



Service Manual

Nakamichi

ST-7 ST-7E

AM/FM Stereo Tuner



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1. GENERAL

1.1. Packing Materials, Owner's Manual, and Auxiliary Parts

<u>Part No.</u>	<u>Description</u>	<u>Q'ty</u>
OF03865A	Carton Box ST-7	1
OF03866B	Carton Box ST-7E	1
OF03863A	Packing L	1
OF03864A	Packing R	1
OD04527A	Owner's Manual (English)	1
OD04526A	Owner's Manual (English/German/French)	1
OB90069A	AM Loop Antenna	1
OB90070A	AM Loop Antenna Holder for wall mounting	1

2. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

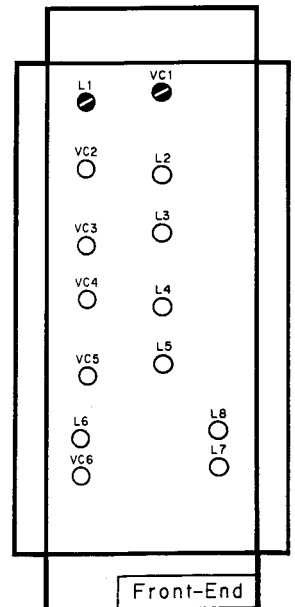
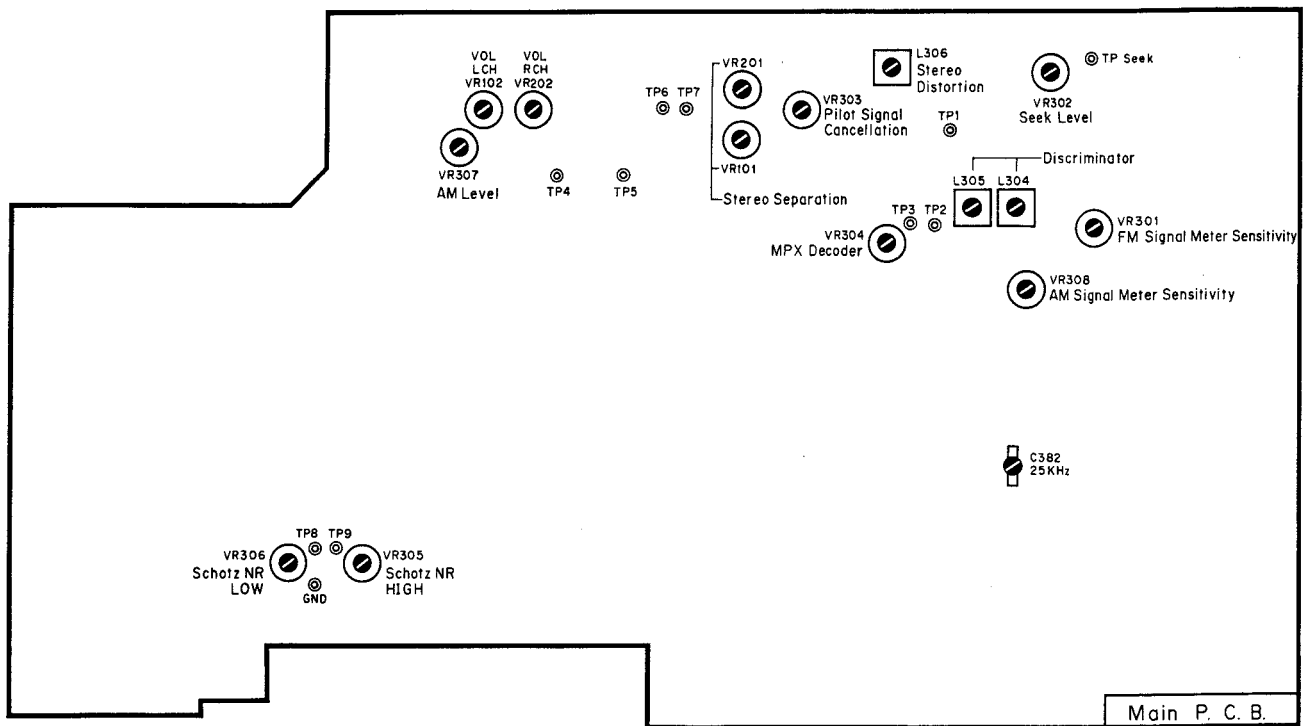



Fig. 2

3. ELECTRICAL ADJUSTMENT

Note: Adjustment should be made in a shielded room in principle.

3.1. FM Adjustment

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Preliminary Step				<ol style="list-style-type: none"> Connect an FM Generator to the FM Antenna Input Terminal of the ST-7/ST-7E. Set the FM Generator as follows (either Stereo or Mono mode): The FM Generator should be set as follows unless otherwise specified. <ul style="list-style-type: none"> Stereo <ul style="list-style-type: none"> Frequency: 93 MHz Modulation: <ul style="list-style-type: none"> ST-7 (U.S.A. & Canada) <ul style="list-style-type: none"> Audio -- 1 kHz 90% Pilot -- 19 kHz 10% (1 kHz signal: L=R) ST-7 (Australia) & ST-7E <ul style="list-style-type: none"> Audio -- 1 kHz 50% Pilot -- 19 kHz 10% (1 kHz signal: L=R) RF Level: 65 dBf Mono <ul style="list-style-type: none"> Frequency: 93 MHz Modulation: <ul style="list-style-type: none"> ST-7 (U.S.A. & Canada) <ul style="list-style-type: none"> Audio -- 1 kHz 100% ST-7 (Australia) & ST-7E <ul style="list-style-type: none"> Audio -- 1 kHz 60% RF Level: 65 dBf Set the Output Level controls on the rear panel at maximum.
2	25 kHz Adjustment	Frequency Counter to Pin 24 of IC310 (TC9147BP) on Main P.C.B.		Main P.C.B. C382	<ol style="list-style-type: none"> Short pins 36 and 41 of IC310 (TC9147BP) on the Main P.C.B. Ass'y. Adjust trimmer capacitor C382 to obtain 25000.5 Hz $\pm 0.4/-0.5$ Hz on the frequency counter. Remove short between pins 36 and 41 of IC310.
3	Monophonic Sensitivity Adjustment	Oscilloscope, VTVM and Distortion Meter to Output Jacks	FM Generator Mono ST-7/ST-7E FM Mute - OFF Seek Level - 20 dBf Mode - ST Meter - Signal Schotz NR - OFF	FM Front-end L1, VC1	<ol style="list-style-type: none"> Set the frequency of the FM Generator to 90 MHz and tune the ST-7/ST-7E. Turn L1 to obtain minimum distortion and maximum output level. Decrease the RF Level of the FM Generator and repeat above 2 to perform precise adjustment. Set the frequency of the FM Generator to 106 MHz and tune the ST-7/ST-7E. Adjust VC1 to obtain minimum distortion and maximum output level. Decrease the RF level and repeat above 5 to perform precise adjustment. Repeat above 2 to 6 two or three times. <p>Note: Do not turn other coils or trimmer capacitors on the Front-end. However, if distortion is not small enough, finely adjust L2 - L5 and VC2 - VC5 on the Front-end till satisfactory result is obtained. (Set the frequency to 90 MHz for adjusting L2 - L5 and to 106 MHz for VC2 - VC5.)</p>

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
4	Discriminator Alignment	DC Voltmeter across TP1 and TP2, and Distortion Meter to Output Jack	FM Generator Mono ST-7/ST-7E FM Mute - OFF Seek Level - 20 dBf Mode - ST Meter - Signal Schotz NR - OFF	Main P.C.B. L304, L305	1. Adjust L304 to obtain 0 V \pm 20 mV on the DC voltmeter. 2. Adjust L305 to obtain minimum distortion. 3. Repeat above 1 and 2 two or three times.
5	MPX Decoder Adjustment	Frequency Counter to TP3	FM Generator Stereo ST-7/ST-7E Same as above	Main P.C.B. VR304	1. Cut the 1 kHz audio signals of the FM Generator to provide only 19 kHz pilot signal. 2. Adjust VR304 to obtain 76 kHz \pm 50 Hz on the frequency counter.
6	Pilot Signal Cancellation Adjustment	Oscilloscope across TP6 and TP7	FM Generator Stereo ST-7/ST-7E FM Mute - ON Seek Level - 20 dBf Mode - ST Meter - Signal Schotz NR - OFF	Main P.C.B. VR303	1. Cut the 1 kHz audio signals of the FM Generator to provide only 19 kHz pilot signal. 2. Adjust VR303 so that the waveform on the oscilloscope is minimized in amplitude. 
7	Stereo Distortion Adjustment	Distortion Meter and VTVM to Output Jacks	FM Generator Stereo ST-7/ST-7E Same as above	Main P.C.B. L306	With decreasing the RF level of the FM Generator gradually, adjust L306 (yellow top) to obtain minimum distortion and maximum output level on both channels.
8	Level Adjustment	VTVM to TP4, TP5	FM Generator Mono ST-7/ST-7E Same as above	Main P.C.B. VR102 VR202	Adjust VR102 (VR202) to obtain 550 mV on the VTVM.
9	Stereo Separation Adjustment	VTVM to Output Jack	FM Generator Stereo ST-7/ST-7E Same as above	Main P.C.B. VR101 VR201	1. Cut the R channel 1 kHz audio signal of the FM Generator to provide only L channel signal. Adjust VR201 to obtain minimum R channel output level on the VTVM. 2. Cut the L channel 1 kHz audio signal to provide only R channel signal. Adjust VR101 to obtain minimum L channel output level on the VTVM.
10	FM Signal Meter Sensitivity Adjustment	None	FM Generator Mono ST-7/ST-7E Same as above	Main P.C.B. VR301	1. Set the RF level of the FM Generator to 69 dBf. 2. Adjust VR301 so that all figures (1 - 5) on the Signal Meter light up.

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
11	Seek Level Adjustment	None	FM Generator Stereo ST-7/ST-7E FM Mute - ON Seek Level - 40 dBf/20 dBf Mode - ST Meter - Signal Schotz NR - OFF	Main P.C.B. VR302	<ol style="list-style-type: none"> 1. Connect TPseek (the pin with yellow wire by VR302) to GND. 2. Turn VR302 counterclockwise until the Lock Indicator on the FM/AM Indicator goes out. 3. Slowly turn VR302 clockwise to find the position where the Lock Indicator starts illuminating. 4. Remove GND of TPseek. 5. Press the Seek button to check for accurate seek operation for the RF level range of the FM Generator from 38 to 42 dBf. <p>If satisfactory results are not obtained repeat above 1 through 5. Note: Turning VR302 clockwise causes the seek operation to be stopped in lower RF level.</p>
12	Schotz NR Adjustment	Oscilloscope to TP8, TP9	FM Generator Stereo ST-7/ST-7E FM Mute - ON Seek Level - 20 dBf Mode - ST Meter - Signal Schotz NR - ON/OFF	Main P.C.B. VR305 VR306	<ol style="list-style-type: none"> 1. Set the RF level of the FM Generator to 59 dBf and cut the R channel 1 kHz audio signal. 2. Set the oscilloscope to DC input mode and connect it to TP9. 3. Adjust VR305 to obtain maximum DC level on the oscilloscope. 4. Set the RF level to 30 dBf and connect the oscilloscope to TP8. 5. Turn VR306 and check that the level on the oscilloscope changes from 0 V to approx. 5.5 V. Next, slowly turn VR306 to obtain 3.9 V at TP8. 6. Set the RF level to 45 dBf and cut the 1 kHz audio signals. 7. With switching ON and OFF the Schotz NR switch, check that the noise to signal ratio is improved more than 6 dB in Schotz NR ON mode. <p>If not, repeat steps 1 through 6.</p>

3.2. AM Adjustment

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Level Adjustment	VTVM to Output Jack	AM Generator 1000 kHz 75 dB μ ST-7/ST-7E AM Mode	Main P.C.B. VR307	Adjust VR307 to obtain 900 mV on the VTVM.
2	AM Signal Meter Sensitivity Adjustment	None	AM Generator 1000 kHz 75 dB μ ST-7/ST-7E Meter - Signal	Main P.C.B. VR308	Adjust VR308 so that all figures (1 - 5) on the Signal Meter light up.

