

# Service Manual

74 SD415/01B/02B/07B

Stereo cassette deck

For repair information cassette mechanism  
see Service Manual of "Recorders tape deck  
NMZ-3300D/NMZ-3600D"



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# marantz®

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model SD415

First issue: 1990

4822 725 50919



## 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 to our National Marantz Subsidiary or Agent.

### ORDERING PARTS:

Parts can be ordered either by mail or by telex. In both cases, 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 telex must be signed otherwise such part order will be considered as null and void.

### PARTS ORDERING

Parts may be ordered at the following addresses:

<b>AUSTRIA</b> HORNYPHON Vertriebsgesellschaft GmbH Wienerbergstrasse 1 A 1101 Wien Austria Telex: 132.332	<b>FINLAND</b> MARANTZ DIVISION OF OY PHILIPS Ab Kaivokatu 8 00100 Helsinki Finland Telex: 124811	<b>GREAT BRITAIN</b> MARANTZ AUDIO U.K. Ltd Unit 15/16 Saxon Way Industrial Estate Moor Lane Harmondsworth UB7 0LW Great Britain Telex: 935196	<b>SAUDI ARABIA</b> AL ALAMIAH ELECTRONICS P.O.Box 5954 University Street Riyadh 11432 Saudi Arabia Telex: 401530	<b>SWITZERLAND</b> MARANTZ Technischer Service Duenstrasse 3 3186 Duingen Switzerland
<b>BELGIUM</b> SVD DIVISION MARANTZ Industrialaan 1 1720 Groot-Bijgaarden Belgium Telex: 24466	<b>FRANCE</b> MARANTZ FRANCE 4 Rue Bernard Palissy 92600 Asnières France Telex: 611651	<b>GREECE</b> SHERTON ELECTRONICS S.A. P.O.Box 21025 Hippocrates Street 188 Athens 11471 Greece Telex: 216.795	<b>SOUTH AFRICA</b> MARANTZ DIVISION OF PHILIPS S.A. Main Road Martindale P.O. Box. 58088 Newville 21114 South Africa	<b>TURKEY</b> DOGRUOL Ltd. I.M.C. 6 Blok N°6310 Unkapani Istanbul Turkey Telex: 22085
<b>CHILE</b> MARANTZ DIVISION OF PHILIPS S.A. AV. Santa Maria, 0760 Casilla 2687 Santiago Telex: 240.239	<b>GERMANY</b> MARANTZ GERMANY GmbH Alexanderstrasse 1 2000 Hamburg Germany	<b>JAPAN</b> MARANTZ JAPAN, Inc. 35-1, 7-chome, Sagamiono Sagamihara-shi, Kanagawa Japan	<b>SPAIN</b> PHONO S.A. Ignacio Iglesias 10 Badalona (Barcelona) Spain Telex: 59355	<b>MALTA</b> CACHIA & GALEA Republic Street, 68D Valetta Telex: 1682
<b>DENMARK</b> MARANTZ DIVISION OF PHILIPS SERVICE A/S Prags Boulevard 80 Postbox 1919 DK-2300 København S Denmark Telex: 31201	<b>THE NETHERLANDS</b> Elpro Marantz Wint Hontlaan 28 3526 KV Utrecht The Netherlands Telex: 4748	<b>KUWAIT</b> AL ALAMIAH ELECTRONICS Ussama Building Fahd al Saleem Street P.O.Box 23781 Safat-Kuwait Telex: 22694	<b>SWEDEN</b> MARANTZ DIVISION OF PHILIPS Försäljning AB Tegeluddsvägen 1 S-115 84 Stockholm Sweden Telex: 14060	<b>PORTUGAL</b> MARANTZ Divisao philips S.A. service Ourelra-carnaxide 2795 LinDA-A-VELHA Telex: 43906
	<b>NORWAY</b> MARANTZ DIVISION OF PHILIPS A/S Sandstuveien 40 0680 Oslo 6 Norway Telex: 72640	<b>ITALY</b> MARANTZ ITALIANA S.P.A. Via Chiese, 74 20126 Milano Italy		

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Vestdijk 9  
5600 MD Eindhoven  
The Netherlands  
Phone: +31/40.758290  
Telefax: +31/40.75.82.99  
Telex: 35000 PHTC NL routing IND NLMTFAT

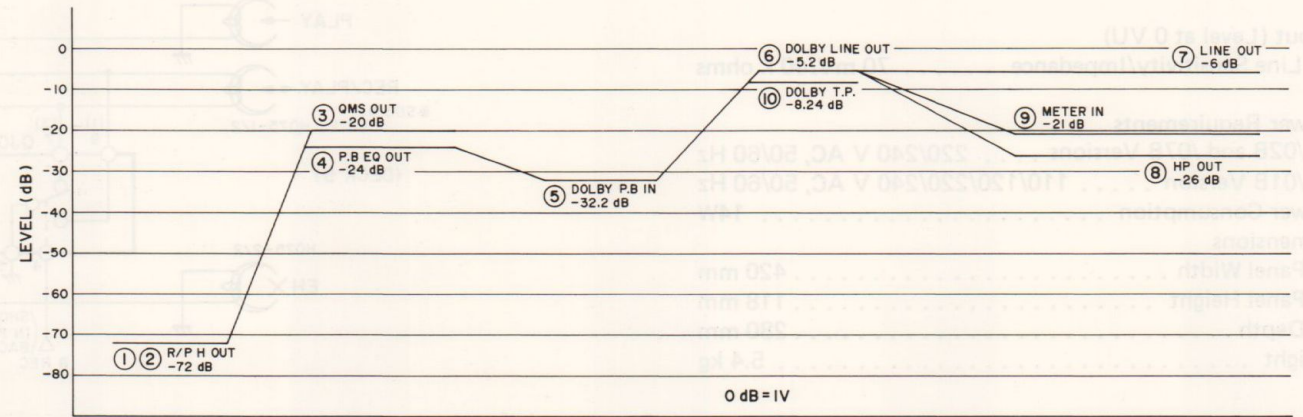
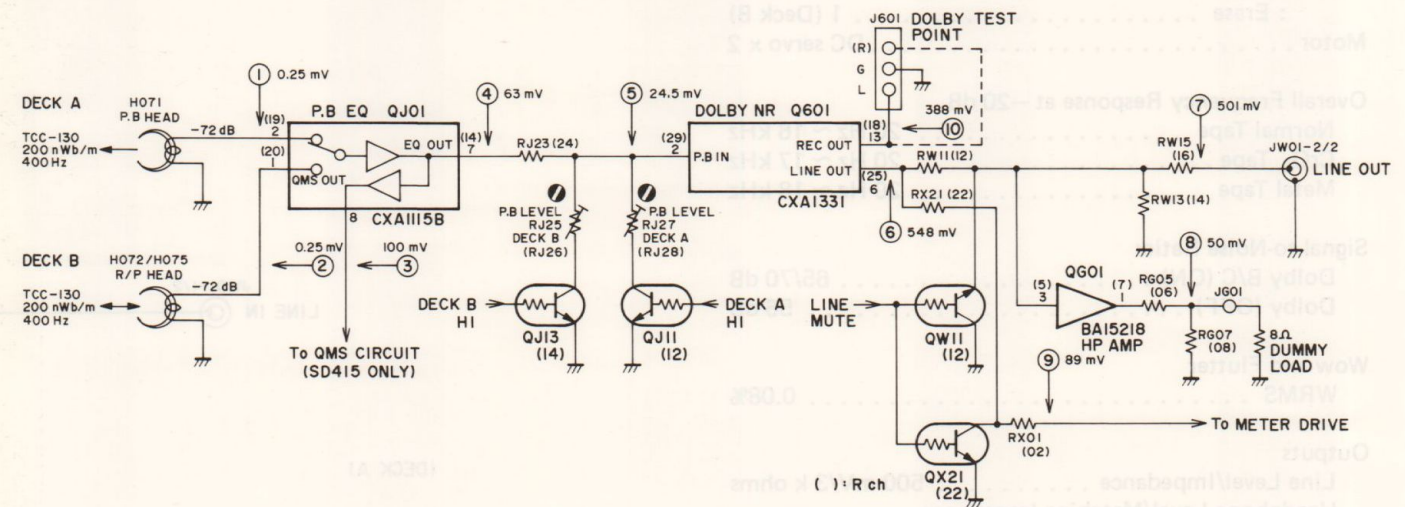
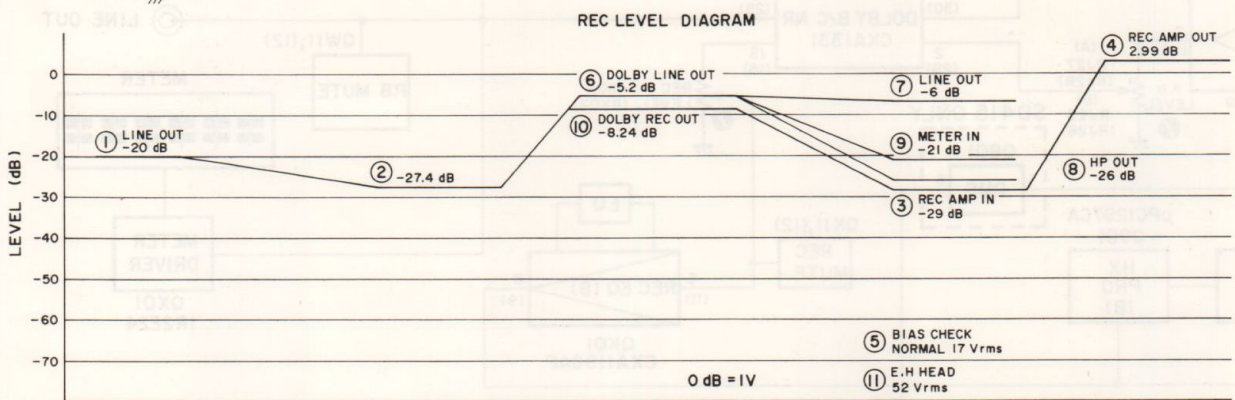
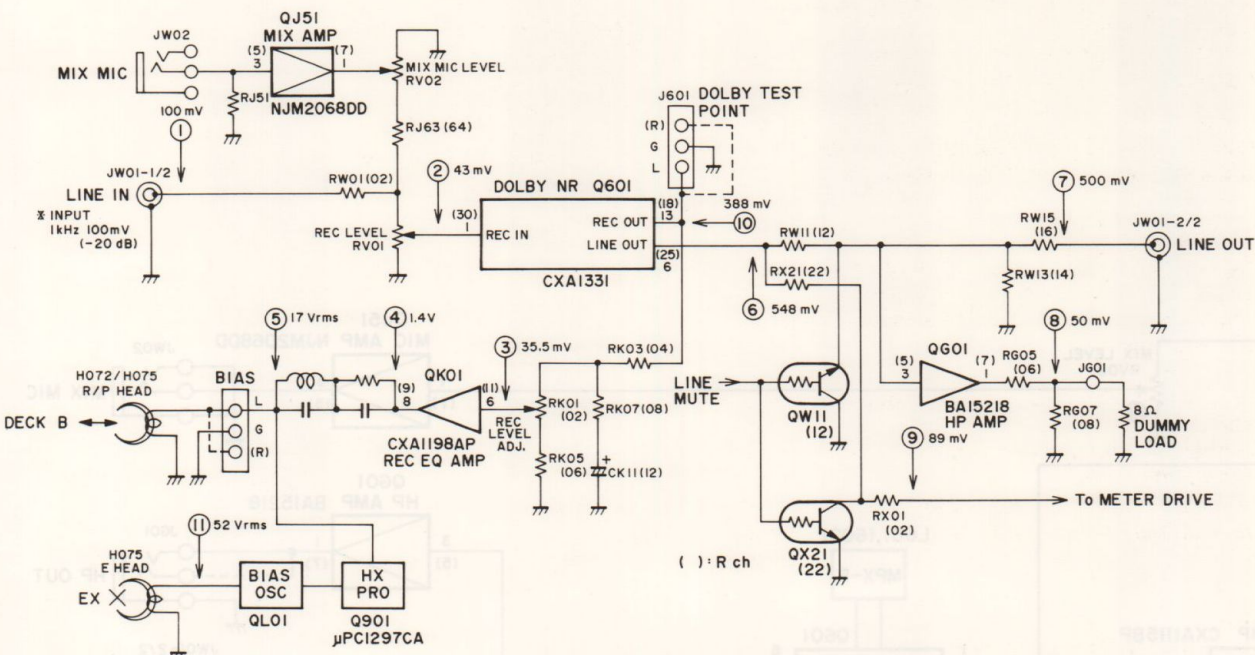
All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your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

