ..... Output level 2 V RMS
Output impedance 200 ohms
Matching load impedance ..... 10 kohms or more
Line output jack (VARIABLE) ..... Output level 4 V RMS
Output impedance 200 ohms
Matching load impedance ..... 10 kohms or more
Digital output ..... Pin jack, 0.5 Vp-p/75 ohms
(Rectangular optical connector)
optical output –19 dBm

Optical Readout System

Laser ..... AlGsAs semiconductor
Wavelength ..... 780 nm

Signal System

Sampling frequency ..... 44.1 kHz
Quantization ..... 16 -bit linear/channel
Error correction ..... Cross-interleave reed solomon code (CIRC),
Class A D/A conversion

Power Supply

/22/52 version ..... 230 V AC 50/60 Hz
/25/55 version ..... 240 V AC 50/60 Hz
/21 version ..... 110–120/220–240 V AC 50/60 Hz
Power Consumption ..... 12 W

Cabinet, etc.

Dimensions (Black)
Width ..... 420 mm
Height ..... 119 mm
Depth ..... 297 mm
Net weight ..... 5 kg

Operating temperatures ..... + 5 °C ~ + 35 °C
Operating humidity ..... 5 % ~ 9 % (without Dew)

Accessories

Remote control unit (RC-72CD) 1
Dimensions (W x H x D) ..... 60 x 15 x 175 mm
Weight (without batteries) ..... 85 g
R03 Batteries 2
Stereo audio cable with RCA pins 1

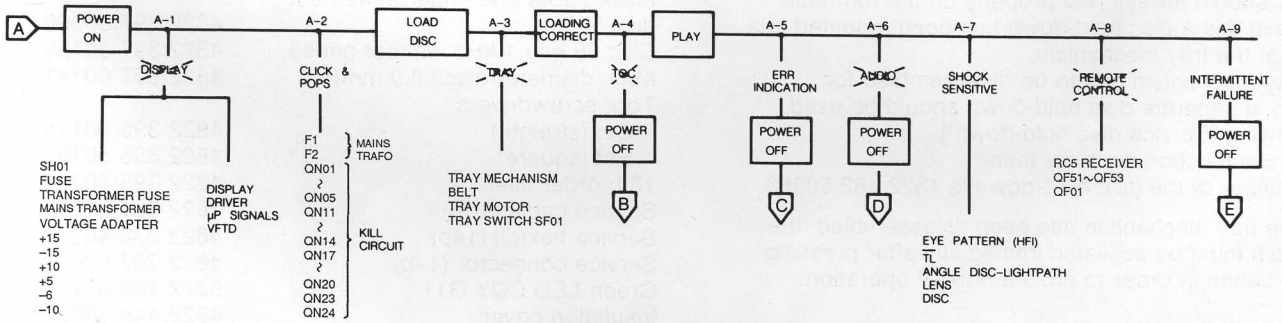
MEASUREMENTS AND ADJUSTMENTS

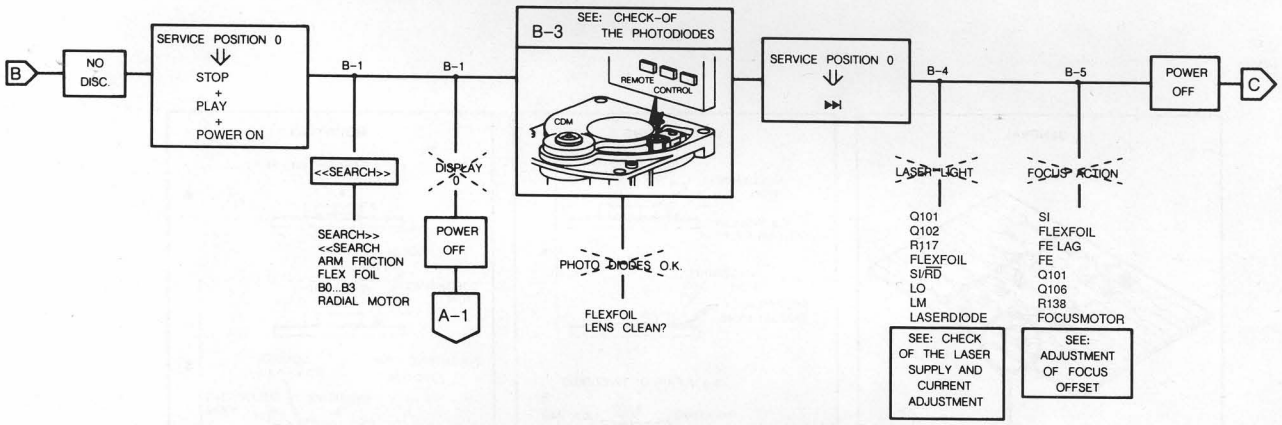
TROUBLE SHOOTING (FAULT FINDING TREE)

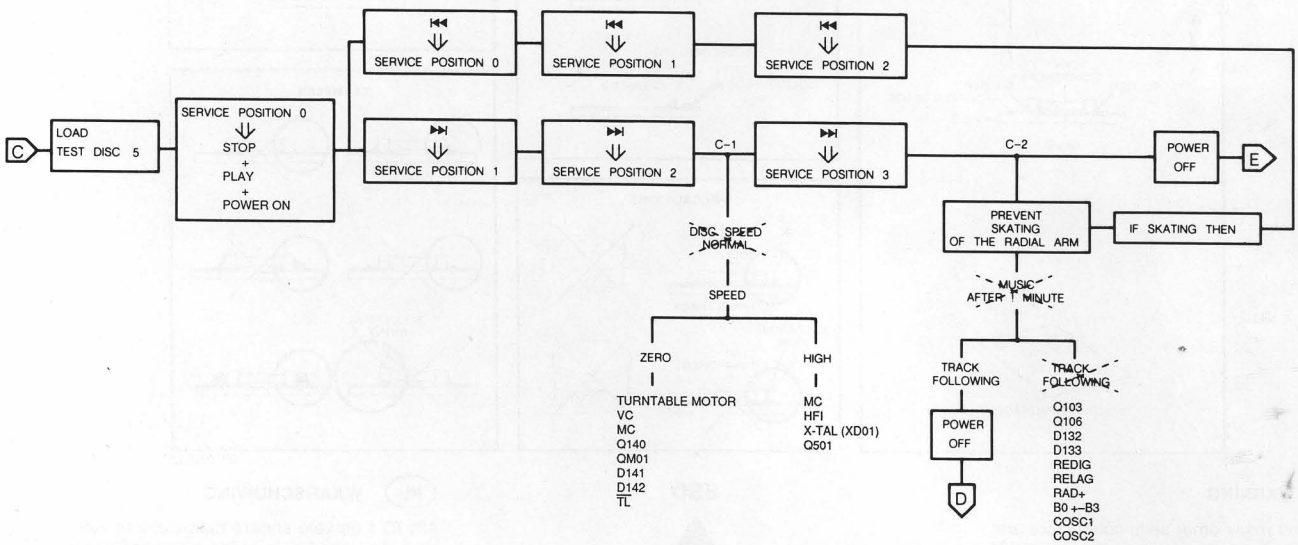
Follow the path of the faultfinding tree beginning at the top left. Perform the actions you come across in the various blocks.
Look at the various side branches to find out if the information you see there applies to your problem. If, for instance, you find the indication ~~display~~ this means that no picture appears on the display.

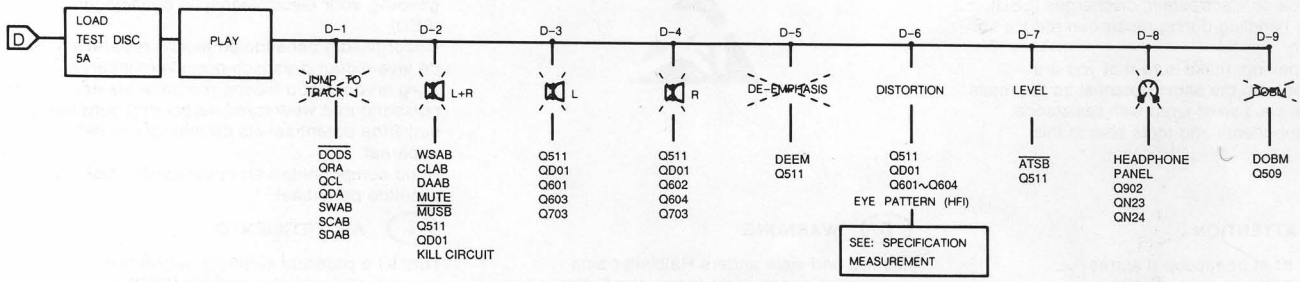
If you establish this fault, follow the branch and perform the recommended actions. Check the signals mentioned. In a number of branches further reference is made to measurements you could carry out.
These measurements are explained in several tables further on in this manual.

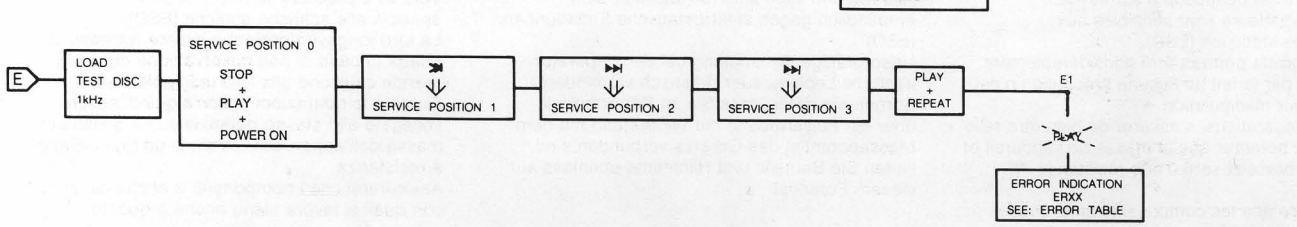
START-UP PROCEDURE











B-3 CHECK OF THE PHOTODIODES

Step	Signal	Mode	◇	∠	▭	⊓	Remarks
1	D2 D1 D3 D4	power on	4 6 7 8	–	–	signal 4Ξ6Ξ7Ξ8	Signal depends on Distance lens ↔ IR LED of remote control

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B-4 CHECK OF LASER SUPPLY

The laser, the lasersupply plus the monitor diode form a feedback system.
A defect in the lasersupply may result in the destruction of the laser. If, in that case, the laser is replaced, (= complete C.D.M.-unit) the new laser will also become defective. However, it is impossible to check and repair a feedback system if a link is missing. For this reason the laser supply can be checked with teh replacement circuit for laser assembly.

Step	Signal	Mode	◇	▭	Remarks
1	LO	serv. pos. 2 SK	11 V	1.8<V <2.3	REPLACEMENT CIRCUIT FOR LASER ASSEMBLY to LO 33Ω GREEN LED to LM CONNECT DIRECTLY TO PANEL SK 18Ω to ⊥ The feetback system sees to it that the same amount of current flows through the LED When SK is open and when SK is closed the LED emits little light PRS 06615 T02/9020
	LM		13 V	170<mV <220	
2	LO	serv. pos. 2 SK	11 V	1.8<V <2.3	
	LM		13 V	170<mV <220	
3	LO	Power on	11 V	0V ± 0.2V	No light

After opening SK the LED will emit a little more light for a short moment.

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B-4 LASER CURRENT ADJUSTMENT

STEP	SIGNAL	MODE	◇	∠	⊓	▭	REMARKS
1	--	POWER OFF	--	--	--	--	CHECK IF FLEX-FOIL IS PROPERLY CONNECTED
2	--	POWER OFF	11 Ω	R134	1kΩ +10% −0	--	PRE ADJUSTMENT OHMIC VALUE
3	--	POWER OFF	--	R136	--	--	SET TO MID-POSITION
4	LASER CURRENT ⩦ VOLTAGE ACROSS R114	TEST DISC 5A PLAY	1 V 2 mV DC	--	⩾15mV	--	IF < 15mV THEN GO TO STEP 3 AND SET R136 TO 1/4 OR 3/4. TRY AGAIN
5	LASER CURRENT ⩦ VOLTAGE ACROSS R114	TEST DISC 5A PLAY	1 V 2 mV DC	R134	50mV	--	--
6	FE-LAG	TEST DISC 5A TRACK 1 PLAY	22 V mV DC	R136	400mV	--	FINE ADJUSTMENT

MDA 02673
T28/020

B-5 ADJUSTMENT OF FOCUS-OFFSET

Step	Signal	Mode	◇	∠	▭	⊓	Remarks
1	–	Power on no disc	–	R136	–	–	adjust for optical mid-position of the focus motor
2	FE LAG	Play Test disc 5 Track 1	22	R136	400mV ± 40 mV DC	–	fine adjustment

ERROR TABLE

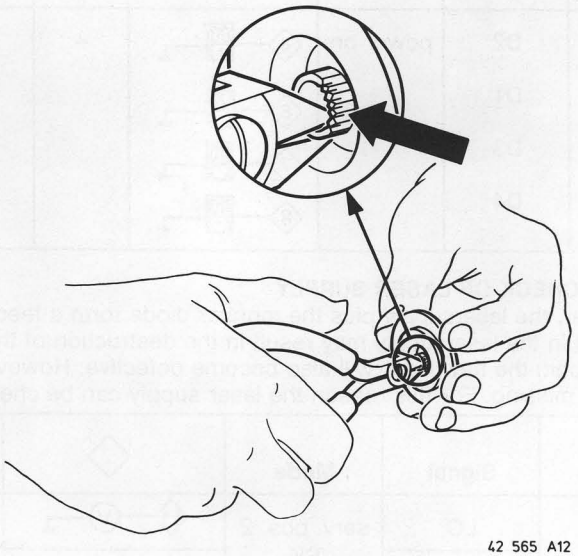
System errors

Indication	Cause	Check
Er 02	No $\overline{TL}$ pulse at start-up	$\overline{Si}$, Sc, RD, Photodiode signal processor $\overline{TL}$, HFI, CD disc present?
Er 03	No lead-in track found	CD disc, radial arm position, REdig, Radial error processor
Er 06	No $\overline{TL}$ pulse within 0.5 sec. during track jumping	RE-lag circuit, $\overline{TL}$, REdig
Er 07	Subcoding error during PLAY	HFI
Er 08	TOC error	CD disc, turntable motor control, radial arm position

Operating errors

Er 30	"NEXT" key operated during the last track, with "REPEAT" turned off.
Er 31	"PREVIOUS" key operated during the first track, with "REPEAT" turned off.
Er 32	AB key operated in AMS mode.
Er 33	The selected index number does not exist on this disc.
Er 34	Programme survey requested; no programme present.
Er 35	The programme memory is full.
Er 36	The programmed track is not present on this CD disc.
Er 37	The selected track is not present on this CD disc.
Er 38	MEMO pressed during AMS while track not known. MEMO pressed during EDIT while cassette time = 0 sec.
Er 39	MEMO or CANCEL pressed while in play program.
Er 40	MEMO pressed when already a delete program has been made.
Er 41	CANCEL pressed when already a not deleted program has been made.
Er 42	Selected track is not a program block.
Er 43	FTS store error: memory full.
Er 44	FTS store error: no program..
Er 46	FTS play error: no FTS program in memory.
Er 47	FTS selection error: upper bound of fts memory. (next).
Er 49	FTS selection error: selection request while storing. (next/prev).
Er 51	FTS selection error: selection request while storing. (review).
Er 52	FTS selection clear error: clear request while storing.
Er 54	FTS store error: no record id (toc) available.
Er 56	AB key pressed when not in PLAY mode.
Er 60	Fast forward/reverse bound.
Er 63	No track possible to play in edit mode.
Er 74	Relative time not found.
Er 75	Binary search time out error.
Er 76	Time search time out error.

SERVICE DISC HOLD-DOWN



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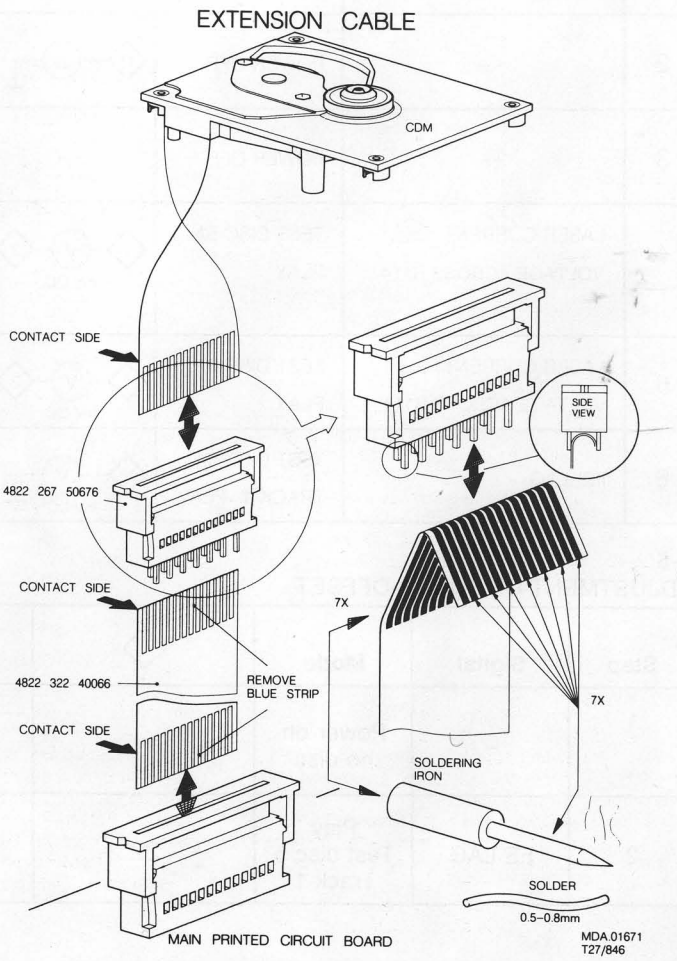
Compose a service Disc hold-down in the following way

- Cut in the most inner ring of a disc hold-down (4822 462 50383) with small and sharp nippers, see fig. above.
- Enlarge the diameter of the innermost ring slightly with the hind part of a pencil or ballpoint, so that it jams onto the turntable with sufficient force.
- If the jamming force decreases after certain time of use, the diameter has to be enlarged with a pencil or ballpoint again.

SERVICE FOIL FOR CDM



SERVICING HINTS

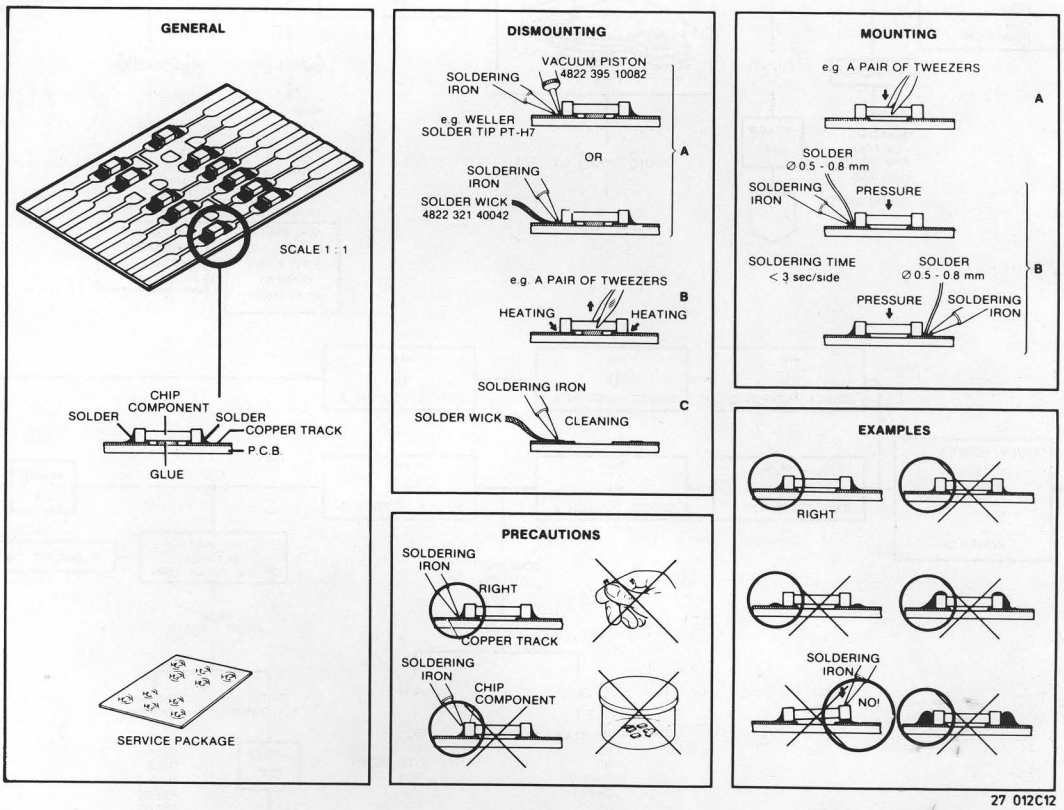
In the set chip components have been applied.
For disassembly and assembly of chip components see the figure below.