4. MECHANISM ASS'Y AND PARTS LIST

4.1. Synthesis

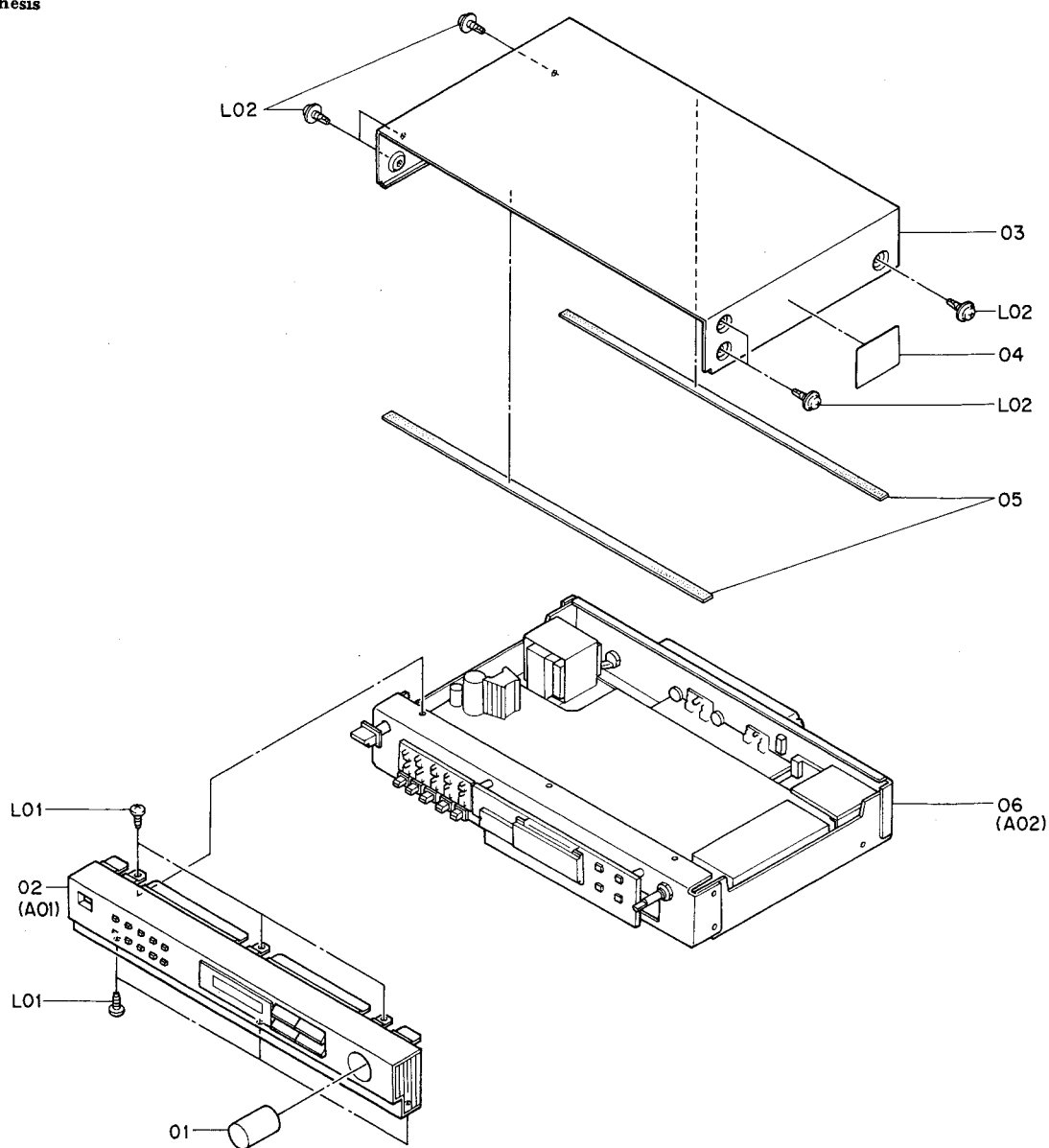


Fig. 4.1

Schematic Ref. No.	Part No.	Description	Qty
		Synthesis Serial No.: C10401001 -	
01	HA04818A	Tuning Knob Ass'y	1
02	HA04816A	Front Panel Ass'y ST-7	1
	HA04817A	Front Panel Ass'y ST-7E	1
03	OH04668A	Top Cover	1
04	OM04377B	Caution Label	1
05	OJ05002C	Top Cover Himelton	2
06	—	Chassis Ass'y	1
L01	OE03283A	ST 3x6 ⊕ Binding (Black Chromate)	6
L02	OE03278A	BT 3x8 ⊕ Pan (Black Chromate)	6

4.2. Front Panel Ass'y (A01)

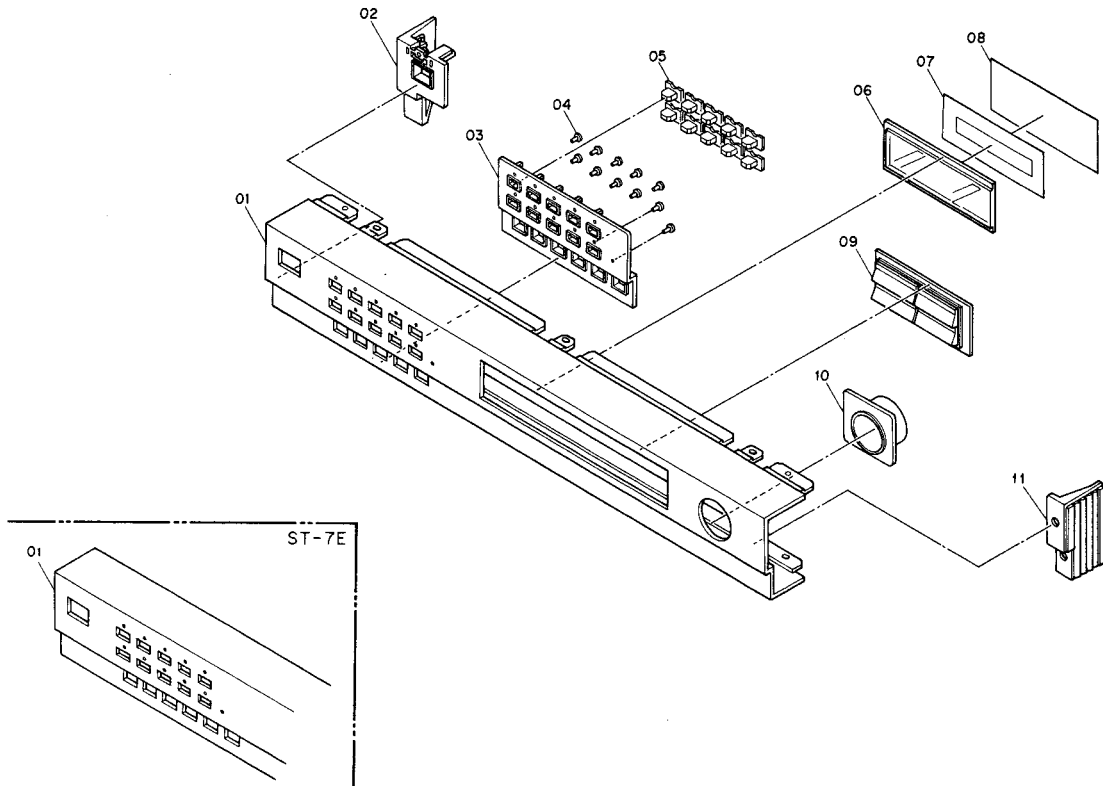


Fig. 4.2

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01	HA04816A	Front Panel Ass'y ST-7	1	10	OB50043A	Power Transformer ST-7 (Australia) & ST-7E	1
	HA04817A	Front Panel Ass'y ST-7E Serial No.: C10401001 -	1		HA04810A	Rear Panel Ass'y ST-7 (U.S.A.)	1
01	OH04620B	Front Panel ST-7	1	HA04814A	Rear Panel Ass'y ST-7 (Canada)	1	
02	OH04621B	Front Panel ST-7E	1	HA04812A	Rear Panel Ass'y ST-7 (Australia)	1	
03	OJ04997A	Station Button Base	1	HA04811A	Rear Panel Ass'y ST-7E (220V Class 2)	1	
04	OH04639B	Lens	11	HA04813A	Rear Panel Ass'y ST-7E (UK)	1	
05	OH04644A	Station Button	10	OJ05019A	Collar Bushing NB-300	4	
06	OH04647A	FL Indicator Lens	1	BA05691A	Main P.C.B. Ass'y ST-7 (U.S.A. & Canada)	1	
07	OJ04996A	FL Indicator Filter A	1	BA05693A	Main P.C.B. Ass'y ST-7 (Australia) & ST-7E	1	
08	OJ04995A	FL Indicator Filter B	1				
09	HA04800A	Up Button Ass'y	1	13	OJ05020A	Collar Bushing NA-310	4
10	OH04648B	Volume Knob Holder	1	14	OJ05027A	Earth Spacer	1
11	OH04641A	Side Panel R	1	15	OJ05005A	P.C.B. Cushion	1
A02	-	Chassis Ass'y Serial No.: C10401001 -	1	16	BA05735A	AM P.C.B. Ass'y	1
				17	OJ05018A	AM P.C.B. Holder	1
01	BA05708A	Display P.C.B. Ass'y ST-7 (U.S.A. & Canada)	1	18	OH04626B	Main Chassis	1
	BA05709A	Display P.C.B. Ass'y ST-7 (Australia) & ST-7E	1	19	OB91009A	Front-end FD812	1
02	OJ04988A	Front Chassis	1	20	OJ03564A	Leg T-S	1
03	BA05711A	Incremental Rotary Encoder Ass'y	1	21	OB90019A	SK Binder	11
04	BA05697A	Memory Switch P.C.B. Ass'y	1	22	OJ05054A	P.C.B. Himelton	1
05	HA04799B	Power Button Ass'y	1	23	OB70059A	Wire ST-7E	1
06	BA05701A	Power Switch P.C.B. Ass'y ST-7 (U.S.A. & Canada)	1	L01	OE03279A	ST3x18 @ Binding (Black Chromate)	12
	BA05702A	Power Switch P.C.B. Ass'y ST-7 (Australia) & ST-7E	1	L02	-	Nut	1
07	OH04643A	Push Button ST-7	5	L03	-	Washer	1
	OH04643A	Push Button ST-7E	6	L04	OE03317A	ST3x6 @ Binding	10
08	BA05698A	Function Switch P.C.B. Ass'y ST-7	1	L05	OE00612A	M3x6 @ Pan (2A)	4
	BA05699A	Function Switch P.C.B. Ass'y ST-7E	1	L06	OJ00896A	M3x6 @ Binding	1
09	OB50042A	Power Transformer ST-7 (U.S.A. & Canada)	1	L07	OJ05057A	Fiber Washer 3.4x7x0.5	1
				L08	OE00172A	Washer 3mm Toothed Lock	2
				L09	OE00037A	Earth Lug B-5	2
				L10	OE03283A	ST3x6 @ Binding (Black Chromate)	10
				L11	OE00865A	BT 3x10 @ Binding	4
				L12	OE00907A	ST4x8 @ Binding (Black Chromate)	2

