

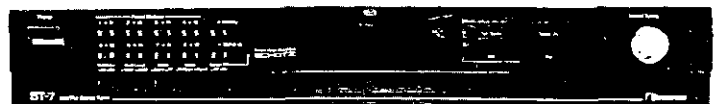


Service Manual

Nakamichi

ST-7 ST-7E ST-70

AM/FM Stereo Tuner



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1. GENERAL

1.1 Introduction

For the ST-7 (U.S.A., Canada & Australia) and ST-7E, this Service Manual is the revised edition.

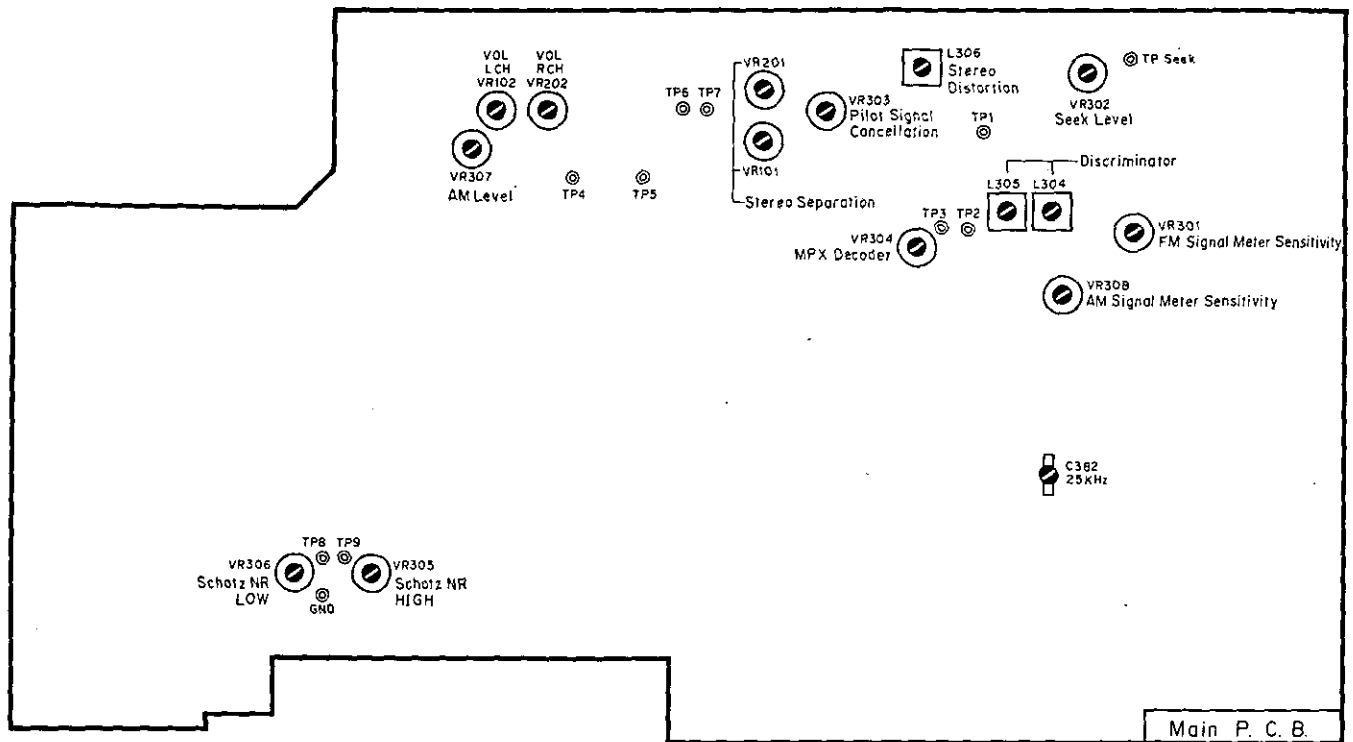
1.2. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi ST-7. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

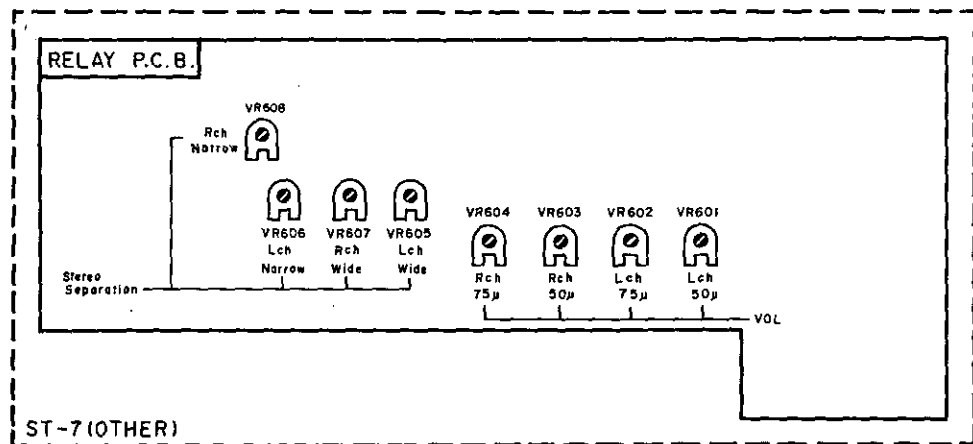
1.3. Packing Materials, Owner's Manual, and Auxillary Parts

<u>Part No.</u>	<u>Description</u>	<u>Q'ty</u>
0F03865A	Carton Box (ST-7)	1
0F03866B	Carton Box (ST-7E)	1
0F03957A	Carton Box (ST-70)	1
0F03863A	Packing L	1
0F03864A	Packing R	1
0D04527A	Owner's Manual (English) (ST-7 (U.S.A.))	1
0D04528A	Owner's Manual (English/German/French) (ST-7 (Canada, Australia & Other) & ST-7E)	1
0D04528A	Owner's Manual (Japanese) (ST-70)	1
0D04449A	Important Notice	1
0B90069A	AM Loop Antenna	1
0B90070A	AM Loop Antenna Holder for wall mounting	1

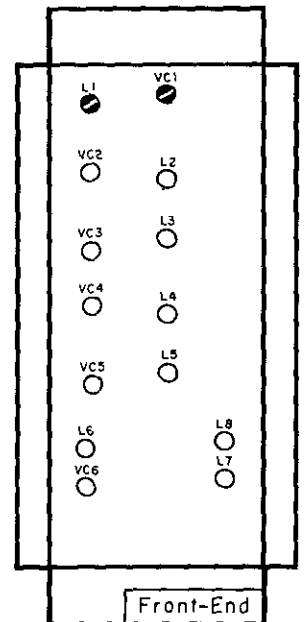
2. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT



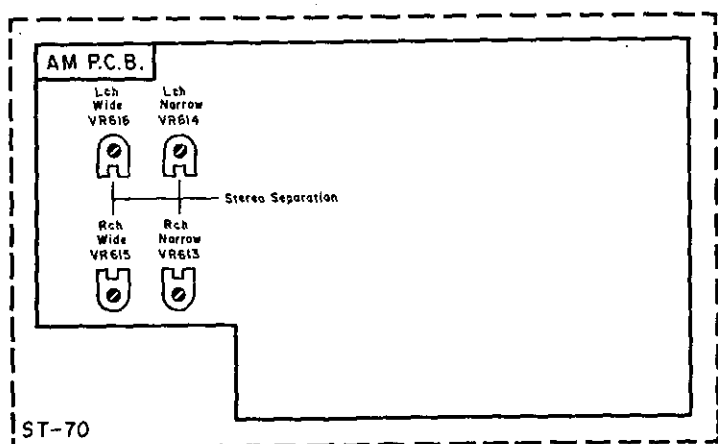
Main P. C. B.



ST-7 (OTHER)



Front-End



ST-70

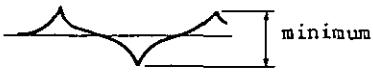
Fig. 2

3. ELECTRICAL ADJUSTMENTS

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

3.1. FM Adjustments

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Preliminary Step				<ol style="list-style-type: none"> 1. Connect an FM Generator to the FM Antenna Input Terminal of the ST-7/7E/70. 2. Set the FM Generator as follows (either Stereo or Mono mode): The FM Generator should be set as follows unless otherwise specified. <ol style="list-style-type: none"> 1. Frequency 93 MHz (83 MHz for ST-70) 2. Modulation <ol style="list-style-type: none"> o ST-7 (U.S.A., Canada & Other (Wide)) & ST-70 Stereo Audio: 1 kHz, 91% Pilot: 19 kHz, 9% o ST-7 (Australia & Other (Narrow)) Stereo Audio: 1 kHz, 51% Pilot: 19 kHz, 9% o Mono Audio: 1 kHz, 60% 3. RF Level: 65 dBf 3. Set the Output Level controls on the rear panel at maximum. 4. The IF Band selector which selects either Wide or Narrow is provided only for ST-7 (Other) & ST-70.
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"> 1. Short pins 36 and 41 of IC310 (TC9147BP) on the Main P.C.B. Ass'y. 2. Adjust trimmer capacitor C382 to obtain 25000 Hz \pm3 Hz on the frequency counter. 3. Remove short between pins 36 and 41 of IC310.
3	Monophonic Sensitivity Adjustment	Oscilloscope, AC voltmeter and Distortion Meter to Output Jacks	FM Generator Mono ST-7/7E/70 FM Mute - OFF Seek Level - 20 dbf Mode - ST Meter - Signal IF Band - Wide Schotz NR - OFF	FM Front-end L1, VC1	<ol style="list-style-type: none"> 1. Set the frequency of the FM Generator to 90 MHz and tune the ST-7/7E/70. 2. Turn L1 to obtain minimum distortion and maximum output level. 3. Decrease the RF Level of the FM Generator and repeat above 2 to perform precise adjustment. 4. Set the frequency of the FM Generator to 106 MHz and tune the ST-7/7E/70. 5. Adjust VC1 to obtain minimum distortion and maximum output level. 6. Decrease the RF level and repeat above 5 to perform precise adjustment. 7. 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 on Main P.C.B. and Distortion Meter to Output Jack	FM Generator Mono ST-7/7E/70 FM Mute - OFF Seek Level - 20 dBf Mode - ST Meter - Signal IF Band - Wide 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 on Main P.C.B.	FM Generator Stereo ST-7/7E/70 Same as above	Main P.C.B. VR304	1. Cut the RF signal applied to the ST-7/7E/70. 2. Adjust VR304 to obtain 76 kHz \pm 50 Hz on the frequency counter.
6	Pilot Signal Cancellation Adjustment	Oscilloscope across TP6 and TP7 on Main P.C.B.	FM Generator Stereo ST-7/7E/70 FM Mute - ON Seek Level - 20 dBf Mode - ST Meter - Signal IF Band - Wide 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 shape of waveform on the oscilloscope is as follows with minimum amplitude. 
7	Stereo Distortion Adjustment	Distortion Meter and AC voltmeter to Output Jacks	FM Generator Stereo ST-7/7E/70 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	AC voltmeter to TP4(L), TP5(R) on Main P.C.B.	FM Generator Mono ST-7/7E/70 Same as above	ST-7 (except for Other), ST-7E & ST-70 VR102 VR202 ST-7 (Other) Relay P.C.B. VR601 VR602 VR603 VR604	ST-7 (except for Other), ST-7E & ST-70: Adjust VR102 (VR202) to obtain 550 mV on the AC voltmeter. ST-7 (Other): 1. Set the IF Band selector of the ST-7 (Other) to Wide. 2. Adjust VR602 (VR604) to obtain 550 mV on the AC voltmeter. 3. Set the IF Band selector to Narrow. 4. Adjust VR601 (VR603) to obtain 550 mV on the AC voltmeter.

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
9	Stereo Separation Adjustment	AC voltmeter to Output Jack	FM Generator Stereo ST-7/7E/70 FM Mute - ON Seek Level - 20 dBf Mode - ST Meter - Signal IF Band - Wide Schotz NR - OFF	ST-7 (except for Other) & ST-7E: VR101 VR201 ST-7(Other): Relay P.C.B. VR605 VR606 VR607 VR608 ST-70: AM P.C.B. VR613 VR614 VR615 VR616	ST-7 (except for Other) & ST-7E: 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 AC voltmeter. 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 AC voltmeter. ST-7 (Other) & ST-70 - Wide: 1. Set the IF Band selector of the ST-7 (Other)/ST-70 to Wide. 2. Cut the R channel 1 kHz audio signal of the FM Generator to provide only L channel signal. Adjust VR607 (ST-7 (Other))/VR615 (ST-70) to obtain minimum R channel output level on the AC voltmeter. 3. Cut the L channel 1 kHz audio signal to provide only R channel signal. Adjust VR605 (ST-7 (Other))/VR616 (ST-70) to obtain minimum L channel output level on the AC voltmeter. ST-7 (Other) & ST-70 - Narrow 1. Set the IF Band selector of the ST-7 (Other)/ST-70 to Narrow. 2. Apply the same procedure as in 2 as above, except for VR608 (ST-7 (Other))/VR613 (ST-70). 3. Apply the same procedure as in 3 as above, except for VR606 (ST-7 (Other))/VR614 (ST-70).
10	FM Signal Meter Sensitivity Adjustment	None	FM Generator Mono ST-7/7E/70 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 the figure "5" of the Signal Meter starts illuminating.
11	Seek Level Adjustment	None	FM Generator Stereo ST-7/7E/70 FM Mute - ON Seek Level - 40 dBf/20 dBf Mode - ST Meter - Signal IF Band - Wide Schotz NR - OFF	Main P.C.B. VR302 Function Switch P.C.B. VR301	1. Set the RF level of the FM Generator and Seek Level switch of the ST-7/7E/70 to 40 dBf. 2. Turn VR301 on the Function Switch P.C.B. Ass'y fully counterclockwise. 3. Connect TPseek (the pin with yellow wire by VR302) to GND. 4. Turn VR302 counterclockwise until the Lock Indicator on the FM/AM Indicator goes out. 5. Slowly turn VR302 clockwise to find the position where the Lock Indicator starts illuminating. 6. Remove GND of TPseek. 7. Set the RF level and Seek Level switch to 20 dBf. 8. Press the Seek button to set the ST-7/7E/70 in Seek mode. 9. Turn VR301 on the Function Switch P.C.B. Ass'y so that the ST-7/7E/70 is locked at the FM Generator's frequency. Note: Turning VR301 or VR302 clockwise causes the seek operation to stop in lower RF level.

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
12	Schotz NR Adjustment	Oscilloscope to TP8, TP9	FM Generator Stereo ST-7/7E/70 FM Mute - ON Seek Level - 20 dBf Mode - ST Meter - Signal IF Band - Wide 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 Adjustments

STEP	ITEM	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Level Adjustment	AC voltmeter to Output Jacks	AM Generator 1000 kHz 116 dB μ /m Modulation - 30% Audio Signal - 400 Hz ST-7/7E/70 AM Mode	Main P.C.B. VR307	<ol style="list-style-type: none"> 1. Set the measurement instruments as shown in Fig. 3. Set the distance between the AM Loop Antenna of the ST-7/7E/70 and a test loop to 60 cm. To obtain 90 dBμ/m field strength at AM Loop Antenna, set the output of the AM signal generator to 116 dBμ/m as loss is 26 dBμ/m in this setting. 2. Adjust VR307 to obtain 900 mV (except for ST-70)/750 mV (ST-70) on the AC voltmeter.
2	AM Signal Meter Sensitivity Adjustment	DC voltmeter between IC301-16 (LA1245) and GND on AM P.C.B.	AM Generator Same as above ST-7/7E/70 Same as above	Main P.C.B. VR308	With the same setting as in Step 1, adjust VR308 to obtain 10 V \pm 50 mV on the DC voltmeter.