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



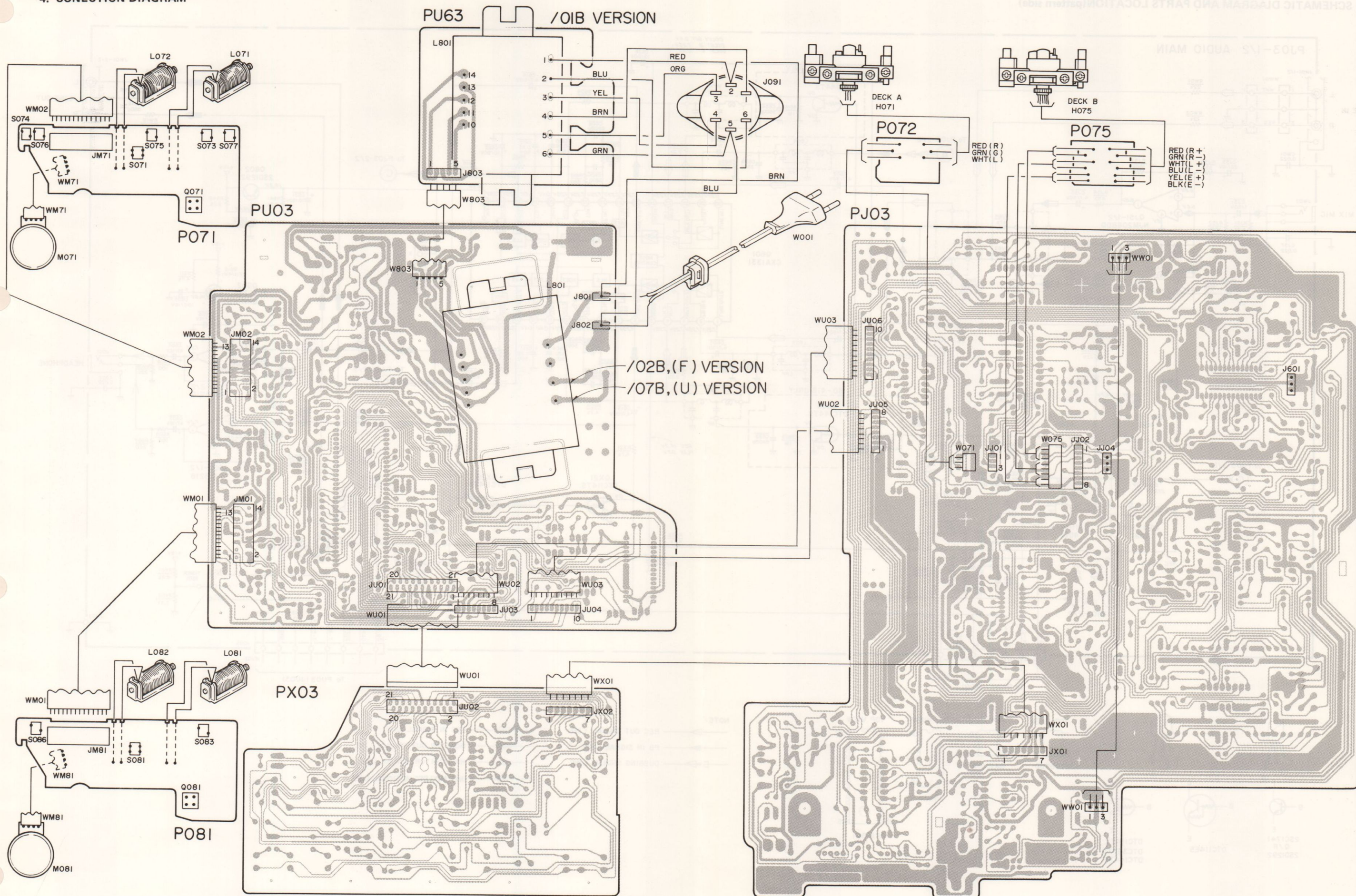






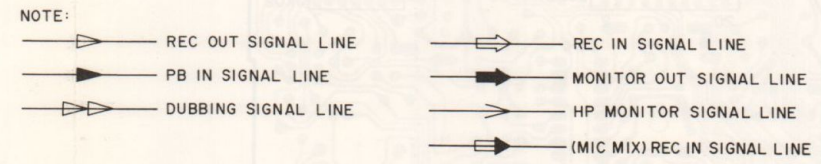
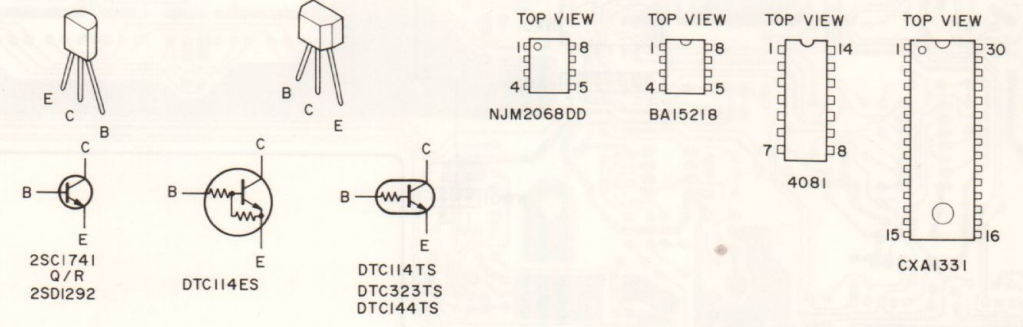
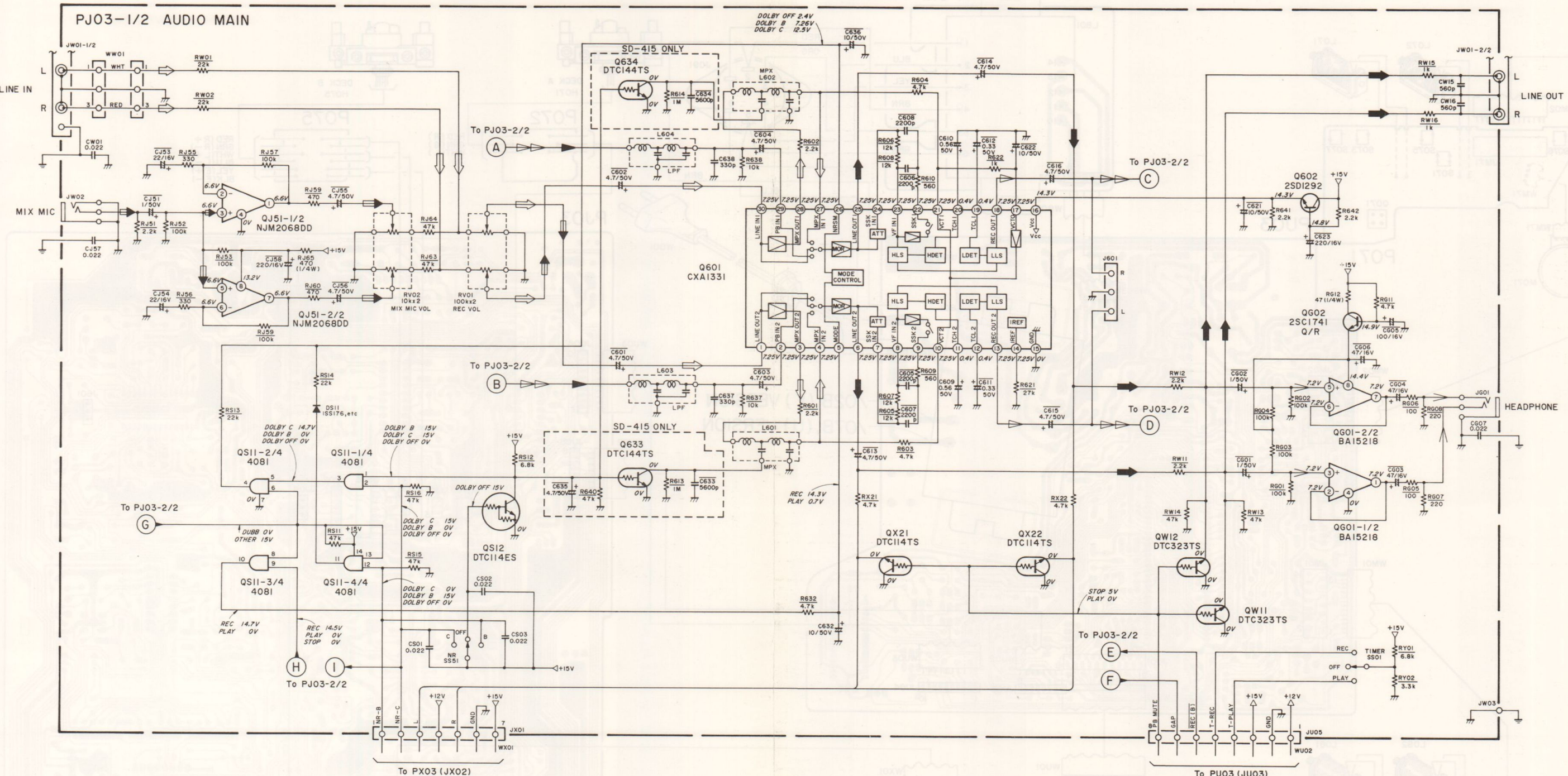