4.3. Chassis Ass'y (A02)

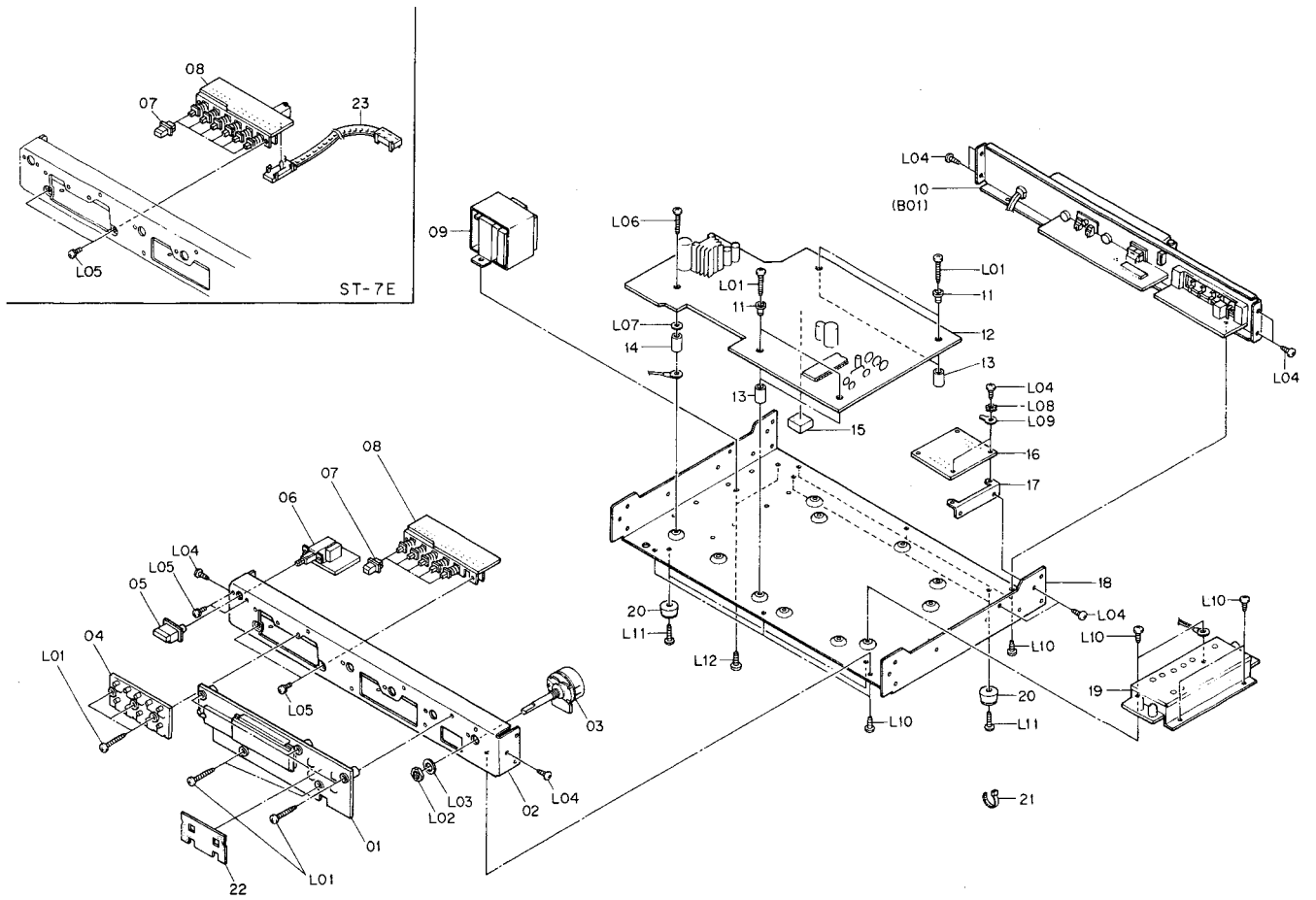


Fig. 4.3

4.4. Rear Panel Ass'y (B01)

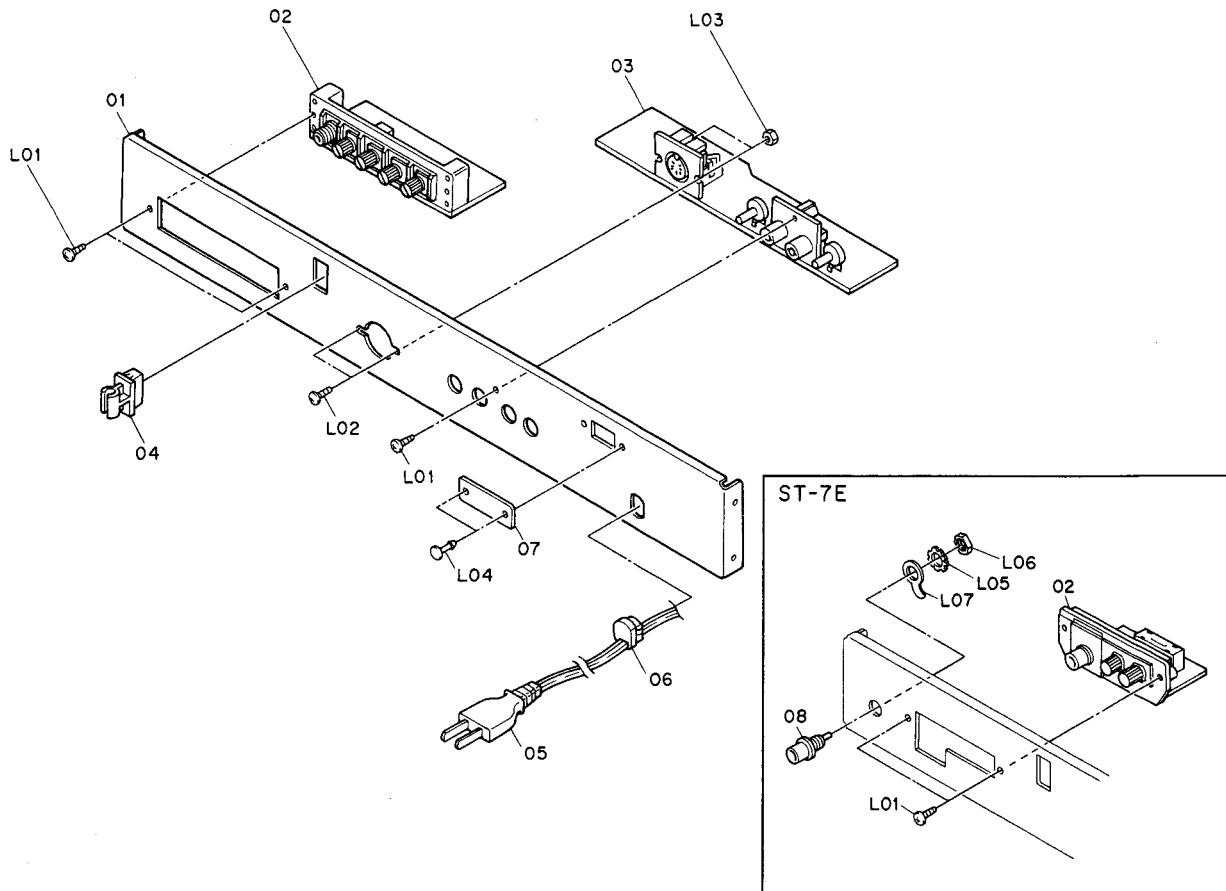


Fig. 4.4

Schematic Ref. No.	Part No.	Description	Qty
B01	HA04810A	Rear Panel Ass'y ST-7 (U.S.A.)	1
	HA04814A	Rear Panel Ass'y ST-7 (Canada)	1
	HA04812A	Rear Panel Ass'y ST-7 (Australia)	1
	HA04811A	Rear Panel Ass'y ST-7E (220V Class 2)	1
	HA04813A	Rear Panel Ass'y ST-7E (UK) Serial No.: C10401001 -	1
01	OH04656A	Rear Panel Ass'y ST-7	1
	OH04657B	Rear Panel Ass'y ST-7E	1
02	BA05696A	Antenna P.C.B. Ass'y ST-7	1
	BA05695A	Antenna P.C.B. Ass'y ST-7E	1
03	BA05694A	Pin Jack P.C.B. Ass'y	1
04	OB90071A	AM Loop Antenna Holder	1
05	OB08533A	Power Cord ST-7 (U.S.A.)	1
	OB08504A	Power Cord ST-7 (Canada)	1
	OB05241A	Power Cord ST-7 (Australia)	1
	OB08093U	Power Cord ST-7E (220V Class 2)	1
	OB08348A	Power Cord ST-7E (UK)	1
06	OB08037U	Cord Bushing C ST-7 (U.S.A. & Australia) & ST-7E (220V Class 2)	1
	OB08351A	Cord Bushing 4K-4 ST-7 (Canada) & ST-7E (UK)	1
	07	OJ04601B	Switch Cover
08	OB90079A	Antenna Plug ST-7E	1
L01	OE00921A	BT 3x8 ♂ Binding (Black Chromate)	3
L02	OE00818A	M3x8 ♂ Binding (Black Chromate)	2
L03	OE00507A	Nut Hex, M3	2
L04	OB08583A	Plastic Rivet	2
L05	OE03284A	Washer 10mm Toothed Lock	1
L06	—	Nut for Antenna Plug ST-7E	(1)
L07	—	Earth Lug for Antenna Plug ST-7E	(1)

5. MOUNTING DIAGRAMS AND PARTS LIST

Notes: 1. Mounting diagram shows a dip side view of the printed circuit board.

2. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.

3. Following transistors are interchangeable with each other.

a. 2SA733, 2SA608SP, 2SA1048, 2SA1175

b. 2SC945, 2SC536SP, 2SC2458, 2SC2785

4. Abbreviation for part name:

TR — Transistor, SiD — Silicon Diode, GD — Germanium Diode, ZD — Zener Diode

RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor

CE — Electrolytic Capacitor, CM — Mylar Capacitor, CC — Ceramic Capacitor, CP — PP Capacitor,

CT — Tantalum Capacitor, CF — Film Capacitor, C — Mica Capacitor

5.1. Power Switch P.C.B. Ass'y

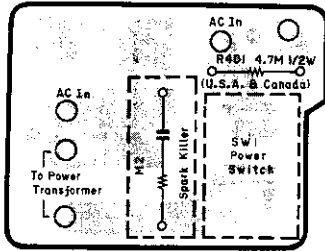


Fig. 5.1

5.2. Antenna P.C.B. Ass'y

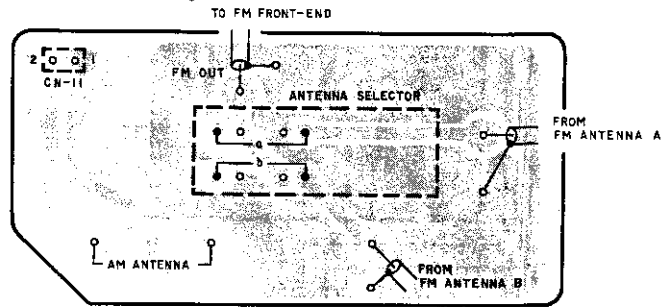


Fig. 5.2.1 For ST-7E

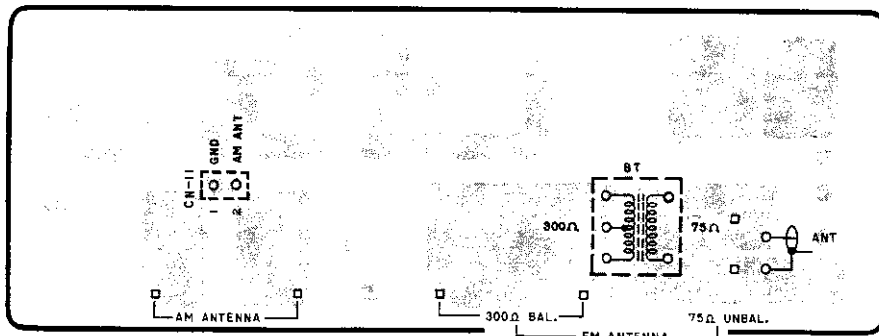


Fig. 5.2.2 For ST-7

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	
R401	BA05701A	Power Switch P.C.B. Ass'y ST-7 (U.S.A. & Canada)	CN11	BA05695A	Antenna P.C.B. Ass'y ST-7E	
	BA05702A	Power Switch P.C.B. Ass'y ST-7 (Australia) & ST-7E		OB60212A	Antenna P.C.B. 2P-T Post	
	OB60203B	Power Switch P.C.B. RK 4.7M 1/2W J		OB81223A	Antenna Terminal (1)	
	OB20057A	ST-7 (U.S.A. & Canada)		OB90078A	Antenna Terminal (1)	
SW1	OB70002A	Power Switch	BT	OB80081A	Antenna Cable (1)	
M2	OB08342A	Spark Killer ST-7 (U.S.A. & Canada)		OB90019A	SK Binder (1)	
M2	OB08445A	Spark Killer ST-7 (Australia) & ST-7E		CN11	OB70058A	Antenna Selector (1)
	OB90059A	Spark Killer Cover ST-7 (Australia) & ST-7E			BA05696A	Antenna P.C.B. Ass'y ST-7
	OB90019A	SK Binder (3)	OB60211B		Antenna P.C.B.	
	OE00752A	Eyelet 2x3 (2)	OB50045A		Balun Transformer	
	OB81409A	Switch GND ST-7 (U.S.A. & Canada) (1)		OB81223A	2P-T Post	
				OB90072A	Antenna Terminal (1)	
				OB90019A	SK Binder (1)	