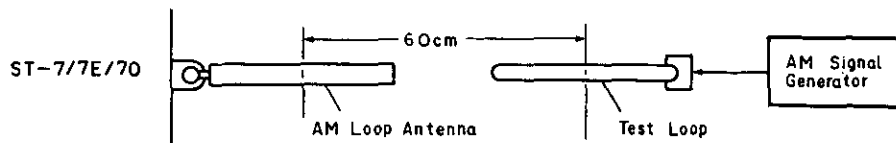


Fig. 3

4. MECHANISM ASS'Y AND PARTS LIST

4.1. Synthesis

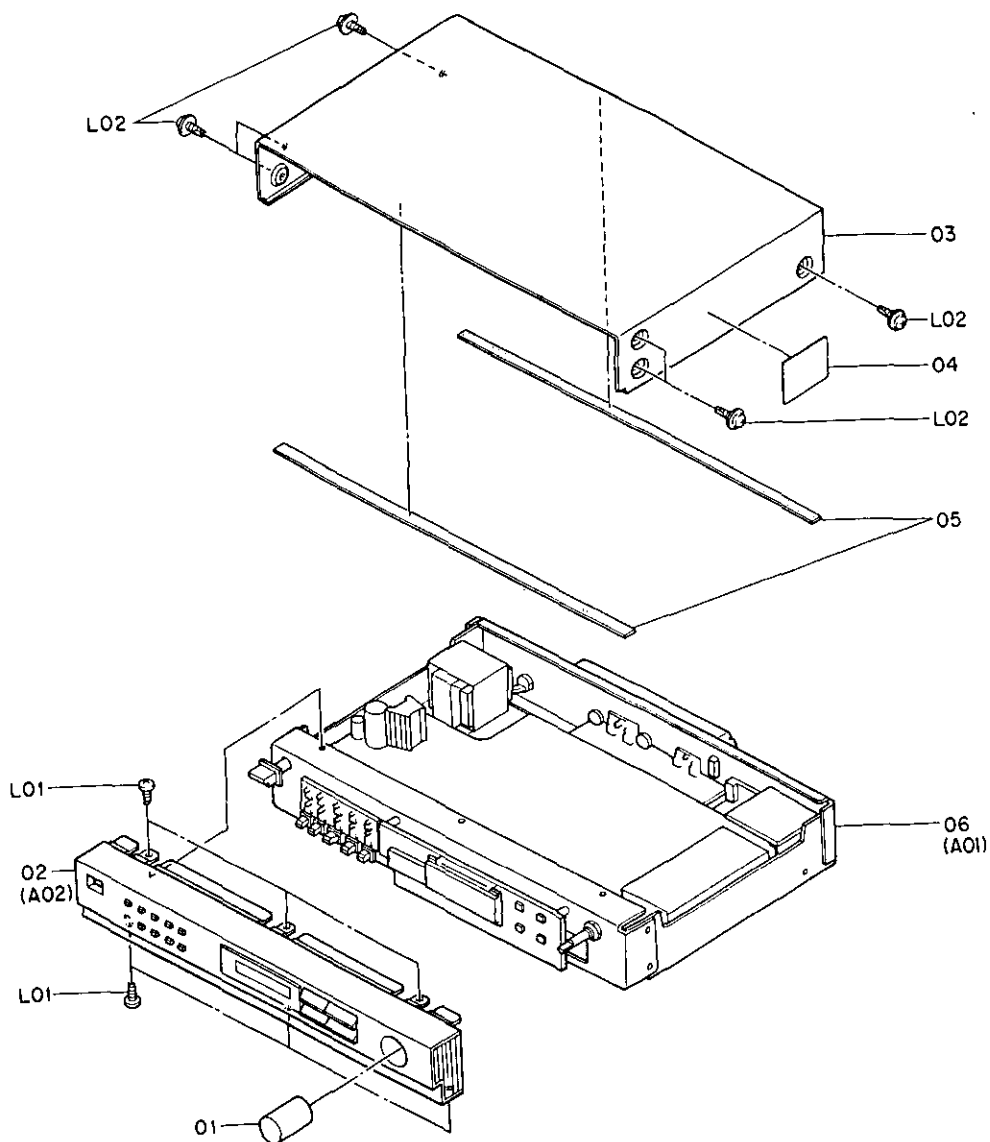


Fig. 4.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty	
		Synthesis						
01	HA04818A	Tuning Knob Ass'y	1		BA05702A	Power Switch P.C.B. Ass'y (ST-7E (Except UK))	1	
02	HA04816A	Front Panel Ass'y (ST-7)	1		BA05704B	Power Switch P.C.B. Ass'y (ST-7E (UK) & ST-7 (Australia & Other))	1	
	HA04817A	Front Panel Ass'y (ST-7E)	1		BA05700A	Power Switch P.C.B. Ass'y (ST-70)	1	
	HA05015A	Front Panel Ass'y (ST-70)	1	07	OH04843A	Push Button (ST-7)	5	
03	OH04668A	Top Cover	1		OH04643A	Push Button (ST-7E & ST-70)	6	
04	OM04377B	Caution Label	1	08	BA05698B	Function Switch P.C.B. Ass'y (ST-7)	1	
05	OJ05002C	Top Cover Himelcon	2		BA05699B	Function Switch P.C.B. Ass'y (ST-7E)	1	
06	—	Chassis Ass'y	1		BA06311B	Function Switch P.C.B. Ass'y (ST-70)	1	
L01	OE03283A	ST8x6 @ Binding (Black Chromate)	6		09	OB50042A	Power Transformer (ST-7 (U.S.A. & Canada))	1
L02	OE03278A	BT8x8 @ Pan (Black Chromate)	6		OB50043A	Power Transformer (ST-7 (Australia & ST-7E))	1	
A01	—	Chassis Ass'y	1		OB50044C	Power Transformer (ST-7 (Other))	1	
				10	OB50041B	Power Transformer (ST-70)	1	
01	BA05708B	Display P.C.B. Ass'y (ST-7 (U.S.A. & Canada) & ST 70)	1		HA05160A	Rear Panel Ass'y (ST-7 (U.S.A.))	1	
	BA05709B	Display P.C.B. Ass'y (ST-7 (Australia & Other) & ST-7E)	1		HA05181A	Rear Panel Ass'y (ST-7 (Canada))	1	
02	OJ04988A	Front Chassis	1		HA05158A	Rear Panel Ass'y (ST-7 (Australia))	1	
03	BA05711A	Incremental Rotary Encoder Ass'y	1		HA05157A	Rear Panel Ass'y (ST-7 (Other))	1	
04	BA05697A	Memory Switch P.C.B. Ass'y	1		HA05159A	Rear Panel Ass'y (ST-7E (Except UK))	1	
05	HA04799B	Power Button Ass'y	1					
06	BA05701A	Power Switch P.C.B. Ass'y (ST-7 (U.S.A. & Canada))	1					

4.2. Chassis Ass'y (A01)

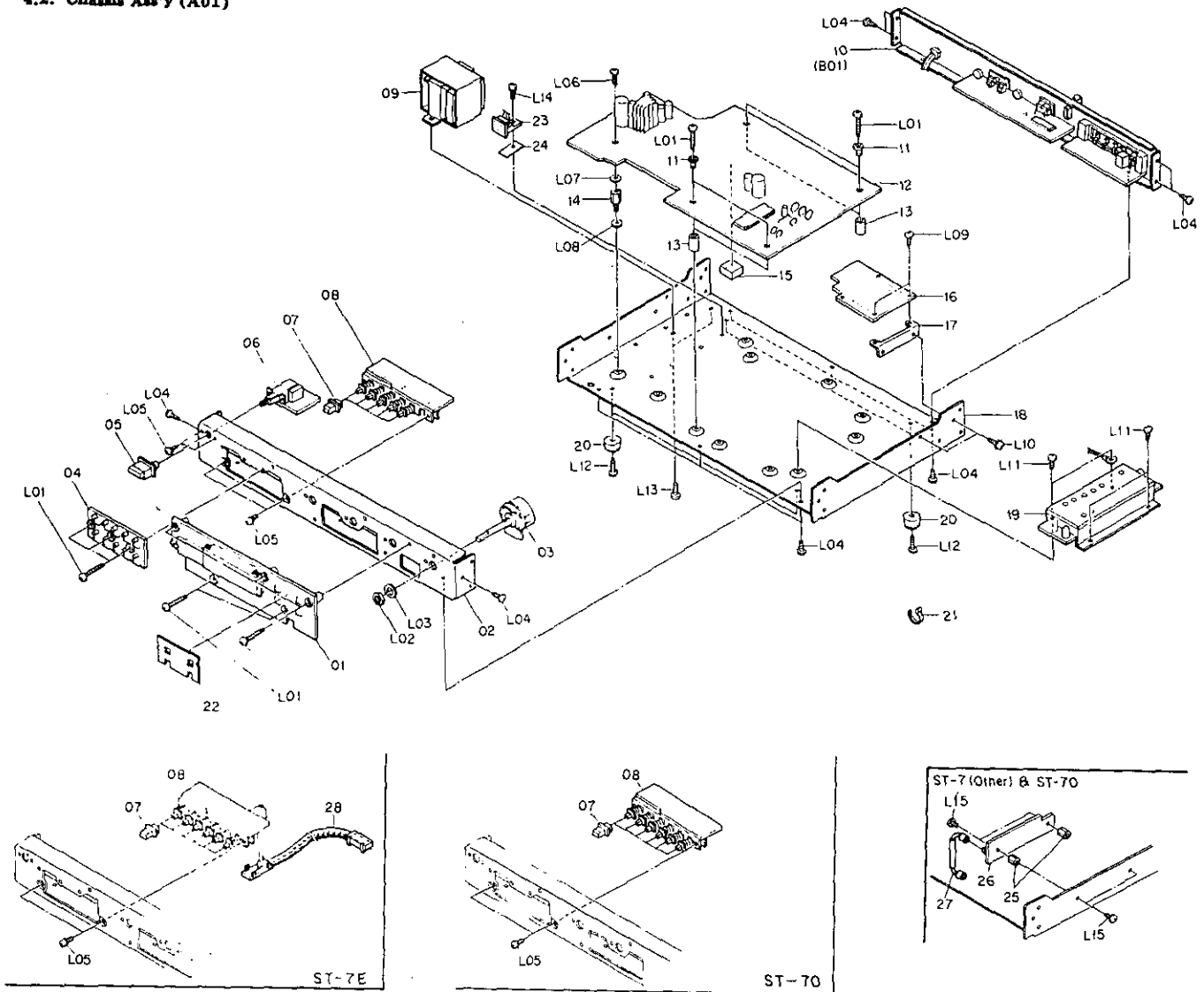


Fig. 4.2

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
	HA05155A	Rear Panel Ass'y (ST-7E (UK))	1	25	OJ05177A	P.C.B. Stud (ST-7 (Other) & ST-70)	2
11	HA05156A	Rear Panel Ass'y (ST-70)	1	26	BA06188A	IF P.C.B. Ass'y (ST-7 (Other))	1
12	OJ05019A	Collar Bushing NB-300	4		BA06316A	IF P.C.B. Ass'y (ST-70)	1
	BA06473A	Main P.C.B. Ass'y (ST-7 (U.S.A. & Canada))	1	27	OB81587A	Cord with Pin Plugs (ST-7 (Other) & ST-70)	1
	BA06475A	Main P.C.B. Ass'y (ST-7 (Australia) & ST-7E)	1	28	OB70059A	Flex Wire (ST-7E)	1
	BA06478A	Main P.C.B. Ass'y (ST-7 (Other))	1	L01	OE03279A	ST3x18 @ Binding (Black Chromate)	12
	BA06474A	Main P.C.B. Ass'y (ST-70)	1	L02	—	Nut	(1)
13	OJ05020A	Collar Bushing NA-310	4	L03	—	Washer	(1)
14	OJ05027A	Earth Spacer	1	L04	OE03283A	ST3x6 @ Binding (Black Chromate)	12
15	OJ05005B	P.C.B. Cushion	1	L05	OE00612A	M3x6 @ Pan (2A)	4
16	BA05735A	AM P.C.B. Ass'y (ST-7 & ST-7E)	1	L06	OE03319A	M3x8 @ Binding (Nickel)	1
	BA06809A	AM P.C.B. Ass'y (ST-70)	1	L07	OJ05057A	Washer 3.4x7x0.5 (Fiber)	1
17	OJ05018A	P.C.B. Holder	1	L08	OE00732A	Washer 8mm	1
18	OH04626E	Main Chassis	1	L09	OE03321A	ST3x6 @ Binding	2
19	OB91009A	Front-end FD812 (ST-7 & ST-7E)	1	L10	OE03082A	BT3x8 @ Binding Toothed-Lock Washer Faced	2
	OB91010A	Front-end FD812DM (ST-70)	1	L11	OE00800A	ST3x6 @ Binding	4
20	OJ05162A	Leg T-S	4	L12	OE00888A	BT3x12 @ Binding	4
21	OB90019A	Insu-Lock SKB80 (ST-7 (U.S.A., Canada & Australia) & ST-7E)	11	L13	OE00907A	ST4x8 @ Binding (Black Chromate)	2
	OB90019A	Insu-Lock SKB80 (ST-7 (Other))	14	L14	OE00800A	ST3x6 @ Binding	1
22	OJ05054A	P.C.B. Himelon	1	L15	OE00870A	M3x6 @ Binding (Black Chromate) (ST-7 (Other) & ST-70)	4
23	BA06512A	+15V Regulator P.C.B. Ass'y	1				
24	OJ05179A	Insulator	1				

4.3. Front Panel Ass'y (A02)

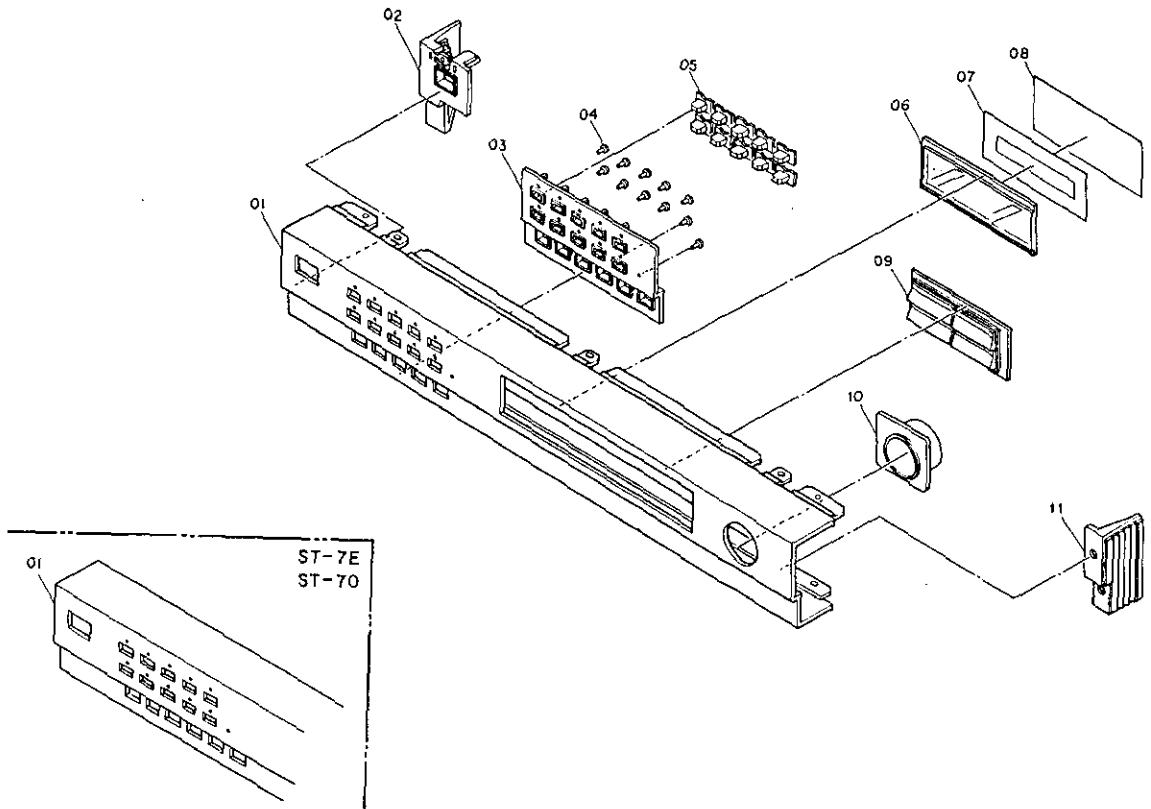


Fig. 4.3

Schematic Ref. No.	Part No.	Description	Q'ty
A02	HA04816A	Front Panel Ass'y (ST-7)	1
	HA04817A	Front Panel Ass'y (ST-7E)	1
	HA05016A	Front Panel Ass'y (ST-70)	1
01	OH04620B	Front Panel (ST-7)	1
	OH04621B	Front Panel (ST-7E)	1
	OH04851B	Front Panel (ST-70)	1
02	OH04640B	Side Panel L	1
03	OJ04997A	Station Button Base	1
04	OH04639B	Lens	11
05	OH04644A	Station Button	10
06	OH04647A	FL Indicator Lens	1
07	OJ04998A	FL Indicator Filter A	1
08	OJ04995B	FL Indicator Filter B	1
09	HA04800B	Up Button Ass'y	1
10	OH04648B	Volume Knob Holder	1
11	OH04641A	Side Panel R	1

4.4. Rear Panel Ass'y (B01)

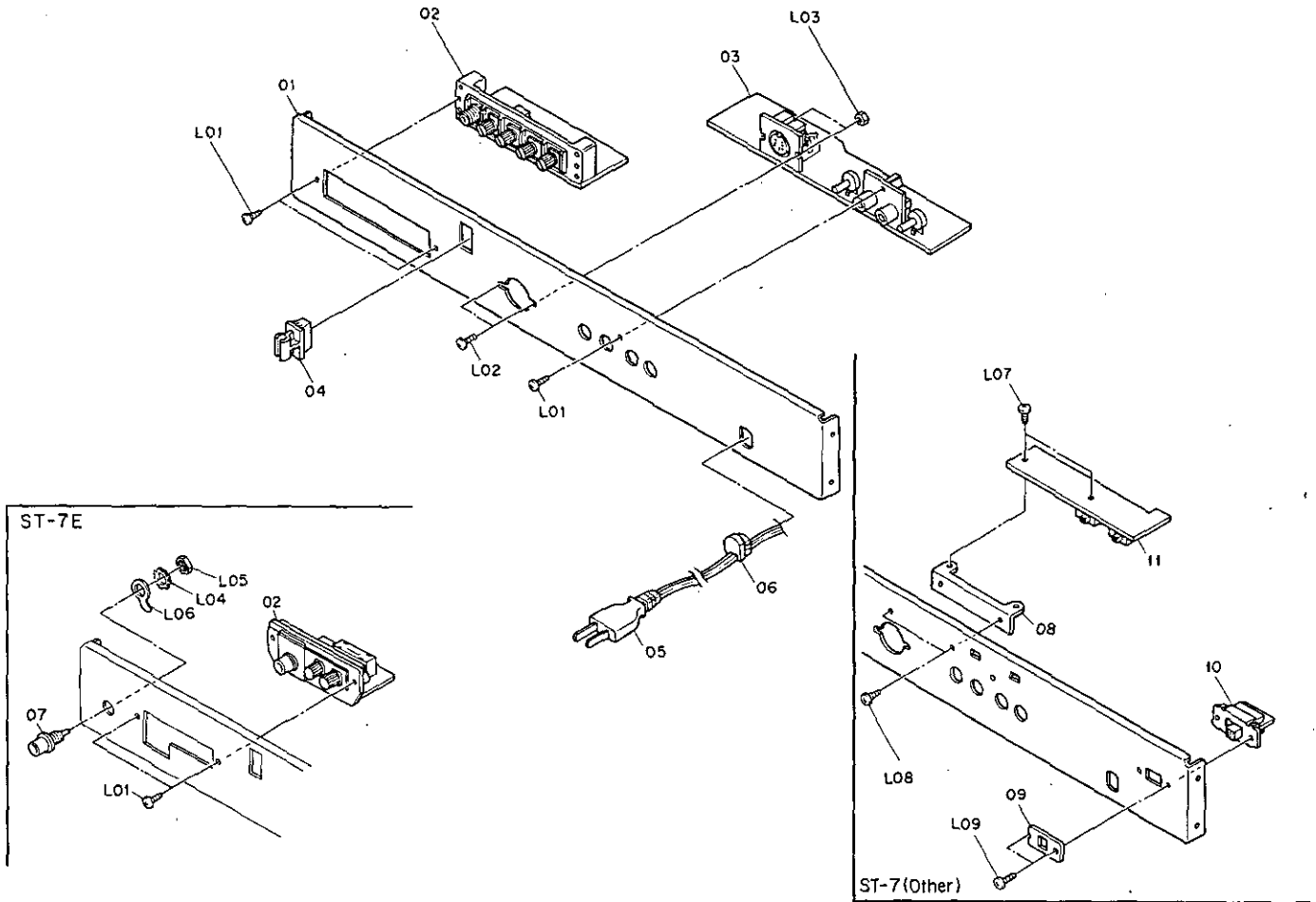


Fig. 4.4

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
B01	HA05160A	Rear Panel Ass'y (ST-7 (U.S.A.))	1	07	0B90079A	Antenna Plug (ST-7E)	1
	HA05181A	Rear Panel Ass'y (ST-7 (Canada))	1	08	0J05018A	P.C.B. Holder (ST-7 (Other))	1
	HA05158A	Rear Panel Ass'y (ST-7 (Australia))	1	09	0M03948A	Voltage Selector Lock Plate (ST-7 (Other))	1
	HA05167A	Rear Panel Ass'y (ST-7 (Other))	1	10	0B07092U	Voltage Selector (ST-7 (Other))	1
	HA05159A	Rear Panel Ass'y (ST-7E (Except UK))	1	11	BA06190A	Relay P.C.B. Ass'y (ST-7 (Other))	1
	HA05155A	Rear Panel Ass'y (ST-7E (UK))	1	L01	0E00921A	BT3x8 \emptyset Binding (Black Chromate)	3
	HA05156A	Rear Panel Ass'y (ST-70)	1	L02	0E00818A	M3x8 \emptyset Binding (Black Chromate)	2
01	0H04656A	Rear Panel (ST-7 (Except Other))	1	L03	0E00507A	Nut Hex. M3	2
	0H04875A	Rear Panel (ST-7 (Other))	1	L04	0E03284A	Washer 10mm Toothed Lock (ST-7E)	1
	0H04657B	Rear Panel (ST-7E)	1	L05	--	Nut for Antenna Plug (ST-7E)	(1)
02	0H04852A	Rear Panel (ST-70)	1	L06	--	Earth Lug for Antenna Plug (ST-7E)	(1)
	BA05696A	Antenna P.C.B. Ass'y (ST-7 & ST-70)	1	L07	0E00800A	ST3x6 \emptyset Binding (ST-7 (Other))	2
03	BA05695A	Antenna P.C.B. Ass'y (ST-7E)	1	L08	0E00921A	BT3x8 \emptyset Binding (Black Chromate) (ST-7 (Other))	2
	BA06476A	Pin Jack P.C.B. Ass'y (ST-7 & ST-7E)	1	L09	0E00818A	M3x8 \emptyset Binding (Black Chromate) (ST-7 (Other))	2
04	BA06477A	Pin Jack P.C.B. Ass'y (ST-70)	1				
	0B90071A	AM Loop Antenna Holder	1				
05	0B90189A	Power Cord (ST-7 (U.S.A.))	1				
	0B08533A	Power Cord (ST-7 (Canada & Other))	1				
06	0B05241A	Power Cord (ST-7 (Australia))	1				
	0B08093U	Power Cord (ST-7E (Except UK))	1				
	0B08348A	Power Cord (ST-7E (UK))	1				
	0B08219B	Power Cord (ST-70)	1				
	0B08037U	Cord Bushing (ST-7 (U.S.A., Australia & Other), ST-7E (Except UK) & ST-70)	1				
	0B08351A	Cord Bushing (ST-7 (Canada) & ST-7E (UK))	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, RW — Wire Wound Resistor