4. CONECTION DIAGRAM





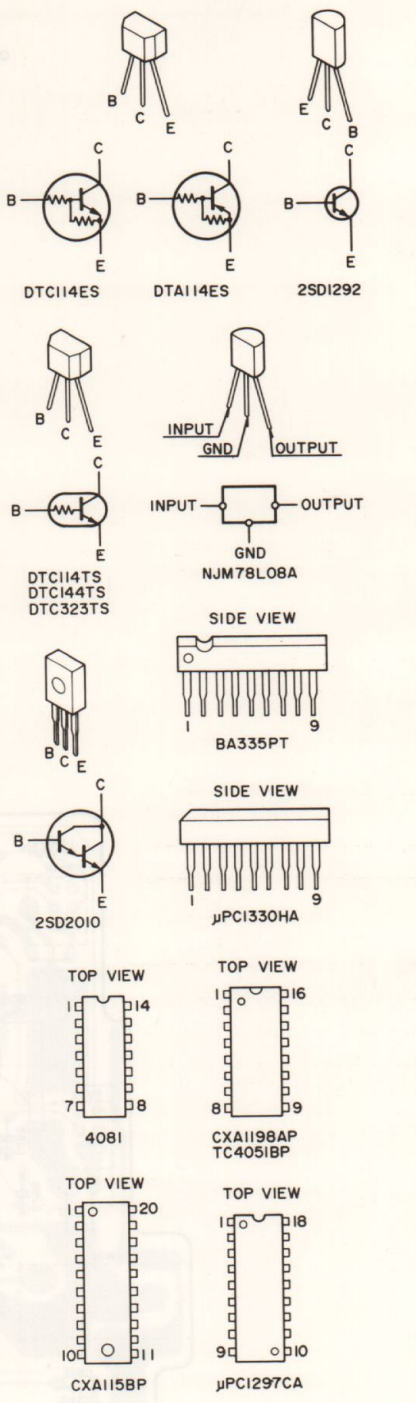
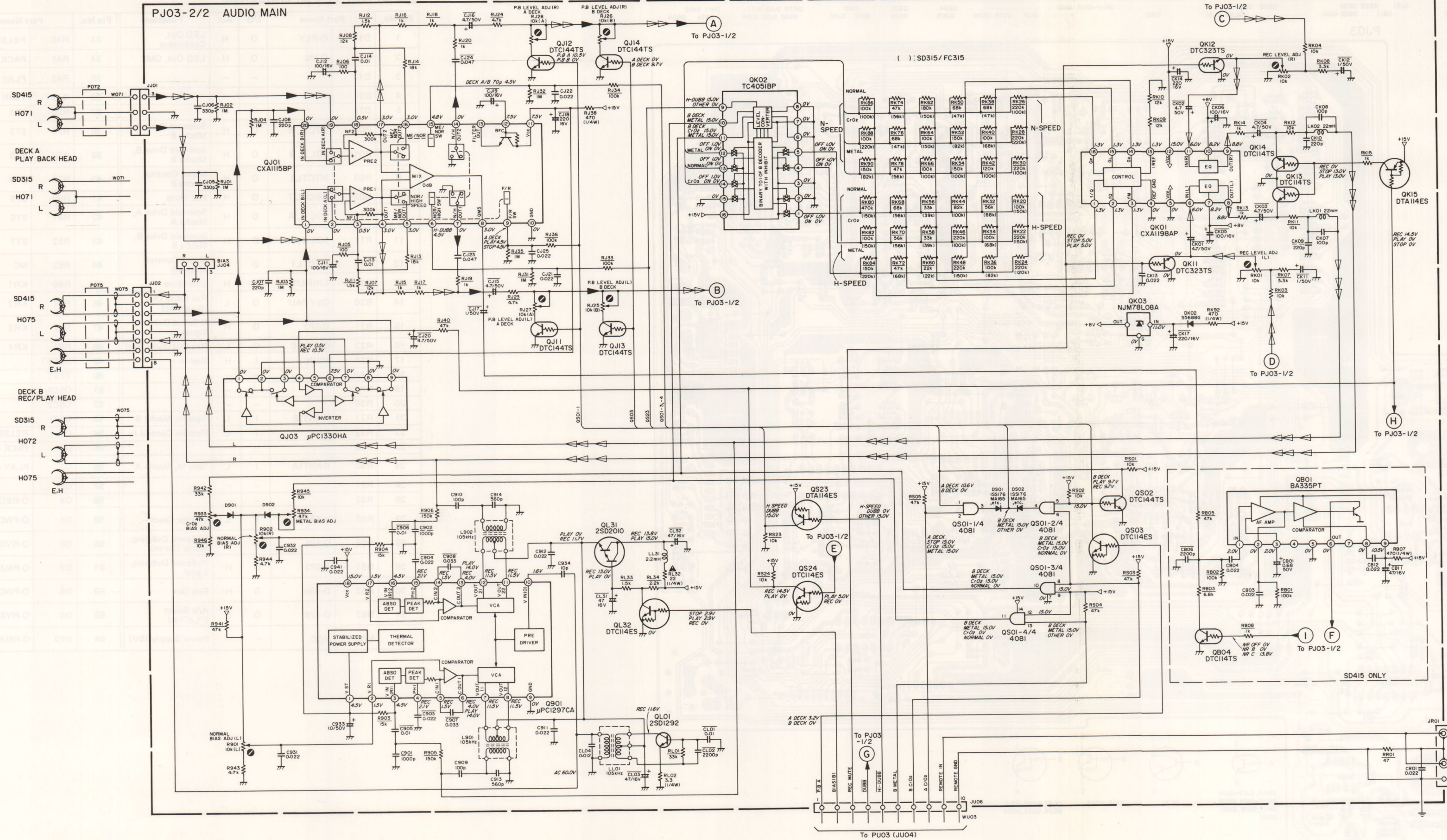
5. SCHEMATIC DIAGRAM AND PARTS LOCATION (pattern side)











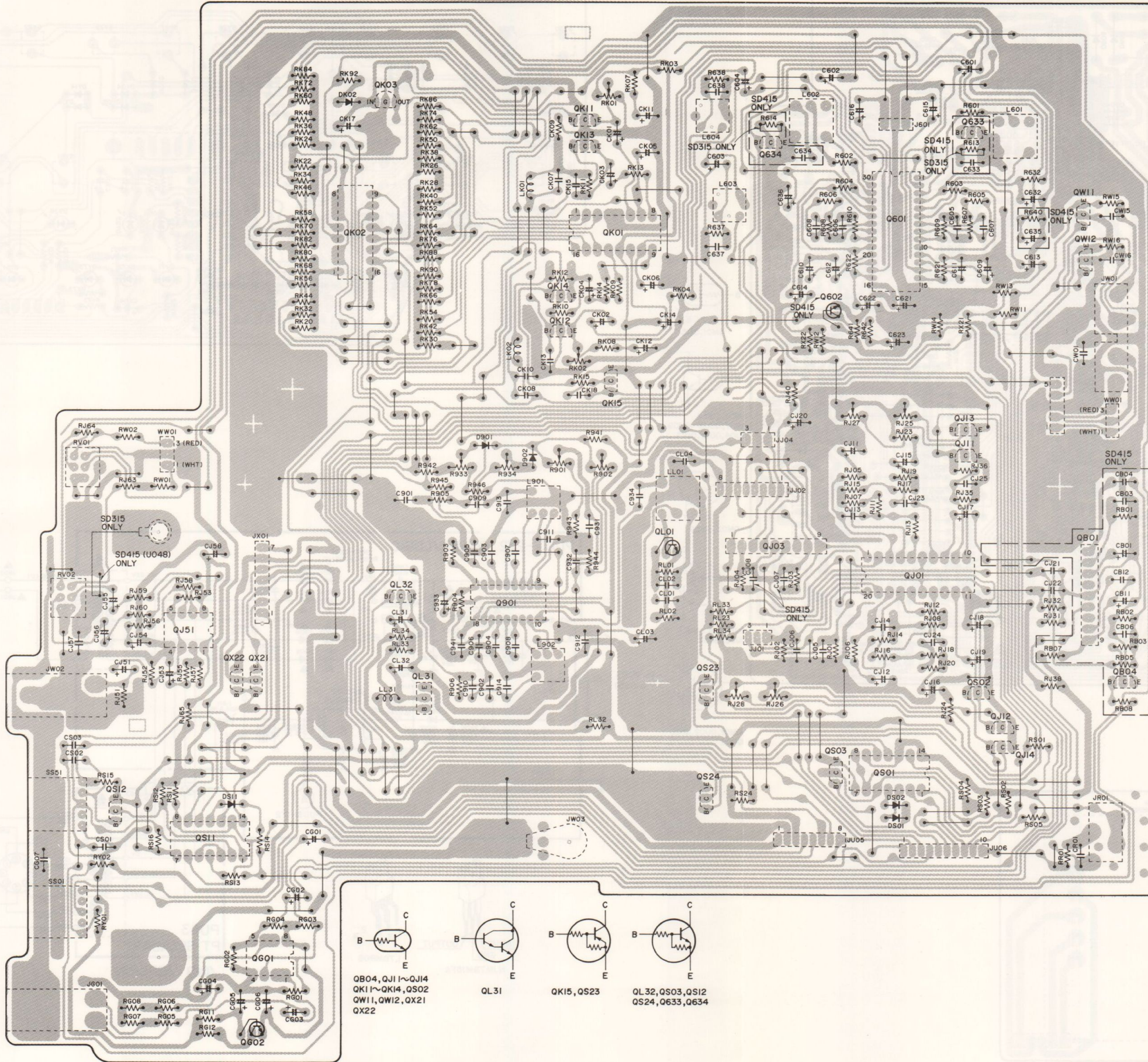
NOTE:

- REC OUT SIGNAL LINE
- PB IN SIGNAL LINE
- DUBBING SIGNAL LINE



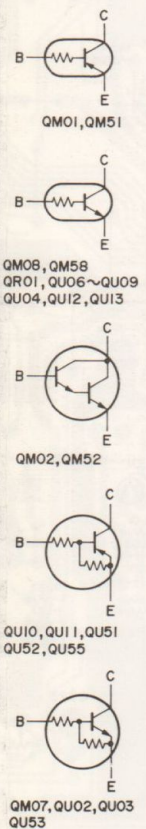
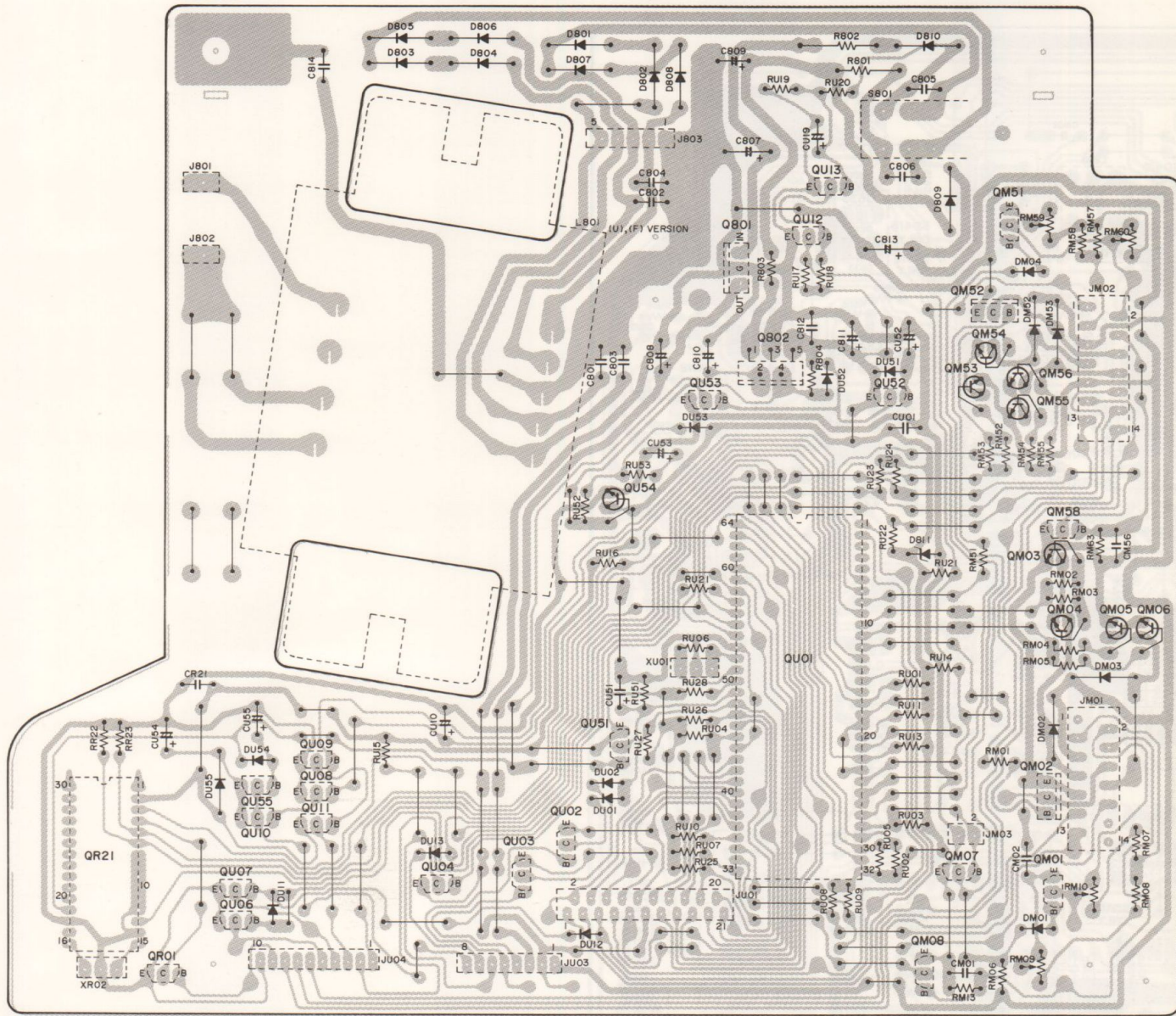
QJ51 QX22 QX21 QK02 QK03 QK01 QK11~QK15 QK01 Q634 Q602 Q601 Q633 QJ13 QJ11 QW11 QW12  
 QS12 QS11 QG02 QG01 QL32 QL31 Q901 QL01 QS23 QS24 QJ03 QS03 QS01 QJ01 QS02 QJ12 QJ14 QB01 QB04

PJ03

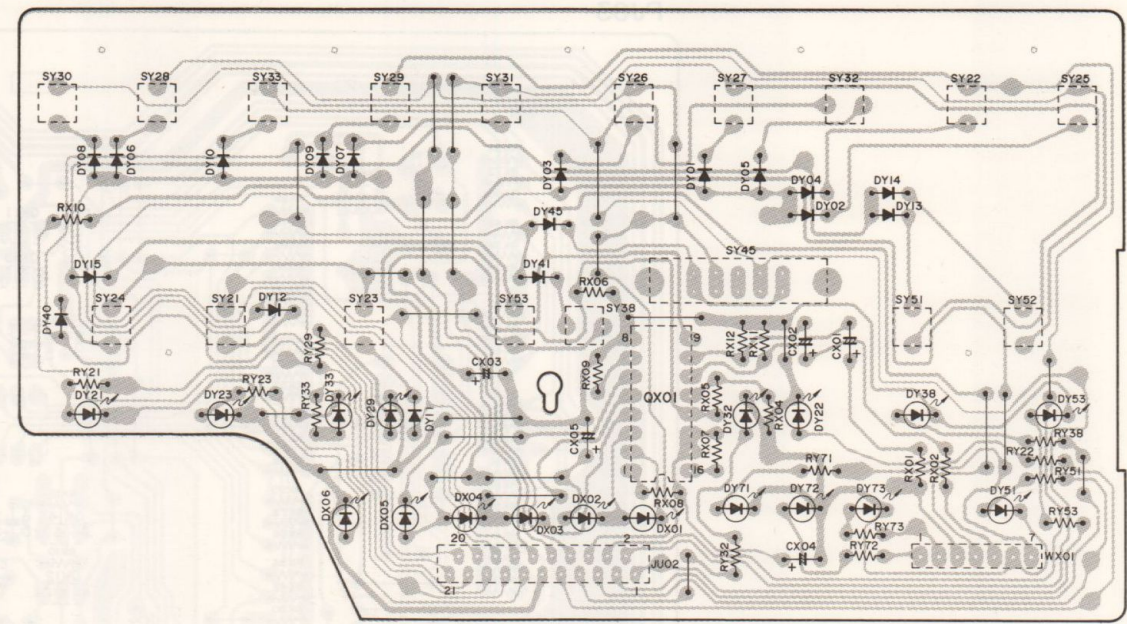




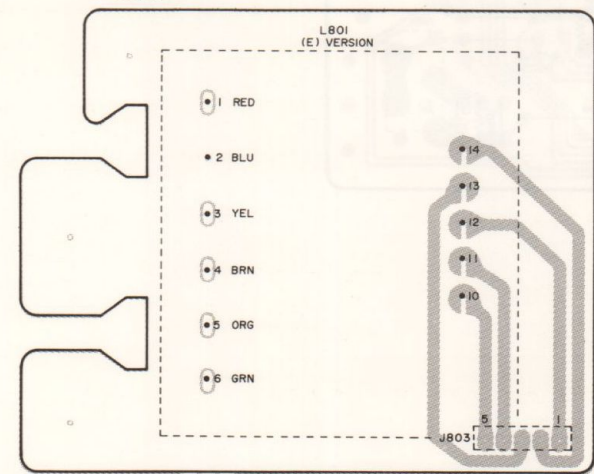
PU03



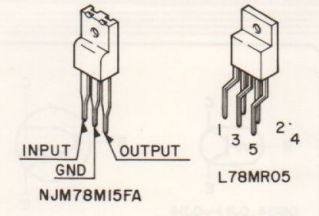
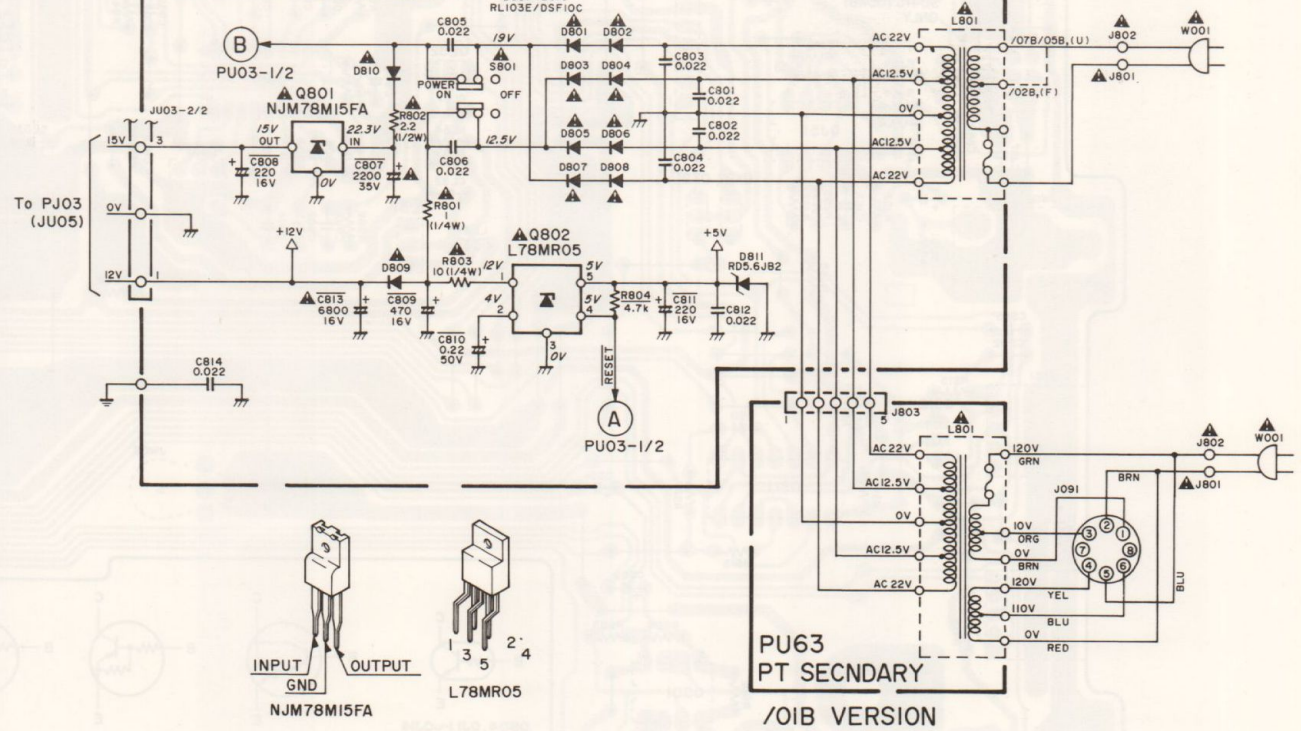
PX03