5.3. Memory Switch P.C.B. Ass'y

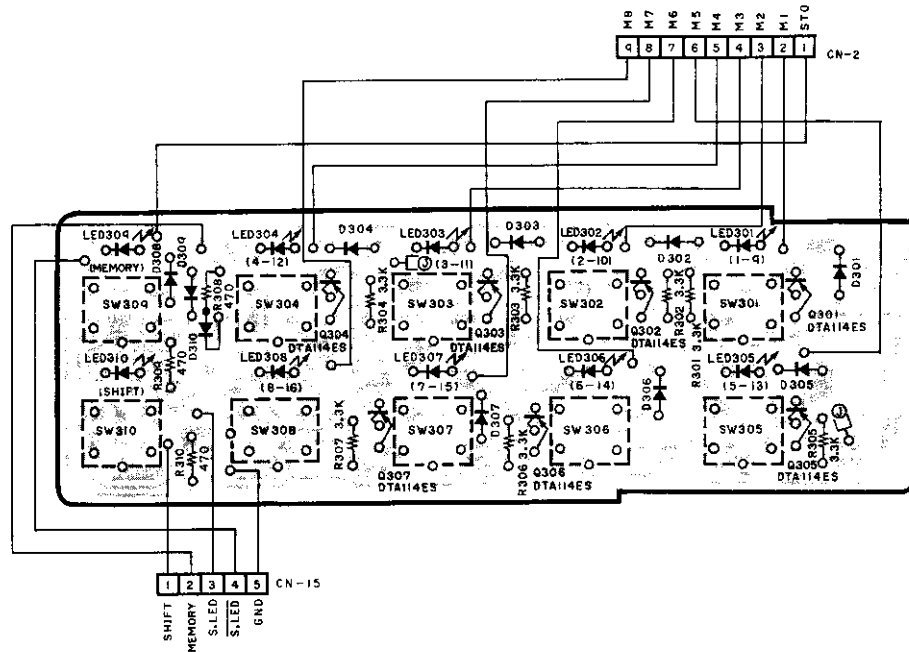


Fig. 5.3

5.4. Function Switch P.C.B. Ass'y

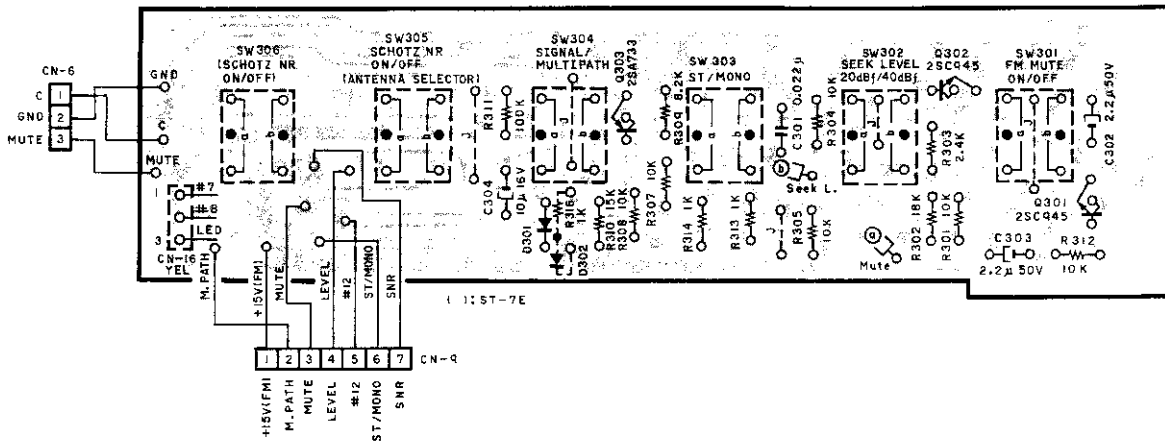


Fig. 5.4

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
Q301-307 LED301-310 D301-310 R301-307 R308,309 310 SW301-310 CN2 CN15	BA05697A	Memory Switch P.C.B. Ass'y	Q301,302 Q303 D301,302 R301,304 305,307 308,312 R302 R303 R309 R310 R311	BA05698A	Function Switch P.C.B. Ass'y ST-7	R313,314	OB09677A	RK 1K 1/6W J
	OB60207A	Memory Switch P.C.B.		BA05699A	Function Switch P.C.B. Ass'y ST-7E	C301	OB09860A	CM 0.022μ 50V J
	OB10058A	TR DTA114ES		OB60206B	Function Switch P.C.B.	C302,303	OB09372A	CE 2.2μ 50V
	OB12215A	LED SLP202C Green		OB10025A	TR 2SC945L (P,K)	C304	OB40009A	CE 10μ 16V
	OB06398A	SiD 1SS176		OB06155A	TR 2SA733 (P)	CN6	OB81354B	3P Connector
	OB09689A	RK 3.3K 1/6W J		OB06398A	SiD 1SS176	CN9	OB81367A	7P Connector
	OB09669A	RK 470 1/6W J		OB09701A	RK 10K 1/6W J	CN16	OB81186A	3P-S Post
	OB70043A	Tact Switch		OB09707A	RK 18K 1/6W J	SW301-305	OB70040A	Push Switch 5-Key ST-7
	OB81362A	9P Connector		OB09705A	RK 15K 1/6W J	SW301-306	OB70041A	Push Switch 6-Key ST-7E
	OB81356B	5P Connector		OB09725A	RK 100K 1/6W J			
OJ04703A	Bushing TA-300 (3)							
OJ05008A	Bushing TB-310 (3)							
OJ05001A	Reflector (10)							