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

CT — Tantalum Capacitor, CSP — Polystyrene Capacitor, C — Mica Capacitor

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

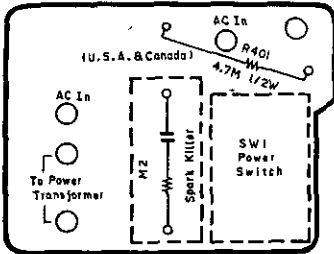


Fig. 5.1

5.2. +15 V Regulator P.C.B. Ass'y

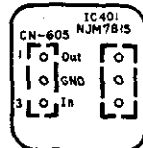


Fig. 5.2

5.3. Antenna P.C.B. Ass'y
(1) For ST-7E

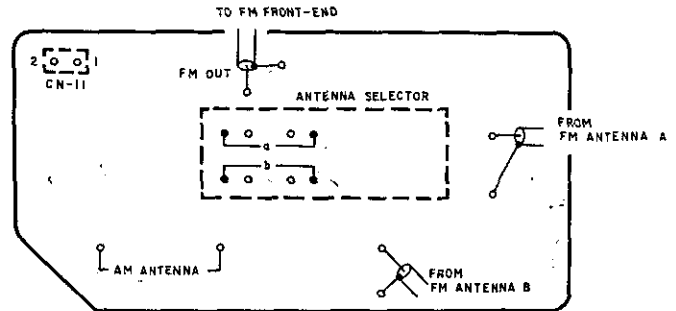


Fig. 5.3.1 For ST-7E

(2) For ST-7 and ST-70

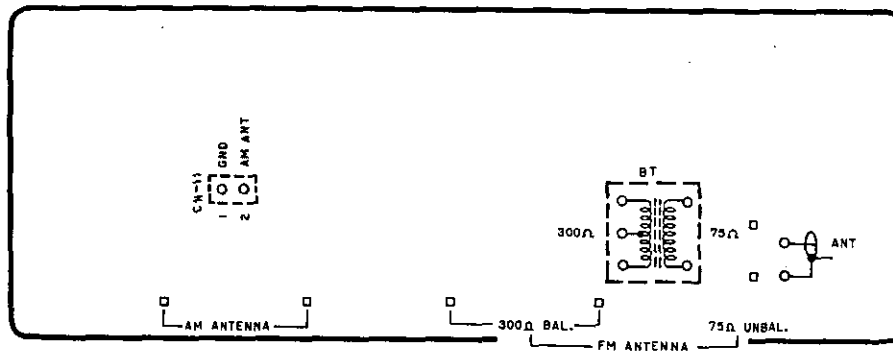


Fig. 5.3.2 For ST-7 and ST-70

Schematic Ref. No.	Part No.	Description	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))	IC401 CN605	OB08955A	Spark Killer (ST-7E (UK) & ST-7 (Australia & Other))	BT CN11	OB60212A	Antenna P.C.B. (ST-7E)
	BA05702A	Power Switch P.C.B. Ass'y (ST-7E (Except UK))		OB90059A	Spark Killer Cover (ST-7E (Except UK))		OB60211B	Antenna P.C.B. (ST-7 & ST-70)
	BA05704B	Power Switch P.C.B. Ass'y (ST-7E (UK) & ST-7 (Australia & Other))		OE00752A	Eyelet 2x3 (2)		OB50045A	Balun Transformer (ST-7 & ST-70)
	BA05700A	Power Switch P.C.B. Ass'y (ST-70)		OB81409A	Switch GND (ST-7 (U.S.A. & Canada)) (1)		OB81223A	2P-T Post
	OB60203B	Power Switch P.C.B. RK 4.7M 1/2W J (ST-7 (U.S.A. & Canada))		BA06512A	+15V Regulator P.C.B. Ass'y		OB90078A	Antenna Terminal (ST-7E) (1)
	OB20057A	Power Switch Spark Killer (ST-7 (U.S.A. & Canada))		OB60363A	+15V Regulator P.C.B. IC NJM7815		OB90072A	Antenna Terminal (ST-7 & ST-70) (1)
	OB71006A	Power Switch Spark Killer (ST-7 (U.S.A. & Canada))		OB82860A	3P Connector		OB80081A	Antenna Cable (ST-7E) (1)
	OB08342A	Power Switch Spark Killer (ST-7 (U.S.A. & Canada))		BA05695A	Antenna P.C.B. Ass'y (ST-7E)		OB90019A	Insu-Lock SKB80 (1)
	OB08445A	Power Switch Spark Killer (ST-7E (Except UK))		BA05696A	Antenna P.C.B. Ass'y (ST-7 & ST-70)		OB70058A	Antenna Selector (ST-7E) (1)
	OB08363A	Power Switch Spark Killer (ST-70)						

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

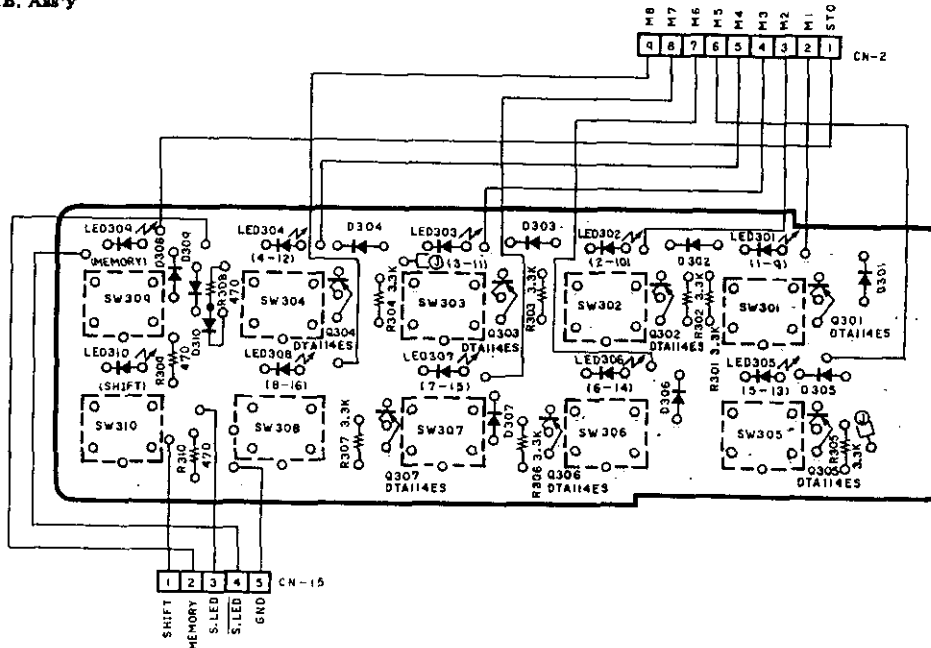
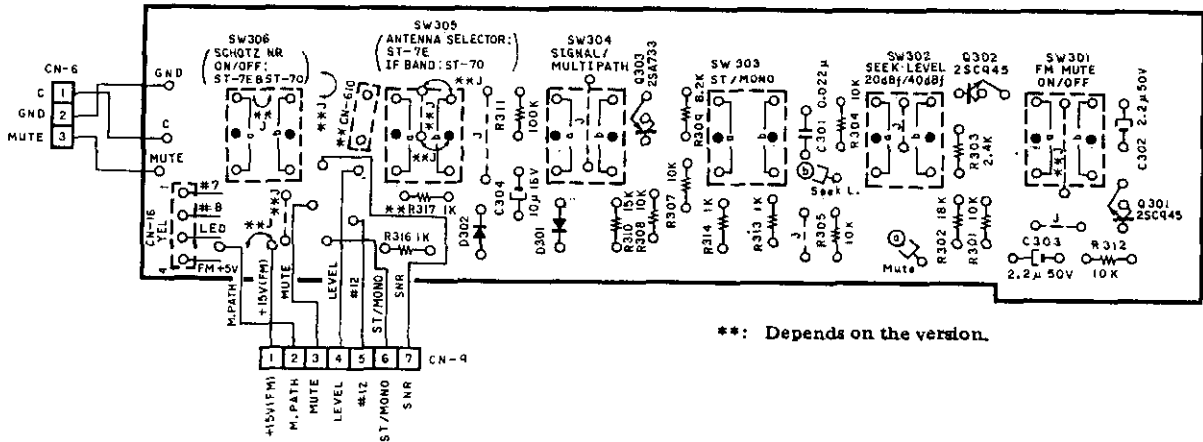


Fig. 5.4

5.5. Function Switch P.C.B.



** : Depends on the version.

Fig. 5.5

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05697A	Memory Switch P.C.B. Ass'y		BA05698B	Function Switch P.C.B. Ass'y (ST-7)	RS17	OB09677A	RK 1K 1/6W J (ST-70)
	OB60207C	Memory Switch P.C.B.		BA05699B	Function Switch P.C.B. Ass'y (ST-7E)	C301	OB09860A	CM 0.022μ 50V J
Q301-307	OB10058A	TR DTA114ES	Q301,302	OB10025A	TR 2SC945L (P,K)	C302,303	OB09872A	CE 2.2μ 50V
LED301-310	OB12406A	LED LD201MG (Green)	Q303	OB06155A	TR 2SA733 (P)	C304	OB40009A	CE 10μ 16V
D301-310	OB06398A	SID 1SS176	D301,302	OB06398A	SID 1SS176	SW301-305	OB70040A	Push Switch 5-Key (ST-7)
R301-307	OB09689A	RK 3.3K 1/6W J	VR301	OB32060A	Semi VR 4.7K	SW301-306	OB70041A	Push Switch 6-Key (ST-7E)
R308,309	OB09669A	RK 470 1/6W J	R301,304	OB09701A	RK 10K 1/6W J	SW301-306	OB70086A	Push Switch SUFX6 (ST-70)
310			305,307			CN6	OB81354B	3P Connector
SW301-310	OB70043A	Tact Switch KHH15910	308,312			CN9	OB81367A	7P Connector
CN2	OB81362B	9P Connector	R302	OB09707A	RK 18K 1/6W J	CN16	OB81190A	4P-S Post (Yellow)
CN15	OB81366C	5P Connector	R309	OB09699A	RK 8.2K 1/6W J	CN610	OB82892A	3P Connector (ST-70)
	OJ04703A	Bushing TB-300 (3)	R310	OB09705A	RK 15K 1/6W J		OB81379B	1P Contact L=430 (1)
	OJ05008A	Bushing TA-310 (3)	R311	OB09725A	RK 100K 1/6W J		OB81380B	1P Contact L=430 (1)
	OB02377B	PD Connector V090 (1)	R313,314	OB09677A	RK 1K 1/6W J			
			316					

5.6. AM Switch P.C.B. Ass'y

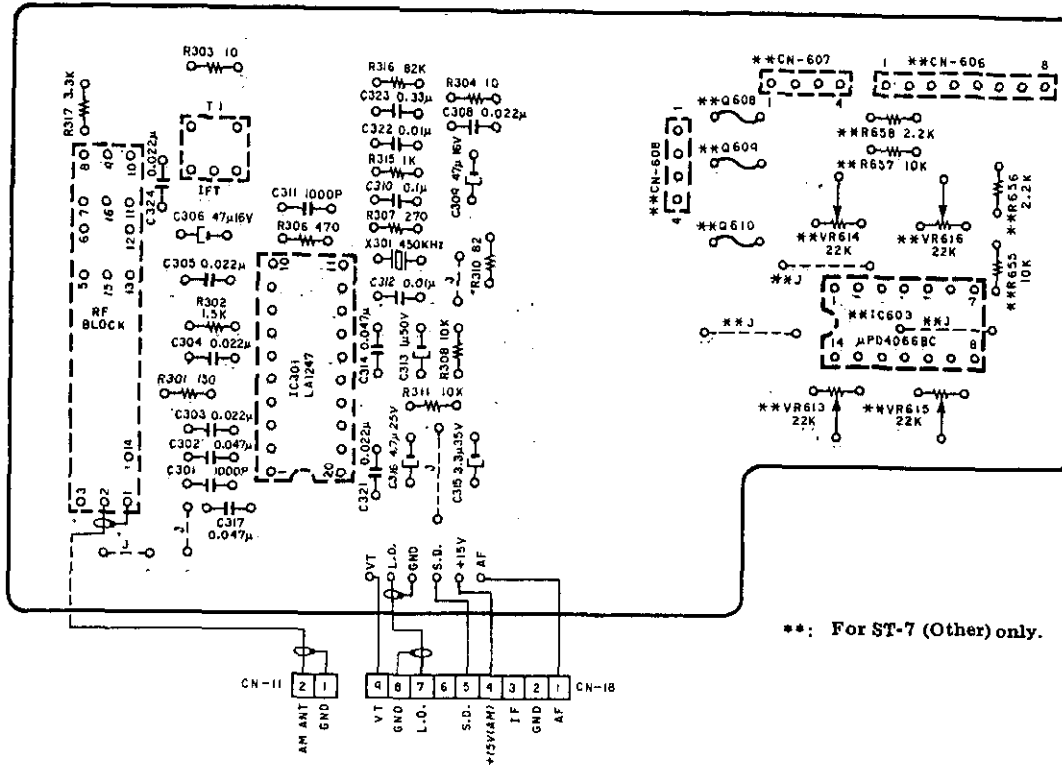


Fig. 5.6

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05735A	AM P.C.B. Ass'y (ST-7 & ST-7E)	CN11	0B82481C	2P Connector
	BA06809A	AM P.C.B. Ass'y (ST-70)	CN18	0B82444C	9P Connector
			CN606	0B81204A	8P-S Post (Black) (ST-70)
			CN607	0B81806A	4P Connector (ST-70)
IC301	0B60242D	AM P.C.B.			
IC603	0B11243A	IC LA1247	CN608	0B81607A	4P Connector (ST-70)
	0B06144A	IC μ PD4066BC (ST-70)		0B51214A	AM RF Block (1)
T1	0B51213A	IFT 450kHz			
X301	0B92003A	Crystal 450kHz			
Q608-610	0B11248A	IC ICP-N5 (ST-70)			
VR613-616	0B32082A	Seml-VR 22K (ST-70)			
R301	0B09657A	RK 150 1/6W J			
R302	0B09681A	RK 1.5K 1/6W J			
R303,304	0B09216A	RF 10 1/6W J			
R306	0B09669A	RK 470 1/6W J			
R307	0B09683A	RK 270 1/6W J			
R308,311	0B09701A	RK 10K 1/6W J			
R310	0B09651A	RK 82 1/6W J			
R315	0B09677A	RK 1K 1/6W J			
R318	0B09723A	RK 82K 1/6W J			
R317	0B09689A	RK 3.3K 1/6W J			
R655,657	0B09701A	RK 10K 1/6W J (ST-70)			
R666,658	0B09685A	RK 2.2K 1/6W J (ST-70)			
C801,311	0B09288A	CC 1000P 50V K			
C302,314	0B41027A	CC 0.047 μ 25V M			
317					
C803-305	0B41023A	CC 0.022 μ 25V M			
308,321					
324					
C806,309	0B40012A	CE 47 μ 16V			
C810	0B09292A	CC 0.1 μ 50V Z			
C812,322	0B41019A	CC 0.01 μ 25V M			
C813	0B40189A	CE 1 μ 50V			
C815	0B40169A	CE 3.3 μ 35V			
C816	0B40014A	CE 4.7 μ 25V			
C823	0B09778A	CM 0.33 μ 50V M			