PU63

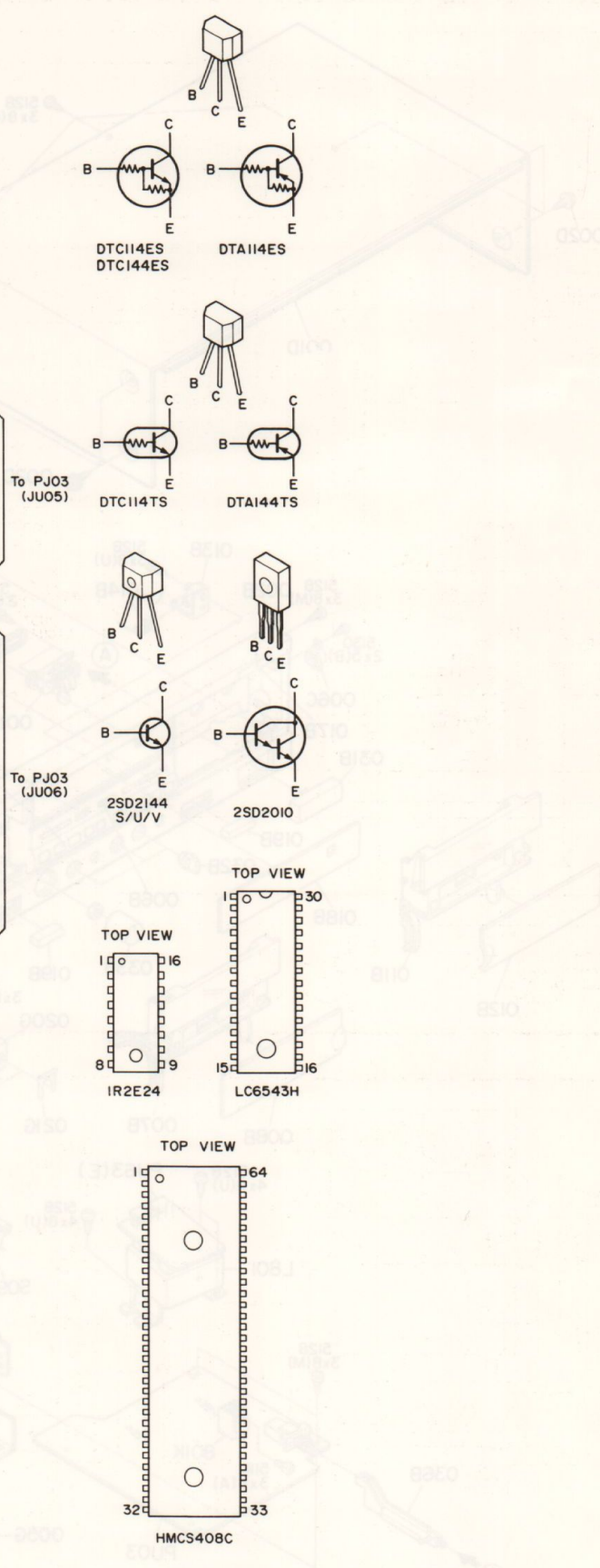
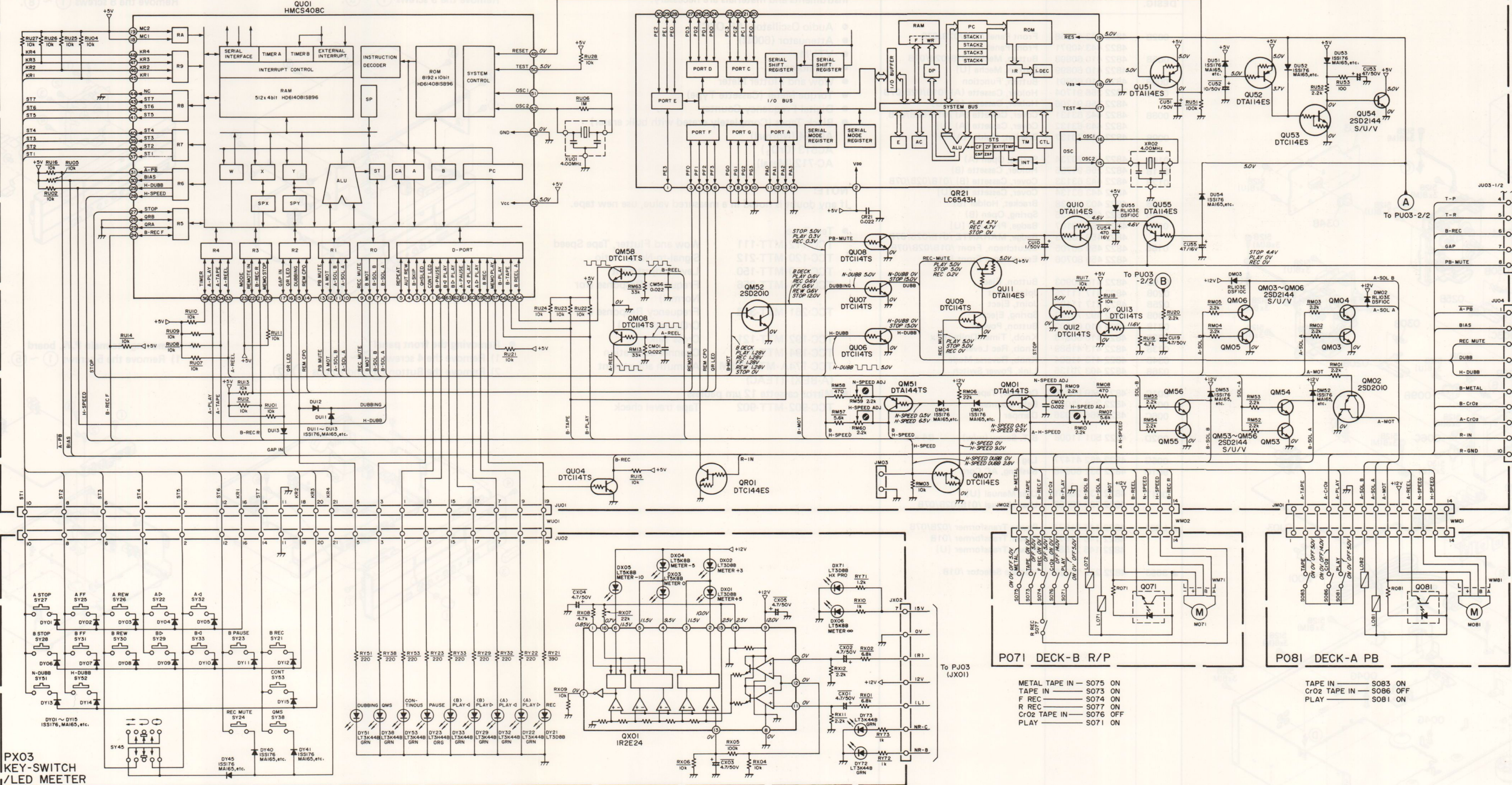


PU03-2/2 POWER/LOGIC

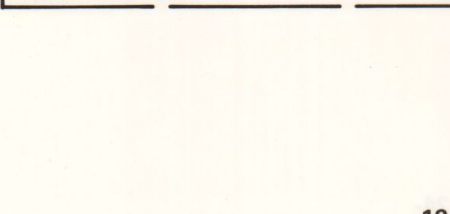




PU03-1/2 LOGIC/POWER SUPPLY

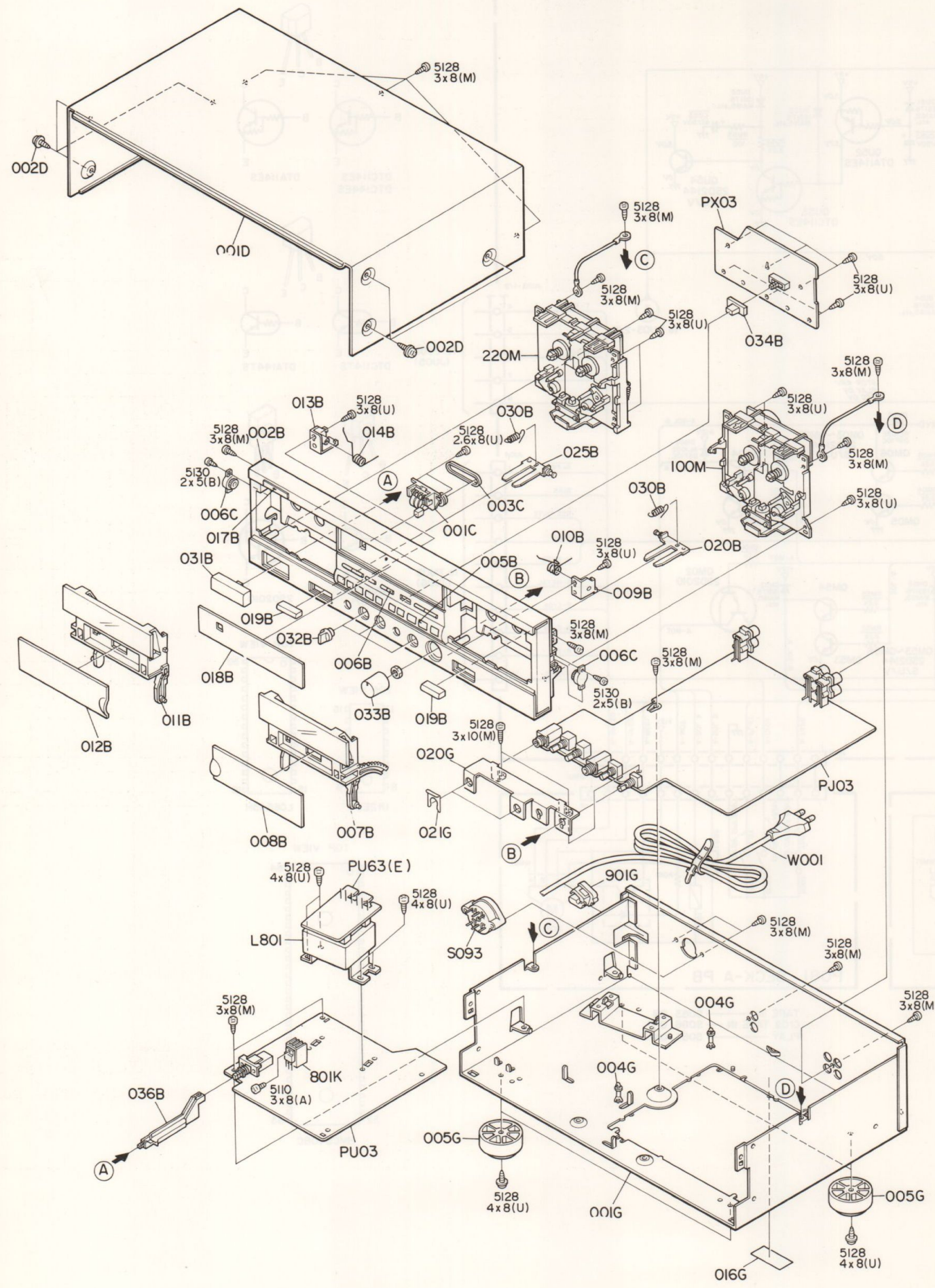


PX03 KEY-SWITCH /LED MEETER





7. EXPLODED VIEW AND PARTS LIST



REF. DESIG.	PART NO.	DESCRIPTION
002B	4822 443 40958 4822 443 40971	Front Panel /01B/02B/07B Front Panel [U]
005B	4822 410 60898 4822 410 60899	Button, Mecha /01B/02B/07B Button, Mecha [U]
006B	4822 410 60901	Button, Function
007B	4822 256 91704 4822 256 91706	Holder, Cassette (A) /01B/02B/07B Holder, Cassette (A) [U]
008B	4822 443 63131 4822 443 63132	Cover, Cassette (A) /01B/02B/07B Cover, Cassette (A) [U]
009B	4822 403 70137	Bracket, Holder (A)
010B	4822 492 70734	Spring, Open (A)
011B	4822 256 91705	Holder, Cassette (B)
012B	4822 443 63133 4822 443 63134	Cover, Cassette (B) /01B/02B/07B Cover, Cassette (B) [U]
013B	4822 403 70138	Bracket, Holder (B)
014B	4822 492 70735	Spring, Open (B)
017B	4822 454 40107 4822 459 10943 4822 459 80705 4822 459 80706	Badge, PHILIPS [U] Badge, MARANTZ /01B/02B/07B Escutcheon, Front /01B/02B/07B Escutcheon, Front [U]
018B	4822 459 80705 4822 459 80706	Escutcheon, Front [U]
019B	4822 410 60903	Button, Eject
020B	4822 417 11125	Joint, Eject
025B	4822 417 11126	Joint, Eject
030B	4822 492 70733	Spring, Eject
031B	4822 410 60902	Button, Power
032B	4822 410 60873	Knob, Timer/Dolby/Mix
033B	4822 413 41589	Knob, Rec Level
034B	4822 413 41604	Knob, Reverse Mode
036B	4822 403 70136	Link, Power Switch
001C	4822 349 50345	Counter, Tape
003C	4822 358 31087	Belt, Counter
006C	4822 466 92936	Damper
002D	4822 501 11008	B.T. Screw (w/w) B4 x 8
005G	4822 462 41477	Leg
901G	4822 532 60948	Bushing, AC Cord
001T	4822 736 20861 4822 736 20862	User Manual [U] User Manual /01B/02B/07B
▲ L801	4822 146 21571 4822 146 21572 4822 146 21581	Power Transformer /02B/07B Power Transformer /01B Power Transformer [U]
▲ S093	4822 272 10227	Voltage Selector /01B

8. TEST EQUIPMENT REQUIRED FOR SERVICING

For measuring or checking your Cassette Deck, the following instruments and materials are necessary.