5.5. Pin Jack P.C.B. Ass'y

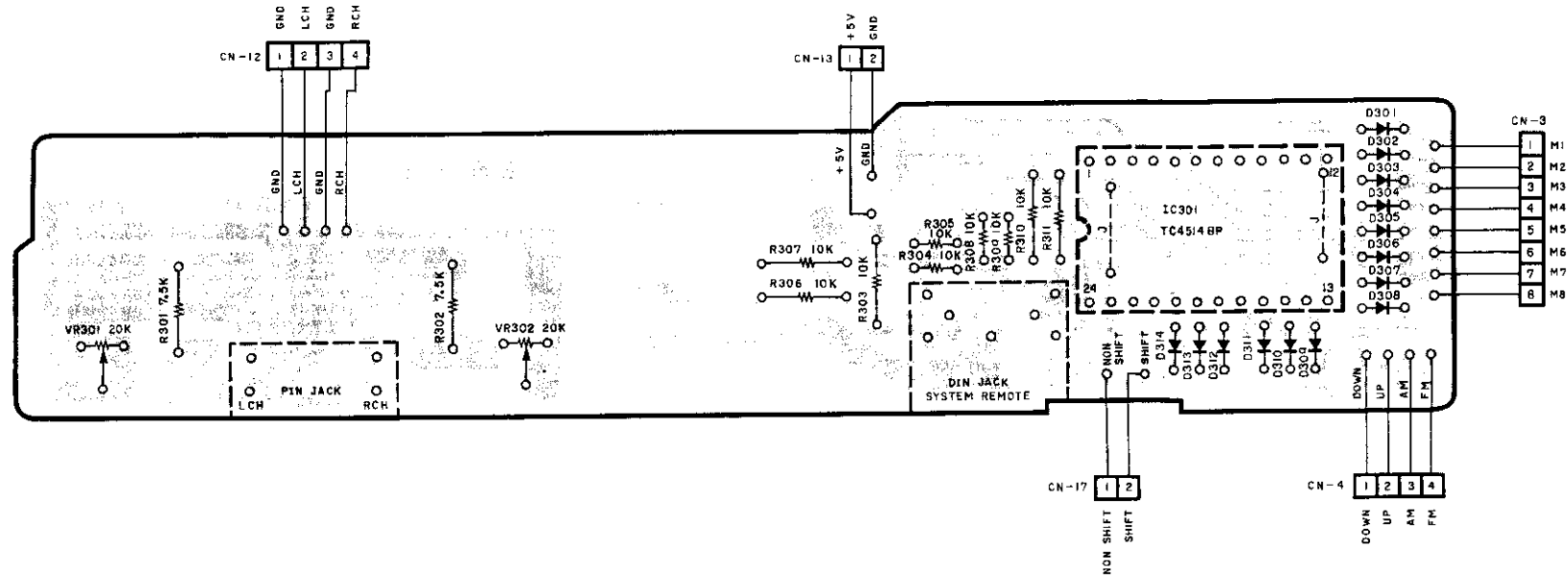


Fig. 5.5

5.6. Display P.C.B. Ass'y

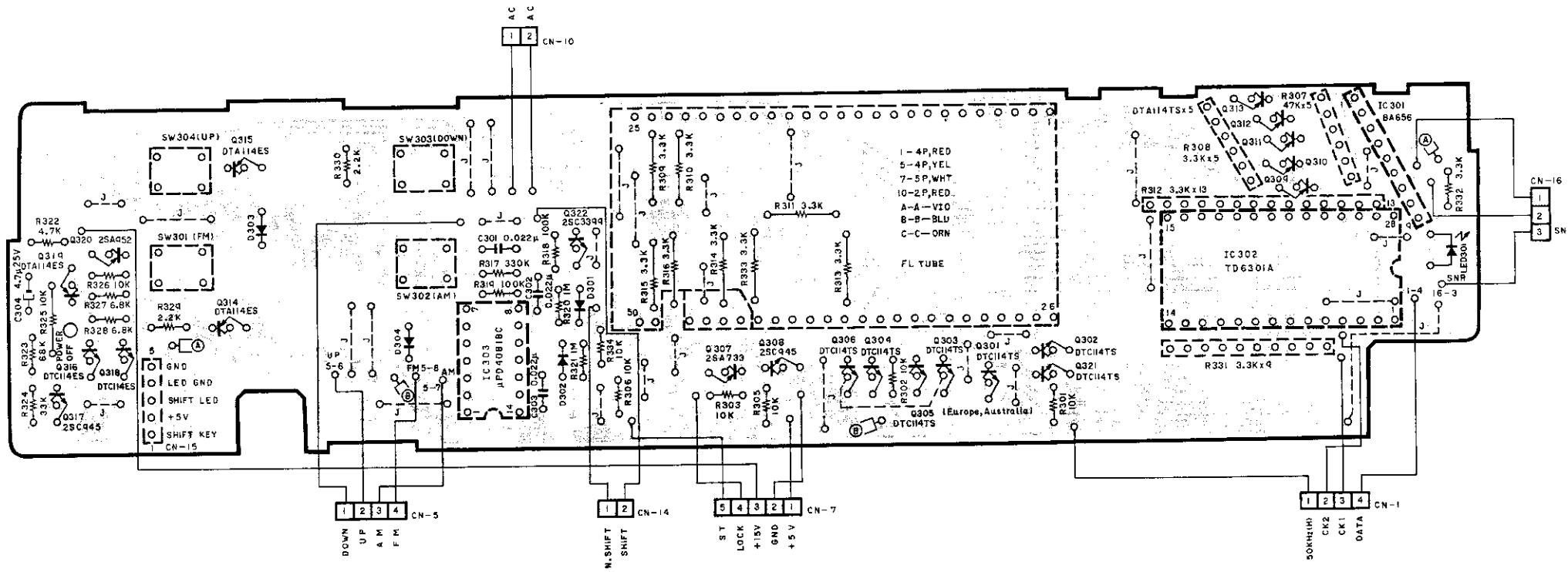


Fig. 5.6

Schematic Ref. No.	Part No.	Description
	BA05694A	Pin Jack P.C.B. Ass'y
IC301	OB60205B	Pin Jack P.C.B. IC M4514BP
D301-314	OB06398A	SiD 1SS176
VR301,302	OB32042A	Potentiometer 20K
R301,302	OB09183A	RK 7.5K 1/4W J
R303,306	OB01888A	RK 10K 1/4W J
307,310		
311		
R304,305	OB09701A	RK 10K 1/6W J
308,309		
CN3	OB81363B	8P Connector
	OB81358B	4P Connector (1)
	OB81360A	4P Connector (1)
	OB82410B	2P Connector (1)
	OB81408B	2P Connector (1)
	OB81350A	7P DIN Socket (1)
	OB81351A	2P Pin Jack (1)
	BA05708A	Display P.C.B. Ass'y ST-7 (U.S.A. & Canada)
	BA05709A	Display P.C.B. Ass'y ST-7 (Australia) & ST-7E
IC301	OB60208B	Display P.C.B. IC BA656
IC302	OB11162A	IC TD6301A
IC303	OB11160A	IC μPD4081BC
Q301-306	OB10104A	TR DTC114TS
321		
Q307	OB06013A	TR 2SA733 (P,Q)
Q308,317	OB01872A	TR 2SC945L (P,Q)
Q309-313	OB10057A	TR DTA114TS
Q314,315	OB10058A	TR DTA114ES
319		
Q316,318	OB10068A	TR DTC114ES
Q320	OB10097A	TR 2SA952 (K,L)
Q322	OB10007A	TR 2SC3399
LED301	OB12215A	LED SLP202C Green
D301,302	OB06398A	SiD 1SS176
303,304		
R301-303	OB09701A	RK 10K 1/6W J
305,306		
326,334		
R307	OB21006A	R Network 47Kx5
R308	OB21007A	R Network 3.3Kx5
R309,310	OB09533A	RK 3.3K 1/4W J
311,313		
314,315		
316,333		
R312	OB21005A	R Network 3.3Kx13
R317	OB09737A	RK 330K 1/6W J
R318,319	OB09725A	RK 100K 1/6W J
R320,321	OB09749A	RK 1M 1/6W J
R322	OB09693A	RK 4.7K 1/6W J
R323	OB09721A	RK 68K 1/6W J
R324	OB09713A	RK 33K 1/6W J
R325	OB01888A	RK 10K 1/4W J
R327,328	OB09697A	RK 6.8K 1/6W J
R329,330	OB09685A	RK 2.2K 1/6W J
R331	OB21004A	R Network 3.3Kx9
R332	OB09689A	RK 3.3K 1/6W J
C301,302	OB09860A	CM 0.022μ 50V J
303		
C304	OB40272A	CE 4.7μ 25V
SW301,302	OB70043A	Tact SW
303,304		
CN1	OB81357B	4P Connector
CN5	OB81359A	4P Connector
CN7	OB81361A	5P Connector
CN10	OB81352A	2P Connector
CN14	OB81368A	2P Connector
CN15	OB81193A	5P-S Post
CN16	OB81369B	3P Connector
	OB90074A	FL Tube (1)
	OJ05004B	FL Cushion (3)
	OJ05001A	Re flector (1)
	OJ04703A	Bu shing TB-300 (5)
	OJ05008A	Bu shing TA-310 (5)

5.8. Main P.C.B. Assy

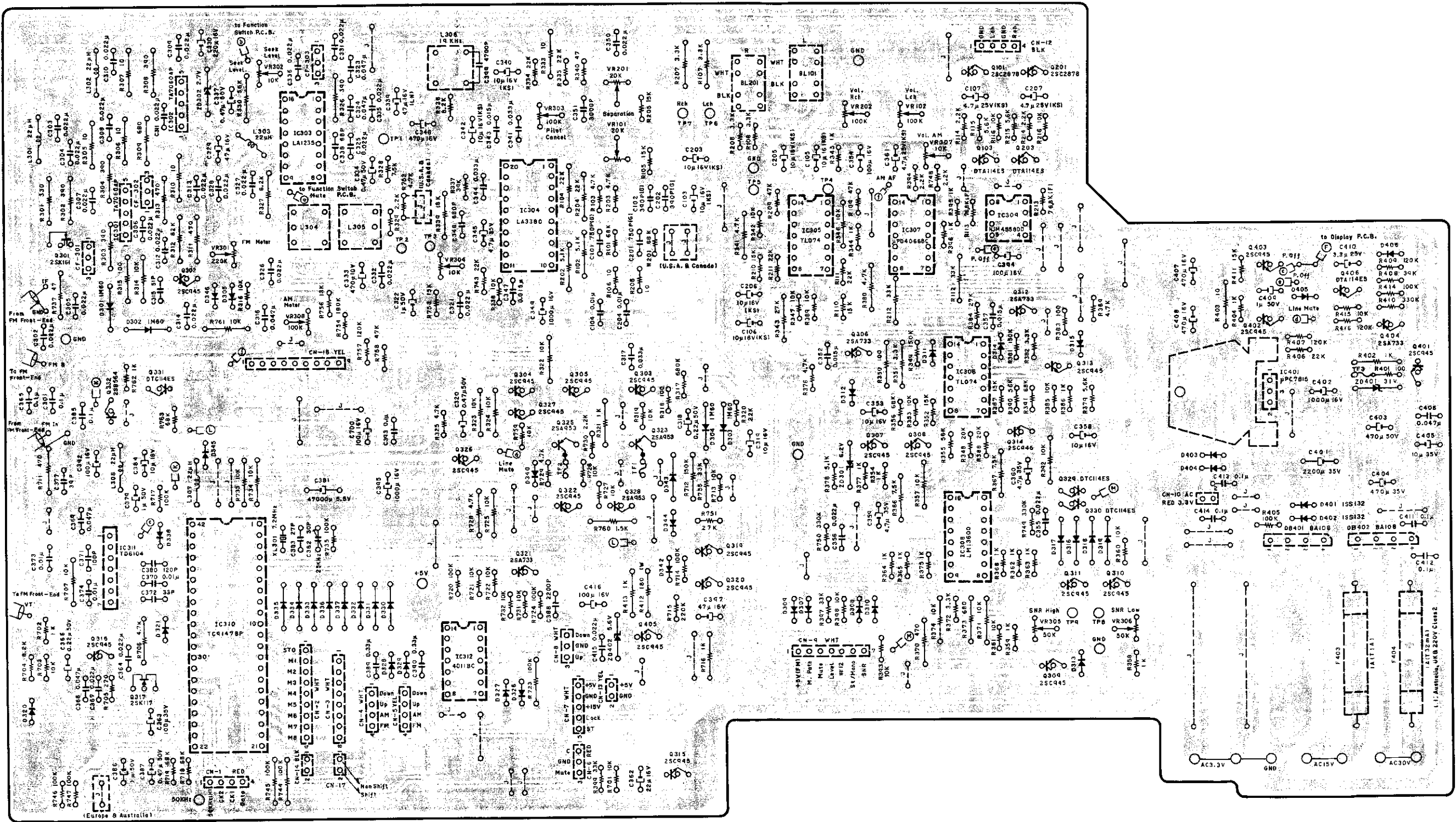


Fig. 5.8

6. SCHEMATIC DIAGRAM

6.1. IC Block Diagrams

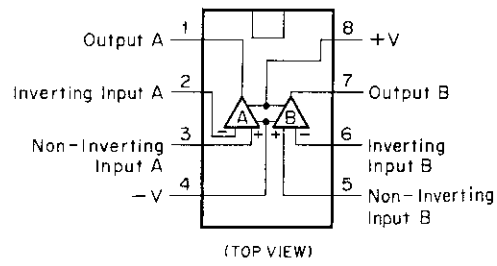


Fig. 6.1.1 Operational Amp. IC NJM4558DD

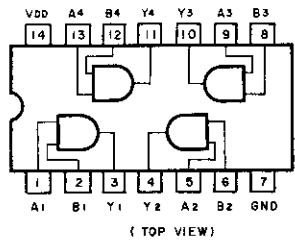


Fig. 6.1.2 AND Gate C-MOS IC μPD4081BC

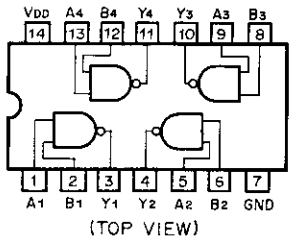


Fig. 6.1.3 NAND Gate C-MOS IC μPD4011BC

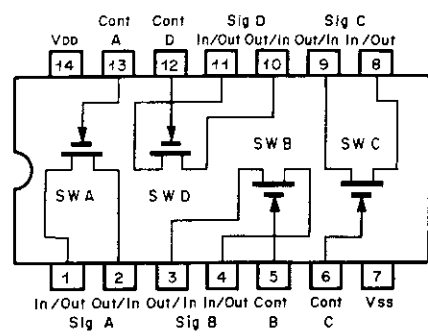


Fig. 6.1.4 Bilateral Switch C-MOS IC μPD4066BC

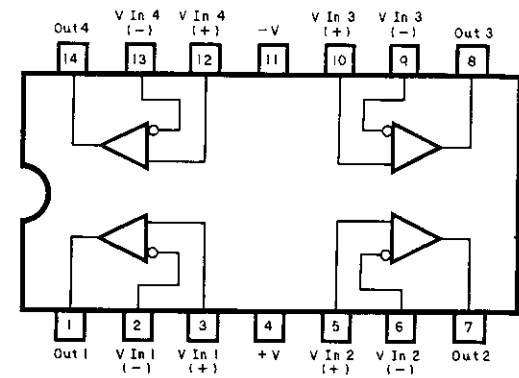


Fig. 6.1.5 Operational Amp. IC TL074

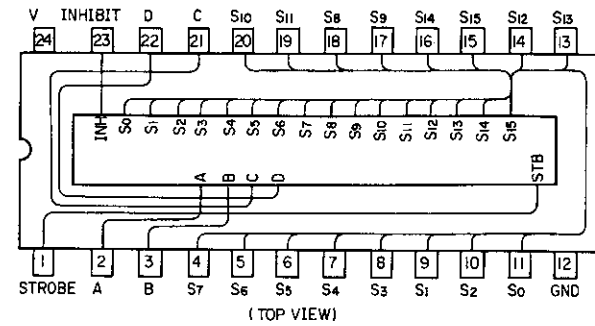


Fig. 6.1.6 4-to-16 Line Decoder IC M4514BP

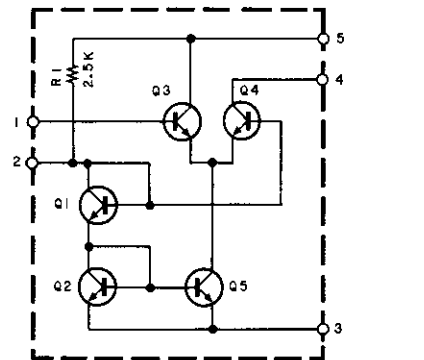


Fig. 6.1.7 FM IF Amp. IC TA7060AP

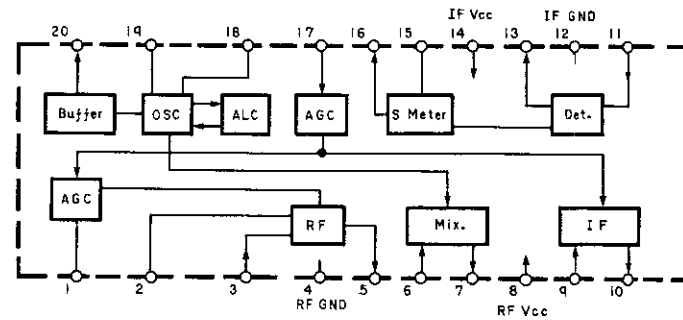


Fig. 6.1.11 AM Tuner IC (with Electronic Tuning of Table Top Stereo) LA1245

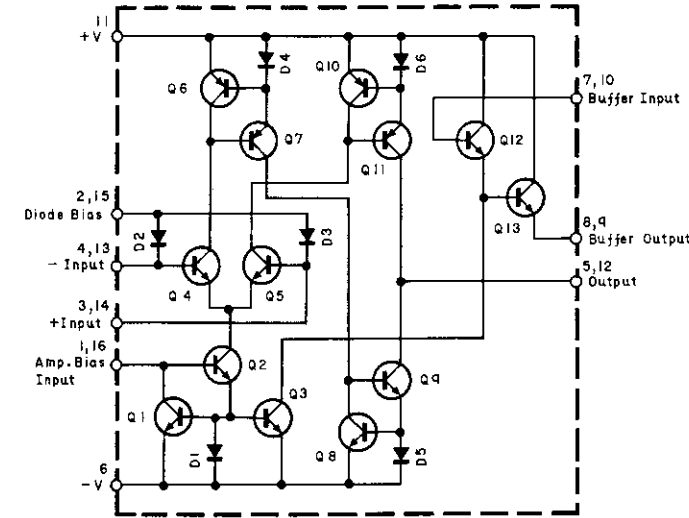


Fig. 6.1.9 Operational Transconductance Amp. (with Linearizing Diodes and Buffer) IC LM13600