5.7. Relay P.C.B. Ass'y

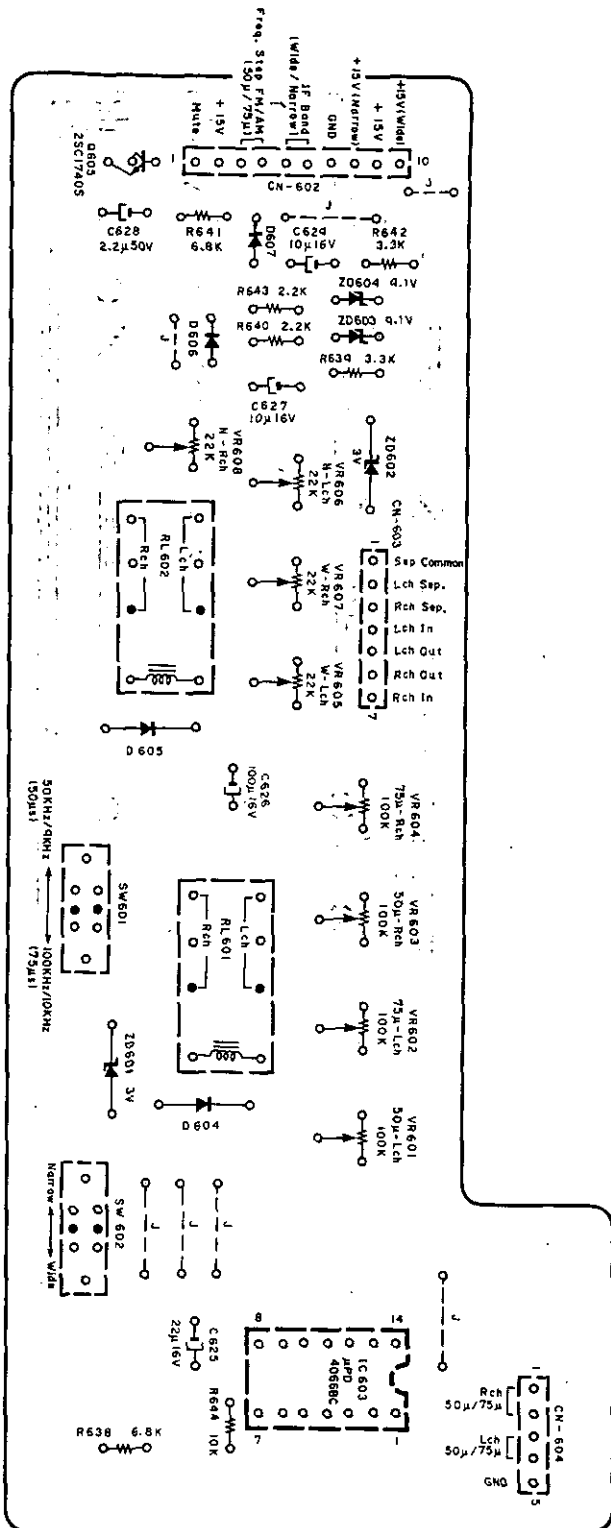


Fig. 5.7

Schematic Ref. No.	Part No.	Description
	BA06190A	Relay P.C.B. Ass'y (ST-7 (Other))
IC603	OB60362B	Relay P.C.B.
Q605	OB06144A	IC μ PD4066BC
ZD601,602	OB10034A	TR 2SC1740S
	OB12103A	ZD 2.7V
		RD2.7EB2
ZD603,604	OB12305A	ZD 9.1V
		MTZ9.1A
D604,605	OB06398A	SID 1SS176
606,607		
VR601,602	OB32086A	Semi VR 100K
603,604		
VR605,606	OB32082A	Semi VR 22K
607,608		
R638,641	OB09697A	RK 6.8K 1/6W J
R639,642	OB09689A	RK 3.3K 1/6W J
R640,643	OB09685A	RK 2.2K 1/6W J
R644	OB09701A	RK 10K 1/6W J
C625	OB40010A	CE 22 μ 16V
C626	OB40208A	CE 100 μ 16V
C627,629	OB40009A	CE 10 μ 16V
C628	OB40027A	CE 2.2 μ 50V
RL601,602	OB90142A	Relay MR62-12SR
SW601,602	OB70073A	Mini Slide Switch SSF-022A
CN602	OB81211A	10P-S Post (White)
CN603	OB81201A	7P-S Post (Red)
CN604	OB81194A	5P-S Post (Yellow)

5.8. IF P.C.B. Ass'y

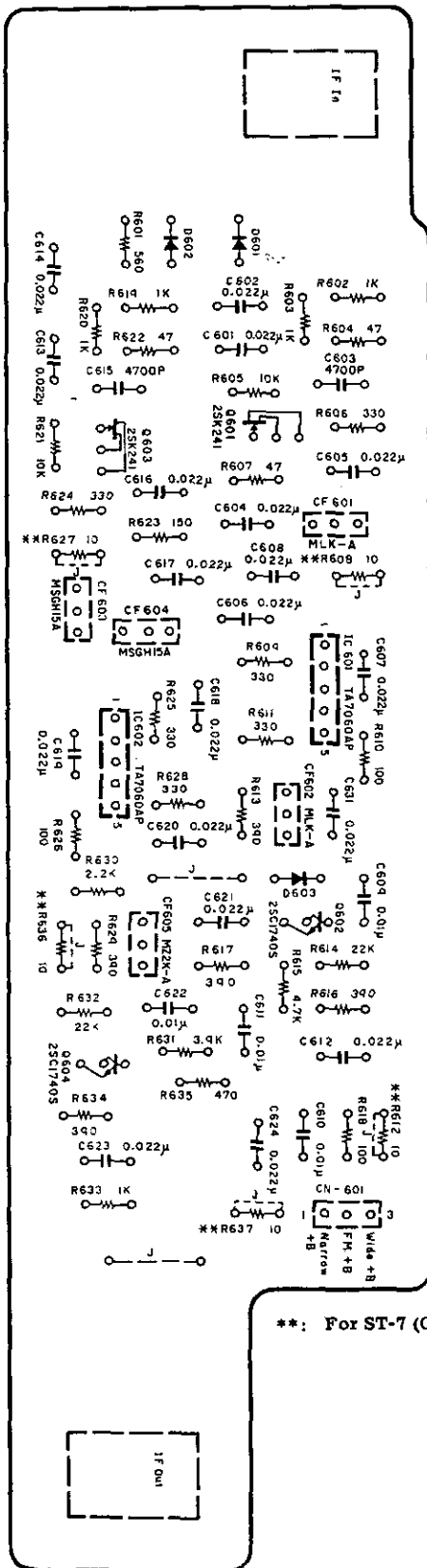


Fig. 5.8

Schematic Ref. No.	Part No.	Description
	BA06189A	IF P.C.B. Ass'y (ST-7 (Other))
	BA06316A	IF P.C.B. Ass'y (ST-70)
IC601,602	OB60361A	IF P.C.B.
Q601,603	OB11156A	IC TA7060AP
Q602,604	OB10127A	FET 2SK241 (GR)
D601,602	OB10034A	TR 2SC1740S
603	OB06398A	SID 1SS176
R601	OB09671A	RK 560 1/6W J
R602,603	OB09677A	RK 1K 1/6W J
619,620		
633		
R604,607	OB09645A	RK 47 1/6W J
622		
R605,621	OB09701A	RK 10K 1/6W J
R606,609	OB09665A	RK 330 1/6W J
611,624		
625,628		
R608,612	OB09629A	RK 10 1/6W J (ST-7 (Other))
627,636		
637		
R610,618	OB09653A	RK 100 1/6W J
626		
R613,616	OB09667A	RK 390 1/6W J
617,629		
634		
R614,632	OB09709A	RK 22K 1/6W J
R615	OB09693A	RK 4.7K 1/6W J
R623	OB09657A	RK 150 1/6W J
R630	OB09685A	RK 2.2K 1/6W J
R631	OB09691A	RK 3.9K 1/6W J
R635	OB09669A	RK 470 1/6W J
C601,602	OB41023A	CC 0.022μ 25V (19)
604-608		
612-614		
616-621		
623,624		
631		
C603,615	OB41549A	CC 4700P 100V J
C609,610	OB41563A	CC 0.01μ 25V Z
611,622		
CF601,602	OB41075A	Ceramic Filter SFE10.7MLK-A
CF603,604	OB41746A	Ceramic Filter SFE10.7MSGH15A
CF605	OB41697A	Ceramic Filter SFE10.7MZ2K-A
CN601	OB81228A	3P-T Post (Black)
	OB81589A	Phone Jack S-Q3063 (2)

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

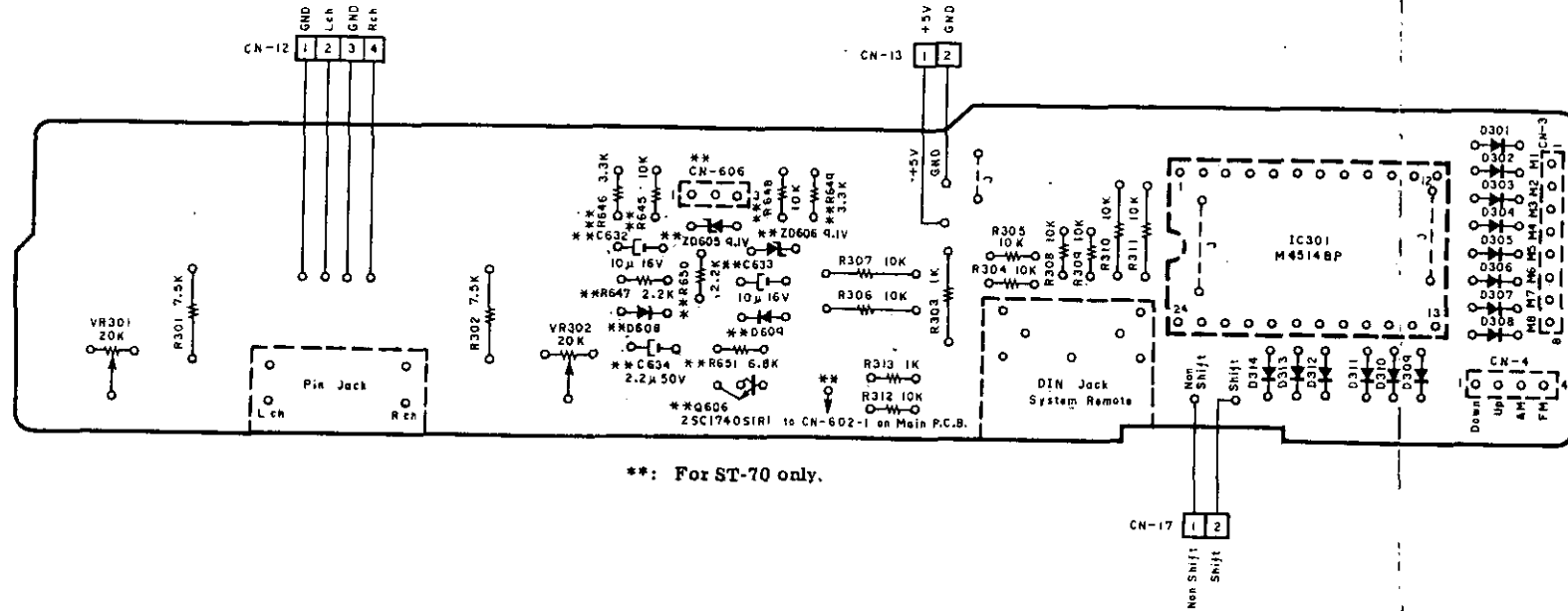


Fig. 5.9

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

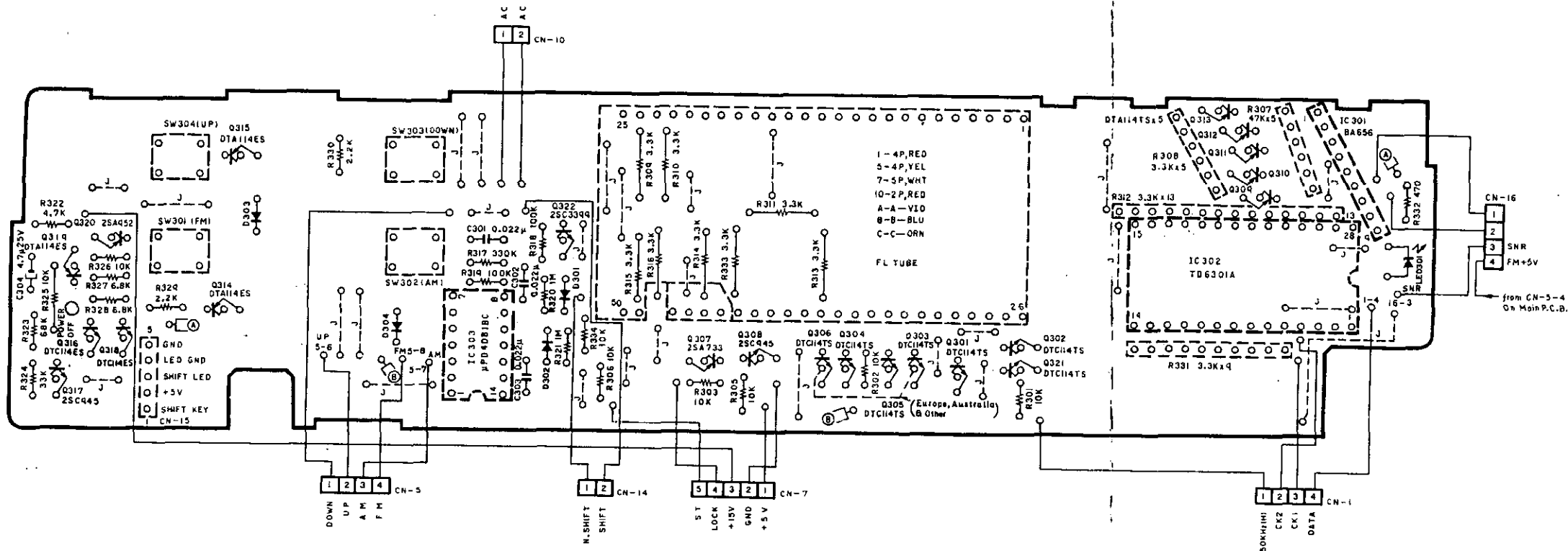
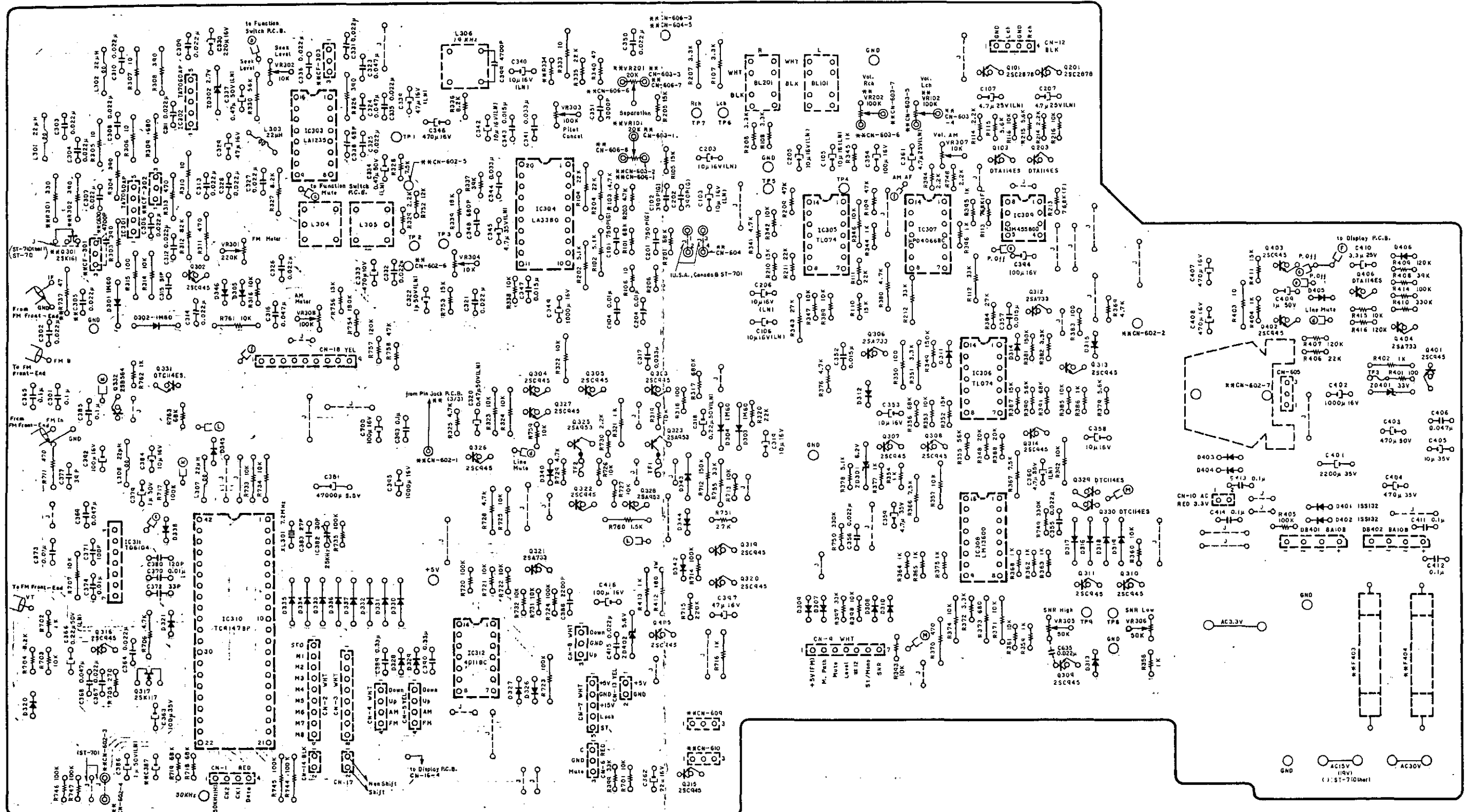