The disc should always rest properly on the turntable.
To achieve this a disc hold-down has been mounted in a bracket of the tray mechanism.
If the tray mechanism has to be disassembled for servicing, a seperate disc hold-down should be used.
(See drawing "Service disc hold-down")
The set can function normally then.
Code number of the disc hold-down is 4822 462 50383.

When the tray mechanism has been disassembled, the tray switch must be activated immediatly after pressing the play button in order to ensure normal operation.

SERVICE TOOLS

Audio signals disc	4822 397 30184
Disc without errors (test disc 5) + disc with DO errors, black spots and fingerprints (test disc 5A)	4822 397 30096
Disc 65 min 1 kHz without 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
Service cable (4p)	4822 321 21284
Service flexfoil (14p)	4822 322 40066
Service connector (14p)	4822 267 50676
Green LED CQY G11	5322 130 32182
Insulation cover	4822 444 60655



(GB) WARNING

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

ESD

(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.

(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 serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

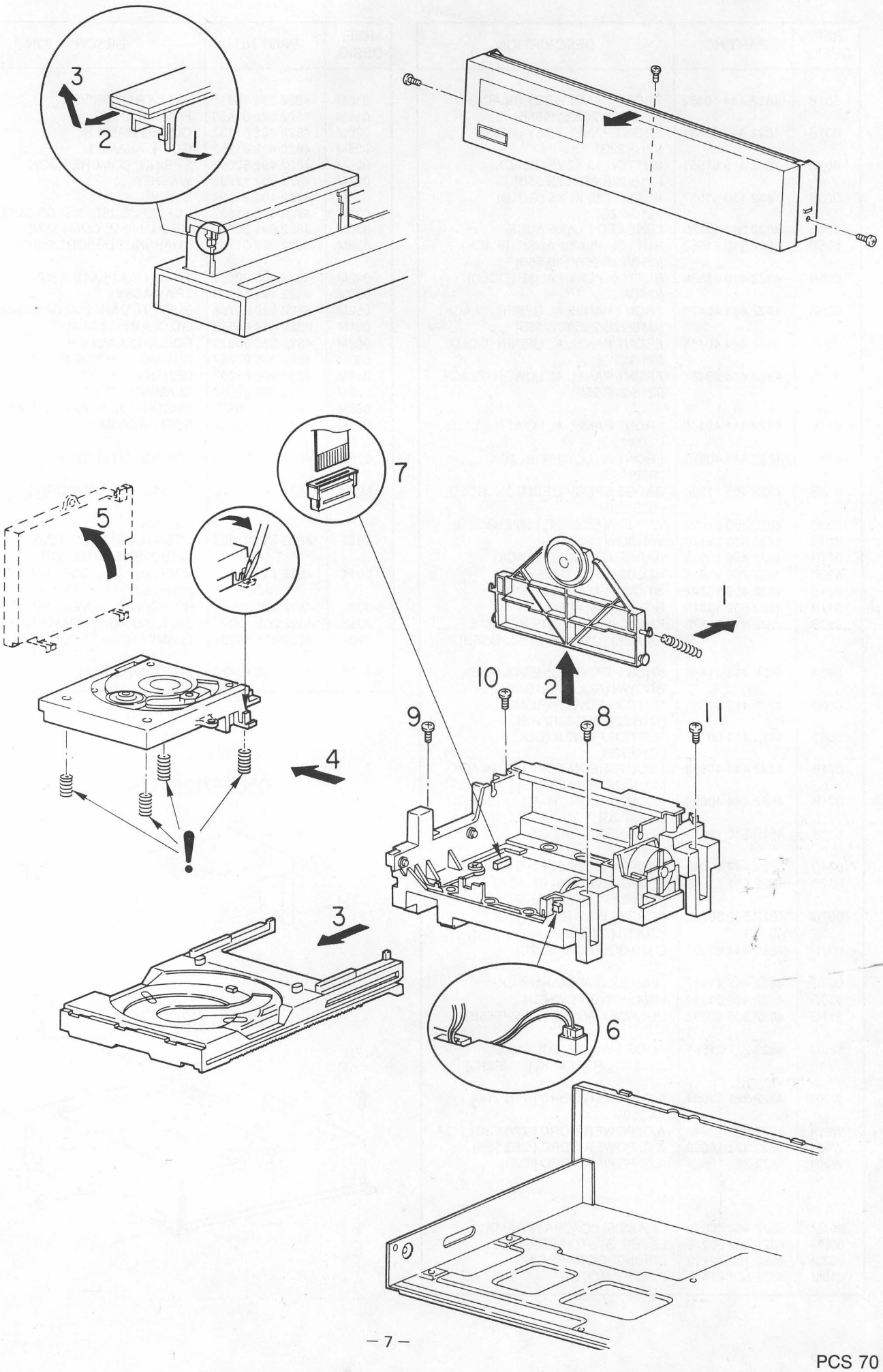
(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgiältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
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.

(I) AVVERTIMENTO

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

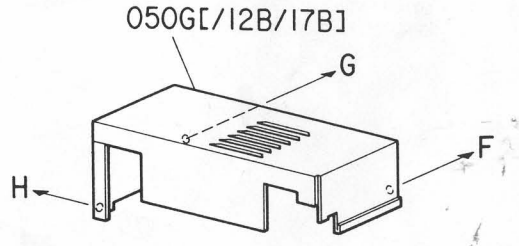
DISASSEMBLY OF LOADING AND CAM

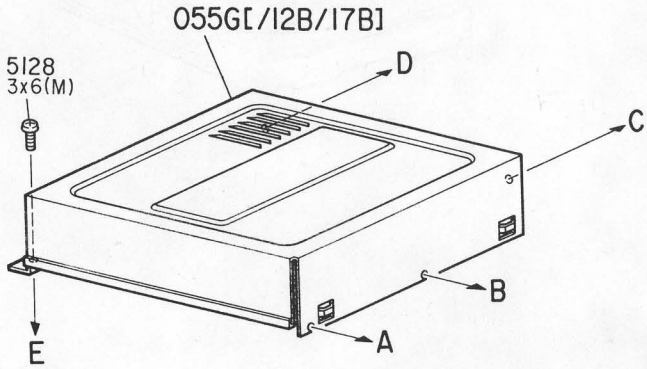


MECHANICAL PARTS LIST

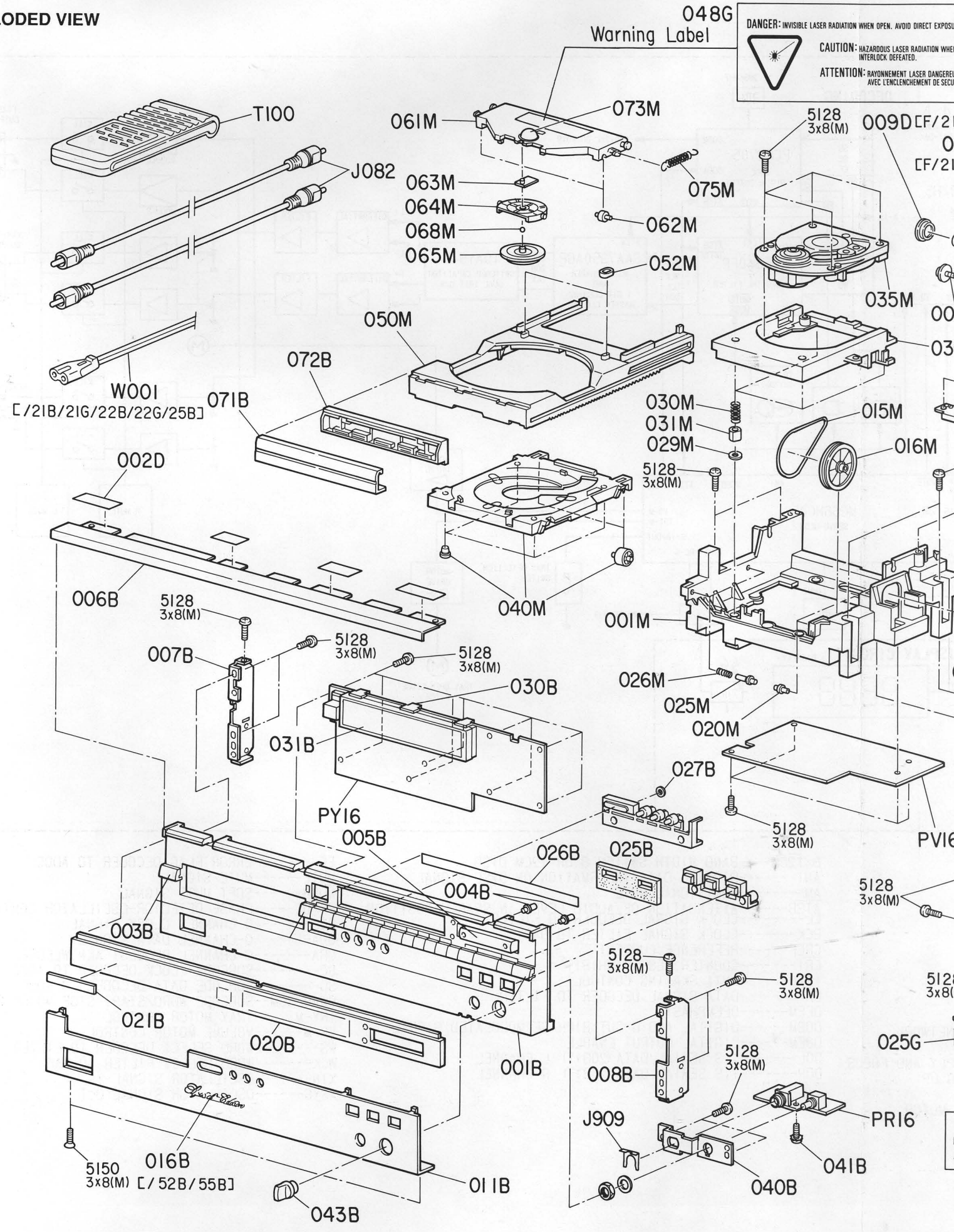
(288K)

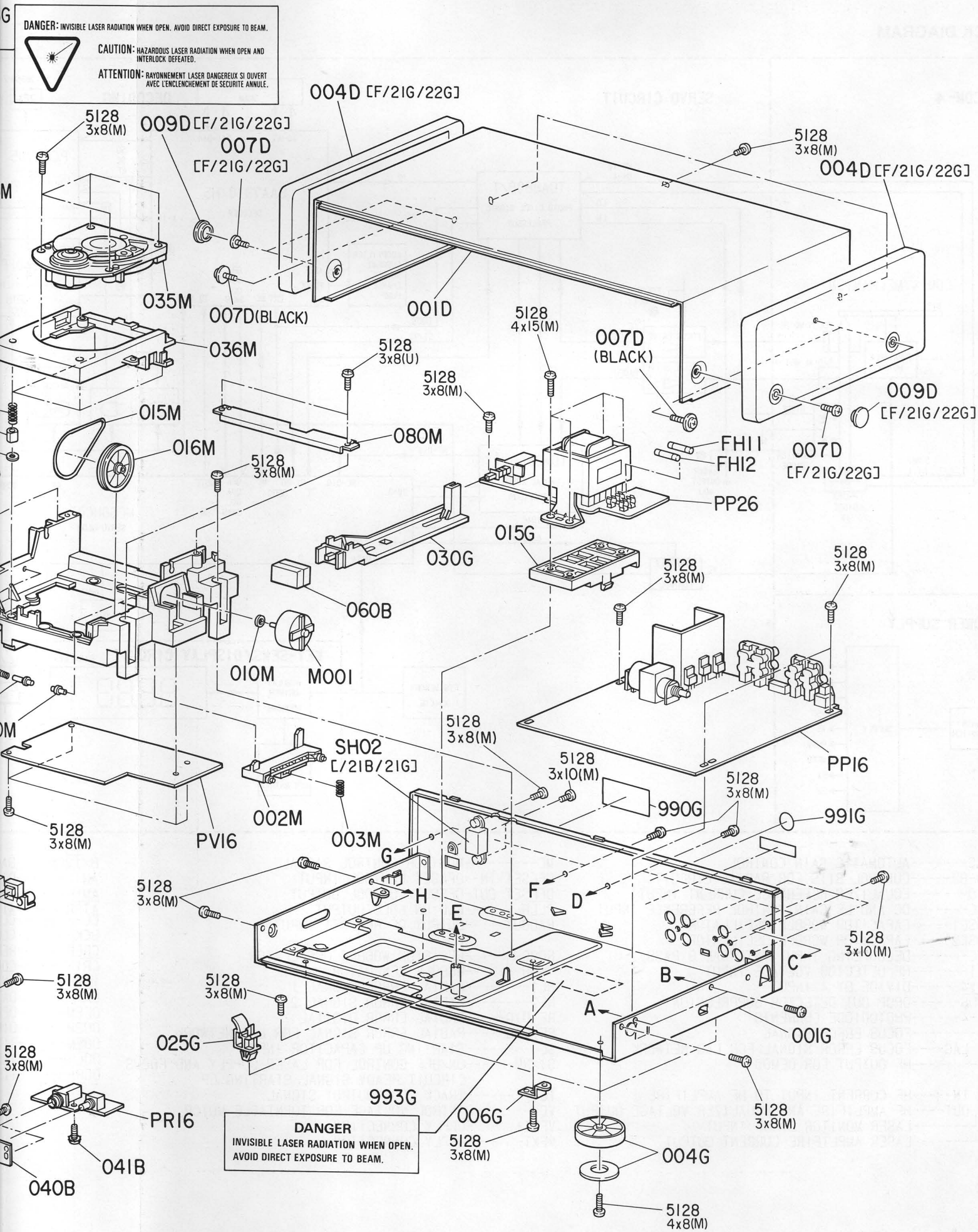
REF. DESIG.	PART NO.	DESCRIPTION
001B	4822 444 40482	FRONT PANEL ASSY (BLACK) [/21B/22B/25B/52B/55B]
001B	4822 444 40681	FRONT PANEL ASSY (GOLD) [/21G/22G]
003B	4822 410 61551	BUTTON,10 KEYS (BLACK) [/21B/22B/25B/52B/55B]
003B	4822 410 61557	BUTTON,10 KEYS (GOLD) [/21G/22G]
004B	4822 381 11285	LENS,LED PLAY/PAUSE
005B	4822 410 61552	BUTTON,PLAY/PAUSE (BLACK) [/21B/22B/25B/52B/55B]
005B	4822 410 61558	BUTTON,PLAY/PAUSE (GOLD) [/21G/22G]
006B	4822 444 40479	FRONT PANEL AL UPPER (BLACK) [/21B/22B/25B/52B/55B]
006B	4822 444 40485	FRONT PANEL AL UPPER (GOLD) [/21G/22G]
011B	4822 444 40481	FRONT PANEL AL LOWER (BLACK) [/21B/22B/25B]
011B	4822 444 40486	FRONT PANEL AL LOWER (GOLD) [/21G/22G]
011B	4822 444 40575	FRONT AL LOWER (BLACK) [/52B/55B]
016B	4822 459 11096	BADGE,SPECIAL EDITION (GOLD) [/52B/55B]
020B	4822 450 62099	WINDOW [21B/22B/25B/21G/22G]
020B	4822 450 62119	WINDOW [/52B/55B]
021B	4822 459 10943	BADGE,MZ (GOLD/BLACK)
030B	4822 256 91819	HOLDER, F.L. TUBE
031B	4822 459 10942	STICKER ADHESIVE SHEET
041B	4822 502 13315	B.T.SCREW(W/TL)
043B	4822 410 60873	KNOB,HEAD PHONE VOLUME (BLACK) [/21B/22B/25B/52B/55B]
043B	4822 413 41642	KNOB,HEAD PHONE VOLUME BROWN (GOLD) [/21G/22G]
060B	4822 410 61556	BUTTON,POWER (BLACK) [/21B/22B/25B/52B/55B]
060B	4822 410 60741	BUTTON,POWER (GOLD) [/21G/22G]
071B	4822 444 40693	ESCUTCHEON,TRAY LID (BLACK) [/21B/22B/25B/52B/55B]
071B	4822 444 40694	ESCUTCHEON,TRAY LID (GOLD) [/21G/22G]
072B	4822 532 12112	RETAINER, TRAY LID
004D	4822 444 40499	SIDE PANEL (GOLD) [/21G/22G]
007D	4822 501 11008	B.T.SCREW(W/W) (BLACK) [/21B/22B/25B/52B/55B]
007D	4822 502 30732	SCREW, BIND B-TITE 4x13 (GOLD) [/21G/22G]
009D	4822 444 60607	CAP (GOLD) [/21G/22G]
004G	4822 462 41947	LEG,GOLD ALUMINUM CAP
030G	4822 402 61394	LINK,POWER SWITCH
911G	4822 325 50202	BUSHING, AC CORD [/52B/55B]
SH02	4822 277 21561	SLIDE SWITCH, VOLTAGE SELECTOR (BLACK) [/21B/21G]
W001	4822 321 11004	A.C. POWER CORD [/21B/21G] 1A 250V
W001	4822 321 10249	A.C. POWER CORD [/22B/22G] 2..5A
W001	4822 321 10629	A.C. POWER CORD [/25B/55B]
W001	4822 321 10804	A.C. POWER CORD [/52B]
001M	4822 464 50872	CHASSIS, LOADING FRAME
002M	4822 402 50276	LEVER, SWITCH BRACKET
003M	4822 492 52123	SPRING, COMPSPRING
010M	4822 528 81447	PULLEY,MOTOR
015M	4822 358 10115	BELT,TRAY DRIVE
016M	4822 528 81455	PULLEY,DRIVE
020M	4822 402 61132	GUIDE,FRAME R
025M	4822 402 61252	GUIDE,FRAME L
026M	4822 492 52094	SPRING, COMPRESSION
029M	4822 532 11396	WASHER
030M	4822 492 51902	SPRING
031M	4822 466 61587	BUFFER, SUSPENS. GROMMET
035M	4822 691 30209	MECHANISM, CDM4 MINI
036M	4822 402 61196	CHASSIS, SUPPORT PIECE
040M	4822 466 92251	TRAY, LIFT PLATE ASSY
050M	4822 444 50603	TRAY ASSY
052M	4822 532 51756	BUFFER, DAMPING GROMMET
061M	4822 444 60568	LID,CLAMPER ARM
062M	4822 528 90639	ROLLER,CLAMPER
063M	4822 466 92257	RETAINER, PIVOT PLATE
064M	4822 402 61207	CENTRING RING
065M	4822 530 80503	CLAMPER, PRESSURE RING K
068M	4822 520 40177	SUSTAINER, BEARING BALL
073M	4822 462 42044	BUFFER,060M
075M	4822 492 32883	SPRING, TENSION
M001	4822 361 30368	D.C.MOTOR, TRAY DRIVE
		PACKING
001T	4822 736 21802	USER MANUAL CD-72MK2 [/21B/22B/25B/21G/22G]
001T	4822 736 21827	USER MANUAL CD-72MK2SE [/52B/55B]
J082	4822 321 22611	RCA CONNECTIVE CORD (GOLD)
J083	4822 265 10092	JACK, AC ADAPTER [/21B/21G]
J909	4822 401 11351	CLAMPER, SNAP PLATE
T100	4822 218 10427	IR COMMANDER