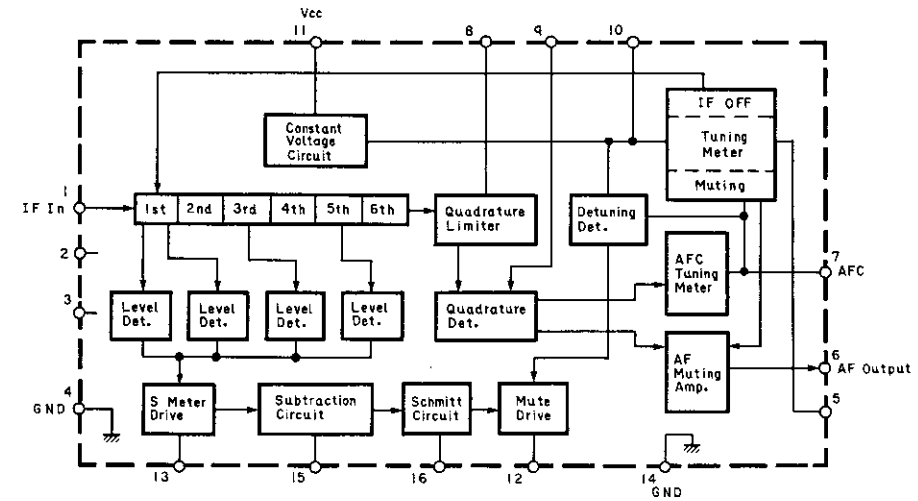


Fig. 6.1.10 FM IF System IC LA1235

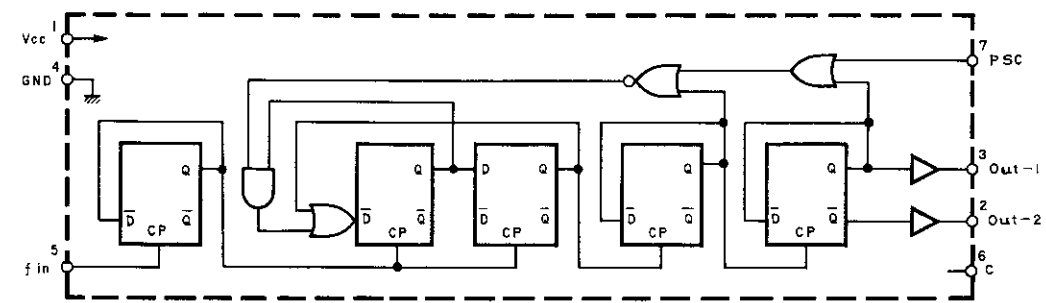


Fig. 6.1.11 ECL Prescaler (FM) IC TD6104

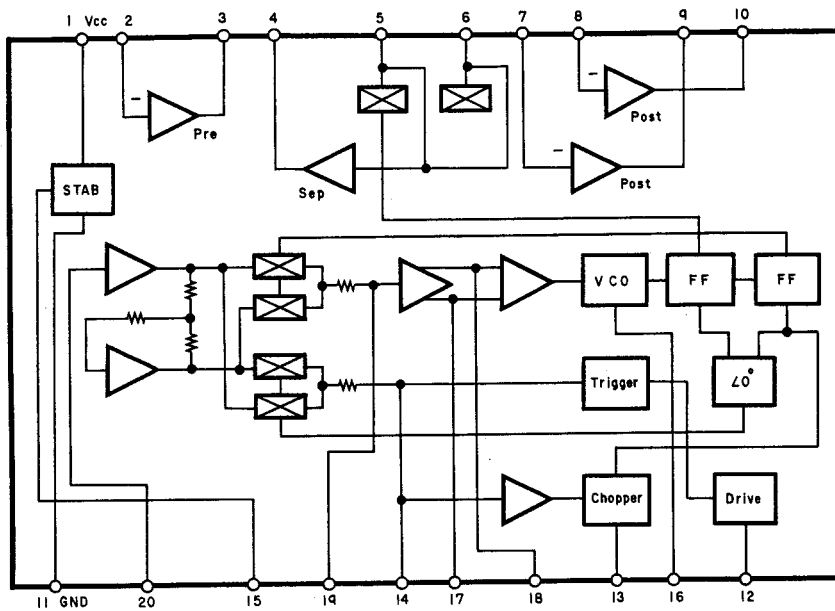


Fig. 6.1.12 PLL FM Stereo MPX Demodulator IC LA3380

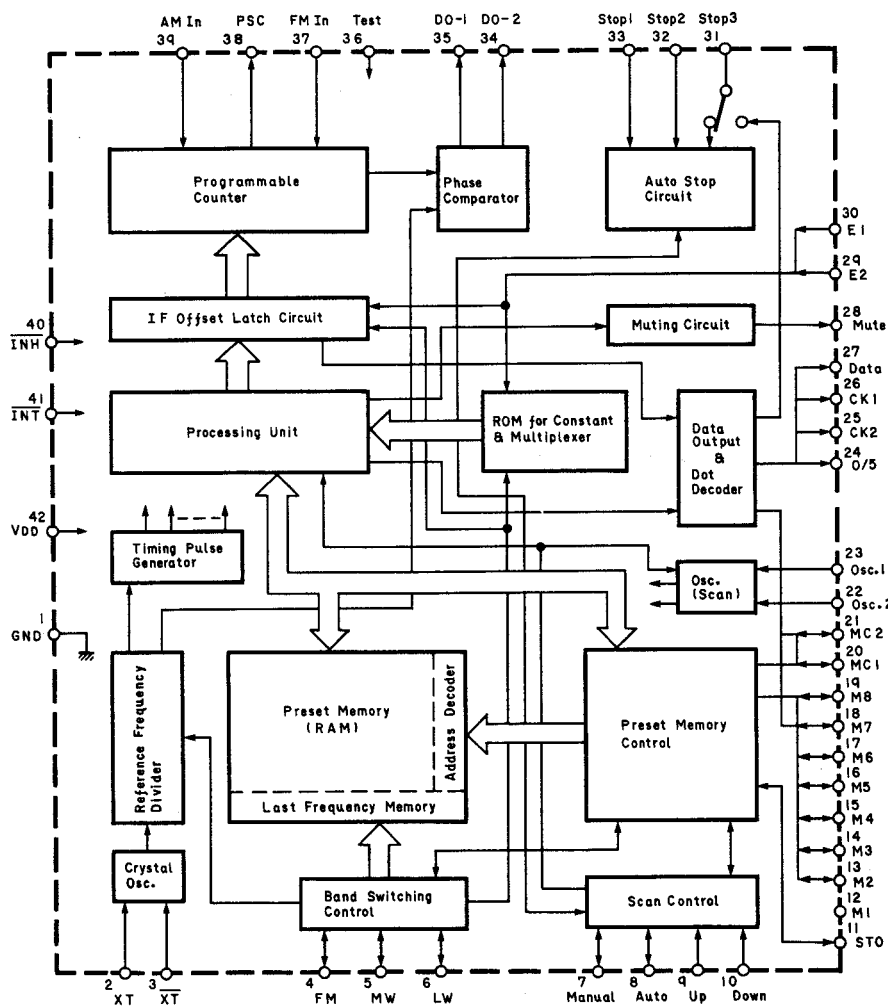


Fig. 6.1.13 FM/MW/LW 3-Band Digital Tuning (Static Method) IC TC9147BP

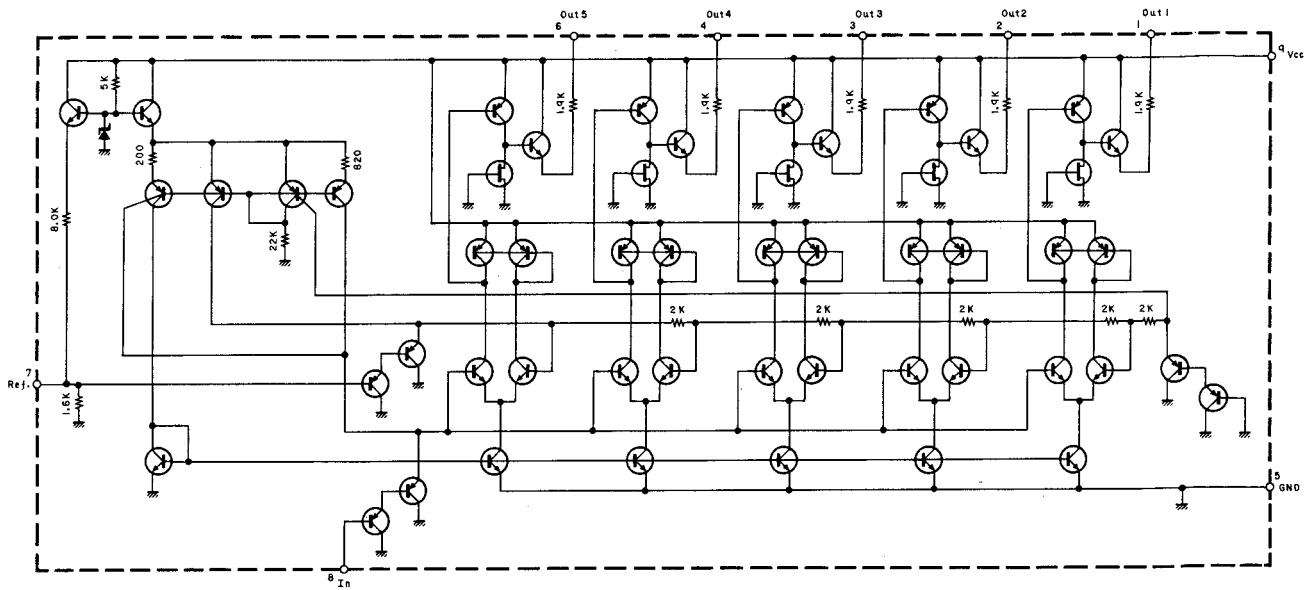


Fig. 6.1.14 Level Meter Driver IC BA656

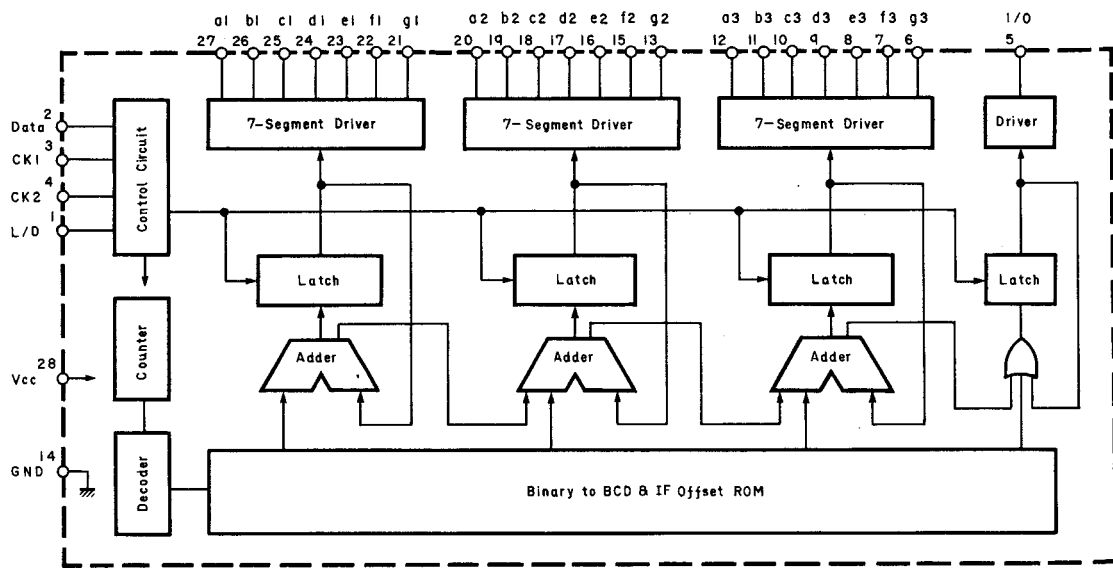


Fig. 6.1.15 Indicator Driver IC TD6301A

6.2. Schematic Diagram

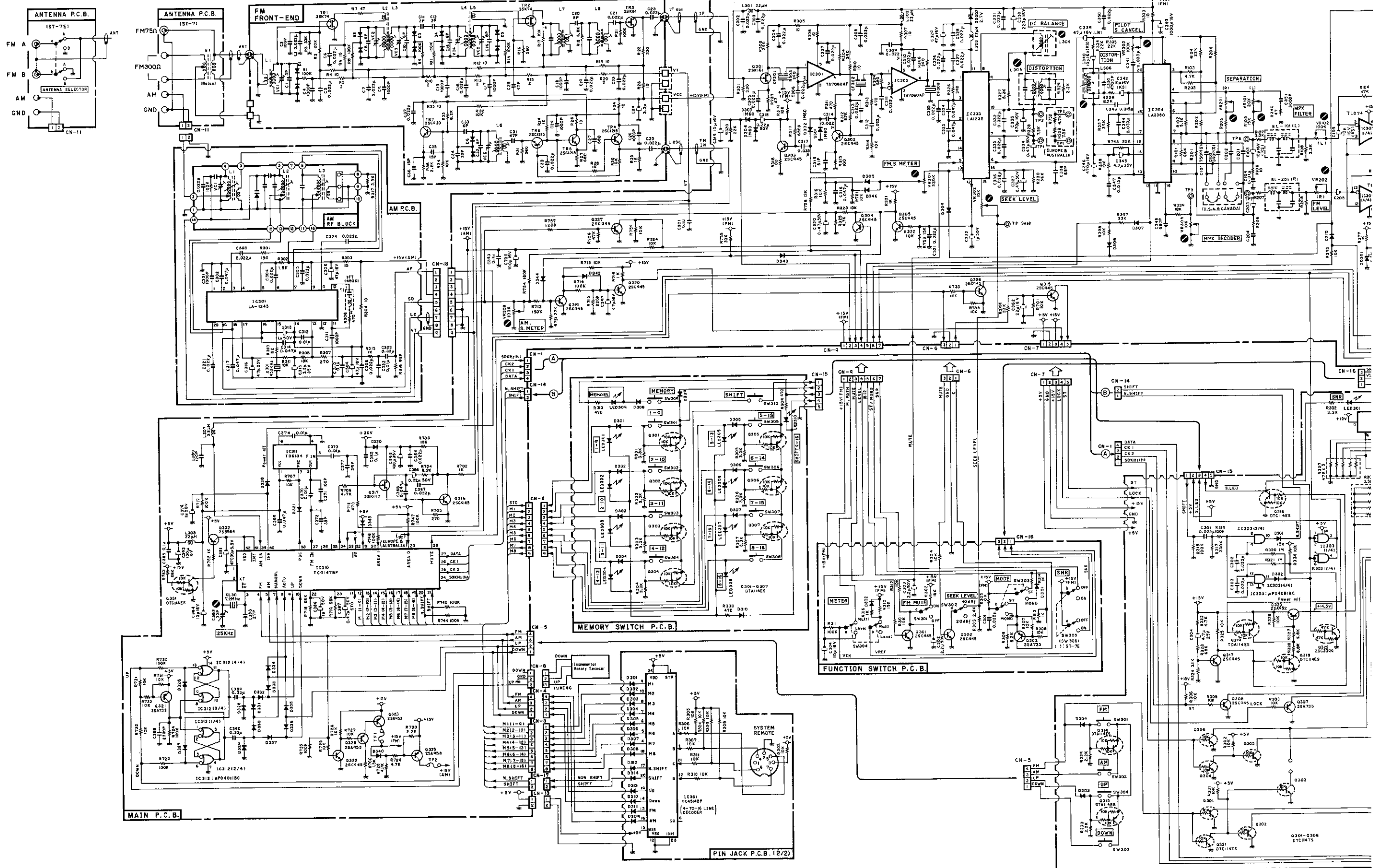
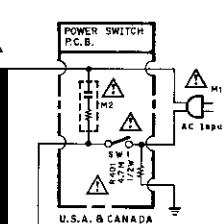
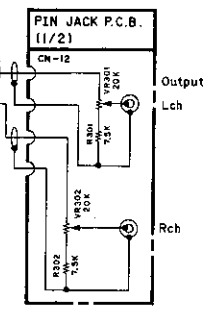
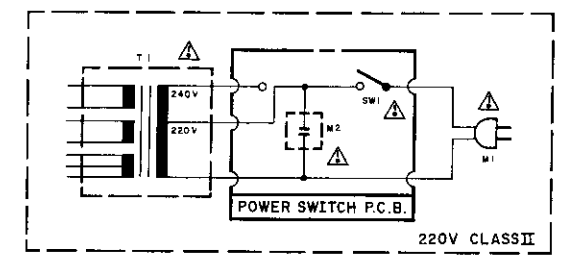