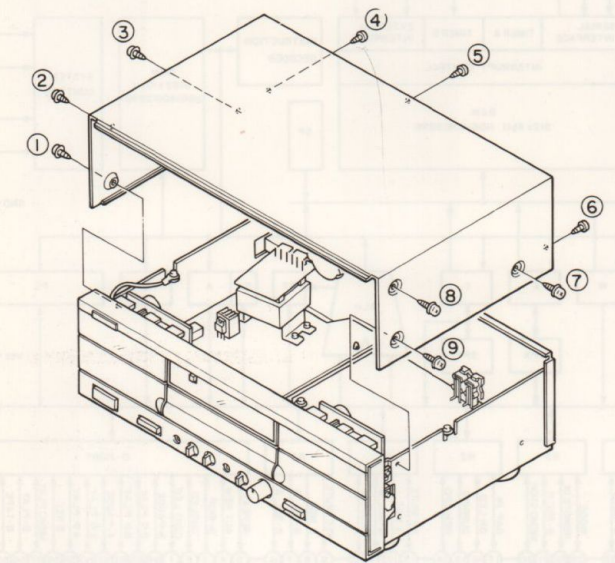
- Audio Oscillator (AF OSC)
- Attenuator (600Ω)
- VTVM
- Oscilloscope
- Wow and Flutter Meter
- Torque Meter (Cassette Type)
- Digital Frequency Counter
- Black Tapes (Completely erased with bulk eraser)  
AC224 (Normal)  
AC513 (CrO<sub>2</sub>)  
AC-712 (Metal)

**NOTE:**  
If any doubt is noted in a measured value, use new tape.

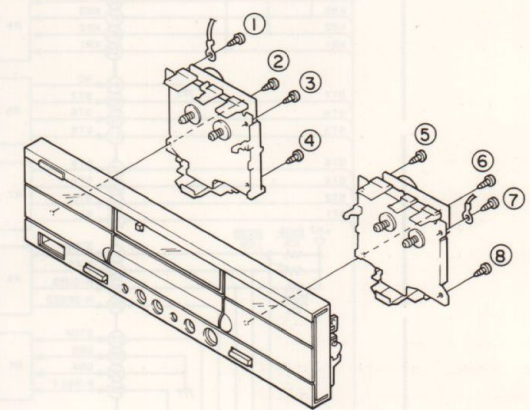
- Test Tape  
TCC-112·MTT-111      Wow and Flutter, Tape Speed  
TCC-120·MTT-212      Signal-to-Noise Ratio  
TCC-130·MTT-150      Level Adjustment  
TCC-161·MTT-256      Frequency Response (for Normal)  
TCC-261·MTT-356      Frequency Response (for CrO<sub>2</sub> and Metal)
- Test Tape  
TCC-192·MTT-121      Cross Talk  
TCC-194·MTT-141      Channel Separation  
TCC-174A·MTT-255M      Azimuth adjustment (A-BEX)·(TEAC)
- Mirror cassette 12 μm padless  
TCC-902·MTT-902      Tape travel check

9. DISASSEMBLY

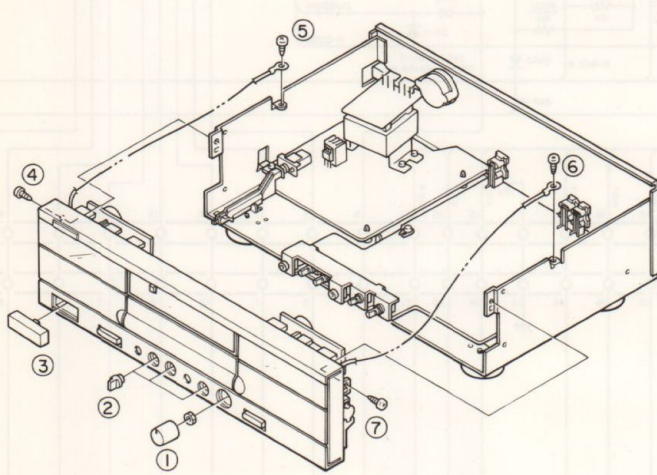
• Removing the top cover.  
Remove the 9 screws ① ~ ⑨.



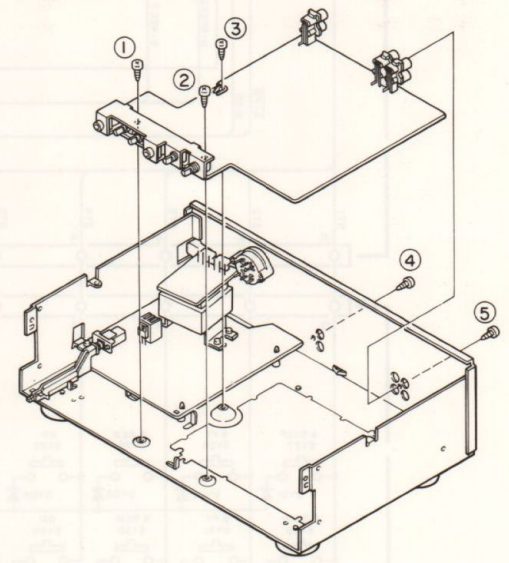
• Removing the mechanism  
Remove the 8 screws ① ~ ⑧.



• Removing the front panel  
1) Remove the 4 screws ④ ~ ⑦.  
2) Remove the Button ③ and Knobs ①, ②.



• Removing the main P.W. board  
1) Remove the 5 screws ① ~ ⑤.





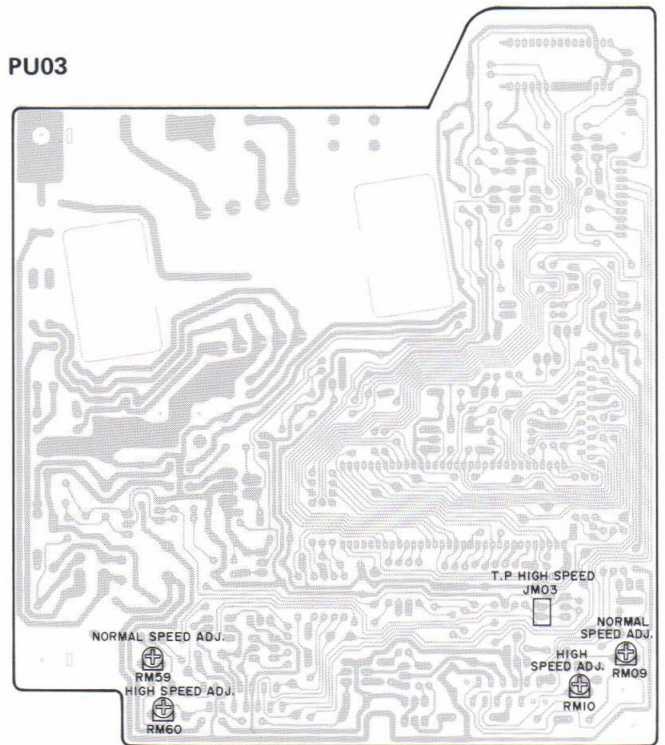
## 10. ELECTRICAL ADJUSTMENT

### Precautions before Adjustment

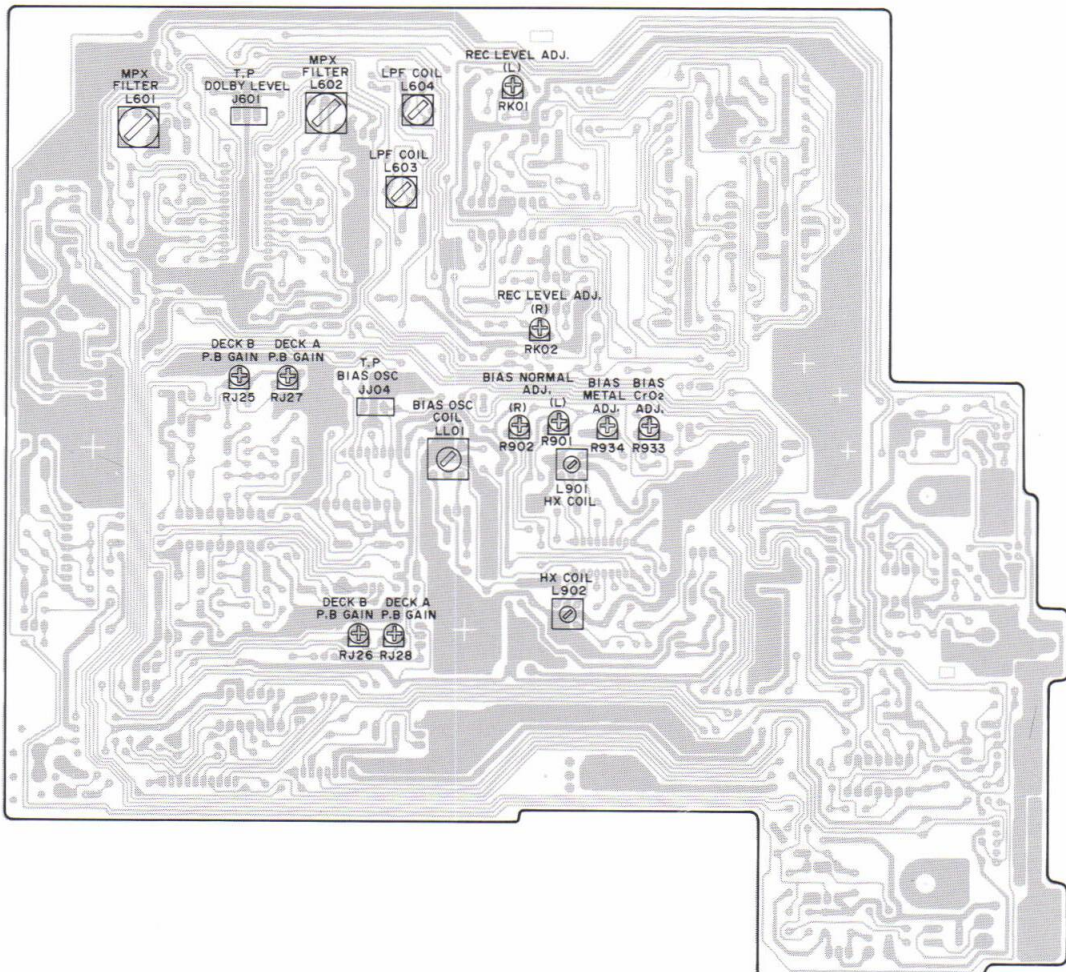
1. Before playing the test tape back, thoroughly demagnetize the heads, capstan and similar metal parts using an eraser as the test tape-recorded tone is easily erased.
2. Do not place the test tape on any measuring instrument.
3. Do not put the test tape near a place where the eraser is used.
4. Method of Demagnetization: — Turn the eraser power switch on at a remote position far away from the heads. Bring the eraser close to the heads, capstan and other parts to be demagnetized, and move it up and down four or five times to demagnetize. Slowly separate the eraser far away from the parts, and turn the power switch off.
5. Tools to be used shall not be magnetized. It is recommended to demagnetize tools occasionally using a demagnetizer.
6. Do not turn semi-fixed resistor more than needed.
7. Do not apply locking bond excessively.