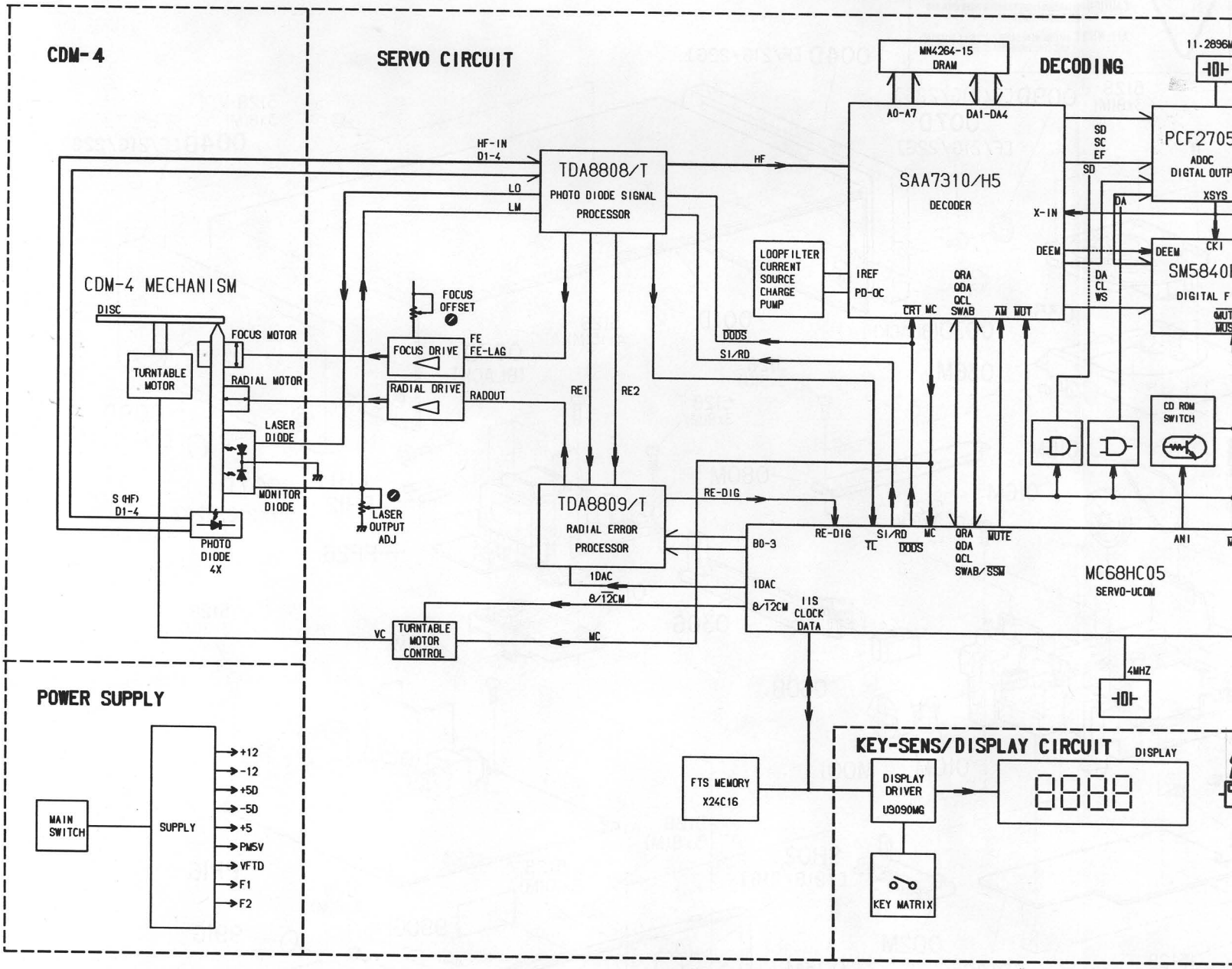


EXPLODED VIEW




DANGER: INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION: HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED.
ATTENTION: RAYONNEMENT LASER DANGEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE.
004D [F/21G/22G]
5128 3x8(M)
009D [F/21G/22G]
007D [F/21G/22G]
035M
007D(BLACK)
001D
036M
5128 3x8(U)
5128 4x15(M)
007D (BLACK)
009D [F/21G/22G]
015M
016M
080M
FHI1
FHI2
007D [F/21G/22G]
PP26
030G
015G
060B
010M
M001
PP16
SH02 [/21B/21G]
002M
003M
PVI6
5128 3x10(M)
990G
991G
001G
025G
PR16
041B
040B
993G
006G
004G
5128 4x8(M)
DANGER
INVISIBLE LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.

BLOCK DIAGRAM



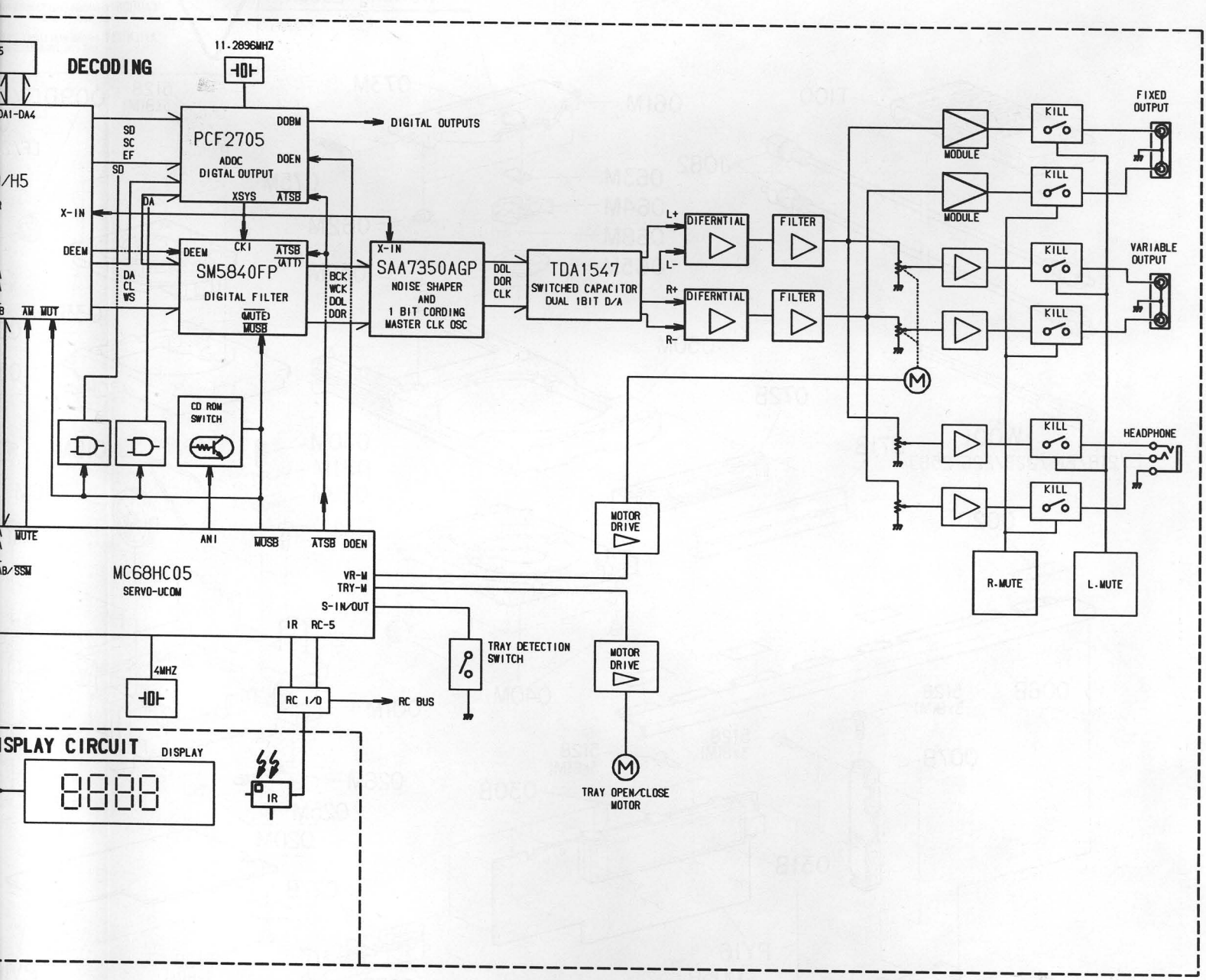
AGC-------AUTOMATIC GAIN CONTROL
B0-B3-----CONTROL BITS FOR RADIAL CIRCUIT
BEQ-------EQUALIZER REFERENCE CURRENT INPUT
BGC-------DC AND LF GAIN CONTROL REFERENCE INPUT
COSC1-----CAPACITOR WOBBLE OSCILLATOR
COSC2-----CAPACITOR WOBBLE OSCILLATOR
DEC-------DECOUPLING INPUT INTERNAL BYPASS
DET-------HF DETECTOR VOLTAGE INPUT
DIV4------DIVIDE BY 4 INPUT
DODS------DROP OUT DETECTOR SUPPRESSION
D1-4------PHOTODIODE CURRENTS
FE--------FOCUS ERROR SIGNAL
FE LAG----FOCUS ERROR SIGNAL FOR LAG NETWORK
HF--------HF OUTPUT FOR DEMOD

HF IN-----HF CURRENT INPUT TO HF AMPLIFIRE
HF OUT----HF AMPLIFIRE AND EQUALIZER VOLTAGE OUTPUT
LM--------LASER MONITOR DIODE INPUT
LO--------LASER AMPLIFIRE CURRENT OUTPUT

MC---------MONITOR CONTROL SIGNAL
OFFSET IN--OFFSET CONTROL INPUT
OFFSET OUT-OFFSET CONTROL OUTPUT
PLLH-------PLL ON HOLD OUTPUT
RADOUT-----OUTPUT OF RE2-RE1 INPUT

ROSC-------RESISTOR WOBBLE OSCILLATOR
RWOB-------WOBBLE GENERATOR INPUT
RE1--------RADIAL ERROR SIGNAL 1
RE2--------RADIAL ERROR SIGNAL 2
RE DIG-----RADIAL ERROR DIGITAL
RE LAG-----RADIAL ERROR SIGNAL FOR LAG NETWORK
SC---------STARTING UP CAPACITOR INPUT
SI/RD------ON/OFF CONTROL FOR LASER SUPPLY AND FOCUS CIRCUIT.READY SIGNAL, STARTING UP
TL---------TRACK LOSS OUTPUT SIGNAL
VC -------CONTROL VOLTAGE FOR TURNTABLE MOTOR
VEXT+ ---SUPPLY CONNECTION
VEXT- ---SUPPLY CONNECTION

8/12CM----
ANI-------
AM--------
ATSB------
CL--------
BCK-------
CREF------
CRI-------
1DAC------
DA--------
DEEM------
DOBM------
DOEM------
DOL-------
DOR-------



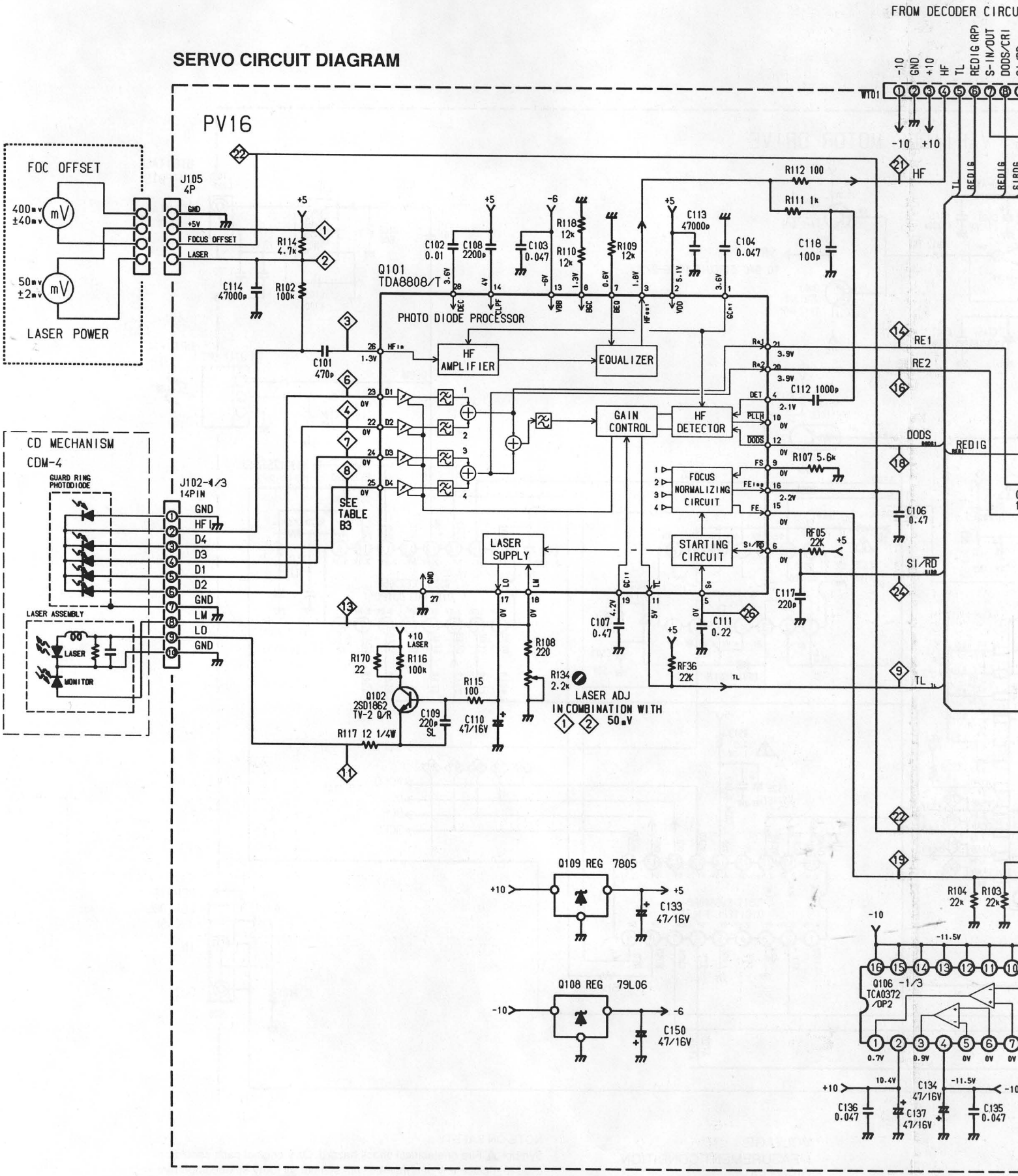
8/12CM----BAND WIDTH SWITCH 8 OR 12CM DISC
ANI-------DIGITAL DATA INFORMATION ON DISC SIGNAL
AM--------ADDITIONAL MUTE
ATSB------ATTENUATION OF AUDIO LEVEL IN SEARCH POSITION
CL--------CLOCK SIGNAL DECODER TO FTLTER
BCK-------CLOCK SIGNAL FILTER TO DAC
CREF------REFERENCE CURRENT
CRI-------COUNTER RESET INHIBIT
1DAC------ANTI SKATING CONTROL
DA--------DATA SIGNAL DECODER TO FILTER
DEEM------DEEMPHASIS
DOBM------DIGITAL AUDIO OUT:BIPHASE MODULATED SIGNAL
DOEM------DIGITAL OUTPUT ENABLE
DOL-------IIS SERIAL DATA (20BIT) L CHANNEL
DOR-------IIS SERIAL DATA (20BIT) R CHANNEL

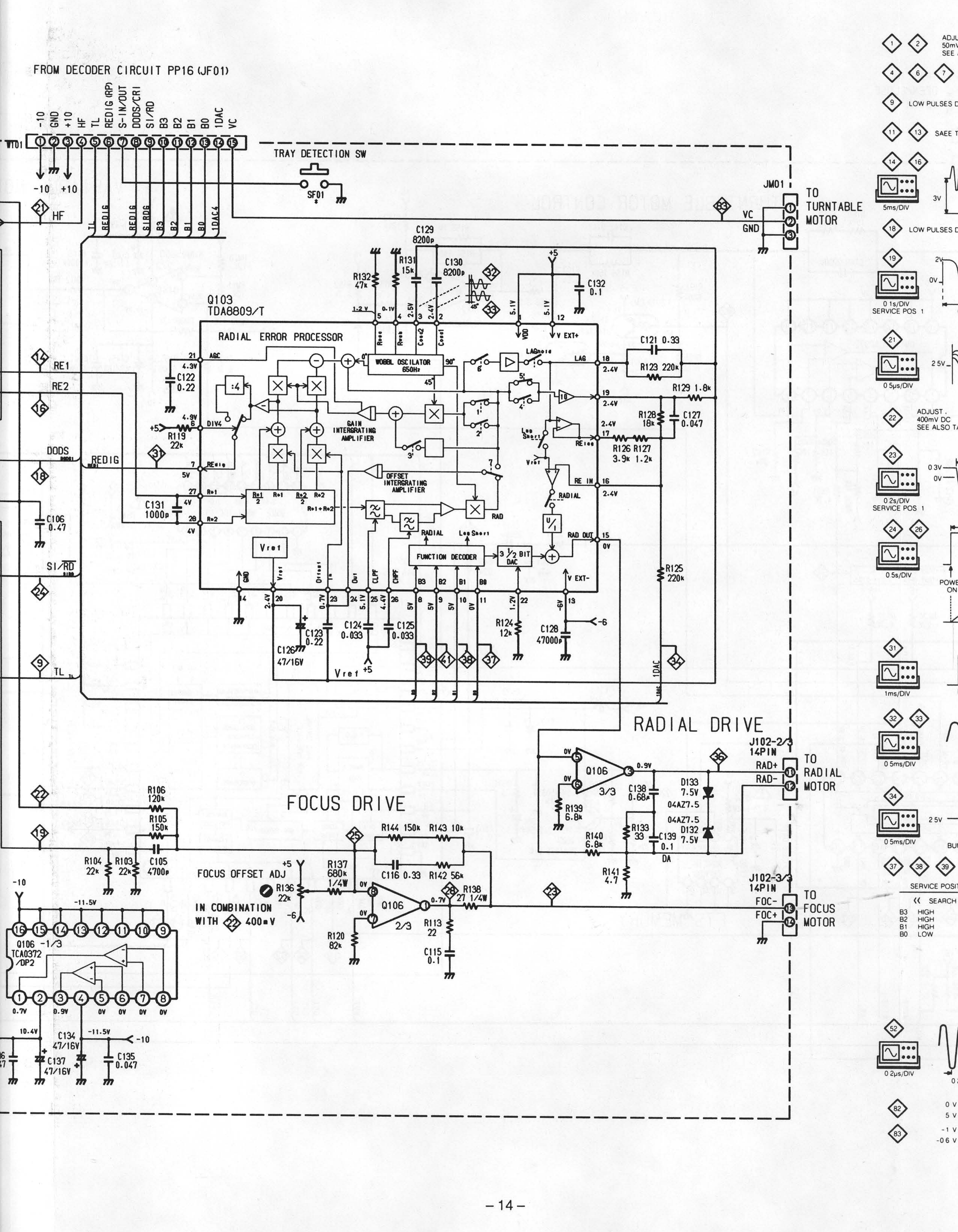
EF--------ERROR FLAG DECODER TO ADOC
MUTE------MUTE SIGNAL
MUSB------SOFT MUTE SIGNAL
PD/OC-----PHASE DETECTOR-OSCILLATOR CONTROL
QCL-------Q-CHANNEL CLOCK SIGNAL
QDA-------Q-CHANNEL DATA SIGNAL
QRA-------Q-CHANNEL REQUEST AKNOWLEDGE
SC--------SUBCODE CLOCK DECODER TO ADOC
SD--------SUBCODE DATA DECODER TO ADOC
SWAB/SSM--SUBCODE WORD/START-STOP MOTOR SIGNAL
TRY-M ---TRAY MOTOR CONTROL
VR-M------VOLUME MOTOR CONTROL
WS--------WORD SELECT DECODER TO FILTER
WCK-------WORD SELECT FILTER TO DAC
XIN-------OSCILLATOR SIGNAL IN
XSYS------OSCILLATOR SIGNAL OUT