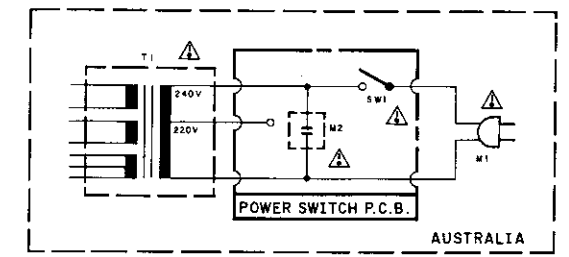
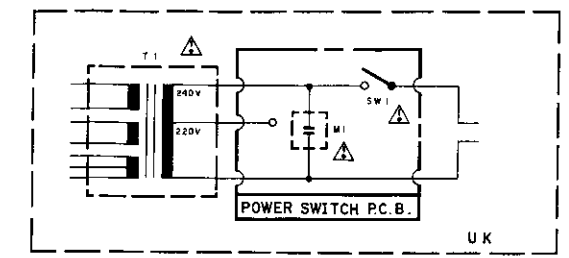
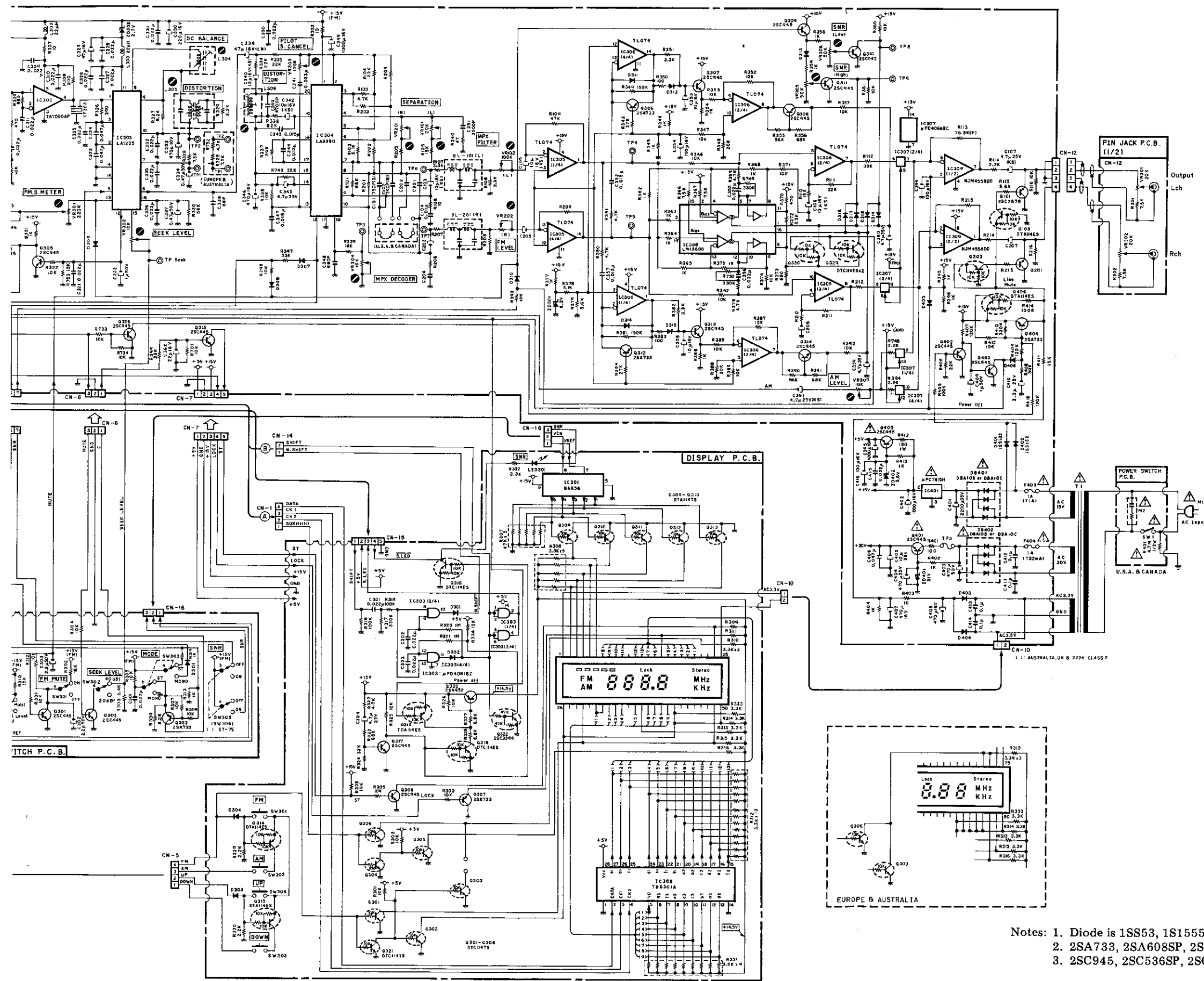

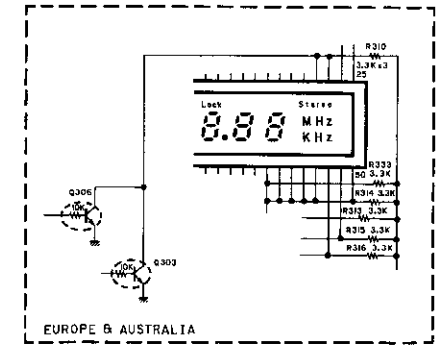


Fig. 6.2



Warning:
 Parts marked with the symbol  have critical characteristics. Use ONLY replacement parts recommended by the manufacturer. It is recommended that the unit be operated from a suitable DC supply or batteries during initial check-out procedure.

Caution:
 Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective. **WARNING — DO NOT** return the unit to the customer until the problem is located and corrected.



- Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
 2. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
 3. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