### ADJUSTMENT POINT (Component Side)

PU03



PJ03





## 11. ELECTRICAL MEASUREMENTS AND ADJUSTMENTS

### General conditions

The following general conditions apply to the electrical measurements and adjustments, unless explicitly stated otherwise.

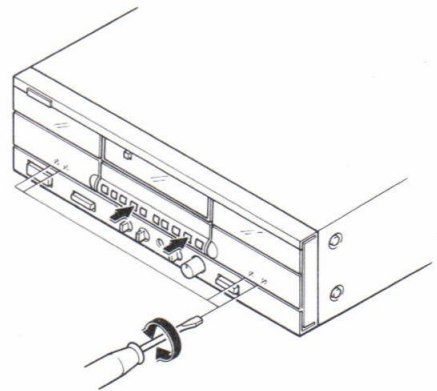
- Ambient temperature 20 to 25°C
- Dolby switch SS51 off
- The voltages have been measured relative to earth.
- The adjustment and measurement should be done for Deck A, as well as Deck B.

Adjustment	Cassette	Recorder in position	Apply signal to	Measure on	Read on	Adjust with	Value
Playback speed	TCC-112 MTT-111	PLAY Deck A High speed *a		JW01 (Line out)	Frequency Counter	RM10	5980 Hz } 6020 Hz
		PLAY Deck A Normal speed				RM09	2990 Hz } 3010 Hz
		PLAY Deck B High speed *a				RM60	5980 Hz } 6020 Hz
		PLAY Deck B Normal speed				RM59	2990 Hz } 3010 Hz
Head azimuth	TCC-174A MTT-255M	PLAY		JW01 (Line out)	VTVM	Head azimuth adjust screw *b	Max.
Playback output	TCC-130 MTT-150	PLAY *h		J601	mV-meter	Deck A RJ27 (L) RJ28 (R) Deck B RJ25 (L) RJ26 (R)	387.5 mV
Recording playback level	AC224	REC+PLAY	1 kHz 100 mV JW01 (Line in)	J601	mV-meter	RV01 *h	387.5 mV
		PLAY		J601	mV-meter	Deck B RK01 (L) RK02 (R)	387.5 mV
	AC-712 side 2 Metal cassette *c						
Recording playback frequency response	AC224 Normal cassette	REC+PLAY DOLBY-C	1 kHz 100 mV JW01 (Line in)	J601	mV-meter	RV01 *h	387.5 mV
			1 kHz, 10 kHz 100 mV–25 dB	–	–	–	–
		PLAY DOLBY-C		JW01 (Line out)	mV-meter	Deck B R901 (L) R902 (R)	Playback level differences of 1 kHz and 12.5 kHz is within 0±1.0 dB *d, e
		DOLBY-OFF *f					
		DOLBY-B *g					

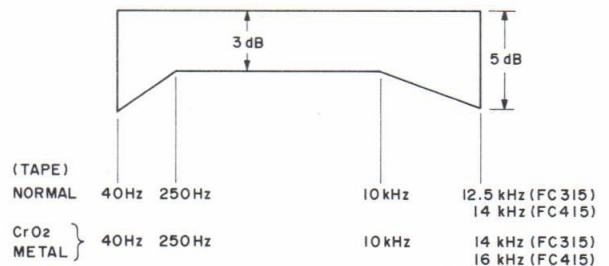


Adjustment	Cassette	Recorder in position	Apply signal to	Measure on	Read on	Adjust with	Value
Recording playback frequency response	AC513 CrO <sub>2</sub> cassette	REC+PLAY DOLBY-C	1 kHz 100 mV JW01 (Line in)	J601	mV-meter	RV01 *h	387.5 mV
			1 kHz, 10 kHz 100 mV-25 dB	-	-	-	-
		PLAY DOLBY-C		JW01 (Line out)	mV-meter	Deck B R933	Playback level differences of 1 kHz and 12.5 kHz is within 0±1.0 dB *e
		DOLBY-OFF *f					
		DOLBY-B *g					
		Metal cassette	REC+PLAY DOLBY-C	1 kHz 100 mV JW01 (Line in)	J601	mV-meter	RV01 *h
	1 kHz, 10 kHz 100 mV-25 dB			-	-	-	-
	PLAY DOLBY-C			JW01 (Line out)	mV-meter	Deck B R934	Playback level differences of 1 kHz and 12.5 kHz is within 0±1.0 dB *e
	DOLBY-OFF *f						
	DOLBY-B *g						

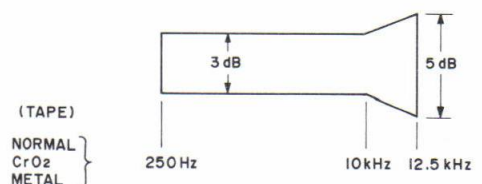
- \*a Prior to adjustment, please short-circuit the both terminals of JM03 then, it will be a high speed mode (9.5 cm/sec.).
- \*b
  - Remove the cassette case and retainer as per the figure and adjust the head azimuth.
  - If the peak level reads of the right and left channels are different, set the lower channel to maximum.
  - Be sure to adjust with the same section on the same side of the tape of both Deck A and Deck B.
  - After adjustment, be sure to lock the screws with bond.
- \*c Record/review the chromium cassette and metal cassette, then confirm the difference of level at recording and reviewing to be within 1 dB respectively.
- \*d When 1 kHz level difference in DOLBY C mode is 1 dB or more compared to the monitor level, adjust Deck B RK01(L), RK02(R) for the recording level adjustment previously, so that the level difference is within 1 dB.
- \*e After adjustment, record 1 kHz, 10 kHz and 12.5 kHz signals, and check that the playback level differences of these frequencies are as given on the right hand.
- \*f
  - Set the DOLBY switch to OFF, record 1 kHz, 10 kHz and 12.5 kHz signals, and check that the playback level differences of these frequencies are as given on the right hand.
  - With the DOLBY switch OFF, check that the L/R channel balance for 10 kHz is less than 3 dB.
- \*g Set the dolby switch to B, record 1 kHz, 10 kHz and 12.5 kHz signals, and check that the playback level differences of these frequencies are as given on the right hand.
- \*h Set the MIC VOL (RV02) to the minimum position.



DOLBY-OFF (4.75 cm/sec)



DOLBY-B, -C (4.75 cm/sec)





## ASSIGNMENT OF COMMON PARTS CODES.

### RESISTOR

**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

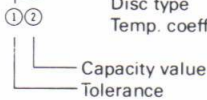
① Resistance value

0.1Ω...001	10Ω...100	1kΩ...102	100kΩ...104
0.5Ω...005	18Ω...180	2.7kΩ...272	680kΩ...684
1Ω...010	100Ω...101	10kΩ...103	1MΩ...105
6.8Ω...068	390Ω...391	22kΩ...223	4.7MΩ...475

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

### C\*\*\*: CERAMIC CAP.

(1) DD1 --- 370, Ceramic condenser  
Disc type  
Temp. coeff. P350 ~ N1000, 50V



#### Examples

① Tolerance (Capacity deviation)

±0.25pF...0
±0.5pF...1
±5%...5

\* Tolerance of COMMON PARTS handled here are as follows:

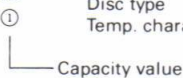
0.5pF ~ 5pF...±0.25pF  
6pF ~ 10pF...±0.5pF  
12pF ~ 560pF...±5%

② Capacity value

0.5pF...005	3pF...030	100pF...101
1pF...010	10pF...100	220pF...221
1.5pF...015	47pF...470	560pF...561

### C\*\*\*: CERAMIC CAP.

(1) DK16 --- 300, High dielectric constant ceramic condenser  
Disc type  
Temp. chara. 2B4, 50V



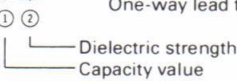
#### Example

② Capacity value

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

### C\*\*\*: ELECTROLY CAP. ( $\frac{\square}{\square}$ ), FILM CAP. ( $\frac{\square}{\square}$ )

(1) EA --- 10, Electrolytic condenser  
One-way lead type, Tolerance ±20%



#### Examples

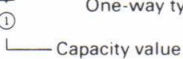
① Capacity value

0.1μF...104	4.7μF...475	100μF...107
0.33μF...334	10μF...106	330μF...337
1μF...105	22μF...226	1100μF...108
		2200μF...228

② Working voltage

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

(2) DF15 --- 350, Plastic film condenser  
One-way type, Mylar ±5% 50V



#### Examples

① Capacity value

0.001μF (1000pF)...102	0.1μF...104
0.0018μF...182	0.56μF...564
0.01μF...103	1μF...105
0.015μF...153	

## 12. ELECTRICAL PARTS LIST

REF. DESIG.	PART NO.	DESCRIPTION
<b>PJ03-MAIN CIRCUIT BOARD</b>		
<b>PJ03-CAPACITORS</b>		
CB01	4822 124 41188	Elect 0.68μF 50V
CB03	4822 122 40491	Ceramic 0.022μF +80% -20%
CB04	4822 122 40491	Ceramic 0.022μF +80% -20%
CB12	4822 122 40491	Ceramic 0.022μF +80% -20%
CG07	4822 122 40491	Ceramic 0.022μF +80% -20%
CJ05	4822 126 11071	Ceramic 330pF ±10%
CJ08		
CJ21	4822 122 40491	Ceramic 0.022μF +80% -20%
CJ22	4822 122 40491	Ceramic 0.022μF +80% -20%
CJ25	4822 122 40491	Ceramic 0.022μF +80% -20%
CJ57	4822 122 40491	Ceramic 0.022μF +80% -20%
CK07	4822 126 10734	Ceramic 100pF ±10%
CK08	4822 126 10734	Ceramic 100pF ±10%
CK09	4822 122 40522	Ceramic 220pF ±10%
CK10	4822 122 40522	Ceramic 220pF ±10%
CK13	4822 122 40491	Ceramic 0.022μF +80% -20%
CL04	4822 121 43774	Film 0.012μF ±10%
CR01	4822 122 40491	Ceramic 0.022μF +80% -20%
CS01	4822 122 40491	Ceramic 0.022μF +80% -20%
CS03		
CW01	4822 122 40491	Ceramic 0.022μF +80% -20%
CW15	4822 126 10409	Ceramic 560pF ±10%
CW16	4822 126 10409	Ceramic 560pF ±10%
C609	4822 124 23445	Elect 0.56μF 50V
C610	4822 124 23445	Elect 0.56μF 50V
C637	4822 126 11071	Ceramic 330pF ±10%
C639	4822 126 11071	Ceramic 330pF ±10%
C909	4822 126 10734	Ceramic 100pF ±10%
C910	4822 126 10734	Ceramic 100pF ±10%
C911	4822 122 40491	Ceramic 0.022μF +80% -20%
C912	4822 122 40491	Ceramic 0.022μF +80% -20%
C913	4822 121 43775	Film 560pF ±10%
C914	4822 121 43775	Film 560pF ±10%
C931	4822 122 40491	Ceramic 0.022μF +80% -20%
C932	4822 122 40491	Ceramic 0.022μF +80% -20%
C934	4822 122 32185	Ceramic 10pF ±0.5pF
C941	4822 122 40491	Ceramic 0.022μF +80% -20%
<b>PJ03-RESISTORS</b>		
RB07	4822 050 24701	470Ω ±5% ¼W, Metal
▲RG12	4822 111 90731	47Ω ±2% ¼W, Fuse
RJ25	4822 100 11351	10KΩ, Trimming
RJ28		
RJ38	4822 050 24701	470Ω ±5% ¼W, Metal
RJ65	4822 050 24701	470Ω ±5% ¼W, Metal
RK01	4822 100 11351	10KΩ, Trimming
RK02	4822 100 11351	10KΩ, Trimming
RK92	4822 050 24701	470Ω ±5% ¼W, Metal
RL02	4822 050 23308	3.3Ω ±5% ¼W, Metal
▲RL32	4822 113 90119	22Ω ±2% ¼W, Fuse
RV01	4822 100 30143	100KΩx2, Volume
RV02	4822 100 30142	10KΩx2, Volume
▲RX23	4822 116 60307	1Ω ±5% ¼W, Fuse
▲R642	4822 111 90731	47Ω ±2% ¼W, Fuse
R901	4822 100 11351	10KΩ, Trimming
R902	4822 100 11351	10KΩ, Trimming
R933	4822 100 11372	47KΩ, Trimming
R934	4822 100 11372	47KΩ, Trimming