NETWORK
PLY AND FOCUS
G UP
MOTOR

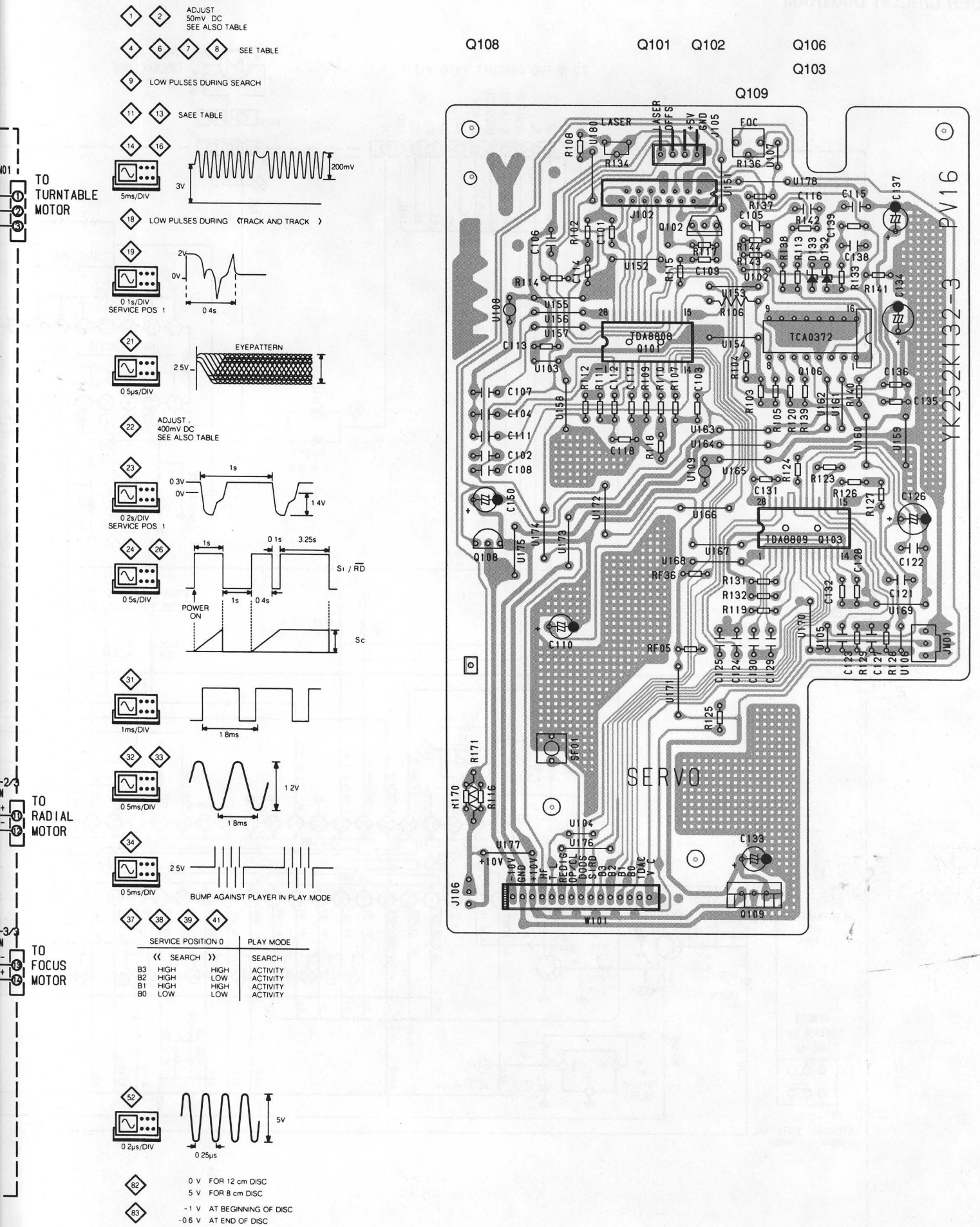
SCHEMATIC DIAGRAM AND PARTS LOCATION (PATTERN SIDE)

SERVO CIRCUIT DIAGRAM

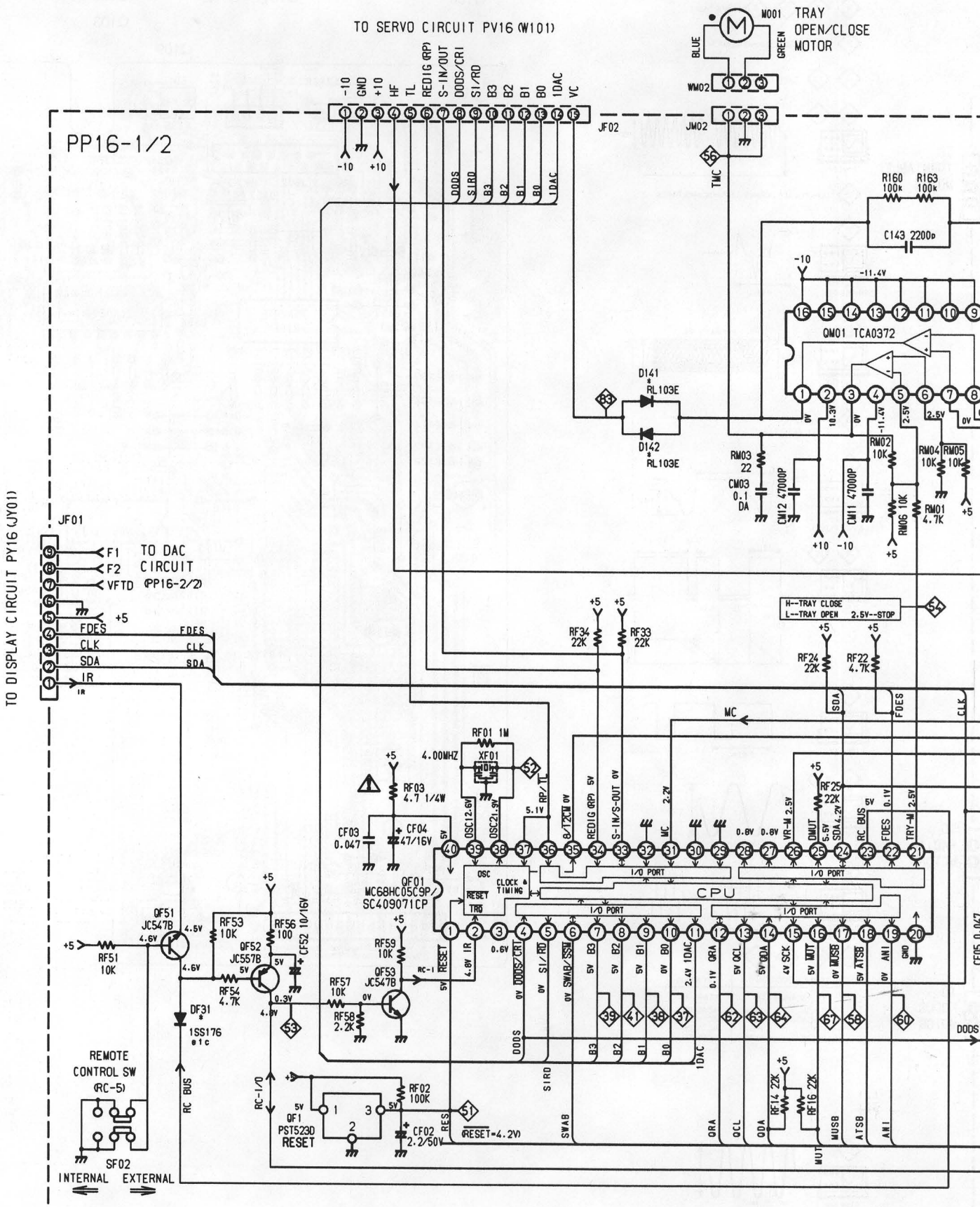




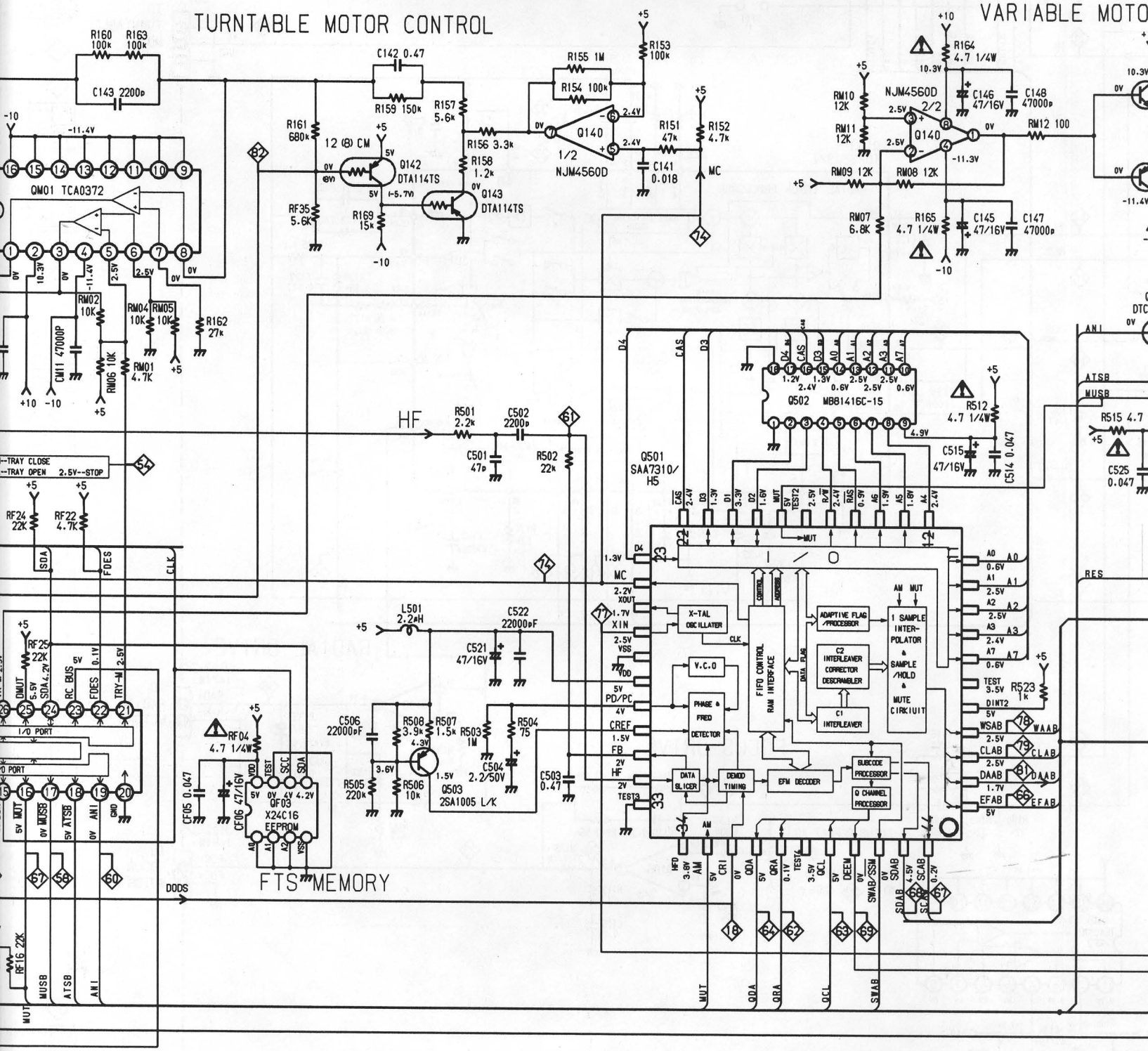
FROM DECODER CIRCUIT PP16 (JF01)
TRAY DETECTION SW
SF01
JM01
TO TURNTABLE MOTOR
Q103
TDA8809/T
RADIAL ERROR PROCESSOR
WOBBL OSCILATOR 650Hz
GAIN INTERGRATING AMPLIFIER
OFFSET INTERGRATING AMPLIFIER
FUNCTION DECODER
3 1/2 BIT DAC
RADIAL DRIVE
J102-2/3 14PIN
TO RADIAL MOTOR
FOCUS DRIVE
FOCUS OFFSET ADJ
IN COMBINATION WITH 22 400mV
J102-3/3 14PIN
TO FOCUS MOTOR
Q106 -1/3
TCA0372/DP2
LOW PULSES
ADJUST. 400mV DC SEE ALSO
SERVICE POS 1
SERVICE POSIT
SEARCH
B3 HIGH
B2 HIGH
B1 HIGH
B0 LOW

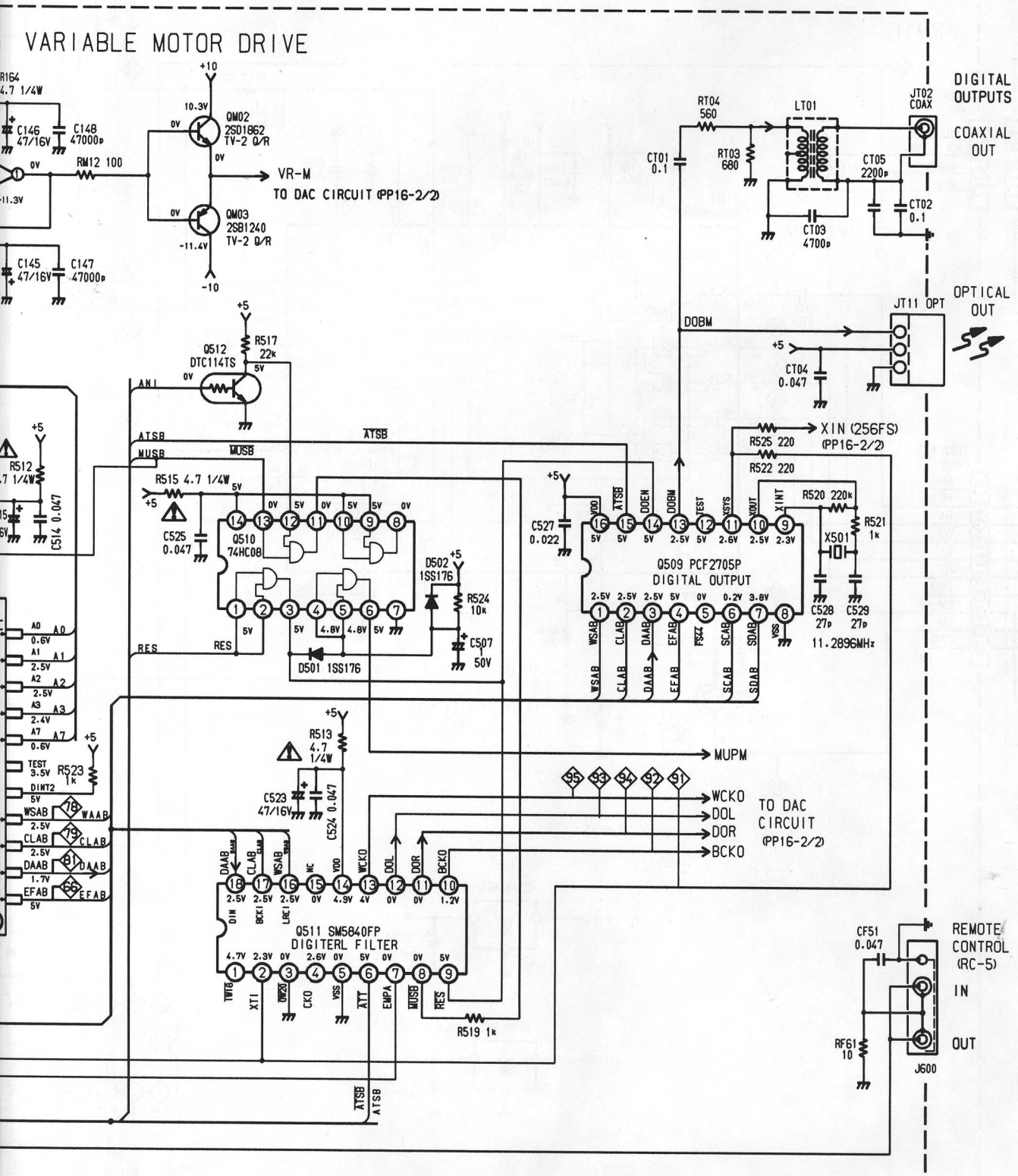

1 2 ADJUST 50mV DC SEE ALSO TABLE
4 6 7 8 SEE TABLE
9 LOW PULSES DURING SEARCH
11 13 SAEE TABLE
14 16
5ms/DIV
3V
200mV
18 LOW PULSES DURING 《TRACK AND TRACK 》
19
2V
0V
0 1s/DIV
SERVICE POS 1
0 4s
21
EYEPATTERN
2 5V
0 5µs/DIV
22 ADJUST . 400mV DC SEE ALSO TABLE
23
1s
0 3V
0V
1 4V
0 2s/DIV
SERVICE POS 1
24 26
1s
0 1s
3 25s
SI / RD
0 5s/DIV
POWER ON
1s
0 4s
Sc
31
1ms/DIV
1 8ms
32 33
0 5ms/DIV
1 2V
1 8ms
34
2 5V
0 5ms/DIV
BUMP AGAINST PLAYER IN PLAY MODE
37 38 39 41
SERVICE POSITION 0
PLAY MODE
《 SEARCH 》
SEARCH
B3 HIGH HIGH ACTIVITY
B2 HIGH LOW ACTIVITY
B1 HIGH HIGH ACTIVITY
B0 LOW LOW ACTIVITY
52
0 2µs/DIV
5V
0 25µs
82
0 V FOR 12 cm DISC
5 V FOR 8 cm DISC
83
-1 V AT BEGINNING OF DISC
-0 6 V AT END OF DISC
TO TURNTABLE MOTOR
TO RADIAL MOTOR
TO FOCUS MOTOR
Q108
Q101
Q102
Q106
Q103
Q109
LASER
FOC
TDA8808 Q101
TCA0372
TDA8809 Q103
SERVO
W101
J106
YK252K132-3 PV16

DECODER CIRCUIT DIAGRAM



TRAY
OPEN/CLOSE
MOTOR





VOLTAGE:
MEASUREMENT CONDITION
DISC : 5A
MODE : STOP (TOC)