Fig. 5.10

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA06476A	Pin Jack P.C.B. Ass'y (ST-7 & ST-7E)		BA05708B	Display P.C.B. Ass'y (ST-7 (U.S.A. & Canada) & ST-70)
	BA06477A	Pin Jack P.C.B. Ass'y (ST-70)		BA05709B	Display P.C.B. Ass'y (ST-7 (Australia & Other) & ST-7E)
IC301	OB60205D	Pin Jack P.C.B.	IC301	OB60208C	Display P.C.B.
Q606	OB11179A	IC M4514BP	IC302	OB11162A	IC BA656
	OB10032A	TR 2SC1740S (ST-70)	IC303	OB11160A	IC TD6301A
ZD605,606	OB12305A	ZD 9.1V MTZ9.1A (ST-70)	Q301-306	OB10104A	TR DTC114TS (7) 321
D301-314	OB06398A	SID 1SS176	Q307	OB06013A	TR 2SA733 (P,Q)
D608,609	OB06398A	SID 1SS176 (ST-70)	Q308,317	OB01872A	TR 2SC945L (P,Q)
VR301,302	OB32042A	Semi VR 20K	Q309-313	OB10067A	TR DTA114TS (5)
R301,302	OB09183A	RK 7.5K 1/4W J	Q314,315	OB10058A	TR DTA114ES 319
R303	OB01857A	RK 1K 1/4W J	Q316,318	OB10068A	TR DTC114ES
R304,305	OB09701A	RK 10K 1/6W J	Q320	OB10097A	TR 2SA952 (K,L)
308,309			Q322	OB10007A	TR 2SC3399
312			LED301	OB12406A	LED LD201MG (Green)
R306,307	OB01888A	RK 10K 1/4W J	D301,302	OB06398A	SID 1SS176
310,311			303,304		
R313	OB09677A	RK 1K 1/6W J	R301-303	OB09701A	RK 10K 1/6W J (7)
R645,648	OB09701A	RK 10K 1/6W J (ST-70)	305,306		
R646,649	OB09689A	RK 3.3K 1/6W J (ST-70)	326,334		
R647,650	OB09685A	RK 2.2K 1/6W J (ST-70)	R307	OB21006A	R-Network 47Kx5
R651	OB09697A	RK 6.8K 1/6W J (ST-70)	R308	OB21007A	R-Network 3.3Kx5
C632,633	OB40009A	CE 10µ 16V (ST-70)	R309,310	OB09533A	RK 3.3K 1/4W J
C634	OB40027A	CE 2.2µ 50V (ST-70)	311,313		
CN3	OB81363B	8P Connector	314,315		
CN4	OB81358B	4P Connector	316,333		
CN12	OB81360A	4P Connector	R312	OB21005A	R-Network 3.3Kx13
CN13	OB82410C	2P Connector	R317	OB09737A	RK 380K 1/6W J
CN17	OB82861A	2P-H Connector	R318,319	OB09725A	RK 100K 1/6W J
CN606	OB81230A	3P-T Post (Yellow) (ST-70)	R320,321	OB09749A	RK 1M 1/6W J
	OB81350A	7P DIN Socket (1)	R322	OB09693A	RK 4.7K 1/6W J
	OB81351A	2P Pin Jack (1)	R323	OB09721A	RK 68K 1/6W J
			R324	OB09713A	RK 38K 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 470 1/6W J
			C301,302	OB09860A	CM 0.022µ 50V J
			303		
			C304	OB40272A	CE 4.7µ 25V
			SW301,302	OB70043A	Tact Switch
			303,304		
			CN1	OB81357C	4P Connector
			CN5	OB81359C	4P Connector
			CN7	OB81361C	5P Connector
			CN10	OB81352B	2P Connector
			CN14	OB81368B	2P Connector
			CN15	OB81193A	5P-S Post (Red)
			CN16	OB81369D	4P Connector
			OB90074A	FL Tube (1)	
			OJ05004B	FL Cushion (3)	
			OJ04703A	Bushing TB-300 (5)	
			OJ05008A	Bushing TA-310 (5)	
			OB80044A	PD Connector V300 (1)	
			OB82041B	PD Connector V050 (1)	
			OB82215A	PD Connector V090 (1)	
			OB82407B	PD Connector V500 (1)	
			OV14040N	Jumper Wire 42 (ST-7 (Australia & Other) & ST-7E) (1)	

5.11. Main P.C.B. Ass'y



** : Depends on the version.

Fig. 5.11

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA06473A	Main P.C.B. Ass'y (ST-7 (U.S.A. & Canada))	R101,201 356,391 718,719	OB09721A	RK 68K 1/6W J	R341,380 706,728 R343	OB01846A	RK 4.7K 1/4W J	C345,359 360	OB40258A	CE 4.7μ 35V (LN)	CN12	OB81232A	4P-T Post (Black)
	BA06475A	Main P.C.B. Ass'y (ST-7 (Australia) & ST-7E)	R102,202 R103,203 325,369 376,729	OB09314A OB09693A	RK 5.1K 1/4W J RK 4.7K 1/6W J	R344,345 354,358 359,362 363,364 365,368	OB05743A OB09677A	RK 27K 1/4W J RK 1K 1/6W J	C346,407 408 C348 C349,396 C351 C354,392 394,416 700	OB40081A	CE 470μ 16V	CN13 CN14 CN17 CN18 CN602	OB81226A OB81224A OB81223A OB81254A OB81584B	2P-T Post (Yellow) 2P-T Post (Black) 2P-T Post (White) 9P-T Post (Yellow) 10P Connector (ST-7 (Other))
	BA06478A	Main P.C.B. Ass'y (ST-7 (Other))	R104,204 R105,110 205,210 352,387	OB05615A OB09705A	RK 22K 1/4W J RK 15K 1/6W J	R348,388 R349,381 R355,390 R366,367 R378 R384,751 R397,399 R405,414 714,717 720,724 735,746 747 R407,409 418,757 R410,749 750 R412 R705 R712 R715 R723,744 745 R737	OB09708A OB09729A OB09719A OB09183A OB09694A OB09711A OB09713A OB09725A	RK 20K 1/6W J RK 150K 1/6W J RK 56K 1/6W J RK 7.5K 1/4W J RK 5.1K 1/6W J RK 27K 1/6W J RK 33K 1/6W J RK 100K 1/6W J	C355,356 364,367 415 C362 C363 C368 C370,373 374 C371 C372 C377 C379,409 C380 C381 C382	OB05582A	CM 0.022μ 50V J	CN603 CN604 CN606 CN609,610 F403	OB81583A OB81582B OB81605B OB81635A OB8347U	7P Connector (ST-7 (Other)) 5P Connector (ST-7 (Other)) 8P Connector (ST-70) 3P-T Post (ST-70) Fuse T1A (ST-7 (Australia) & ST-7E)
	BA06474A	Main P.C.B. Ass'y (ST-70)	R108,208 R109,209 758 R111,211 320,335 406 R112,212 755 R113,213 R114,214 329,394 730,748 R115,215 379 R116,216 316,319 338,342 347,353 360,361 385,389 393,398 416,701 703,713 721,722 726,727 731,732 759	OB09689A OB09717A OB09709A OB05509A OB22444A OB09685A OB09695A OB09701A	RK 3.3K 1/6W J RK 3.3K 1/6W J RK 47K 1/6W J RK 22K 1/6W J RK 33K 1/4W J RM 76.8K 1/6W F RK 2.2K 1/6W J RK 5.6K 1/6W J RK 10K 1/6W J	OB09708A OB09729A OB09719A OB09183A OB09694A OB09711A OB09713A OB09725A OB09727A OB09737A OB24083A OB09663A OB05628A OB09733A OB01889A OB01706A OB09703A OB09731A OB09704A OB05698A OB41122A OB41115A OB09816A	RK 20K 1/6W J RK 150K 1/6W J RK 56K 1/6W J RK 7.5K 1/4W J RK 5.1K 1/6W J RK 27K 1/6W J RK 33K 1/6W J RK 100K 1/6W J RK 120K 1/6W J RK 330K 1/6W J RF 180 1W J RK 270 1/6W J RK 150K 1/4W J RK 220K 1/6W J RK 100K 1/4W J RK 47 1/4W J (ST-7 (U.S.A., Canada & Australia) & ST-7E) RK 12K 1/6W J RK 180K 1/6W J RK 13K 1/6W J RK 1.5K 1/4W J CP 750P 100V G CP 390P 100V G CE 10μ 16V (LN)	C388 C389,390 C399 C401 C402 C403 C404 C405 C410 C630	OB01862A OB40104A OB05796A OB41553A OB41071A OB09370A OB41187A OB40112A OB41004A OB40358A OB41614A OB09781A OB40254A OB40255A OB01802A OB41177A OB41608A OB40109A OB40428A OB40082A OB40427A OB40123A OB40107A OB40100A OB40013A OB41549A OB41075A OB41746A OB41075A OB41746A OB41075A OB41746A OB41712A	CE 22μ 16V CE 100μ 35V CM 0.047μ 50V J CC 0.01μ 20V Z CC 100P 50V J CC 33P 50V J CC 39P 50V J CE 1μ 50V CC 120P 50V J CE 47000μ 5.5V Trimmer Capacitor 30P CC 27P 50V J CE 0.47μ 50V (LN) (ST-7 & ST-7E) CE 1μ 50V (LN) (ST-70) CM 2200P 50V J CM 0.33μ 50V J CSP 4700P 50V CE 2200μ 35V (ST-7 & ST-7E) CE 2200μ 35V (LN) (ST-70) CE 1000μ 16V (ST-7 & ST-7E) CE 1000μ 16V (LN) (ST-70) CE 470μ 50V CE 470μ 35V CE 10μ 35V CE 3.3μ 25V CC 4700P (ST-7 (Other) & ST-70) Ceramic Filter SFE10.7MLK-A (ST-7 (U.S.A. & Canada)) Ceramic Filter SFE10.7MS3GH15A (ST-7 (Australia) & ST-7E) Ceramic Filter SFE10.7MLK-A (ST-7 (U.S.A., Canada & Other) & ST-70) Ceramic Filter SFE10.7MS3GH15A (ST-7 (Australia) & ST-7E) Ceramic Filter SFE10.7MLK-A (ST-7 (U.S.A., Canada & Other)) Ceramic Filter SFE10.7MS3GH15A (ST-7 (Australia) & ST-7E) Ceramic Filter SFE10.7MX-A (ST-70) Thermal Fuse 129°	F404	OB08374A OB08686A OB08345A OB08374A OB08686A OB81411B OB81438A OB82404A OB82405A OB82406A OB02361B OB02377B OB82061C OB82227A OB82321B OB82332A OB81377A OB81378A OB81378A OV30040N OV30080N OV30150N OB08349B	Fuse 1A (ST-7 (U.S.A., Canada & Other)) Fuse 1A (ST-70) Fuse T63mA (ST-7 (Australia) & ST-7E) Fuse 1A (ST-7 (U.S.A., Canada & Other)) Fuse 1A (ST-70) F.E. Ground (1) Ground Cable (1) Pin Plug A (ANT) (1) Pin Plug B (IF) (1) Pin Plug C (OSC) (1) PD Connector V230 (1) PD Connector V090 (1) PD Connector V150 (1) PD Connector V250 (1) PD Connector V70 (1) PD Connector V350 (1) 1P Connector L=70 (1) 1P Connector L=150 (1) 1P Connector L=150 (ST-70) (2) Wire 40 (1) Wire 80 (1) Wire 150 (1) Fuse Clip (ST-7 (Australia) & ST-7E) (4)	

6. SCHEMATIC DIAGRAM

6.1. IC Block Diagrams

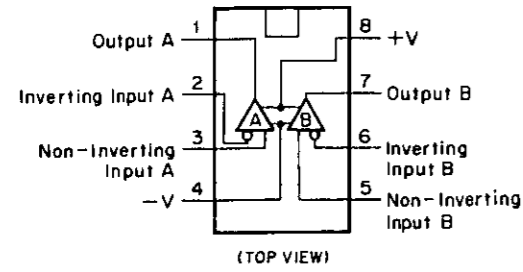


Fig. 6.1.1 Operational Amp. IC NJM4558DD

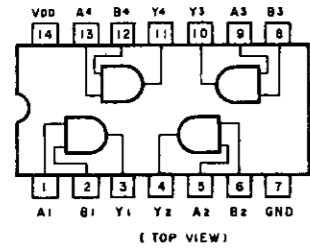


Fig. 6.1.2 AND Gate C-MOS IC μPD4081BC

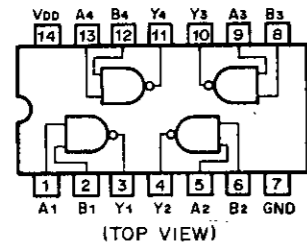


Fig. 6.1.3 NAND Gate C-MOS IC μPD4011BC

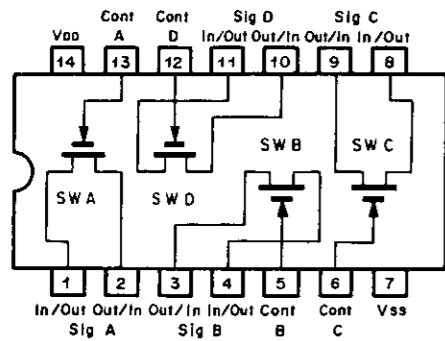


Fig. 6.1.4 Bilateral Switch C-MOS IC μPD4066BC

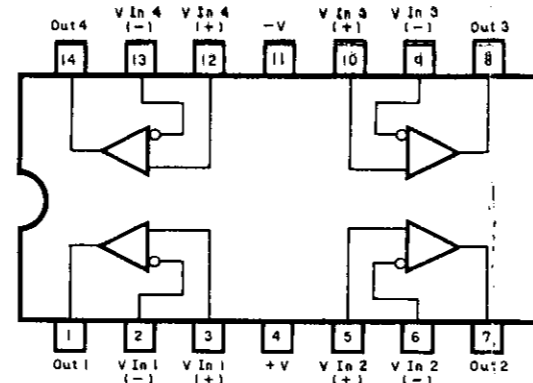


Fig. 6.1.5 Operational Amp. IC TL074

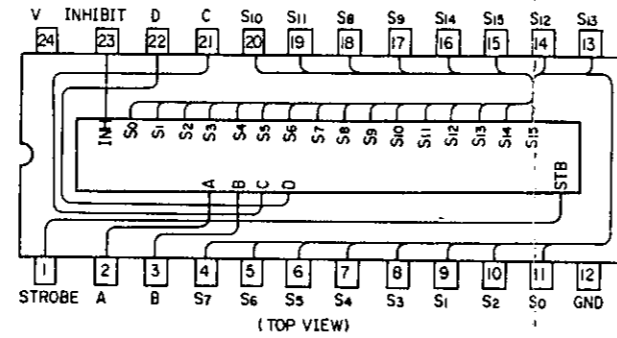


Fig. 6.1.6 4-to-16 Line Decoder IC M4514BP

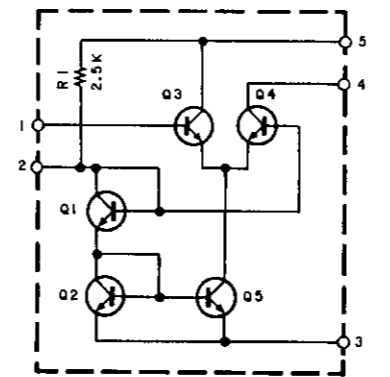


Fig. 6.1.7 FM IF Amp. IC TA7060AP

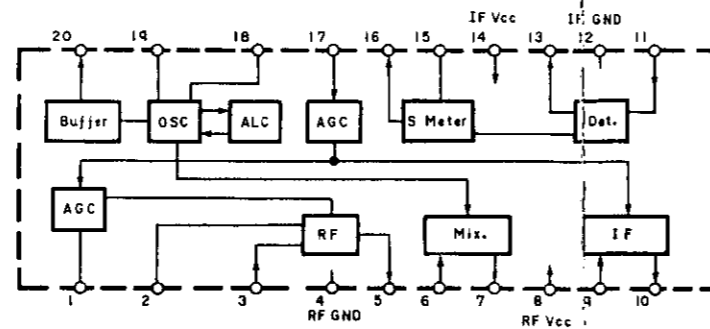


Fig. 6.1.8 AM Tuner IC (with Electronic Tuning of Table Top Stereo) LA1247

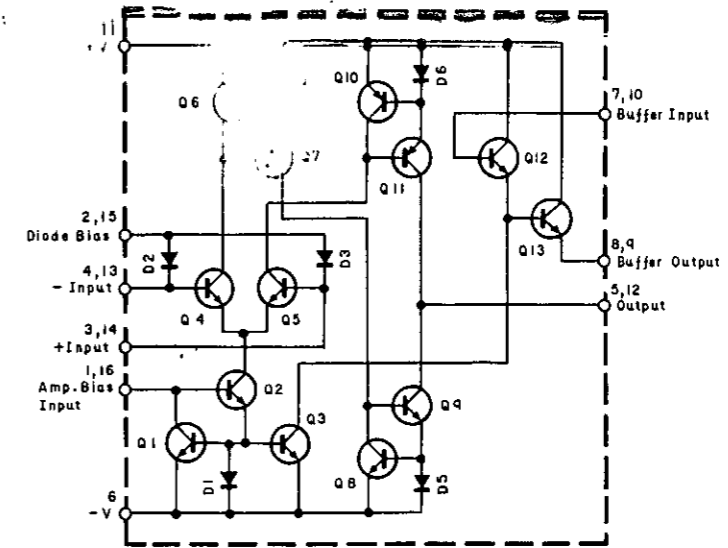


Fig. 6.1.9 Operational Transconductance Amp. (with Linearizing Diodes and Buffer) IC LM13600