REF. DESIG.	PART NO.	DESCRIPTION
<b>PJ03-SEMICONDUCTORS</b>		
DK02	4822 130 80839	Diode S5688G
DS01	4822 130 33305	Diode 1SS176, etc.
DS02	4822 130 33305	Diode 1SS176, etc.
DS11	4822 130 33305	Diode 1SS176, etc.
D901	4822 130 33305	Diode 1SS176, etc.
D902	4822 130 33305	Diode 1SS176, etc.
QB01	4822 209 83706	IC BA335PT
QB04	4822 130 61189	Transistor, Digital DTC114TS
QG01	4822 209 61187	IC BA15218
QG02	4822 130 43191	Transistor 2SC1741(Q, R)
QJ01	4822 209 62249	IC CXA1115BP
QJ03	4822 209 61667	IC $\mu$ PC1330HA
QJ11	4822 130 61188	Transistor, Digital DTC144TS
QJ14		
QJ51	4822 209 73064	IC NJM2068DD
QK01	4822 209 62252	IC CXA1198AP
QK02	4822 209 62253	IC MC14051B
QK03	4822 209 80655	IC NJM78L08A
QK11	4822 130 61723	Transistor, Digital DTC323TS
QK12	4822 130 61723	Transistor, Digital DTC323TS
QK13	4822 130 61189	Transistor, Digital DTC114TS
QK14	4822 130 61189	Transistor, Digital DTC114TS
QK15	4822 130 61227	Transistor, Digital DTA114ES
QL01	4822 209 61886	Transistor 2SD1292(Q, R)
QL31	4822 130 61725	Transistor 2SD2010
QL32	4822 130 60588	Transistor, Digital DTC114ES
QS01	4822 209 82966	IC 4081
QS02	4822 130 61188	Transistor, Digital DTC144TS
QS03	4822 130 60588	Transistor, Digital DTC114ES
QS11	4822 209 82966	IC 4081
QS12	4822 130 60588	Transistor, Digital DTC114ES
QS23	4822 130 61227	Transistor, Digital DTA114ES
QS24	4822 130 60588	Transistor, Digital DTC114ES
QW11	4822 130 61723	Transistor, Digital DTC323TS
QW12	4822 130 61723	Transistor, Digital DTC323TS
QX21	4822 130 61189	Transistor, Digital DTC114TS
QX22	4822 130 61189	Transistor, Digital DTC114TS
Q601	4822 209 62251	IC CXA1331
Q602	4822 130 61886	Transistor 2SD1292(Q, R)
Q633	4822 130 61188	Transistor, Digital DTC144TS
Q634	4822 130 61188	Transistor, Digital DTC144TS
Q901	4822 209 72874	IC $\mu$ PC1297CA
<b>PJ03-MISCELLANEOUS</b>		
JG01	4822 267 31132	Jack, Headphone
JR01	4822 266 30274	Terminal, 2P RCA Pin
JW01	4822 265 30397	Terminal, 4P RCA Pin
JW02	4822 267 31132	Jack, Mix Mic
LK01	4822 157 53521	Choke Coil, 22mH
LK02	4822 157 53521	Choke Coil, 22mH
LL01	4822 148 81074	OSC Transformer, 105KHz
LL31	4822 152 20622	Choke Coil, 2.2mH
L601	4822 157 52461	MPX Coil
L602	4822 157 52461	MPX Coil
L603	4822 157 62214	MPX Coil, Low Filter
L604	4822 157 62214	MPX Coil, Low Filter
L901	4822 157 60436	OSC Transformer, 105KHz
L902	4822 157 60436	OSC Transformer, 105KHz
SS01	4822 273 10208	Rotary Switch, Timer
SS51	4822 273 10208	Rotary Switch, NR

REF. DESIG.	PART NO.	DESCRIPTION
<b>PU03-LOGIC/POWER SUPPLY CIRCUIT BOARD</b>		
<b>PU03-CAPACITORS</b>		
CM01	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
CM02	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
CM56	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
CR21	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
C801	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
}		
C806	4822 122 40491	Ceramic 0.022 $\mu$ F +80% -20%
C812		
C814		
<b>PU03-RESISTORS</b>		
RM09	4822 100 20681	2.2K $\Omega$ , Trimming
RM10	4822 100 20681	2.2K $\Omega$ , Trimming
RM59	4822 100 20681	2.2K $\Omega$ , Trimming
RM60	4822 100 20681	2.2K $\Omega$ , Trimming
▲ R801	4822 116 21086	1 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W, Fusible
▲ R802	4822 116 60307	1 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W, Fusible
▲ R803	4822 115 90166	10 $\Omega$ $\pm$ 2% $\frac{1}{4}$ W, Fuse
<b>PU03-SEMICONDUCTORS</b>		
DM01	4822 130 33305	Diode 1SS176, etc.
DM02	4822 130 32508	Diode RL103E/DSF10C
DM03	4822 130 32508	Diode RL103E/DSF10C
DM04	4822 130 33305	Diode 1SS176, etc.
DM52	4822 130 32508	Diode RL103E/DSF10C
DM53	4822 130 32508	Diode RL103E/DSF10C
DU01	4822 130 33305	Diode 1SS176, etc.
DU02	4822 130 33305	Diode 1SS176, etc.
DU11	4822 130 33305	Diode 1SS176, etc.
}		
DU13	4822 130 33305	Diode 1SS176, etc.
DU51		
}	4822 130 32508	Diode RL103E/DSF10C
DU54		
DU55	4822 130 32508	Diode RL103E/DSF10C
▲ D801	4822 130 32508	Diode RL103E/DSF10C
}		
▲ D810	4822 130 33948	Zener RD5.6JB2/MTZJ5.6B
D811		
QM01	4822 130 61187	Transistor, Digital DTA144TS
QM02	4822 130 61725	Transistor 2SD2010
QM03	4822 130 61892	Transistor 2SD2144S(U,V)
}		
QM06	4822 130 60588	Transistor, Digital DTC114ES
QM07		
QM08		
QM51	4822 130 61187	Transistor, Digital DTA144TS
QM52	4822 130 61725	Transistor 2SD2C10
QM53	4822 130 61892	Transistor 2SD2144S(U, V)
}		
QM56	4822 130 61189	Transistor, Digital DTC114TS
QM58		
QR01	4822 130 42594	Transistor, Digital DTC144ES
QR21	4822 209 63044	IC LC6543H



REF. DESIG.	PART NO.	DESCRIPTION
QU01	4822 209 63043	IC HMCS408C 8K
QU02	4822 130 60588	Transistor, Digital DTC114ES
QU03	4822 130 60588	Transistor, Digital DTC114ES
QU04	4822 130 61189	Transistor, Digital DTC114TS
QU06 }	4822 130 61189	Transistor, Digital DTC114TS
QU09		
QU10	4822 130 61227	Transistor, Digital DTA114ES
QU11	4822 130 61227	Transistor, Digital DTA114ES
QU12	4822 130 61189	Transistor, Digital DTC114TS
QU13	4822 130 61189	Transistor, Digital DTC114TS
QU51	4822 130 61227	Transistor, Digital DTA114ES
QU52	4822 130 61227	Transistor, Digital DTA114ES
QU53	4822 130 60588	Transistor, Digital DTC114ES
QU54	4822 130 61892	Transistor 2SD2144S(U, V)
QU55	4822 130 61227	Transistor, Digital DTA114ES
▲ Q801	4822 209 82829	IC NJM78M15FA
▲ Q802	4822 209 70385	IC L78MR05
		<b>PU03-MISCELLANEOUS</b>
XR02	4822 242 72223	Resonator, 4.00MHz
XU01	4822 242 72223	Resonator, 4.00MHz
▲ S801	4822 276 11816	Push Switch, Power
▲ L801	4822 146 21581	Power Transformer [U]
		<b>PU63-POWER TRANSFORMER CIRCUIT BOARD (/01B/02B/07B)</b>
▲ L801	4822 146 21571	Power Transformer /02B/07B
	4822 146 21572	Power Transformer /01B
		<b>PX03-KEY-SW/LED METER CIRCUIT BOARD</b>
CX03	4822 124 21899	Elect Cap. 4.7μF 25V
CX04	4822 124 21899	Elect Cap. 4.7μF 25V
CX05	4822 124 21899	Elect Cap. 4.7μF 25V
DX01	4822 130 80326	L.E.D. LT3D8B (RED)
DX02	4822 130 80326	L.E.D. LT3D8B (RED)
DX03 }	4822 130 82365	L.E.D. LT5K8B (GRN)
DX06		
DY01 }	4822 130 33305	Diode 1SS176, etc.
DY15		
DY21	4822 130 80326	L.E.D. LT3D8B (RED)
DY22	4822 130 81715	L.E.D. LT3K44B (GRN)
DY23	4822 130 81714	L.E.D. LT3H44B (YEL)
DY29	4822 130 81715	L.E.D. LT3K44B (GRN)
DY32	4822 130 81715	L.E.D. LT3K44B (GRN)
DY33	4822 130 81715	L.E.D. LT3K44B (GRN)
DY38	4822 130 81715	L.E.D. LT3K44B (GRN)
DY40	4822 130 33305	Diode 1SS176, etc.
DY41	4822 130 33305	Diode 1SS176, etc.
DY45	4822 130 33305	Diode 1SS176, etc.
DY51	4822 130 81715	L.E.D. LT3K44B (GRN)
DY53	4822 130 81715	L.E.D. LT3K44B (GRN)
DY71	4822 130 80326	L.E.D. LT3D8B (RED)
DY72	4822 130 81715	L.E.D. LT3K44B (GRN)
DY73	4822 130 81715	L.E.D. LT3K44B (GRN)
QX01	4822 209 63039	IC IR2E24

REF. DESIG.	PART NO.	DESCRIPTION
SY21 }	4822 276 12455	Push Switch, Tact
SY33		
SY38	4822 276 12455	Push Switch, Tact
SY45	4822 277 30867	Slide Switch, Reverse Mode
SY51	4822 276 12455	Push Switch, Tact
SY52	4822 276 12455	Push Switch, Tact
SY53	4822 276 12455	Push Switch, Tact

**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.