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

18 LOW PULSES DURING NEXT AND PREVIOUS

53 ACTIVITY WHEN USING AN IR REMOTE CONTROL.

61 0.5μs/DIV — EYEPATTERN — 2.5V

62 10ms/DIV — PLAY POSITION — QRA — ASYNCHRONOUS μP DEPENDENT

63 0.2ms/DIV — 10×8BITS — QCL

64 — DATA — QDA

66 PULSES WHEN THE DISC IS SLOWLY BRAKED BY HAND

67 50μs/DIV — 136μs

68 ACTIVITY DURING PLAY

69 AUDIO SIGNALS DISC: HIGH ON TRACK 76.78.80.82.84.86.88
LOW ON TRACK 77.79.81.83.85.87.89

74 5μs/DIV — MC SIGNAL — 0V — ≈ 11μs

STAND BY POSITION — 0V

BEGINNING PLAY POSITION — 0V

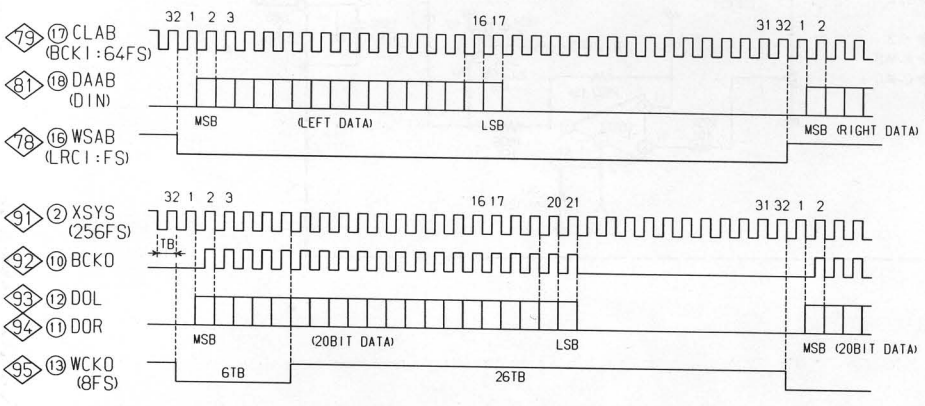
PLAY POSITION — 0V

77 11.2896 MHz SINEWAVE

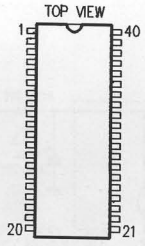
78 5μs/DIV — PLAY POSITION — WSAB

79 — CLAB — 11.34μs

81 ACTIVITY DURING PLAY

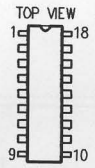


TOP VIEW



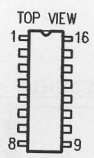
MC68HC05C9

TOP VIEW



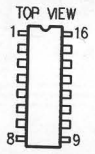
SM5840FP
UPD41416C

TOP VIEW



PCF3523P
TCA0372

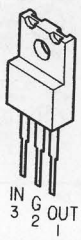
TOP VIEW



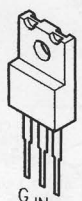
74HC08

TOP VIEW

NJM4560D
NJM5532DD
NJM5534D
NJM2114D



7805
7824
78M15



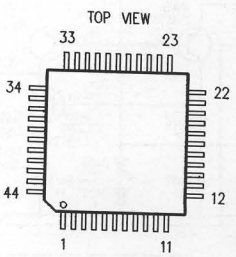
79M15

2SB1240Q/R
2SD1862Q/R

DTA114
DTC114
DTC144

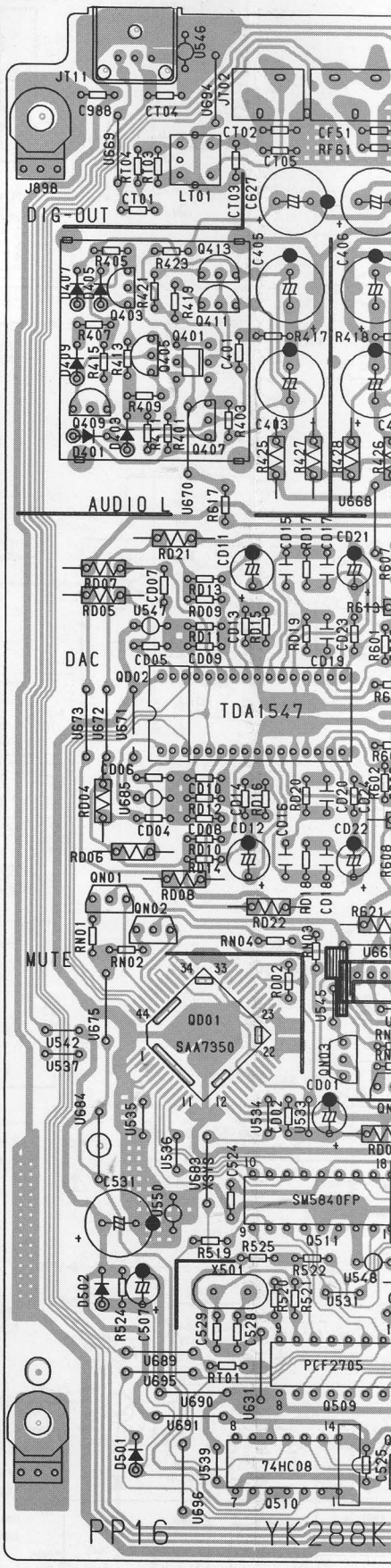
2SA1005
2SC2878A/B
JC547B
JC557B

TOP VIEW



SAA7310GP
SAA7350GP

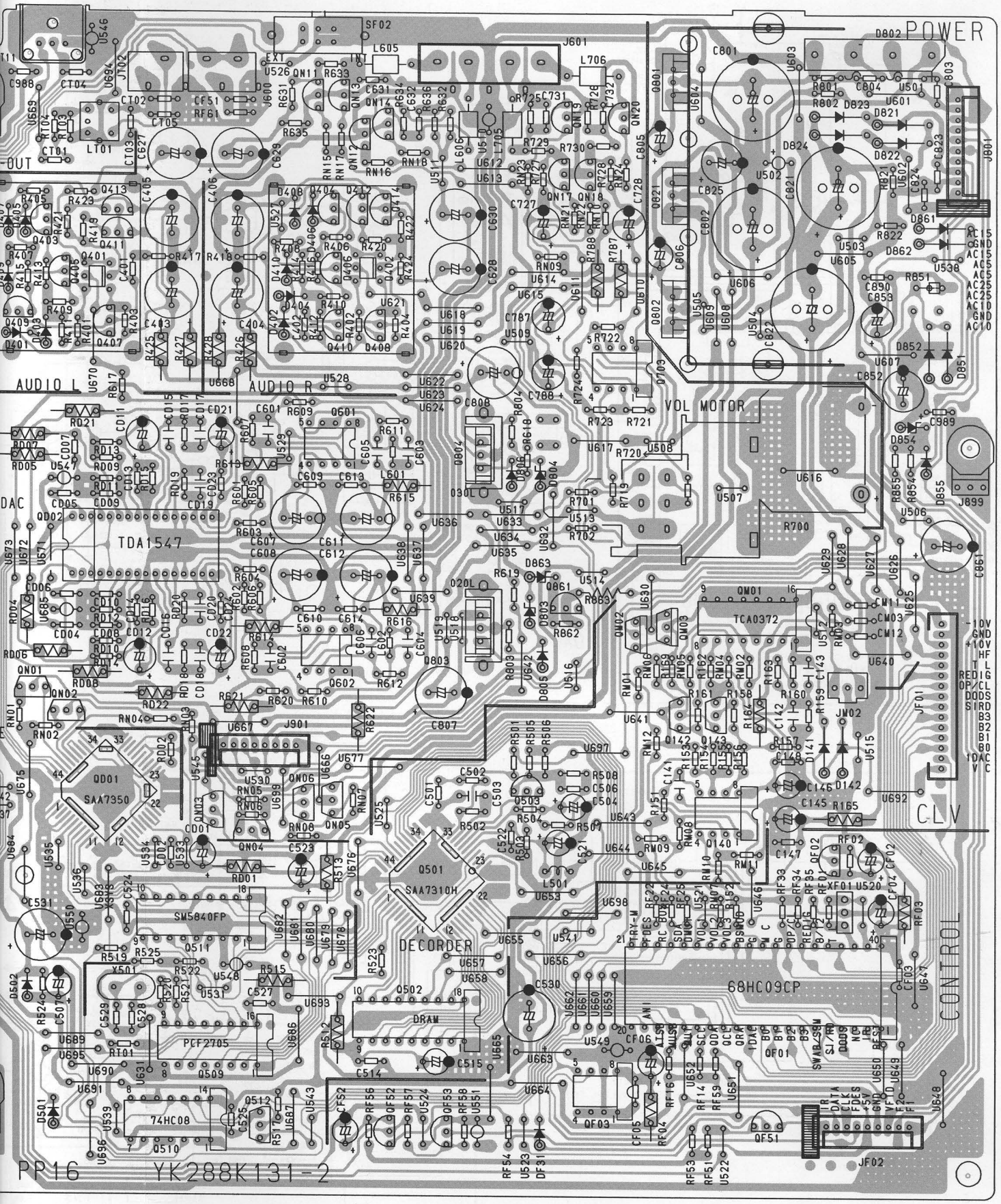
Q403 Q411 Q413 Q
Q409 Q405 Q401 Q407 QN
QN01 QN02 QD01 QD02 Q509~Q5



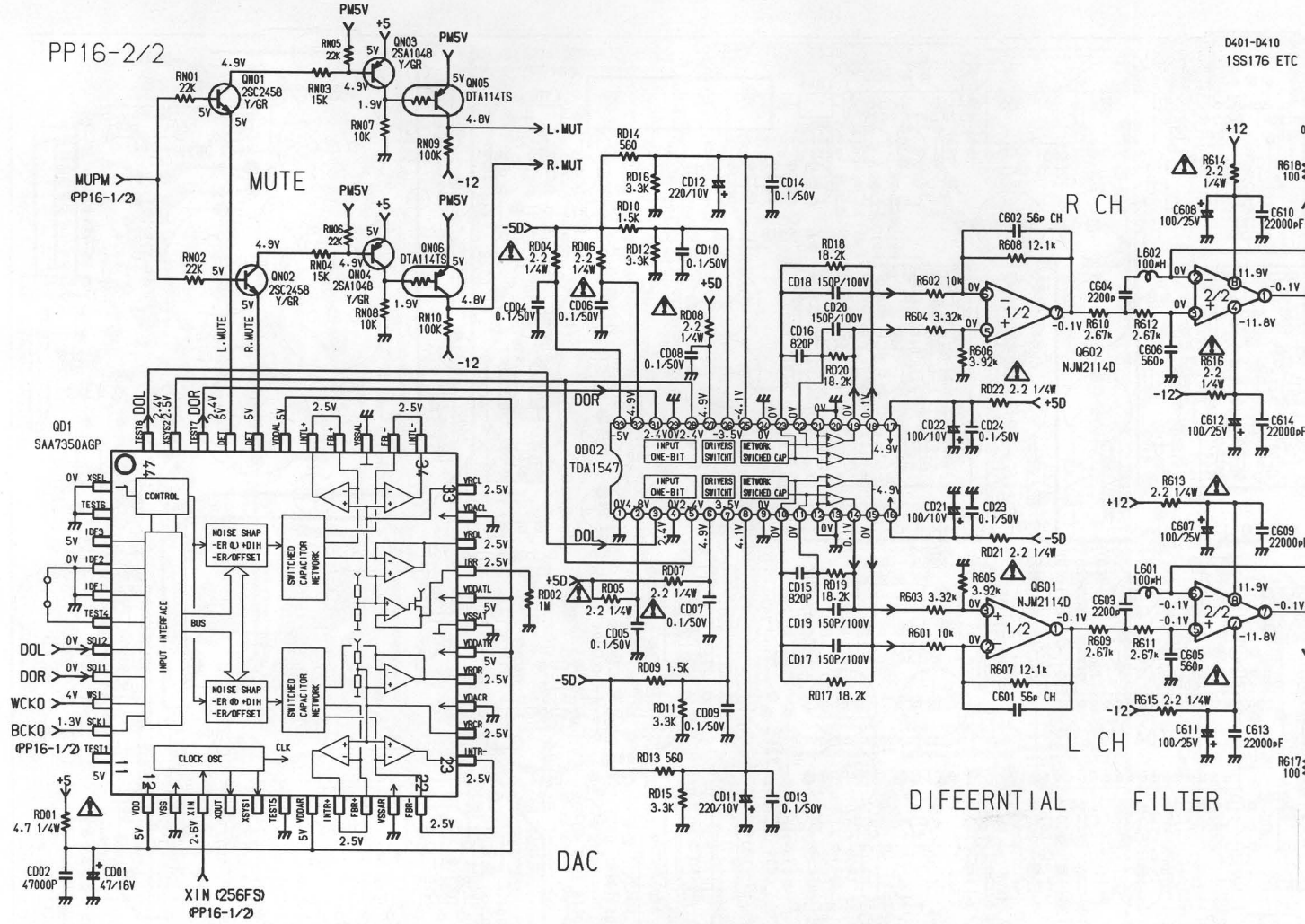
Q403 Q411 Q413 QN11~QN14 Q404 Q412 Q414 QN17~QN20 Q801 Q802 Q821 QM01

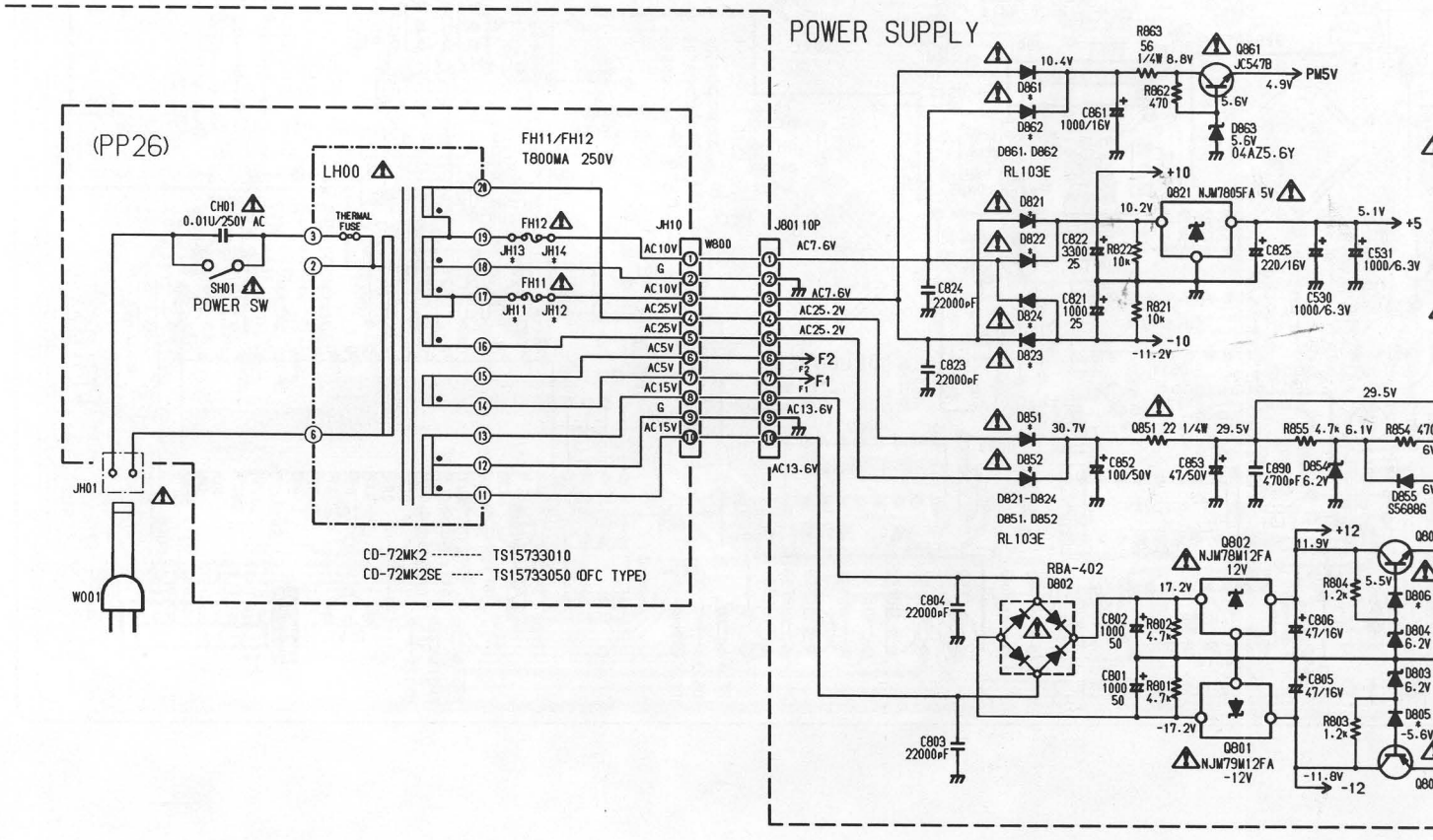
Q409 Q405 Q401 Q407 QN03~QN06 Q406 Q402 Q410 Q408 Q804 Q803 Q861 Q703 QM02 QM03 Q142 Q143 Q140

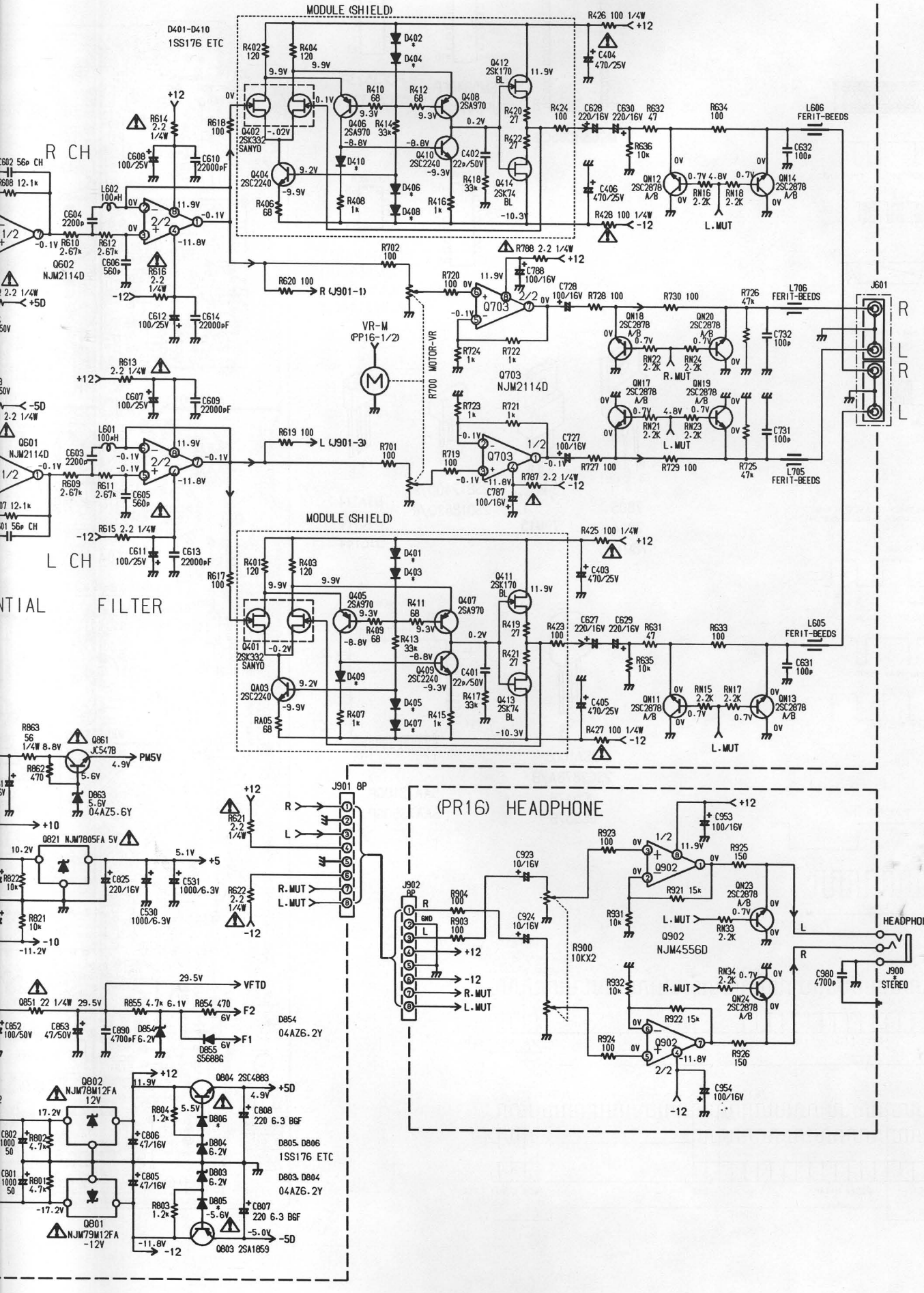
QN01 QN02 QD01 QD02 Q509~Q512 Q601 Q602 Q501 Q502 QF52 QF53 Q503 QF03 Q140 QF51 QF01 QF02