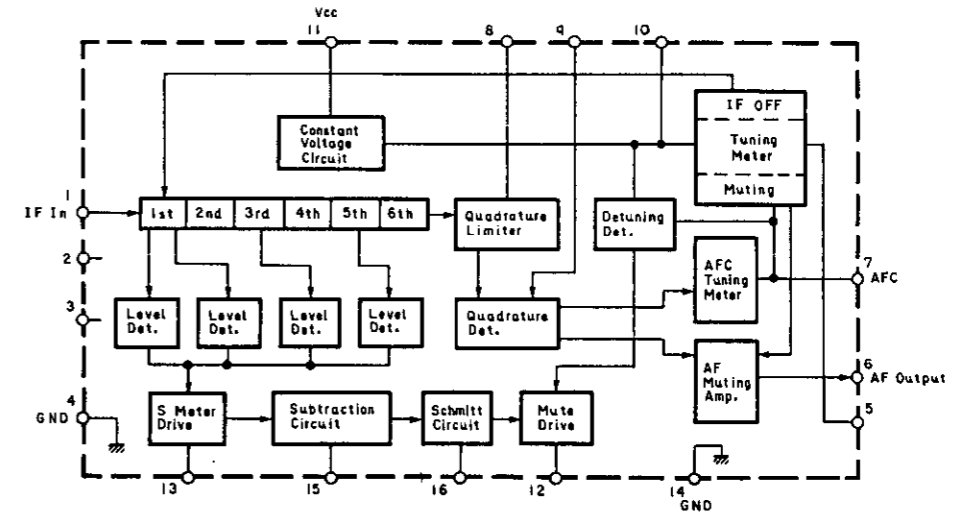


Fig. 6.1.10 FM IF System IC LA1235

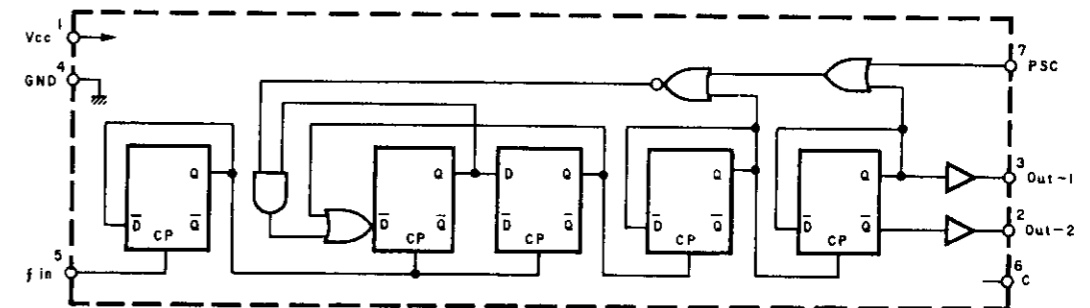


Fig. 6.1.11 ECL Prescaler (FM) IC TD6104

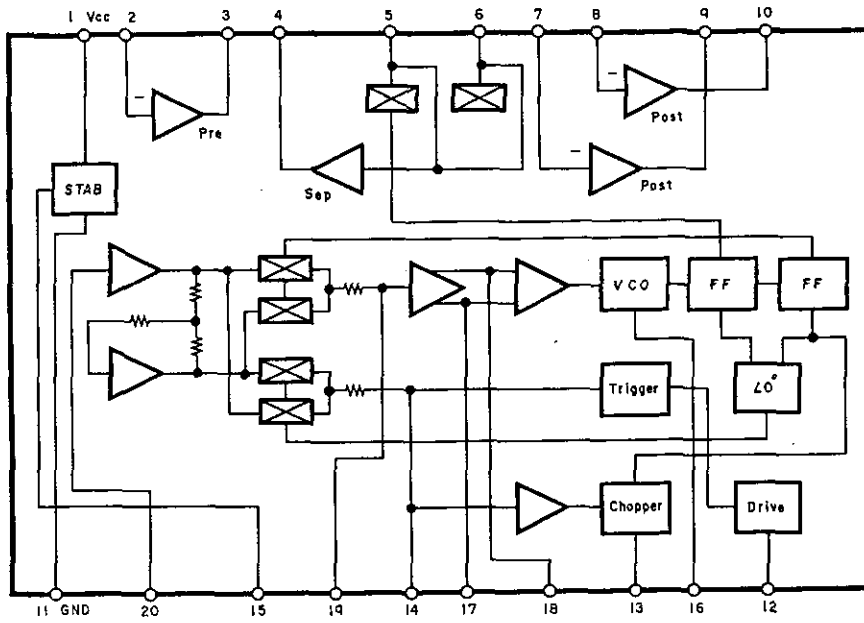


Fig. 6.1.12 PLL FM Stereo MPX Demodulator IC LA3380

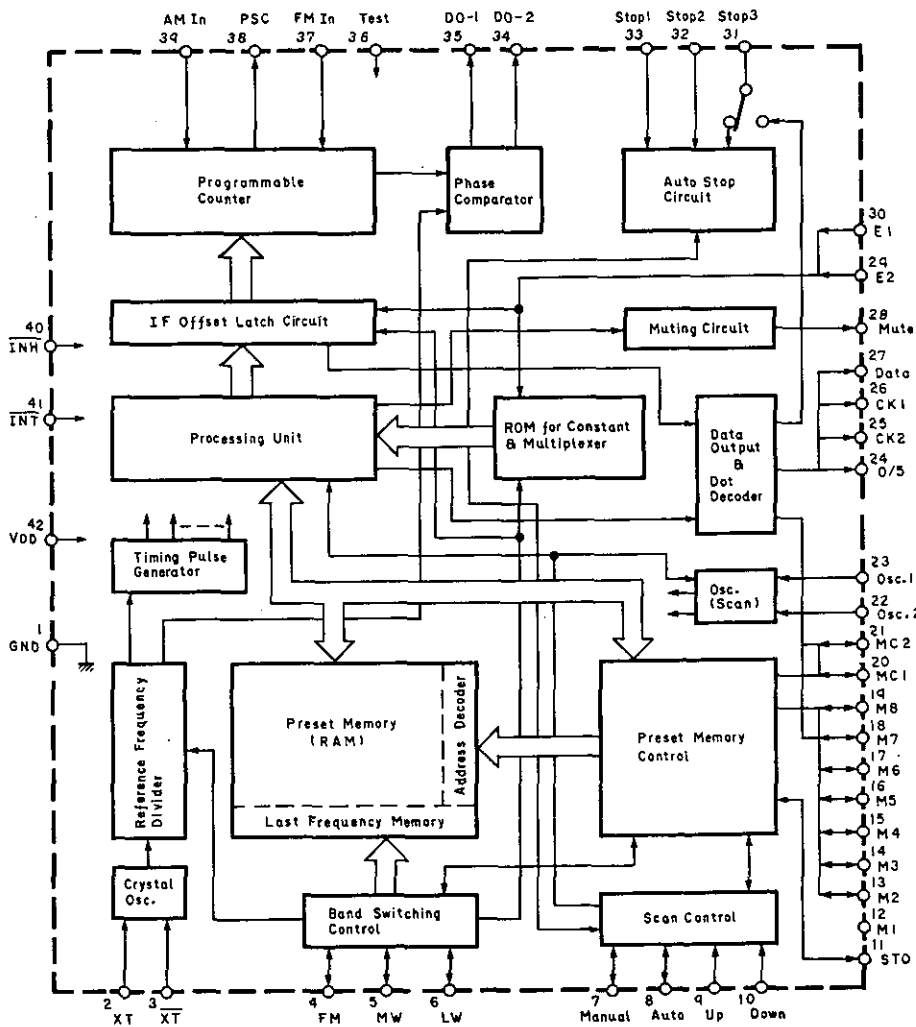


Fig. 6.1.13 FM/MW/LW 3-Band Digital Tuning (Static Method) IC TC9147BP

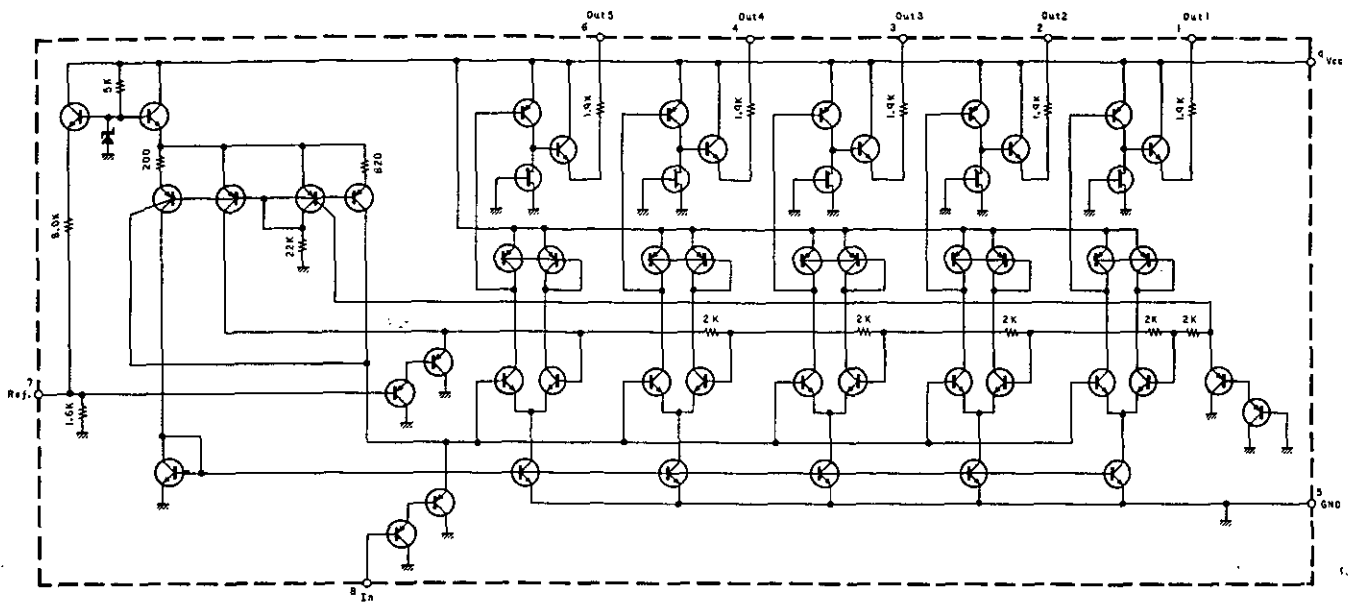


Fig. 6.1.14 Level Meter Driver IC BA656

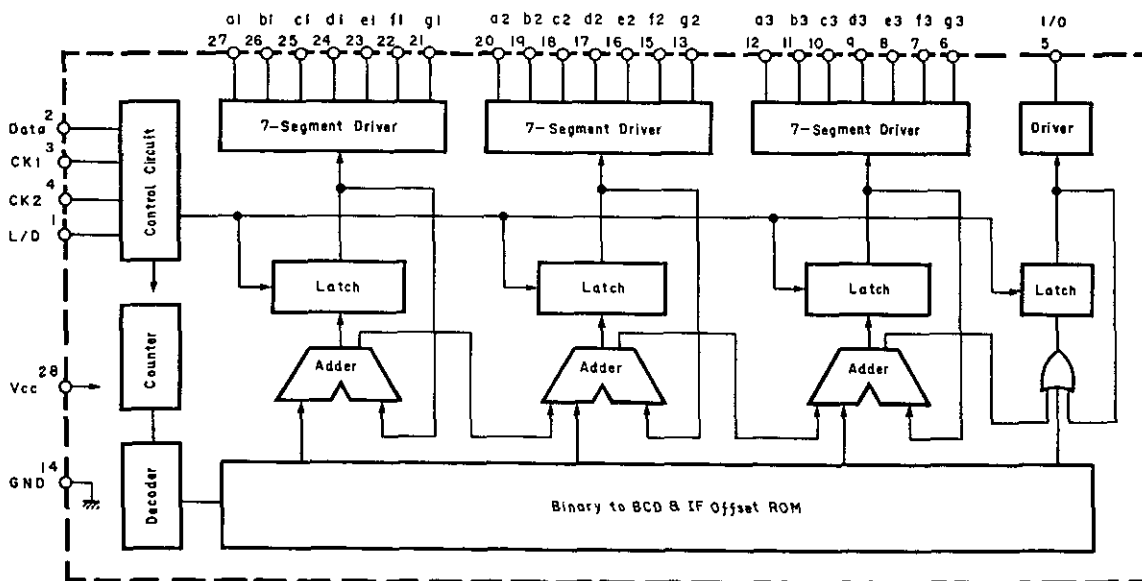


Fig. 6.1.15 Indicator Driver IC TD6301A

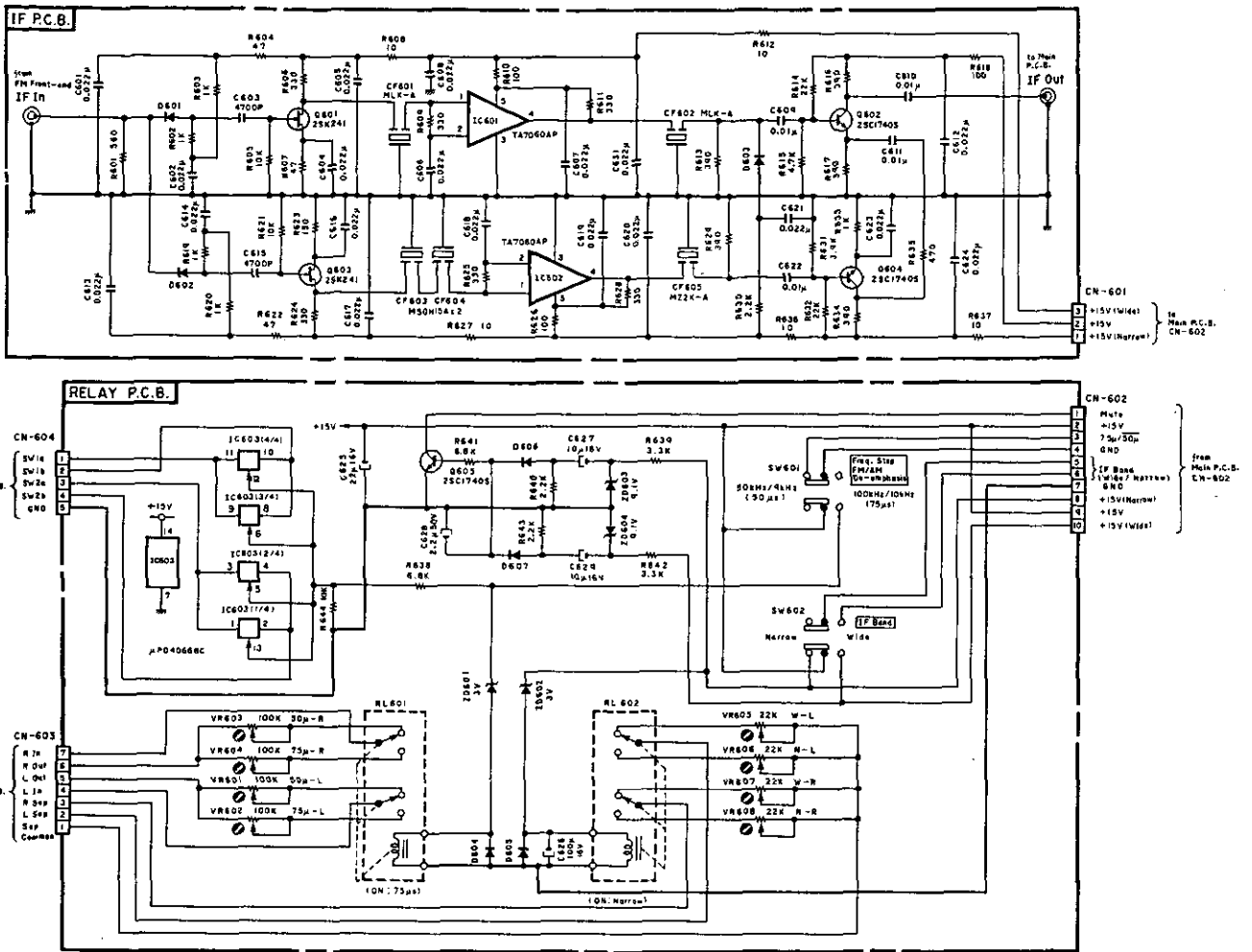


Fig. 6.2.2.2 For ST-7 (Other)

(3) For ST-70

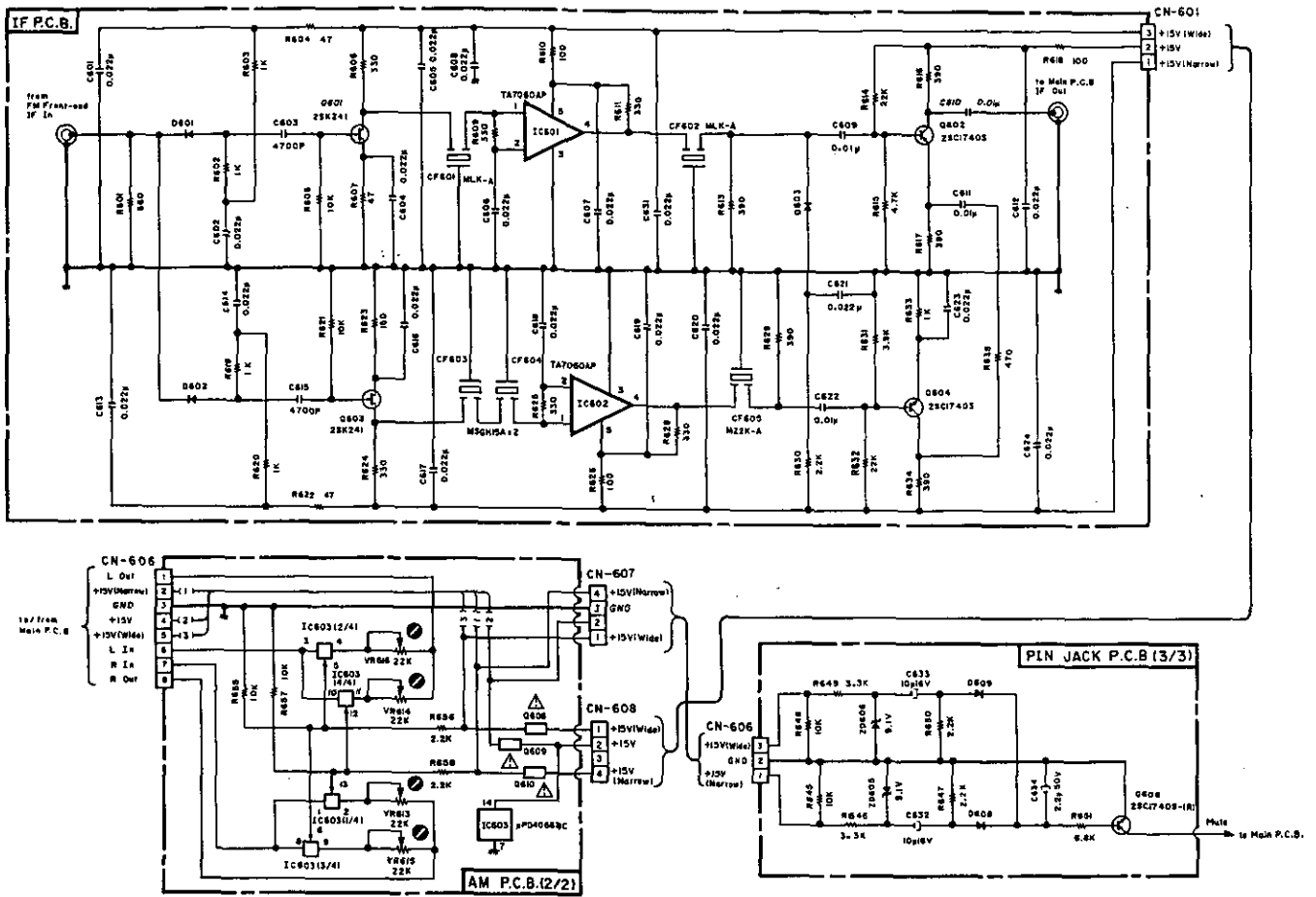
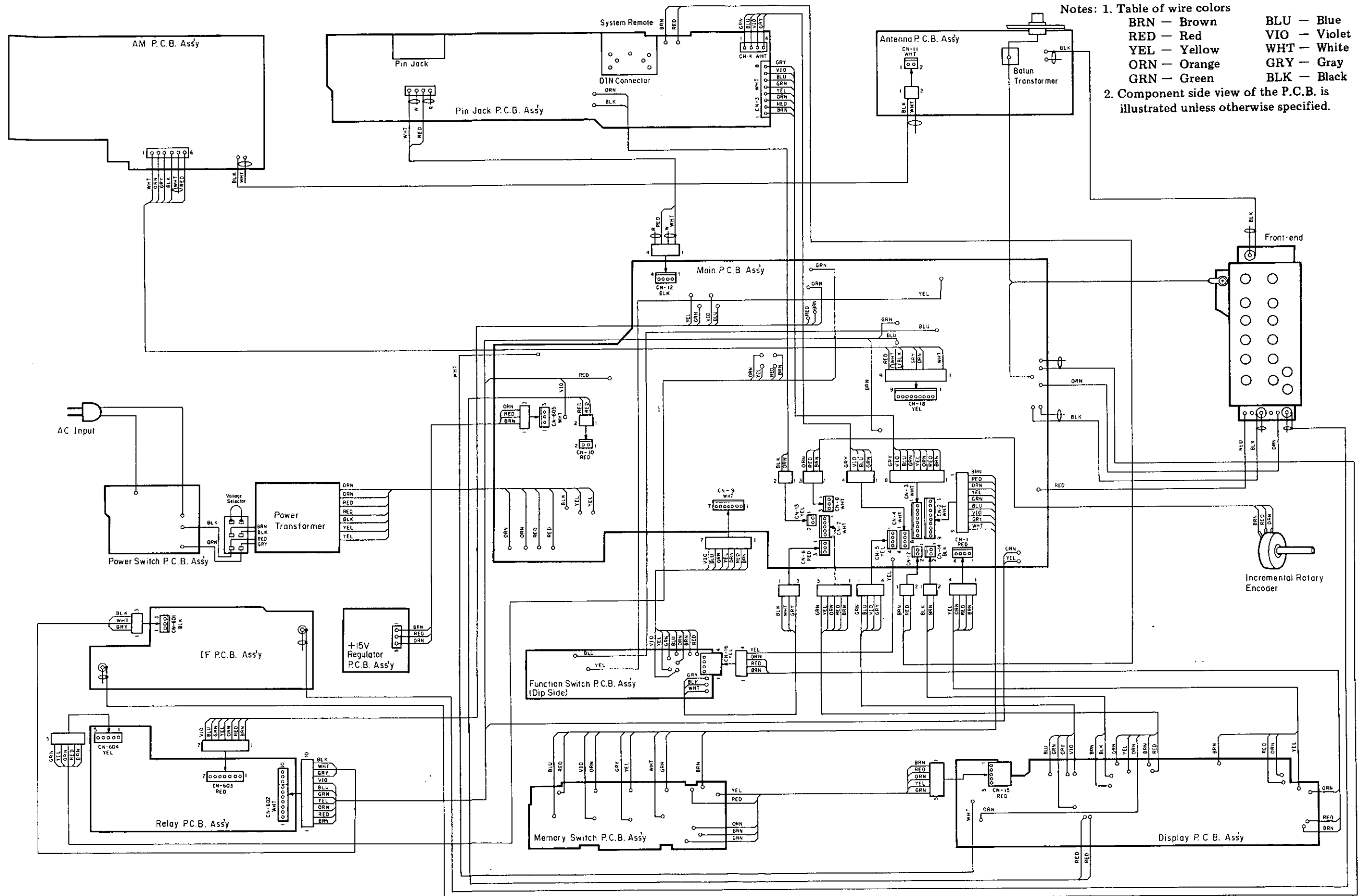