7. WIRING DIAGRAM

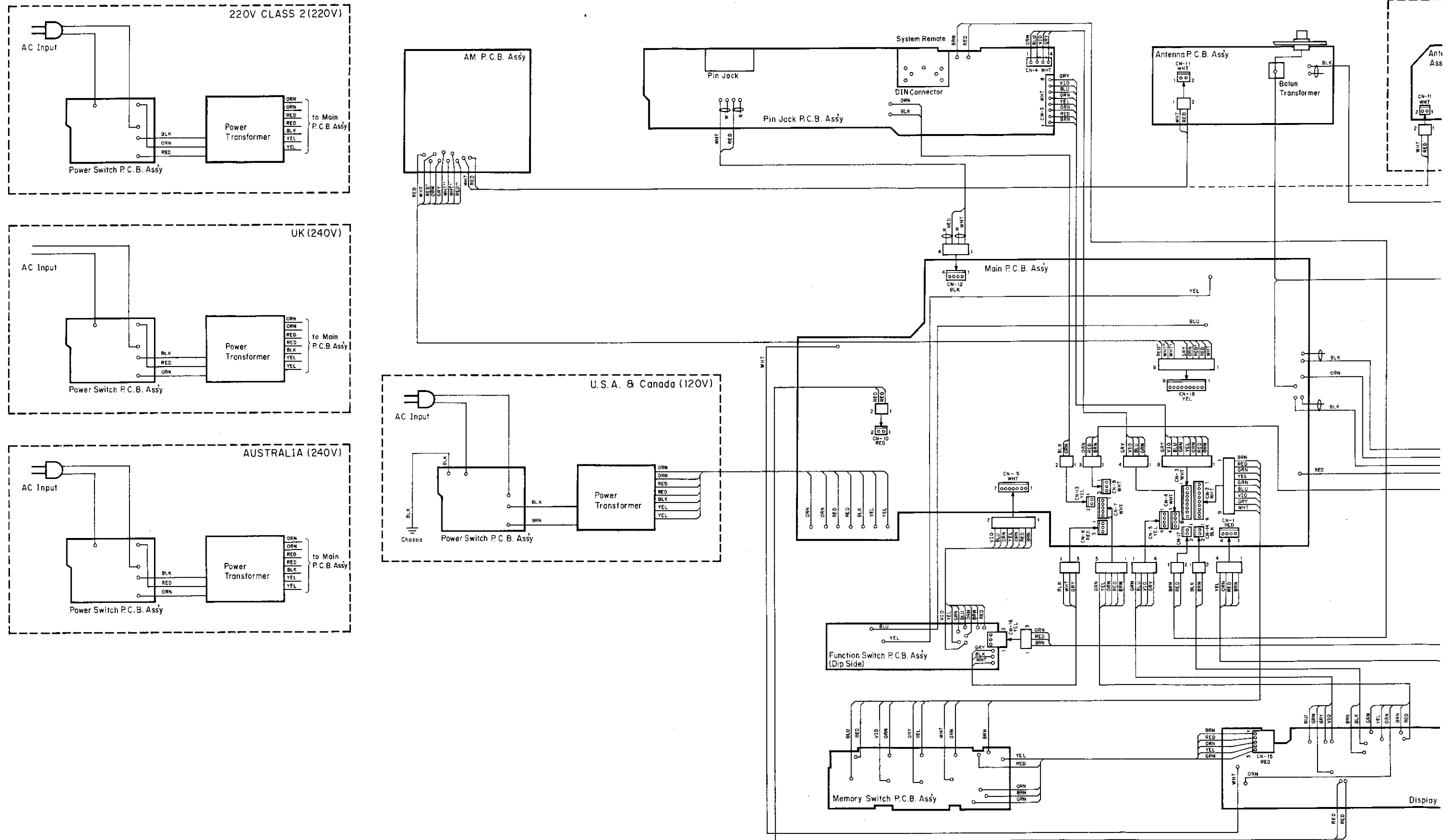


Fig. 7

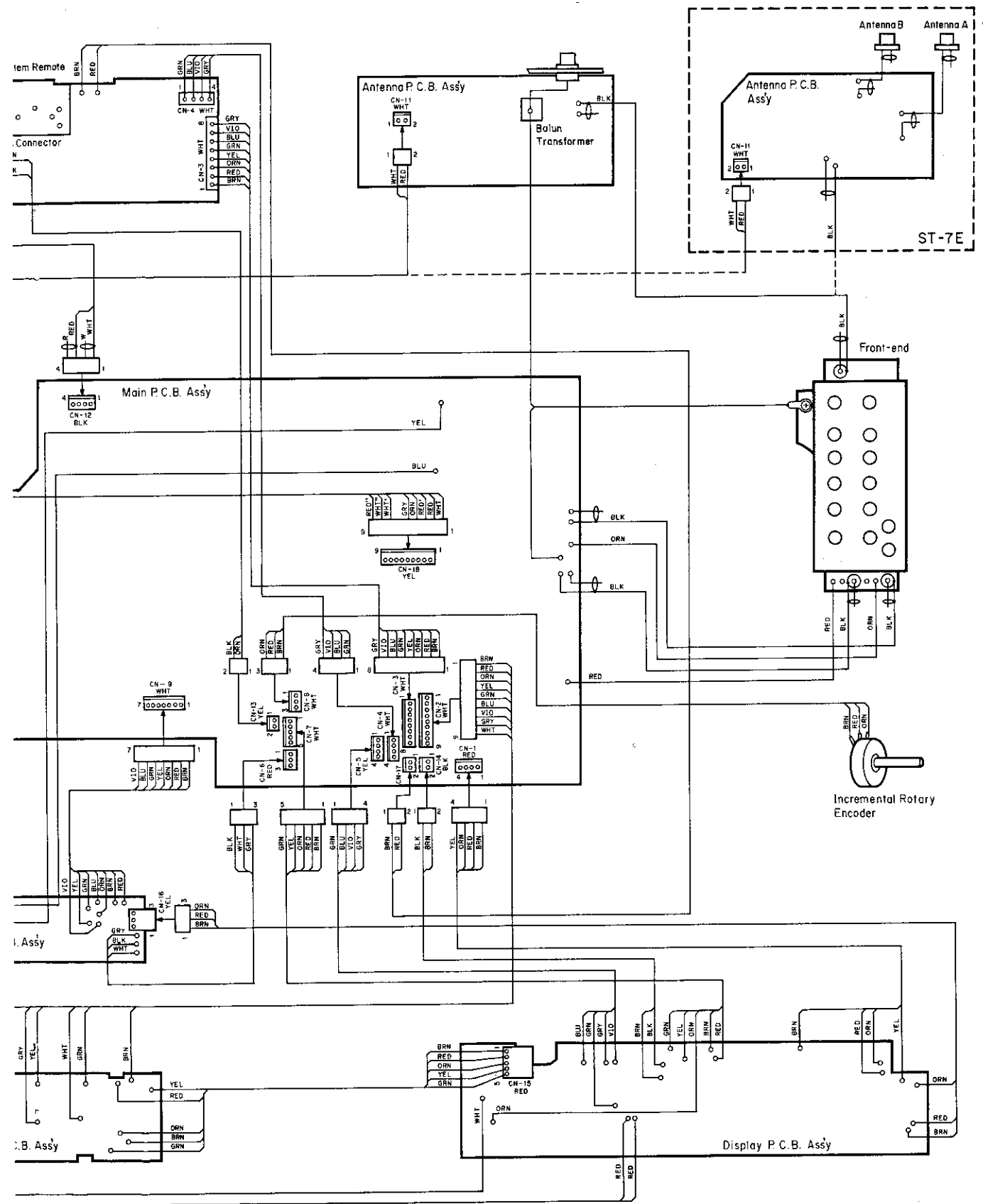


Fig. 7

Notes: 1 Table of wire colors

BRN - Brown	BLU - Blue
RED - Red	VIO - Violet
ORN - Orange	GRY - Gray
YEL - Yellow	WHT - White
GRN - Green	BLK - Black

2. Component side view of the P.C.B. is illustrated unless otherwise specified.

8. BLOCK DIAGRAM

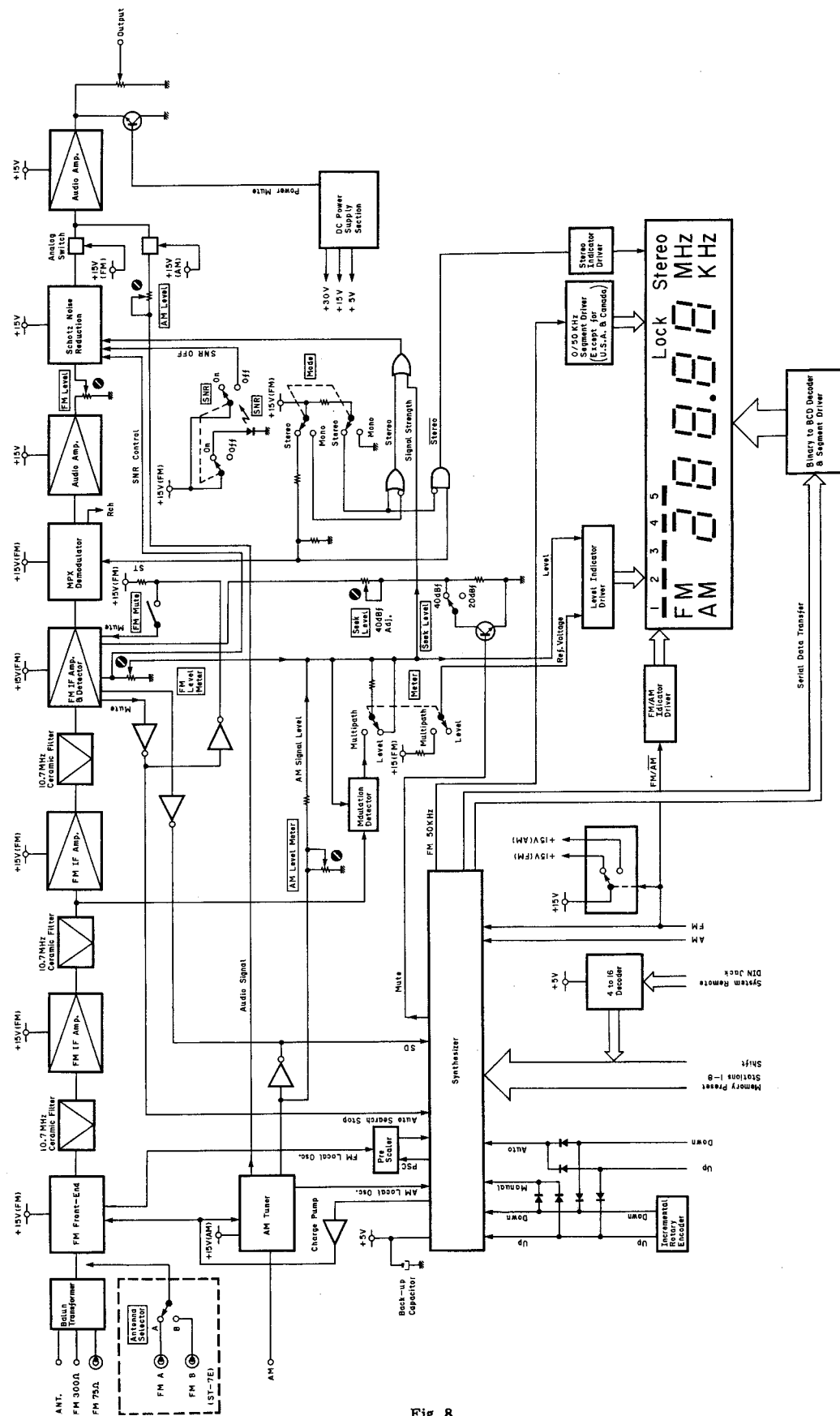


Fig. 8

9. SPECIFICATIONS

[FM Section]

- Note** ● All RF levels in microvolts given in 300-ohm antenna input.
● Modulation: Mono 100%, Stereo Pilot 9%, Stereo Audio Signal 91%

Frequency Range	87.5 — 108.0 MHz in 100 kHz steps
Usable Sensitivity	
Mono	10 dBf/1.7 μ V
Stereo (sub)	17 dBf/3.9 μ V
50 dB Quieting Sensitivity	
Mono	14 dBf/2.7 μ V
Stereo with Schotz NR	28 dBf/14 μ V
Stereo without Schotz NR	37 dBf/39 μ V
Signal to Noise Ratio	
Mono	Better than 80 dB
Stereo	Better than 76 dB
Schotz NR S/N Improvement	More than 6 dB
Schotz NR Active Level	19 — 53 dBf/5 — 250 μ V
High-Blend Threshold Level	19 dBf/5 μ V
Muting Threshold Level	20 dBf/5.5 μ V
Frequency Response	20 — 15,000 Hz \pm 1 dB
Total Harmonic Distortion (1 kHz)	
Mono	Less than 0.06%
Stereo	Less than 0.08%
Capture Ratio	1.9 dB
Alternate Channel Selectivity	
(\pm 400 kHz)	Better than 60 dB
Stereo Separation	
100 Hz/1 kHz/10 kHz	50/55/45 dB
Spurious Response Rejection	Better than 100 dB
Image Rejection	Better than 100 dB
IF Rejection	Better than 100 dB
AM Suppression	Better than 60 dB

[AM Section]

- Note** ● Modulation: 400 Hz, 30%

Frequency Range	520 — 1,710 kHz in 10 kHz steps
Usable Sensitivity	50 dB/m
Signal to Noise Ratio	
(RF input 90 dB/m)	Better than 48 dB
Total Harmonic Distortion	
(RF input 90 dB/m)	Less than 0.4%
Selectivity (\pm 10 kHz)	Better than 20 dB

[General Specifications]

Output Level/Impedance	
FM (1 kHz, Mono, 100% Modulation)	0.5 — 2.0 V (variable)/1.5 k Ω
AM (400 Hz, 30% Modulation)	0.2 — 0.9 V (variable)/1.5 k Ω
FM Antenna Inputs	75 Ω unbalanced 300 Ω balanced
Power Source	120, 220 or 240 V AC; 50/60 Hz (According to country of sale)
Power Consumption	15 W max.
Dimensions	435 (W) x 63 (H) x 289 (D) mm 17-1/8 (W) x 2-1/2 (H) x 11-3/8 (D) inches
Approximate Weight	4.7 kg 10 lb. 6 oz

- Specifications and design are subject to change for further improvement without notice.
- Schotz Noise Reduction manufactured under license from L.S. Research, Inc., U.S. and foreign patents pending.