DAC/HEADPHONE/POWER SUPPLY CIRCUIT DIAGRAM



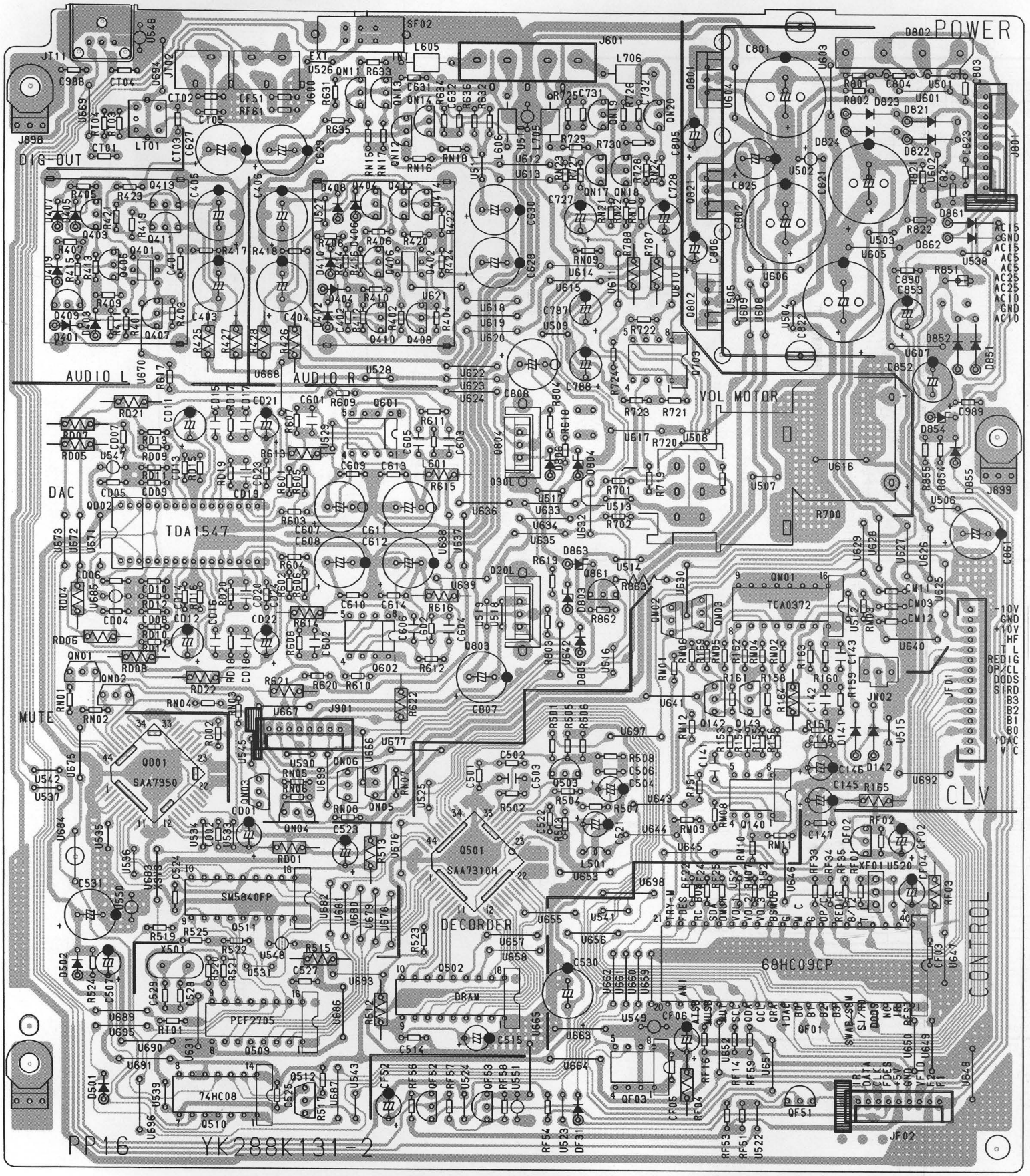



MODULE (SHIELD)
D401-D410
1SS176 ETC
R CH
L CH
Q602 NJM2114D
Q601 NJM2114D
Q703 NJM2114D
VR-M (PP16-1/2)
R700 MOTOR-VR
R620 100 → R (J901-1)
R619 100 → L (J901-3)
J601
L606 FERIT-BEEDS
L705 FERIT-BEEDS
L706 FERIT-BEEDS
L. MUT
R. MUT
(PR16) HEADPHONE
Q902 NJM4556D
R900 10KX2
HEADPHONE
J900 STEREO
J901 8P
Q861 JC547B
Q821 NJM7805FA 5V
Q851 22 1/4W 29.5V
Q802 NJM79M12FA 12V
Q801 NJM79M12FA -12V
Q804 2SC4883
Q803 2SA1859
D854 04AZ6.2Y
D855 S5688G
D805. D806 1SS176 ETC
D803. D804 04AZ6.2Y
PM5V
VFTD
F2
F1

Q403 Q411 Q413 QN11~QN14 Q404 Q412 Q414 QN17~QN20 Q801 Q802 Q821 QM01

Q409 Q405 Q401 Q407 QN03~QN06 Q406 Q402 Q410 Q408 Q804 Q803 Q861 Q703 QM02 QM03 Q142 Q143 Q140

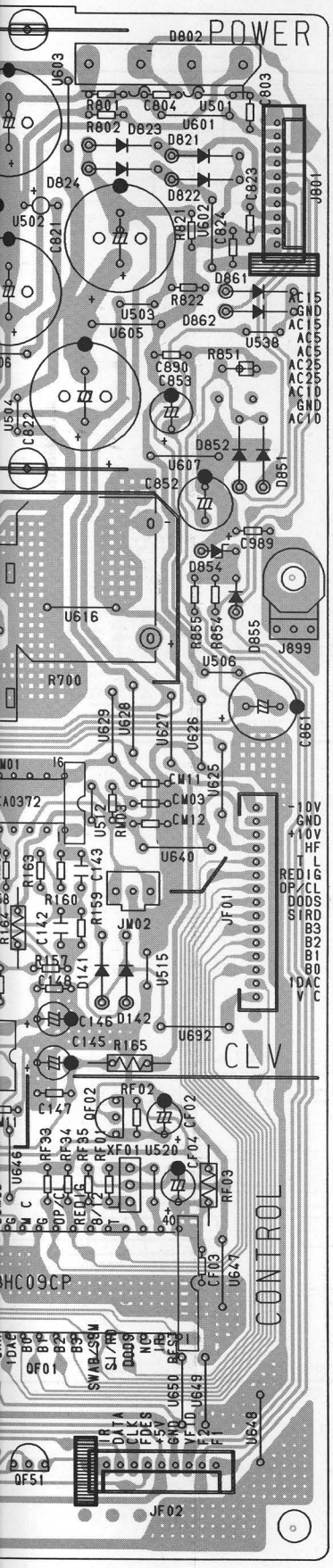
QN01 QN02 QD01 QD02 Q509~Q512 Q601 Q602 Q501 Q502 QF52 QF53 Q503 QF03 Q140 QF51 QF01 QF02