Fig. 6.2.3.1 For ST-70

(2) For ST-7 (Other)

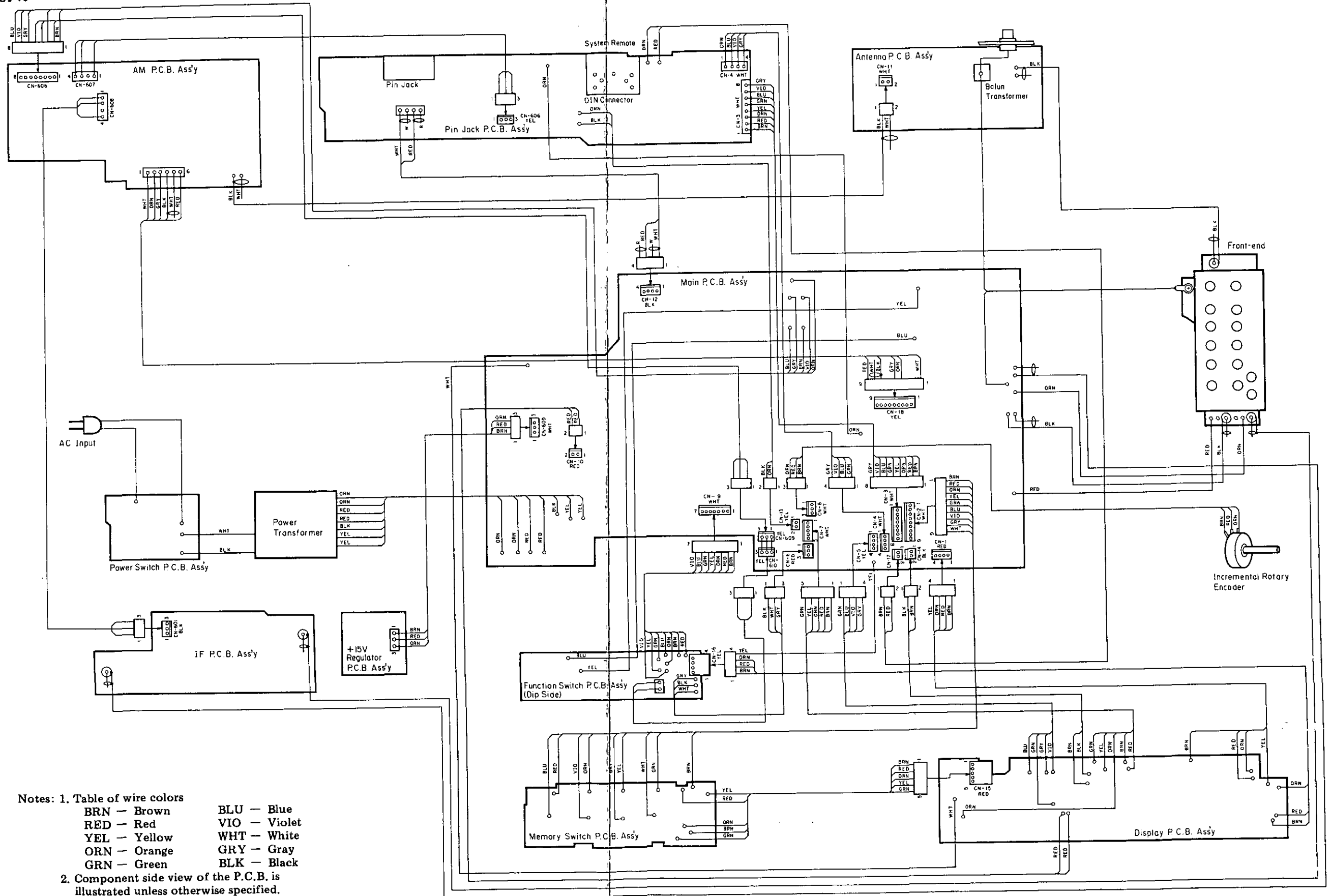


Notes: 1. Table of wire colors
 BRN — Brown BLU — Blue
 RED — Red VIO — Violet
 YEL — Yellow WHT — White
 ORN — Orange GRN — Gray
 GRN — Green BLK — Black

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

Fig. 7.2 For ST-7 (Other)

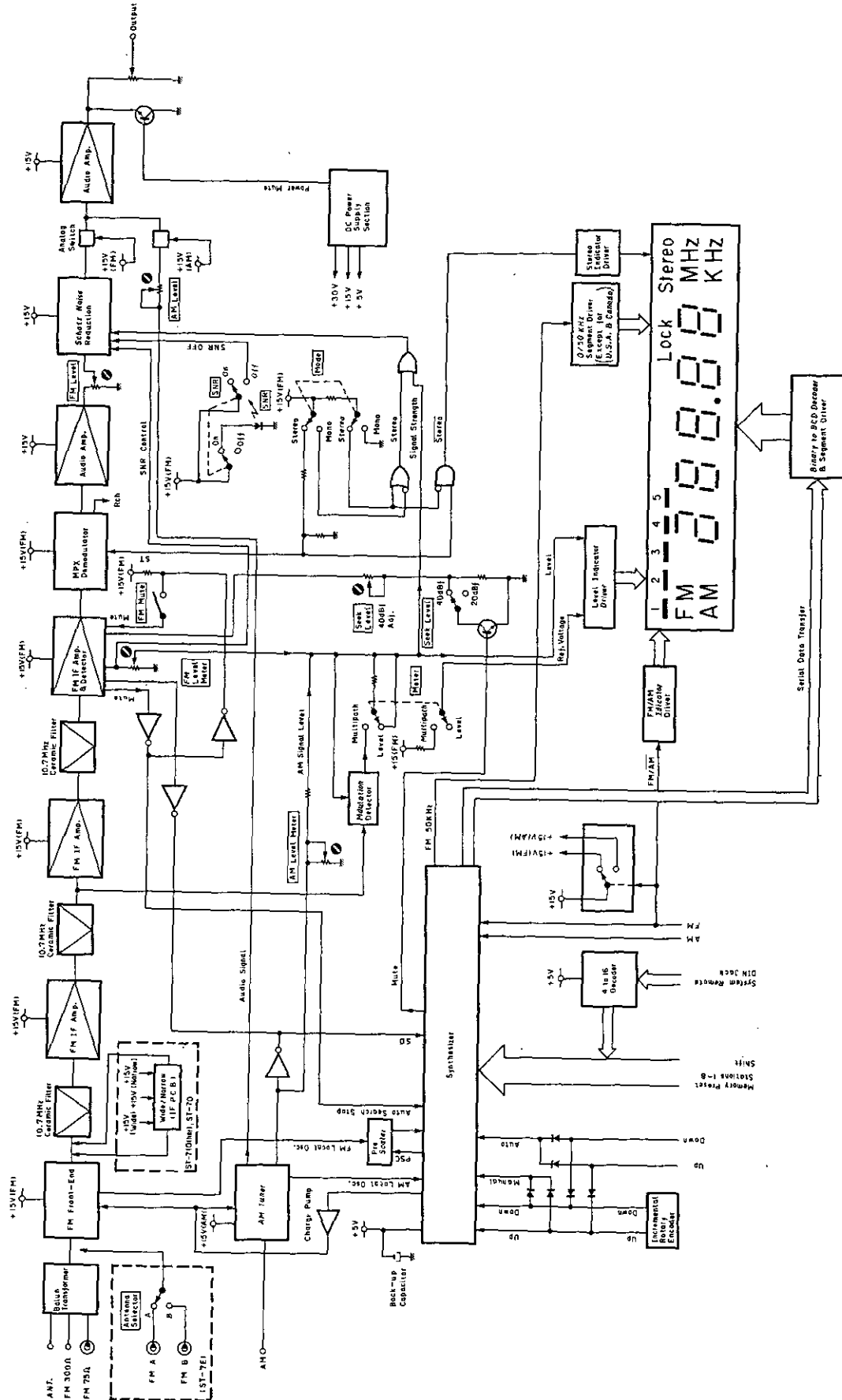
(8) For ST-70



- Notes: 1. Table of wire colors
- | | |
|--------------|--------------|
| BRN - Brown | BLU - Blue |
| RED - Red | VIO - Violet |
| YEL - Yellow | WHT - White |
| ORN - Orange | GRY - Gray |
| GRN - Green | BLK - Black |
2. Component side view of the P.C.B. is illustrated unless otherwise specified.

Fig. 7.3 For ST-70

8. BLOCK DIAGRAM



9. SPECIFICATIONS

(1) ST-7 (U.S.A., Canada & Other (see Note))

Note: Selector switch settings: Frequency step FM/AM: 100 kHz/10 kHz, De-emphasis: 75 μ s, IF Band: Wide

FM Section

- Notes: 1. All RF levels in microvolts are given re 300-ohm antenna input.
2. Modulation: Mono 100%, Stereo Pilot 9%, Stereo Audio Signal 91%

Frequency Range	87.5—108.0 MHz in 100 kHz steps
IHF Usable Sensitivity	
Mono	10 dBf/1.7 μ V
Stereo	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 (U.S.A. & Canada) Better than 79 dB (Other)
Stereo	Better than 76 dB (U.S.A. & Canada) Better than 75 dB (Other)
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 (U.S.A. & Canada) Better than 70 dB (Other)
Stereo Separation	
100 Hz/1 kHz/10 kHz	50/55/45 dB (U.S.A. & Canada) 45/50/35 dB (Other)
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 μ /m
Signal to Noise Ratio (RF input 90 dB μ /m)	Better than 48 dB
Total Harmonic Distortion (RF input 90 dB μ /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)/1.5k ohms
AM (400 Hz, 30% Modulation)	0.2—0.9 V (variable)/1.5k ohms
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. (U.S.A. & Canada) 16 W max. (Other)

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

(2) ST-7 (Other) (see Note)

Note: Selector switch settings: Frequency step FM/AM: 50 kHz/9 kHz, De-emphasis: 50 μ s, IF Band: Narrow

FM Section

Notes: 1. All RF levels in microvolts are given re 300-ohm antenna input.
2. Modulation: Mono 60%, Stereo Pilot 9%, Stereo Audio Signal 51%

Frequency Range	87.50-108.00 MHz in 50 kHz steps
IHF Usable Sensitivity	
Mono	10 dBf/1.7 μ V
Stereo	20 dBf/5.5 μ V
50 dB Quieting Sensitivity	
Mono	18 dBf/4.4 μ V
Stereo with Schotz NR	31 dBf/19.4 μ V
Stereo without Schotz NR	40 dBf/54 μ V
Signal to Noise Ratio	
Mono	Better than 75 dB
Stereo	Better than 71 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 0.12%
Stereo	Less than 0.15%
Capture Ratio	2.3 dB
Alternate Channel Selectivity (\pm 300 kHz)	Better than 75 dB
Stereo Separation	
100 Hz/1 kHz/10 kHz	35/50/30 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	522-1,611 kHz in 9 kHz steps
Usable Sensitivity	50 dB μ /m
Signal to Noise Ratio (RF input 90 dB μ /m)	Better than 48 dB
Total Harmonic Distortion (RF input 90 dB μ /m)	Less than 0.4%
Selectivity (\pm 9 kHz)	Better than 18 dB

General Specifications

Output Level/Impedance	
FM (1 kHz, Mono, 60% Modulation)	0.5-2.0 V (variable)/1.5k ohms
AM (400 Hz, 30% Modulation)	0.2-0.9 V (variable)/1.5k ohms
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	16 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

(3) ST-7 (Australia) & ST-7E

FM Section

- Notes: 1. All RF levels in microvolts are given re 75-ohm antenna input.
2. Modulation: Mono 60%, Stereo Pilot 9%, Stereo Audio Signal 51%

Frequency Range	87.50–108.00 MHz in 50 kHz steps
IHF Usable Sensitivity	
Mono	10 dBf/0.9 μ V
Stereo	20 dBf/2.7 μ V
50 dB Quieting Sensitivity	
Mono	18 dBf/2.2 μ V
Stereo with Schotz NR	31 dBf/9.7 μ V
Stereo without Schotz NR	40 dBf/27 μ V
Signal to Noise Ratio	
Mono	Better than 76 dB
Stereo	Better than 71 dB
Schotz NR S/N Improvement	More than 6 dB
Schotz NR Active Level	19–53 dBf/2.5–125 μ V
High-Blend Threshold Level	19 dBf/2.5 μ V
Muting Threshold Level	20 dBf/2.7 μ V
Frequency Response	20–15,000 Hz \pm 1 dB
Total Harmonic Distortion (1 kHz)	
Mono	Less than 0.08%
Stereo	Less than 0.1%
Capture Ratio	2.3 dB
Alternate Channel Selectivity (\pm 300 kHz)	Better than 60 dB
Stereo Separation	
100 Hz/1 kHz/10 kHz	45/50/40 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	522–1,611 kHz in 9 kHz steps
Usable Sensitivity	50 dB μ /m
Signal to Noise Ratio (RF input 90 dB μ /m)	Better than 48 dB
Total Harmonic Distortion (RF Input 90 dB μ /m)	Less than 0.4%
Selectivity (\pm 9 kHz)	Better than 18 dB

General Specifications

Output Level/Impedance	
FM (1 kHz, Mono, 60% Modulation)	0.5–2.0 V (variable)/1.5k ohms
AM (400 Hz, 30% Modulation)	0.2–0.9 V (variable)/1.5k ohms
FM Antenna Inputs	
ST-7E	75 Ω unbalanced x 2 (300 Ω /75 Ω Converter Plug supplied)
ST-7 (Australia)	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

(4) ST-70 (Japan)

FM Section

- Notes: 1. All RF levels in microvolts are given re 300-ohm antenna input.
2. Modulation: Mono 100%, Stereo Pilot 10%, Stereo Audio Signal 90%

Frequency Range	76.0—90.0 MHz in 100 kHz steps
IHF Usable Sensitivity	
Mono	10 dBf/1.7 μ V
Stereo	17 dBf/3.9 μ V
50 dB Quieting Sensitivity	
Mono	16 dBf/3.5 μ V
Stereo with Schotz NR	28 dBf/14 μ V
Stereo without Schotz NR	37 dBf/39 μ V
Signal to Noise Ratio (Input 65 dBf)	
Mono	Better than 80 dB
Stereo	Better than 74 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% (Wide) Less than 0.25% (Narrow)
Stereo	Less than 0.08% (Wide) Less than 0.3% (Narrow)
Capture Ratio	1.9 dB
Alternate Channel Selectivity	
.....	Better than 70 dB (\pm 400 kHz, Wide)
.....	Better than 75 dB (\pm 300 kHz, Narrow)
Stereo Separation	
100 Hz/1 kHz/10 kHz	45/50/35 dB (Wide) 45/45/35 dB (Narrow)
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	522—1,629 kHz in 9 kHz steps
Usable Sensitivity	50 dB μ /m
Signal to Noise Ratio	
(RF input 90 dB μ /m)	Better than 48 dB
Total Harmonic Distortion	
(RF input 90 dB μ /m)	Less than 0.4%
Selectivity (\pm 9 kHz)	Better than 18 dB

General Specifications

Output Level/Impedance	
FM (1 kHz, Mono, 100% Modulation)	0.5—2.0 V (variable)/1.5k ohms
AM (400 Hz, 30% Modulation)	0.2—0.7 V (variable)/1.5k ohms
FM Antenna Inputs	75 Ω unbalanced 300 Ω balanced
Power Source	100 V AC; 50/60 Hz
Power Consumption	14 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.

Service Manual

Nakamichi ST-7,ST-7E,ST-70

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Telex : 2324721 (NAKAM J)

Nakamichi U.S.A. Corporation

19701 South Vermont Avenue
Torrance, California 90502
Phone : (213) 538-8150

Nakamichi GmbH

Stephanienstrasse 6, 4000 Düsseldorf 1
Phone : (0211) 359036

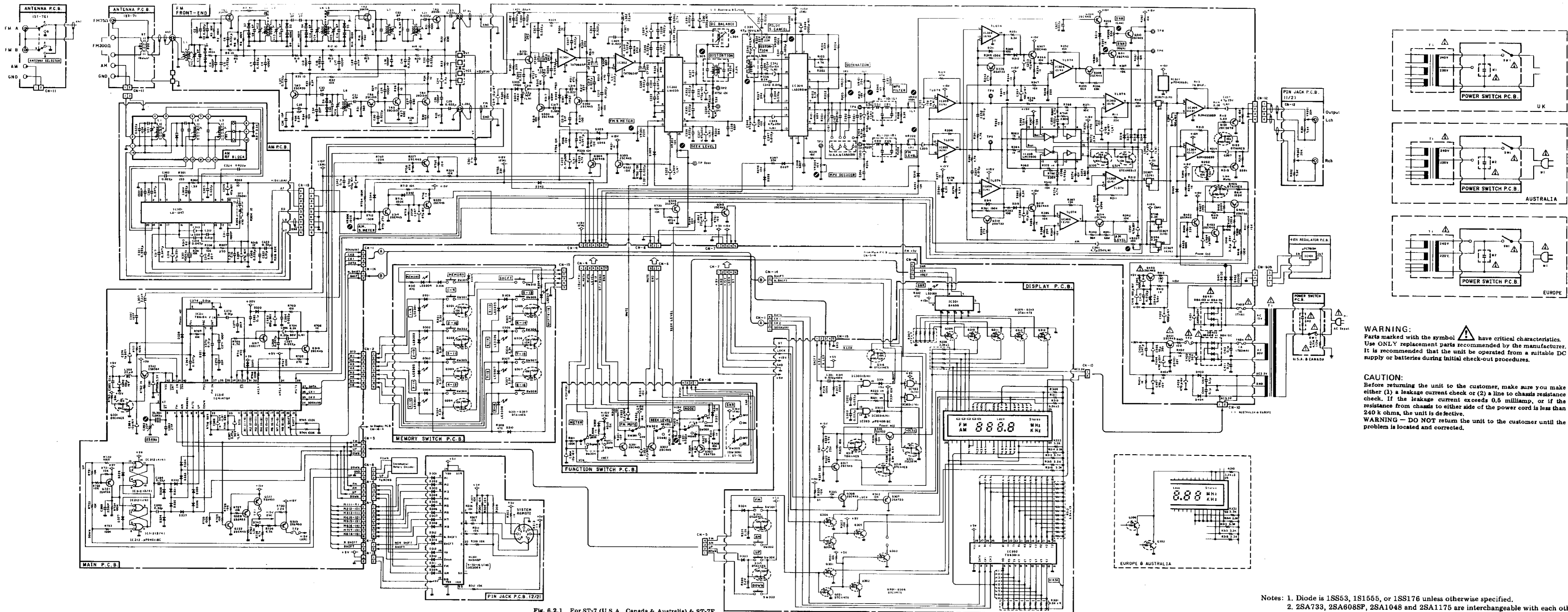

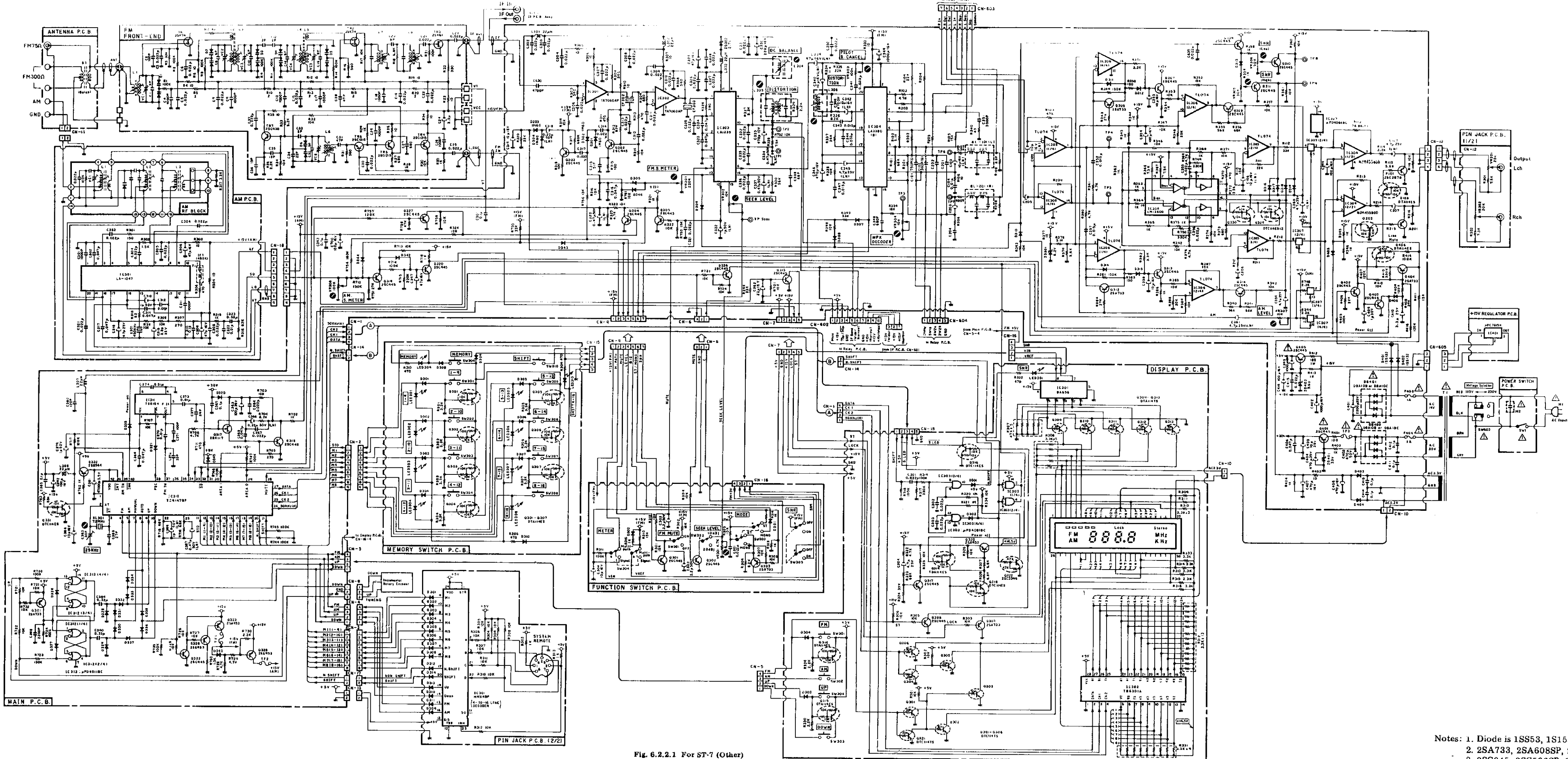



Fig. 6.2.1 For ST-7 (U.S.A., Canada & Australia) & ST-7E

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 procedures.

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 kohms, 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.

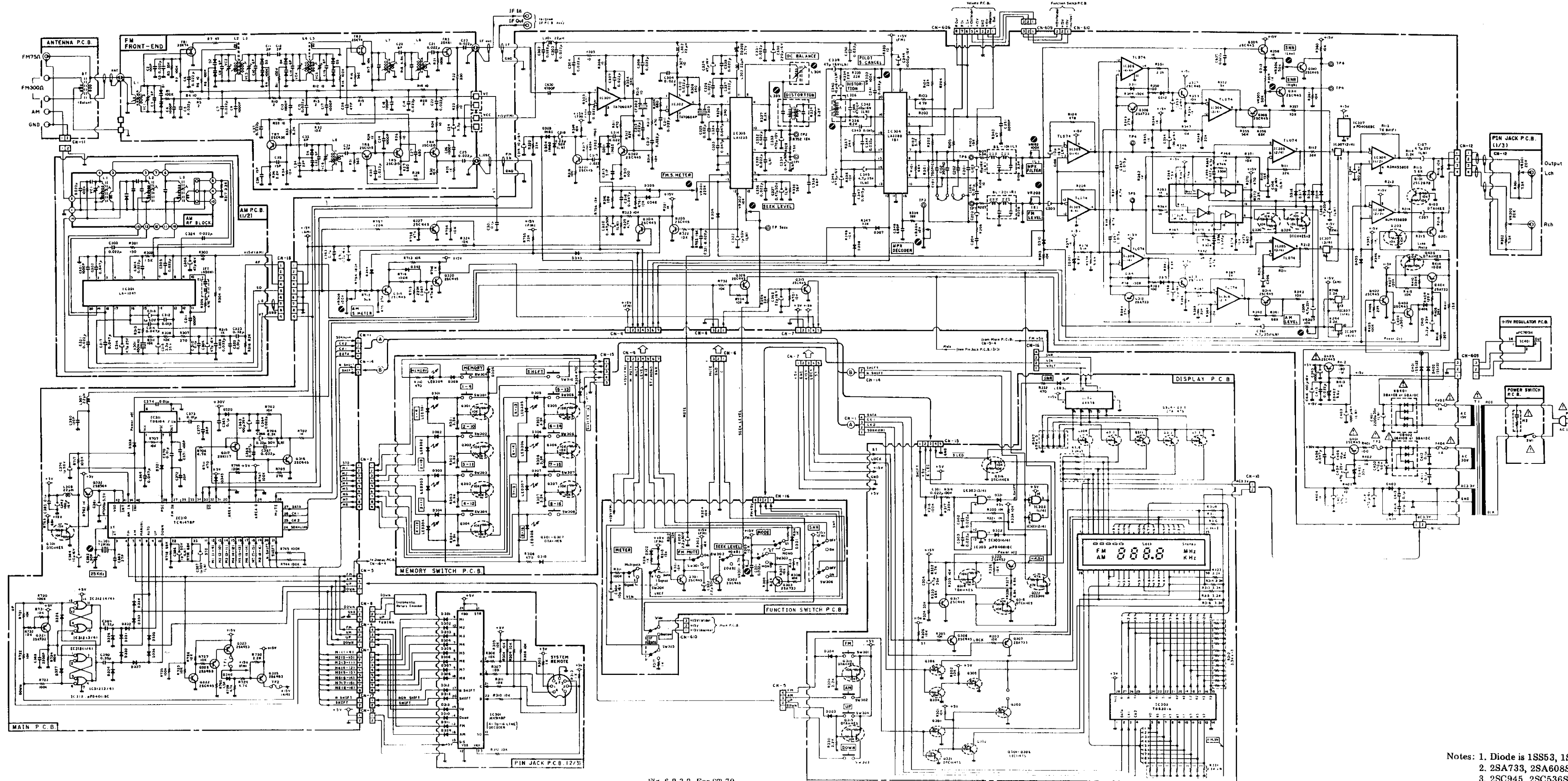



WARNING: Parts marked with the symbol  have critical characteristics. Use ONLY replacement parts recommended by the manufacturer. It is recommended that the unit be operated from a suitable DC supply or batteries during initial check-out procedures.

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.

Fig. 6.2.2.1 For ST-7 (Other)

- Notes:
1. Diode is 1S853, 1S1555, or 1S8176 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.



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 procedures.

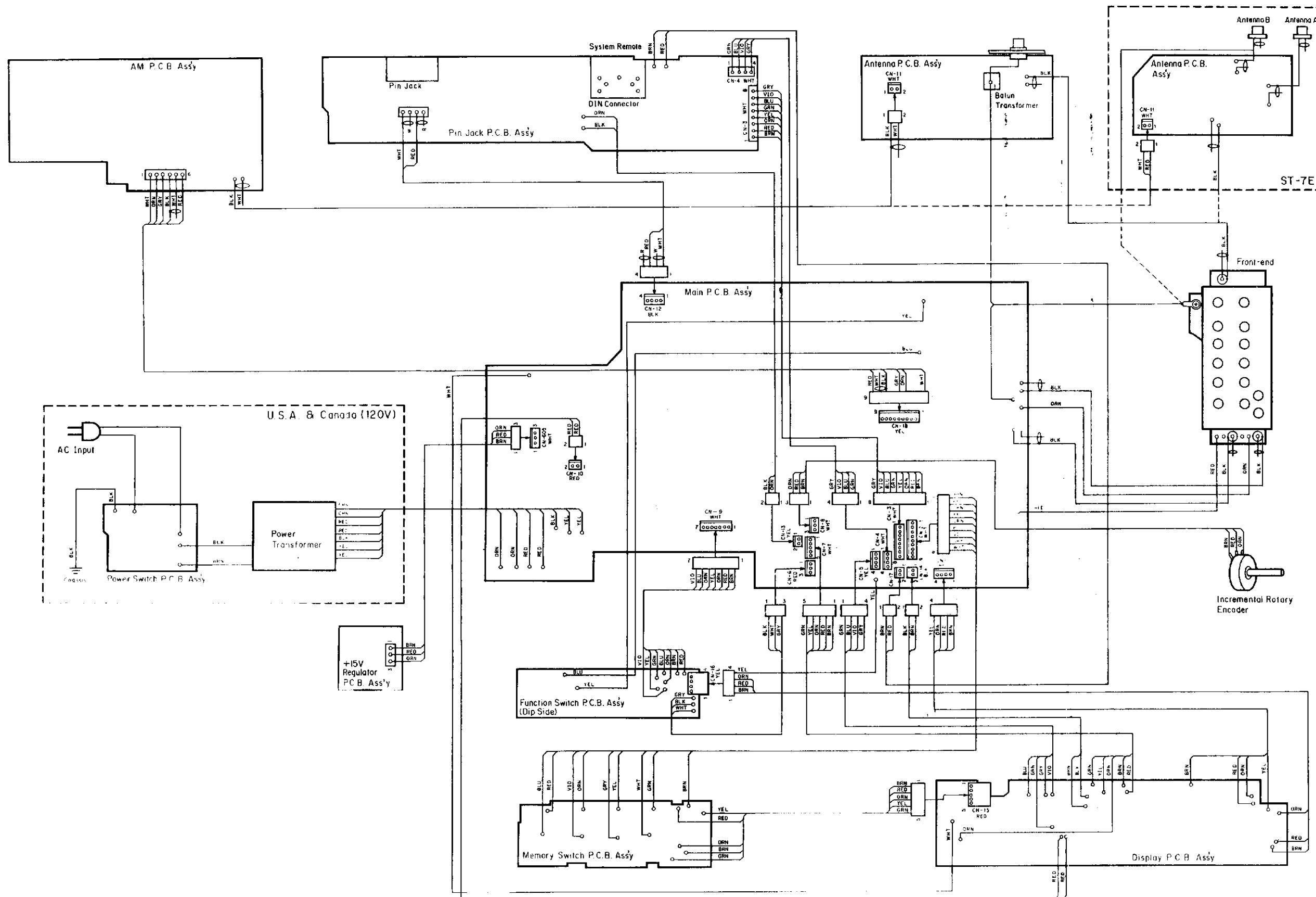
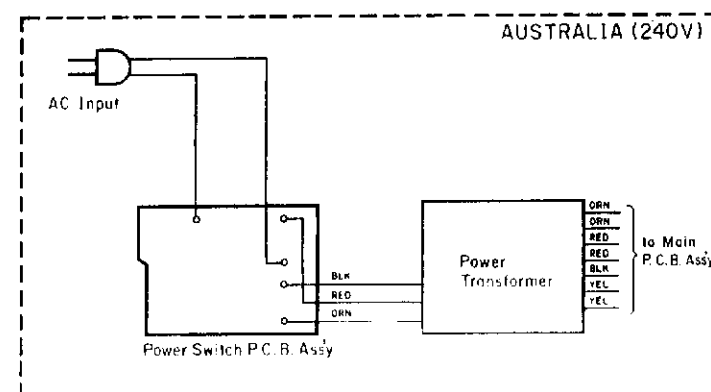
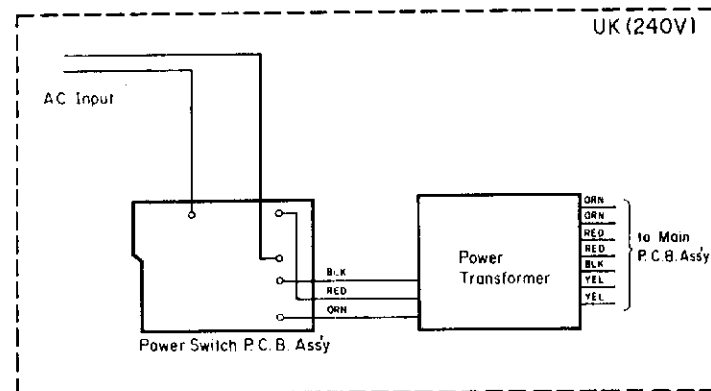
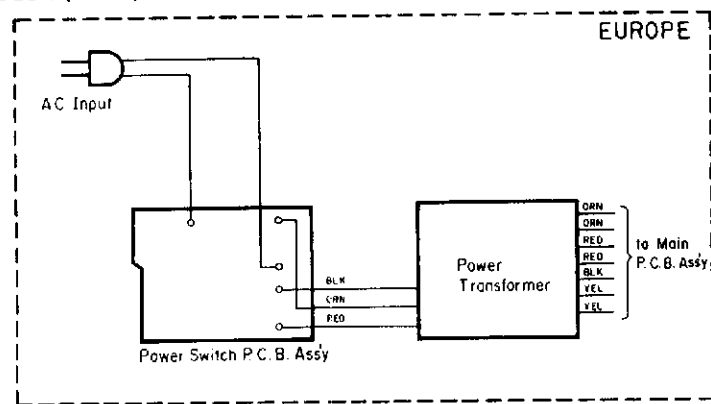
CAUTION: Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective. **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.

Fig. 6.2 3.2 For ST-70

7. WIRING DIAGRAMS

(1) For ST-7 (U.S.A., Canada & Australia) & ST-7E



Notes: 1. Table of wire colors
 BRN - Brown BLU - Blue
 RED - Red VIO - Violet
 YEL - Yellow WHT - White
 ORN - Orange GRY - Gray
 GRN - Green BLK - Black

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

Fig. 7.1 For ST-7 (U.S.A., Canada & Australia) & ST-7E