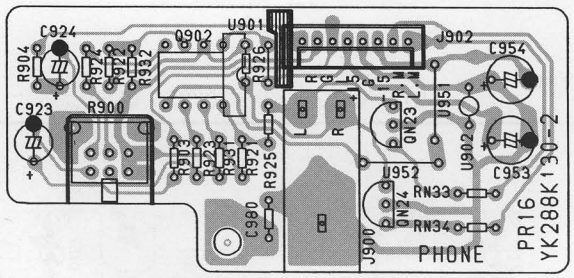
QM01

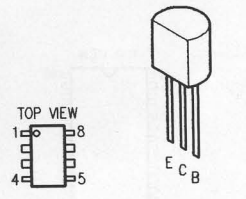
42 Q143 Q140

F51 QF01 QF02

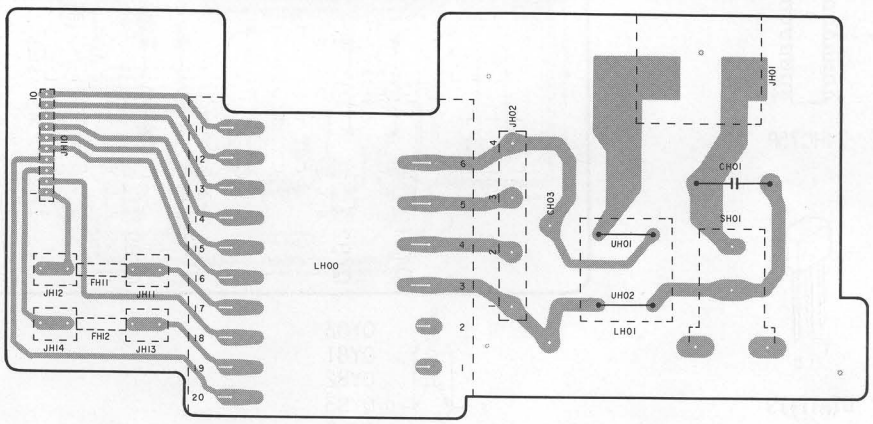


Q902 QN23 QN24

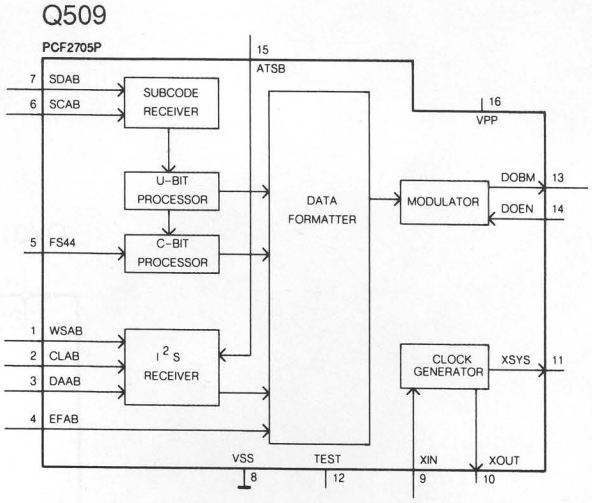




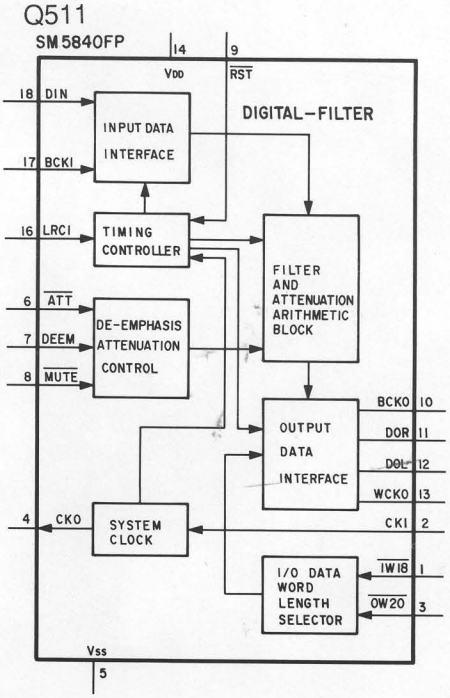
PP26

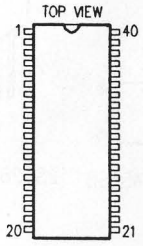


Q509

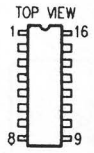


Q511

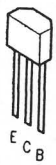




U3090MG

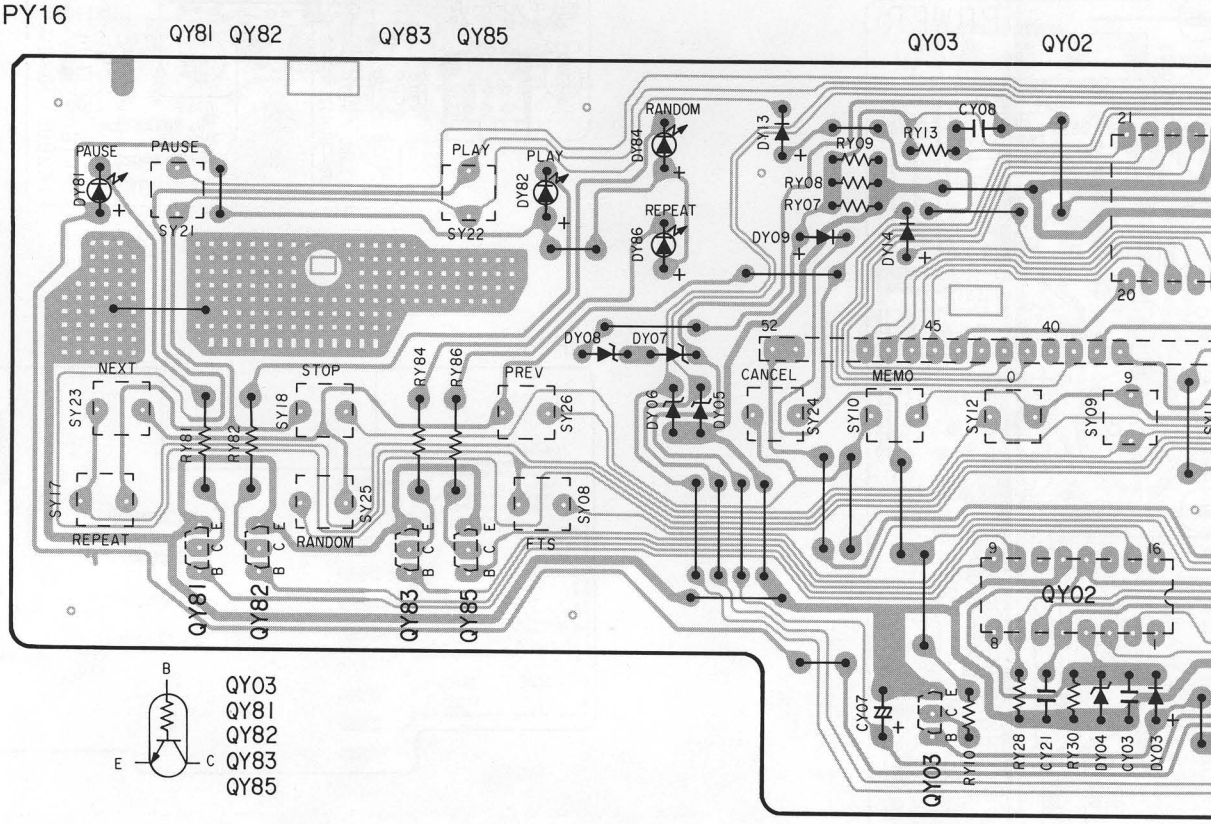


74HC75P



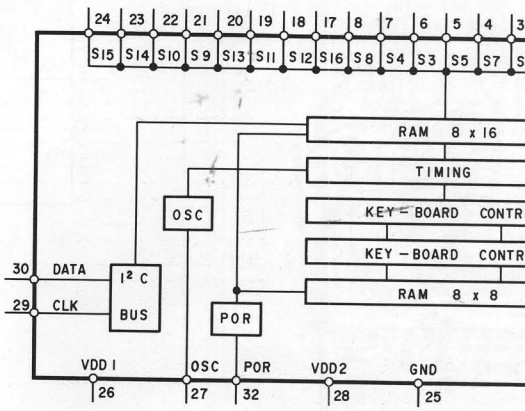
DTA114TS

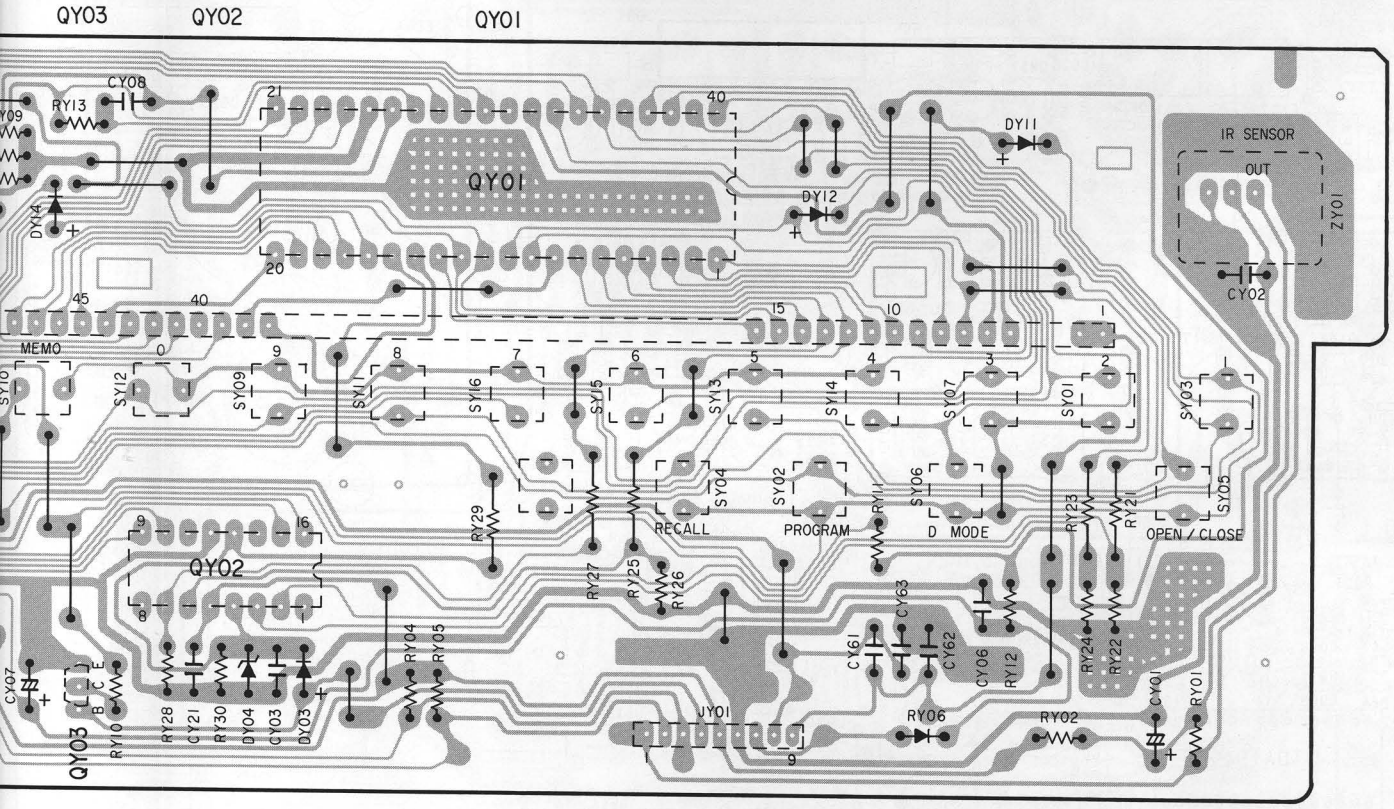
PY16

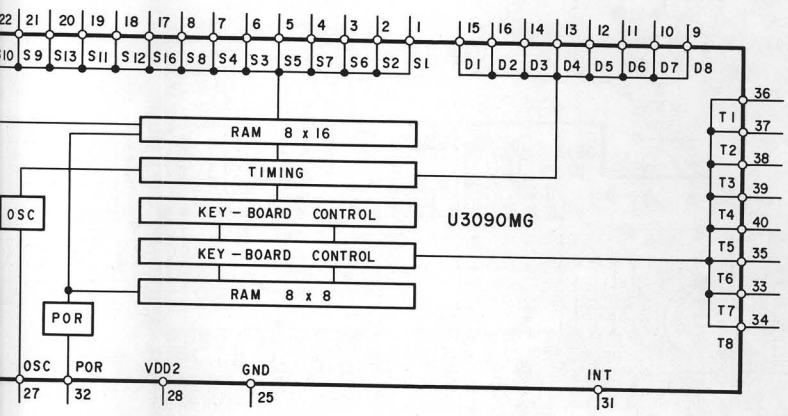


QY03
QY81
QY82
QY83
QY85

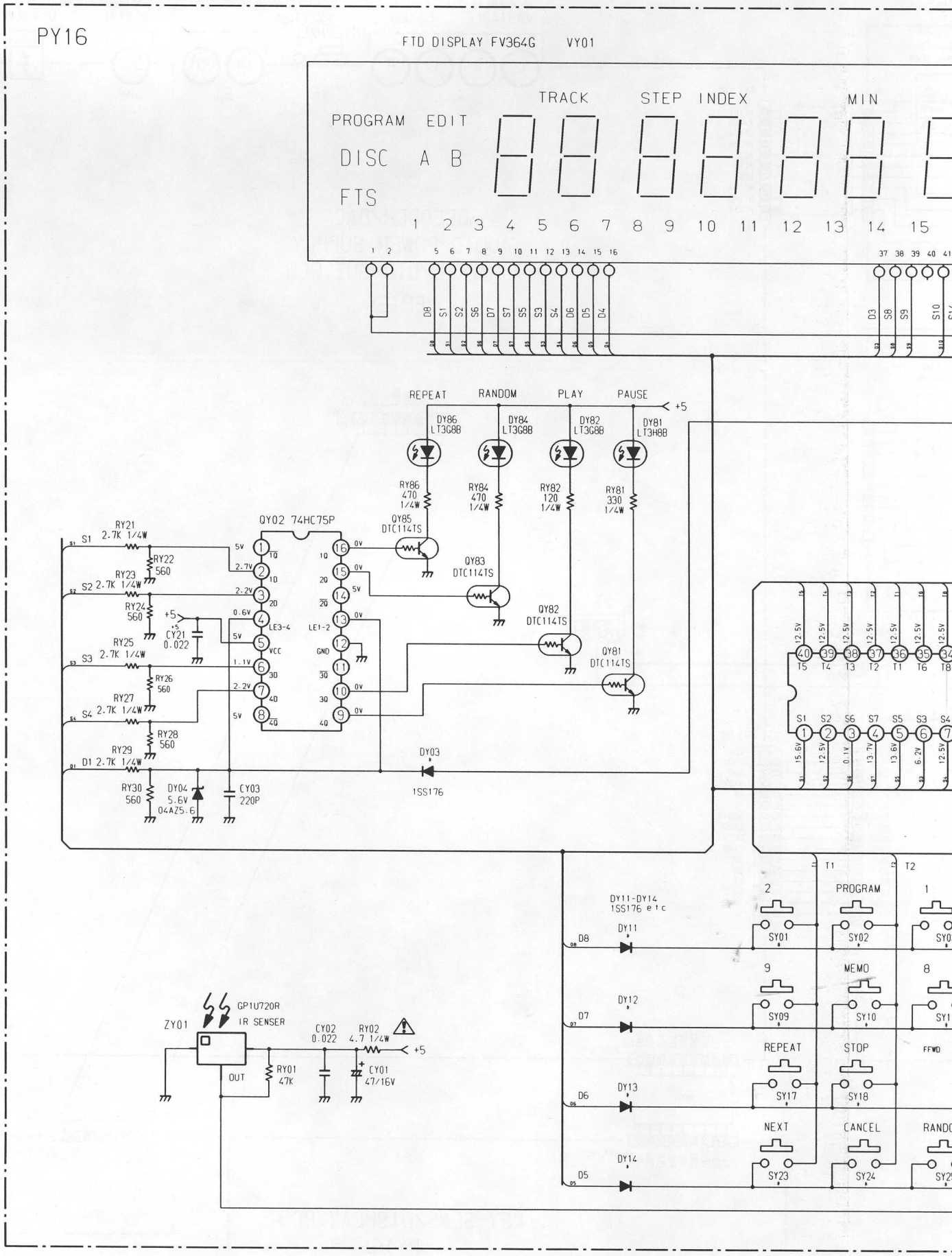
QY01

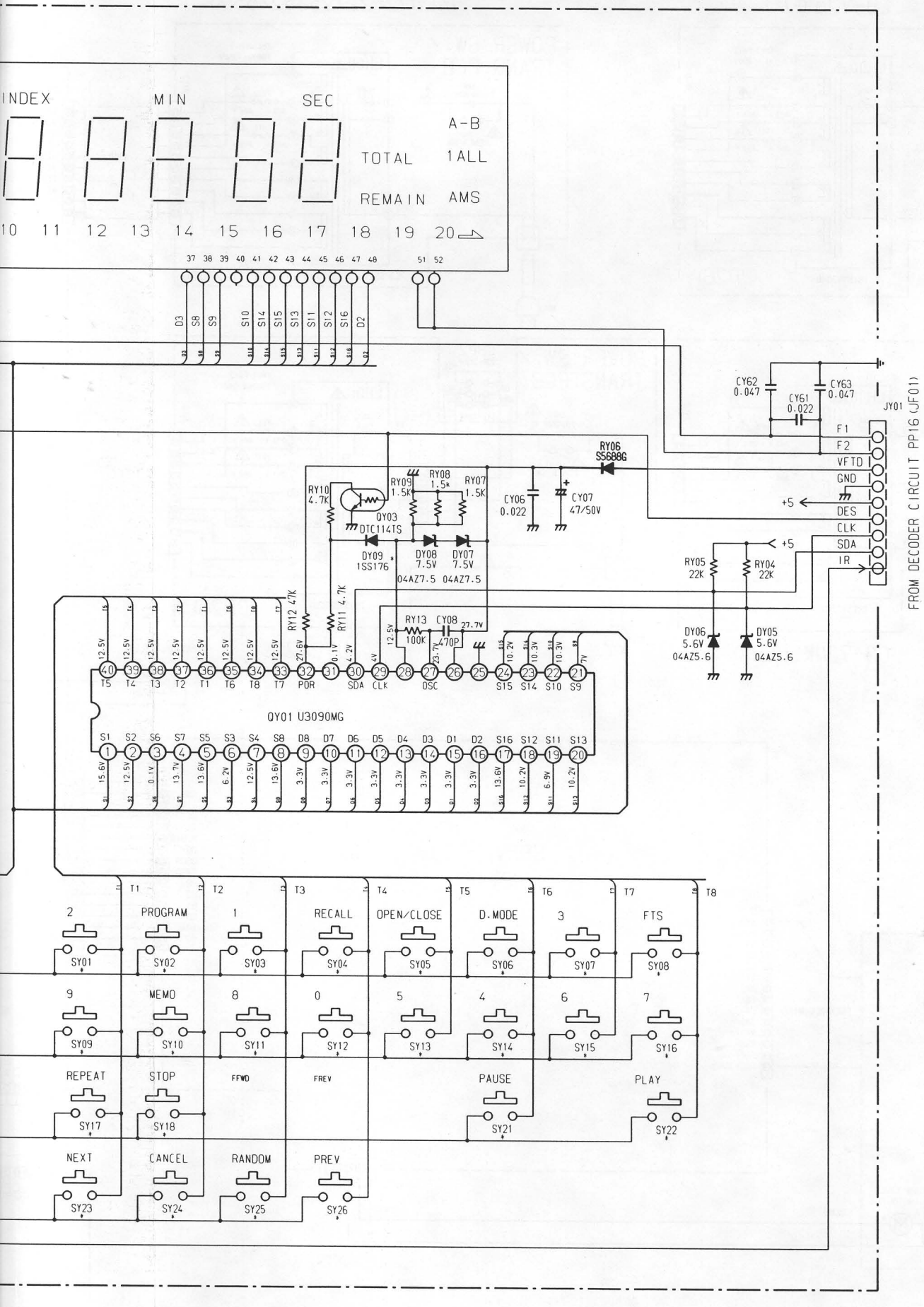



QY03
QY02
QY01
CY08
RY13
DY14
DY11
DY12
IR SENSOR
OUT
ZY01
CY02
MEMO
RECALL
PROGRAM
D MODE
OPEN / CLOSE
RY29
RY27
RY25
RY26
CY61
CY63
CY62
CY06
RY12
RY24
RY22
RY23
RY21
CY07
RY10
RY28
CY21
RY30
DY04
CY03
DY03
RY04
RY05
JY01
RY06
RY02
CY01
RY01

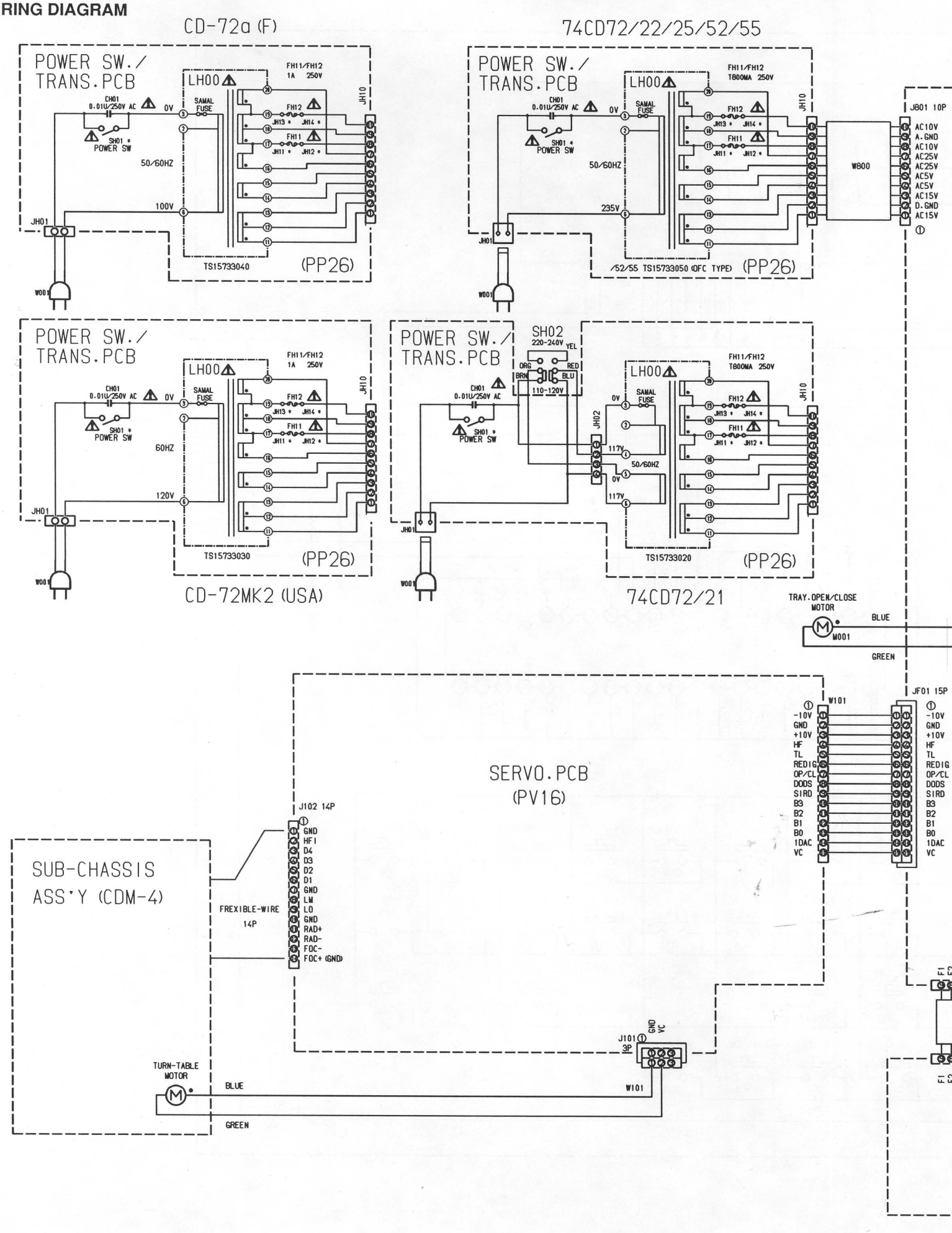

RAM 8 x 16
TIMING
KEY – BOARD CONTROL
KEY – BOARD CONTROL
RAM 8 x 8
U3090MG
OSC
POR
OSC
POR
VDD2
GND
INT
27
32
28
25
31
T1
T2
T3
T4
T5
T6
T7
T8
36
37
38
39
40
35
33
34

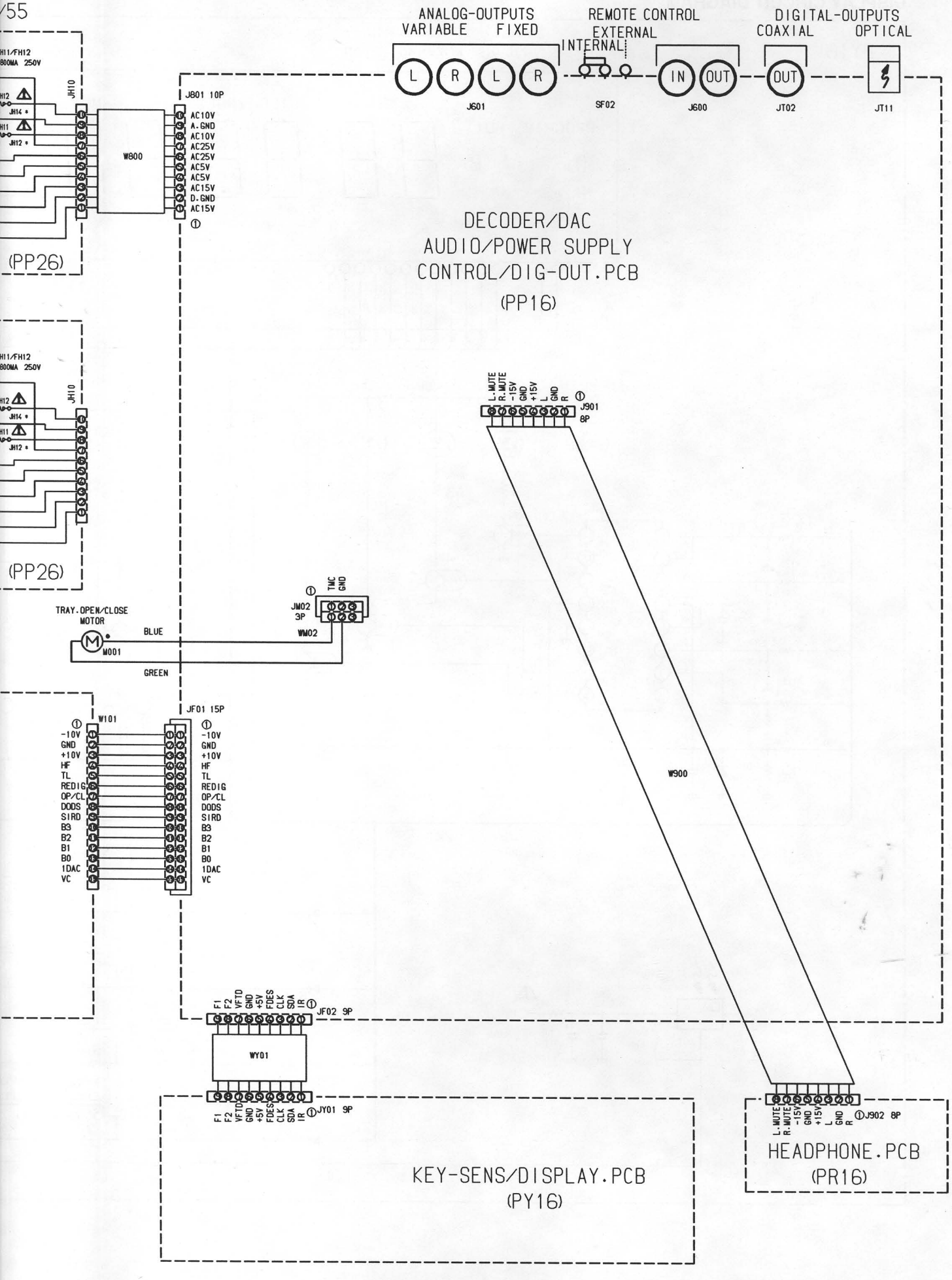
DISPLAY CIRCUIT DIAGRAM




INDEX
MIN
SEC
A-B
TOTAL
1ALL
REMAIN
AMS
10 11 12 13 14 15 16 17 18 19 20
37 38 39 40 41 42 43 44 45 46 47 48
51 52
D3 S8 S9 S10 S14 S15 S13 S11 S12 S16 D2
CY62 0.047
CY61 0.022
CY63 0.047
JY01
F1
F2
VFTD
GND
+5
DES
CLK
SDA
IR
FROM DECODER CIRCUIT PP16 (JF01)
RY06 S5688G
RY10 4.7K
RY09 1.5K
RY08 1.5K
RY07 1.5K
QY03 DTC114TS
CY06 0.022
CY07 47/50V
DY09 1SS176
DY08 7.5V
DY07 7.5V
04AZ7.5 04AZ7.5
RY05 22K
RY04 22K
DY06 5.6V 04AZ5.6
DY05 5.6V 04AZ5.6
RY12 47K
RY11 4.7K
RY13 100K
CY08 470P
QY01 U3090MG
T5 T4 T3 T2 T1 T6 T8 T7 POR SDA CLK OSC S15 S14 S10 S9
S1 S2 S6 S7 S5 S3 S4 S8 D8 D7 D6 D5 D4 D3 D1 D2 S16 S12 S11 S13
T1 T2 T3 T4 T5 T6 T7 T8
2 PROGRAM 1 RECALL OPEN/CLOSE D.MODE 3 FTS
SY01 SY02 SY03 SY04 SY05 SY06 SY07 SY08
9 MEMO 8 0 5 4 6 7
SY09 SY10 SY11 SY12 SY13 SY14 SY15 SY16
REPEAT STOP FFWD FREV PAUSE PLAY
SY17 SY18 SY21 SY22
NEXT CANCEL RANDOM PREV
SY23 SY24 SY25 SY26

WIRING DIAGRAM




ANALOG-OUTPUTS
VARIABLE FIXED
REMOTE CONTROL
EXTERNAL
INTERNAL
DIGITAL-OUTPUTS
COAXIAL OPTICAL
L R L R
J601
SF02
IN OUT
J600
OUT
JT02
JT11
DECODER/DAC
AUDIO/POWER SUPPLY
CONTROL/DIG-OUT.PCB
(PP16)
J801 10P
AC10V
A.GND
AC10V
AC25V
AC25V
AC5V
AC5V
AC15V
D.GND
AC15V
W800
JH10
(PP26)
(PP26)
L.MUTE
R.MUTE
-15V
GND
+15V
L
GND
R
J901
8P
W900
TRAY.OPEN/CLOSE
MOTOR
M001
BLUE
GREEN
TMC
GND
JM02
3P
WM02
W101
JF01 15P
-10V
GND
+10V
HF
TL
REDIG
OP/CL
DODS
SIRD
B3
B2
B1
B0
1DAC
VC
F1
F2
VFTD
GND
+5V
FDES
CLK
SDA
IR
JF02 9P
WY01
JY01 9P
J902 8P
KEY-SENS/DISPLAY.PCB
(PY16)
HEADPHONE.PCB
(PR16)

ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTOR

R＊＊＊ : (1) GD05 xxx 140, Carbon film fixed resistor, ±5% 1/4W
R＊＊＊ : (2) GD05 xxx 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.

C＊＊＊ : CERAMIC CAP.
(1) DD1x xxx 370, Ceramic capacitor
Disc type
Temp. coeff. P350 ~ N1000, 50V
① ② —— Capacity value
—— Tolerance

Examples ;
① Tolerance (Capacity deviation)
± 0.25pF 0
± 0.5pF 1
± 5% 5

＊ Tolerance of COMMON PARTS handled here are as follows :
0.5pF ~ 5pF ....± 0.25pF
6pF ~ 10pF ....± 0.5pF
12pF ~ 560pF ....± 5%

② 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.
(1) DK16 xxx 300, High dielectric constant ceramic capacitor
① Disc type
Temp. chara. 2B4, 50V
—— Capacity value

Examples ;
② Capacity value

100 pF 101	1000 pF 102	10000 pF 103
470 pF 471	2200 pF 222	

C＊＊＊ : ELECTROLY CAP. (⏚), FILM CAP. (⏤)
(1) EA xxx xxx 10, Electrolytic capacitor
One-way lead type,
① ② Tolerance ± 20%
—— Working voltage
—— Capacity value

Examples ;
① 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

② Working voltage

6.3 V 006	25 V 025
10 V 010	35 V 035
16 V 016	50 V 050

(2) DF15 xxx 350, Plastic film capacitor
One-way type, Mylar ± 5% 50V
① —— Capacity value

Examples ;
① Capacity value

0.001 µF (1000pF) 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 : The above CODES (R＊＊＊, R＊＊＊＊, C＊＊＊, C＊＊＊＊ and C＊＊＊) are omitted on the schematic diagram in some case.
On the occasion, be confirmed common parts on the parts list.

REF. DESIG.	PART NO.	DESCRIPTION
		PP16-AUDIO/POWER CIRCUIT BOAARD
		PP16-CAPACITORS
CD01	4822 124 41539	ELECT 47µF 16V
CD02	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CD04 ~ CD10	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CD11	4822 124 90363	ELECT 220µF 10V
CD12	4822 124 90363	ELECT 220µF 10V
CD13	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CD14	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CD15	4822 121 70089	FILM 820PF ± 5% 50V
CD16	4822 121 70089	FILM 820PF ± 5% 50V
CD17 ~ CD20	4822 122 10367	CERAMIC 150PF ± 5% 50V
CD21	4822 124 90353	ELECT 100µF 10V
CD22	4822 124 90353	ELECT 100µF 10V
CD23	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CD24	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CF02	4822 124 90357	ELECT 2.2µF 50V
CF03	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CF04	4822 124 41539	ELECT 47µF 16V
CF05	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CF06	4822 124 41539	ELECT 47µF 16V
CF51	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CF52	4822 124 90352	ELECT 10µF 16V
CM03		CERAMIC 0.1µF +80%-20% 50V
CM11	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CM12	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CT01	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CT02	4822 126 11558	CERAMIC 0.1µF +80%-20% 50V
CT03	4822 122 33795	CERAMIC 4700PF +80%-20%
CT04	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
CT05	4822 126 11726	CERAMIC 2200PF +80%-20%
C145	4822 124 41539	ELECT 47µF 16V
C146	4822 124 41539	ELECT 47µF 16V
C147	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
C148	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
C401	4822 126 10362	CERAMIC 22PF ± 5%
C402	4822 126 10362	CERAMIC 22PF ± 5%
C403 ~ C406	4822 124 23649	ELECT 470µF 25V
C501	4822 126 10513	CERAMIC 47PF ± 5% 50V
C502	4822 126 11726	CERAMIC 2200PF +80%-20%
C503		FILM 0.47µF 50V
C504	4822 124 90357	ELECT 2.2µF 50V
C506	4822 122 40588	CERAMIC 0.022µF ± 20%
C507	4822 124 41543	ELECT 1µF 50V
C514	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
C515	4822 124 41539	ELECT 47µF 16V
C521	4822 124 41539	ELECT 47µF 16V
C522	4822 122 40588	CERAMIC 0.022µF ± 20%
C523	4822 124 41539	ELECT 47µF 16V
C524	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
C525	4822 122 40589	CERAMIC 0.047µF +80%-20% 50V
C527	4822 122 40588	CERAMIC 0.022µF ± 20%
C528	4822 122 33638	CERAMIC 27PF ± 5%
C529	4822 122 33638	CERAMIC 27PF ± 5%
C530	4822 124 22694	ELECT 1000µF 6.3V
C531	4822 124 22694	ELECT 1000µF 6.3V
C601	4822 122 32027	CERAMIC 56PF ± 5% 50V
C602	4822 122 32027	CERAMIC 56PF ± 5% 50V
C605	5322 122 32336	FILM 560PF ± 5% 50V

REF. DESIG.	PART NO.	DESCRIPTION
C606	5322 122 32336	FILM 560PF ± 5% 50V
C607	4822 124 22238	ELECT 100µF 25V
C608	4822 124 22238	ELECT 100µF 25V
C609	4822 122 40588	CERAMIC 0.022µF ± 20%
C610	4822 122 40588	CERAMIC 0.022µF ± 20%
C611	4822 124 22238	ELECT 100µF 25V
C612	4822 124 22238	ELECT 100µF 25V
C613	4822 122 40588	CERAMIC 0.022µF ± 20%
C614	4822 122 40588	CERAMIC 0.022µF ± 20%
C627	4822 124 22039	ELECT 220µF 16V [/21B/22B/25B/21G/22G]
C627	4822 124 80123	ELECT 220µF 16V [/52B/55B]
C628	4822 124 22039	ELECT 220µF 16V [/21B/22B/25B/21G/22G]
C628	4822 124 80123	ELECT 220µF 16V [/52B/55B]
C629	4822 124 22039	ELECT 220µF 16V [/21B/22B/25B/21G/22G]
C629	4822 124 80123	ELECT 220µF 16V [/52B/55B]
C630	4822 124 22039	ELECT 220µF 16V [/21B/22B/25B/21G/22G]
C630	4822 124 80123	ELECT 220µF 16V [/52B/55B]
C631	4822 126 10364	CERAMIC 100PF ± 10%
C632	4822 126 10364	CERAMIC 100PF ± 10%
C727	4822 124 90354	ELECT 100µF 16V
C728	4822 124 90354	ELECT 100µF 16V
C731	4822 126 10364	CERAMIC 100PF ± 10%
C732	4822 126 10364	CERAMIC 100PF ± 10%
C787	4822 124 90354	ELECT 100µF 16V
C788	4822 124 90354	ELECT 100µF 16V
C801	4822 124 23918	ELECT 1000µF 50V [/21B/22B/25B/21G/22G]
C801	4822 124 80257	ELECT 1000µF 35V [/52B/55B]
C802	4822 124 23918	ELECT 1000µF 50V [/21B/22B/25B/21G/22G]
C802	4822 124 80257	ELECT 1000µF 35V [/52B/55B]
C803	4822 122 40588	CERAMIC 0.022µF ±20%
C804	4822 122 40588	CERAMIC 0.022µF ±20%
C805	4822 124 41539	ELECT 47µF 16V
C806	4822 124 41539	ELECT 47µF 16V
C807	4822 124 23363	ELECT 220µF 6.3V
C808	4822 124 23363	ELECT 220µF 6.3V
C821	4822 124 23918	ELECT 1000µF 50V
C822	4822 124 22239	ELECT 3300µF 25V
C823	4822 122 40588	CERAMIC 0.022µF ± 20%
C824	4822 122 40588	CERAMIC 0.022µF ± 20%
C825	4822 124 90364	ELECT 220µF 16V
C852	4822 124 90355	ELECT 100µF 50V
C853	4822 124 22276	ELECT 47µF 50V
C861	4822 124 22722	ELECT 1000µF 16V
C890	4822 122 33795	CERAMIC 4700PF +80%-20%
C980	4822 122 33795	CERAMIC 4700PF +80%-20%
C***		**PP16-CAPACITORS (COMMON)** Plastic film capacitor One-way type, Mylar ± 5% 50V C141~C143, C503, C603, C604
		PP16-RESISTORS
Q851	4822 116 60318	2.2 Ω ± 5% 1/4W
RD01 RD04 RD08 RD17 RD20	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
	4822 116 83963	2.2 Ω ± 5% 1/4W
	4822 117 10448	18.2K Ω ± 1% 1/6W
RD21	4822 116 83963	2.2 Ω ± 5% 1/4W
RD22	4822 116 83963	2.2 Ω ± 5% 1/4W
RF03	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
RF04	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE

REF. DESIG.	PART NO.	DESCRIPTION
R164	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
R165	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
R425 R428	4822 050 21021	100 Ω ± 5% 1/4W
R504	4822 111 41355	75 Ω ± 5% 1/6W
R512	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
R513	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
R515	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE
R601	4822 116 82752	10K Ω ± 1% 1/6W
R602	4822 116 82752	10K Ω ± 1% 1/6W
R603	4822 117 10439	3.32K Ω ± 1% 1/6W
R604	4822 117 10439	3.32K Ω ± 1% 1/6W
R605	4822 117 10441	3.92K Ω ± 1% 1/6W
R606	4822 117 10441	3.92K Ω ± 1% 1/6W
R607	4822 116 82753	12.1K Ω ± 1% 1/6W
R608	4822 116 82753	12.1K Ω ± 1% 1/6W
R609 R612	4822 117 10449	2.67K Ω ± 1% 1/6W
R613 R616	4822 116 83963	2.2 Ω ± 5% 1/4W
R621	4822 116 83963	2.2 Ω ± 5% 1/4W
R622	4822 116 83963	2.2 Ω ± 5% 1/4W
R700	4822 101 30763	10K Ω x 2 B VARIABLE
R787	4822 116 83963	2.2 Ω ± 5% 1/4W
R788	4822 116 83963	2.2 Ω ± 5% 1/4W
R***		**PP16-RESISTORS (COMMON)** CARBON FILM FIXED RESISTOR, ± 5% 1/4W: U631
R***		CARBON FILM FIXED RESISTOR ± 5% 1/6W: RD02, RD09~RD16, RF01,RF02, RF14, RF16, RF22, RF24, RF25, RF33~RF35, RF51, RF53, RF54, RF56~RF59, RF61, RM01~RM12, RN01~RN10, RN15~RN18, RN21~RN24, RT03, RT04, R151~R503, R505~R508, R517, R519~R524, R617~R620, R631~R636, R701, R702, R719~R730, R801~R804, R821, R822, R854, R855, R861, R862 U683, U689
		PP16-SEMICONDUCTORS
DF31	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D141	4822 130 32508	DIODE, RL103E, DSF10C
D142	4822 130 32508	DIODE, RL103E, DSF10C
D401 D410	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D501	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D502	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D802	4822 130 82425	DIODE, RBA-402 BRIDGE
D803	4822 130 80932	ZENER DIODE, 04AZ6.2-Y 6.2V
D804	4822 130 80932	ZENER DIODE, 04AZ6.2-Y 6.2V
D805	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D806	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
D821 D824	4822 130 32508	DIODE, RL103E, DSF10C
D851	4822 130 32508	DIODE, RL103E, DSF10C
D852	4822 130 32508	DIODE, RL103E, DSF10C
D853	4822 130 80932	ZENER DIODE, 04AZ6.2-Y 6.2V

REF. DESIG.	PART NO.	DESCRIPTION
D854	4822 130 80932	ZENER DIODE, 04AZ6.2-Y 6.2V
D855	4822 130 80839	DIODE, S5688G 1A 400V
D861	4822 130 32508	DIODE, RL103E, DSF10C
D862	4822 130 32508	DIODE, RL103E, DSF10C
D863	4822 130 33948	ZENER DIODE, 04AZ5.6-Y 5.6V
QD01	4822 209 31356	IC, BS DAC SAA7350 AGP
QD02	4822 209 31013	IC, TDA1547
QF01	4822 209 32172	MICROPROCESSOR, MC68HC05C9 MAIN µ-COM
QF02	4822 209 73951	IC, RESET PST523D
QF03	4822 209 52171	IC, EEPROM X24C16
QF51	4822 130 62295	TRANSISTOR, JC547B
QF52	4822 130 62386	TRANSISTOR, JC557B
QF53	4822 130 62295	TRANSISTOR, JC547B
QM01	4822 209 62755	IC, POWER OP AMP TCA0372
QM02	4822 130 61441	TRANSISTOR, 2SD1862 (Q,R)
QM03	4822 130 61417	TRANSISTOR, 2SB1240 (Q,R)
QN01	4822 130 60839	TRANSISTOR, 2SC2458 (Y, GR)
QN02	4822 130 60839	TRANSISTOR, 2SC2458 (Y, GR)
QN03	4822 130 60107	TRANSISTOR, 2SA1048 (Y, GR)
QN04	4822 130 60107	TRANSISTOR, 2SA1048 (Y, GR)
QN05	4822 130 63211	DIGITAL TRANSISTOR, DTA114TS
QN06	4822 130 63211	DIGITAL TRANSISTOR, DTA114TS
QN11 ~ QN14	4822 130 43819	TRANSISTOR, 2SC2878 (A, BRANK)
QN17 ~ QN20	4822 130 43819	TRANSISTOR, 2SC2878 (A, BRANK)
Q140	4822 209 83627	IC, NJM4560D
Q142	4822 130 63211	DIGITAL TRANSISTOR, DTA114TS
Q143	4822 130 63211	DIGITAL TRANSISTOR, DTA114TS
Q401	4822 130 63382	F.E.T. 2SK332 D
Q402	4822 130 63382	F.E.T. 2SK332 D
Q403	4822 130 43233	TRANSISTOR, 2SC2240 (GR, BL)
Q404	4822 130 43233	TRANSISTOR, 2SC2240 (GR, BL)
Q405 ~ Q408	4822 130 42951	TRANSISTOR, 2SA970 (GR, BL)
Q409	4822 130 43233	TRANSISTOR, 2SC2240 (GR, BL)
Q410	4822 130 43233	TRANSISTOR, 2SC2240 (GR, BL)
Q411	5322 130 41844	F.E.T. 2SK170 BL
Q412	5322 130 41844	F.E.T. 2SK170 BL
Q413	4822 130 62649	F.E.T. 2SJ74 BL
Q414	4822 130 62649	F.E.T. 2SJ74 BL
Q501	4822 209 63453	IC,DEM/ERCO SAA7310 QFP
Q502	4822 209 73952	IC, D-RAM MB81416C-15 MN4264P-15
Q503	4822 130 61438	TRANSISTOR, 2SA1005 (L, K)
Q509	4822 209 62588	IC, PCF2705P
Q510	4822 209 63471	IC, AND GATE 74HC08
Q511	4822 209 30435	IC, DIGITAL FILTER SM5840FP
Q512	4822 130 61189	DIGITAL TRANSISTOR, DTC114TS
Q601	4822 209 31153	IC, NJM2114D
Q602	4822 209 31153	IC, NJM2114D
Q703	4822 209 31153	IC, NJM2114D
Q801	4822 209 63641	IC, NJM79M12FA
Q802	4822 209 31712	IC, NJM78M12FA
Q803	4822 130 63308	TRANSISTOR, 2SA1859 (O, Y)
Q804	4822 130 63312	TRANSISTOR, 2SC4883 (O, Y)
Q821	4822 209 31631	IC, NJM7805FA
Q861	4822 130 62295	TRANSISTOR, JC547B
		PP16-MISCELLANEOUS
JT02	4822 265 20354	TERMINAL, 1P RCA (GOLD) DIGITAL
JT11	4822 267 31369	JACK, GP1F32T OPTICAL OUTPUT
J600	4822 266 30274	TERMINAL, 2P RCA
J601	4822 266 30369	TERMINAL, 4P (GOLD) RCA AUDIO
LT01	4822 142 60388	PULSE TRANSFORMER
L501	4822 152 20647	CHOKE COIL, 2.2µH
L601	4822 157 62919	CHOKE COIL, 100µH
L602	4822 157 62919	CHOKE COIL, 100µH
L605	4822 158 60605	FERRITE CORE, BEADS
L606	4822 158 60605	FERRITE CORE, BEADS
L705	4822 158 60605	FERRITE CORE, BEADS
L706	4822 158 60605	FERRITE CORE, BEADS
SF02	4822 277 21559	SLIDE SWITCH, INT/EXT RC-5
XF01	4822 242 72223	CERAMIC VIBRATOR 4.00MHz CST4.00MGW
X501	4822 242 72395	CRYSTAL, 11.2896MHz
		PP26-POWER SW CIRCUIT BOARD
		PP26-CAPACITORS
CH01	4822 121 43732	FILM 0.01µF ± 20% 250V [/21B/22B/52B/21G/22G]
CH01	4822 122 33276	CERAMIC 0.01µF ± 20% 400V [/25B/55B]
		PP26-MISCELLANEOUS
FH11	4822 253 30402	FUSE, 800 MA 250V BS LISTED
FH12	4822 253 30402	FUSE, 800 MA 250V BS LISTED
JH01	4822 267 31416	JACK, AC INLET [/21B/22B/25B/55B/21G/22G]
JH01	4822 267 31521	PLUG, AC INLET [/52B]
JH11	4822 256 30329	JACK, FUSE HOLDER
JH12	4822 267 30978	JACK, FUSE HOLDER
JH13	4822 256 30329	JACK, FUSE HOLDER
JH14	4822 267 30978	JACK, FUSE HOLDER
LH00	4822 146 21742	POWER TRANSFORMER 230V [/21B/22B/25B/21G/22G]
LH00	4822 146 21745	POWER TRANSFORMER 230V OFC [/52B/55B]
SH01	4822 276 12925	PUSH SWITCH, POWER
		PR16-HEAD AMP CIRCUIT BOARD
		PR16-CAPACITORS
C923	4822 124 90352	ELECT 10µF 16V
C924	4822 124 90352	ELECT 10µF 16V
C953	4822 124 90354	ELECT 100µF 16V
C954	4822 124 90354	ELECT 100µF 16V
		PR16-RESISTORS
R900	4822 100 20421	10K ΩX2 (B) VARIABLE
		PR16-RESISTORS (COMMON)
R***		CARBON FILM FIXED RESISTOR, ± 5% 1/6W: RN33, RN34, R903, R904, R921~R926, R931, R932
		PR16-SEMICONDUCTORS
QN23	4822 130 43819	TRANSISTOR,2SC2878 (A, BRANK)
QN24	4822 130 43819	TRANSISTOR,2SC2878 (A, BRANK)
Q902	4822 209 83654	IC, NJM4556D

REF. DESIG.	PART NO.	DESCRIPTION
		PV16-SERVO CIRUIT BOARD
		PV16-CAPACITORS
C101	4822 126 11127	CERAMIC 470PF ± 10%
C103	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C109	4822 126 10408	CERAMIC 220PF ± 10%
C110	4822 124 41539	ELECT 47μF 16V
C112	4822 122 33639	CERAMIC 1000PF ± 10%
C113	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C114	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C117	4822 126 10408	CERAMIC 220PF ± 10%
C118	4822 126 10364	CERAMIC 100PF ± 10%
C126	4822 124 23056	ELECT 47μF 16V
C128	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C131	4822 122 33639	CERAMIC 1000PF ± 10%
C132		CERAMIC 0.1μF +80%-20% 50V
C133	4822 124 41539	ELECT 47μF 16V
C134	4822 124 23056	ELECT 47μF 16V
C135	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C136	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
C137	4822 124 41539	ELECT 47μF 16V
C139		CERAMIC 0.1μF +80%-20% 50V
C150	4822 124 41539	ELECT 47μF 16V
		PV16-CAPACITORS (COMMON)
C***		Plastic film capacitor One-way type, Mylar ± 5% 50V C102, C104~C108, C111, C115, C116, C121~C125, C127, C129, C130, C138
		PV16-RESISTORS
R134	4822 101 30707	2.2K Ω TRIMMING LASER
R136	4822 100 20539	22K Ω TRIMMING FOC
		PV16-RESISTORS (COMMON)
R***		CARBON FILM FIXED RESISTOR, ± 5% 1/6W: R102~R120, R123~R129, R131~R133, R137~R144, R170, RF05, RF36
		PV16-SEMICONDUCTORS
D132	4822 130 80272	ZENER DIODE, 04AZ7.5-Z 7.5V
D133	4822 130 80272	ZENER DIODE, 04AZ7.5-Z 7.5V
Q101	4822 209 30436	IC,HF & FOC TDA8808 QFP
Q102	4822 130 61441	TRANSISTOR, 2SD1862 (Q,R)
Q103	4822 209 30437	IC, TDA8809 (RAD) QFP
Q106	4822 209 62755	IC, POWER OP AMP TCA0372
Q108	4822 209 30442	IC, NJM79L06A
Q109	4822 209 31631	IC, NJM7805FA
		PV16-MISCELLANEOUS
JM01	4822 265 30777	PLUG, 3P
J102	4822 267 50676	JACK, SUB CHASSIS CONNECTOR
SF01	4822 276 13296	PUSH SWITCH,, TRAY DETECTER
		PY16-FRONT CIRCUIT BOARD
		PY16-CAPACITORS
CY01	4822 124 41539	ELECT 47μF 16V
CY02	4822 122 40588	CERAMIC 0.022μF ± 20%
CY03	4822 126 10408	CERAMIC 220PF ± 10%
CY06	4822 122 40588	CERAMIC 0.022μF ± 20%
CY07	4822 124 22276	ELECT 47μF 50V
CY08	4822 126 11127	CERAMIC 470PF ± 10%
CY21	4822 122 40588	CERAMIC 0.022μF ± 20%
CY61	4822 122 40588	CERAMIC 0.022μF ± 20%
CY62	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
CY63	4822 122 40589	CERAMIC 0.047μF +80%-20% 50V
		PY16-RESISTORS
RY02	4822 111 90967	4.7 Ω ± 5% 1/4W FUSE

REF. DESIG.	PART NO.	DESCRIPTION
		PY16-RESISTORS (COMMON)
R***		CARBON FILM FIXED RESISTOR, ± 5% 1/4W: RY21, RY23, RY25, RY27, RY29, RY81, RY82, RY84, RY86
R***		CARBON FILM FIXED RESISTOR, ± 5% 1/6W: RY01, RY04, RY05, RY07~RY13, RY22, RY24, RY26, RY28, RY30
		PY16-SEMICONDUCTORS
RY06	4822 130 80839	DIODE, S5688G VRM400V IO=1A
DY03	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
DY04	4822 130 33948	ZENER DIODE, 04AZ5.6-Y 5.6V
DY05	4822 130 33948	ZENER DIODE, 04AZ5.6-Y 5.6V
DY06	4822 130 33948	ZENER DIODE, 04AZ5.6-Y 5.6V
DY07	4822 130 80272	ZENER DIODE, 04AZ7.5-Z 7.5V
DY08	4822 130 80272	ZENER DIODE, 04AZ7.5-Z 7.5V
DY09	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
DY11 ~ DY14	4822 130 33305	DIODE, 1SS176,MA165,1SS254 30V 0.1A
DY81	4822 130 80325	L.E.D. LT3H8B (YELLOW)
DY82	4822 130 82964	L.E.D. LT3G8B (GREEN)
DY84	4822 130 82964	L.E.D. LT3G8B (GREEN)
DY86	4822 130 82964	L.E.D. LT3G8B (GREEN)
QY01	4822 209 30434	IC, DISPLAY DRIVER U3090MG
QY02	4822 209 30443	IC, 4BIT D TYPE LATCH 74HC75AP
QY03	4822 130 61189	DIGITAL TRANSISTOR, DTC114TS
QY81 ~ QY83	4822 130 61189	DIGITAL TRANSISTOR, DTC114TS
QY85	4822 130 61189	DIGITAL TRANSISTOR, DTC114TS
		PY16-MISCELLANEOUS
SY01 ~ SY18	4822 276 20508	PUSH SWITCH
SY21 ~ SY26	4822 276 20508	PUSH SWITCH
VY01	4822 130 91032	DISPLAY UNIT FV364G
ZY01	4822 130 82393	PHOTO UNIT IR-RECEIVER GP1U720R 36KHZ

NOTE ON SAFETY

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