

TABLE OF CONTENTS

Section	Page	Section	Page
I GENERAL INFORMATION		2.5.4 Broad Band 50 Ohm Antennas	2-10
1.1 Scope	1-1	2.6 Power Requirements	
1.2 Transceiver Description	1-1	2.6.1 Operation from All AC Power Sources	2-10
1.2.1 General	1-1	2.6.2 A.C. Operation Under High Line Voltage Conditions	2-10
1.2.2 Front Panel - 1A1	1-1	2.6.3 Operation From D.C. Power Source	2-12
1.2.3 Antenna Coupler Tuning Control Unit - 1A2	1-2	2.7 GRC-951 Audio Remote Control Unit	2-15
1.2.4 Receiver/Exciter - 1A3	1-2	III OPERATION	
1.2.5 Synthesizer - 1A4	1-2	3.1 General	3-1
1.2.6 Filter Module - 1A5	1-2	3.2 Operating Controls	3-1
1.2.7 Power Supply - 1A6	1-2	3.3 Rear Apron Fuses and Con- nectors	3-6
1.2.8 RF Amplifier - 1A7	1-3	3.4 Operating the GSB-900SC into a 50 Ohm Antenna	3-8
1.3 Technical Specifications	1-6	3.5 GRC 951 Audio Remote Control Unit	3-12
1.3.1 General	1-6	IV THEORY OF OPERATION	
1.3.2 Receiver	1-6	4.1 General	4-1
1.3.3 Transmitter	1-7	4.1.1 Overall Block Diagram	4-1
1.4 Equipment Supplied	1-7	4.2 Synthesizer 1A4	4-1
1.5 Optional Equipment	1-8	4.2.1 General	4-1
II INSTALLATION		4.2.2 Spectrum Generator	4-1
2.1 General	2-1	4.2.3 Low Digit Generator	4-2
2.2 Unpacking and Inspection	2-1	4.2.4 Translator - 1A4A3	4-5
2.3 Reshipping	2-1	4.2.5 V.H.F. Divider - 1A4A4	4-6
2.4 General Installation and Mounting Information	2-2	4.2.6 V.C.O. - 1A4A5	4-8
2.4.1 General Installation	2-2	4.2.7 Synthesizer Mother Board - 1A4A6	4-10
2.4.2 Base Station Installation	2-2	4.2.8 Synthesizer Program- ming	4-11
2.4.3 Vehicular Installations	2-5		
2.4.4 Marine Installations	2-6		
2.4.5 Rack Mounted Installa- tions	2-6		
2.5 Antennas and Ground Systems	2-7		
2.5.1 General	2-7		
2.5.2 Narrow Band 50 Ohm Antennas	2-8		
2.5.3 Random Length Non Resonant Antennas	2-8		

TABLE OF CONTENTS (Cont.)

Section	Page	Section	Page
4.2.9 Frequency Display	4-11	4.8 Filter Module 1A5	4-43
4.3 General	4-14	4.8.1 General	4-43
4.3.1 Memory System Mother Board - 1A1A5	4-14	4.8.2 Mother Control Board	4-44
4.3.2 Band Steering Board - 1A1A6	4-14	4.8.3 Voltage ALC Detector	4-44
4.3.3 Load XMT Pushbutton	4-21	4.8.4 ACC Detector	4-44
4.3.4 Memory Board 1A1A7	4-22	4.8.5 Output Detector	4-44
4.4 Receiver		4.8.6 Key Line	4-44
4.4.1 General	4-30	4.8.7 Reflected Power Detector	4-46
4.4.2 VHF Mixer Board - 1A3A1	4-31	4.9 Meter Panel 1A2	4-46
4.4.3 IF/Filter Board - 1A3A2	4-32	V MAINTENANCE AND REPAIR	
4.4.4 Audio Board - 1A3A4	4-33	5.1 General	5-1
4.4.5 Speaker Driver - 1A1A1	4-34	5.2 Preventive Maintenance	5-1
4.5 Exciter	4-34	5.3 Cover Removal	5-1
4.5.1 General	4-34	5.4 Performance Test	5-1
4.5.2 Sideband Generator Board - 1A3A3	4-35	5.4.1 Test Equipment	5-1
4.5.3 IF/Filter Board - 1A3A2	4-36	5.4.2 Preliminary	5-2
4.5.4 VHF Mixer - 1A3A1	4-38	5.4.3 Power Supply (1A6)	5-3
4.5.5 Receiver/Exciter Mother Board	4-38	5.4.4 Front Panel (1A1) and Main Frame (1A8)	5-3
4.6 R. F. Power Amplifier 1A7A1	4-39	5.4.5 Receiver Test	5-4
4.6.1 General	4-39	5.4.6 Transmitter Test	5-5
4.6.2 Predriver, Driver and Power Amplifier	4-39	5.5 Synthesizer	5-6
4.6.3 Current ALC Detector	4-39	5.5.1 Fault Analysis	5-6
4.6.4 VSWR ALC Detector	4-39	5.5.2 Synthesizer Subassembly Testing and Alignment Procedures	5-12
4.7 Power Supply 1A6	4-39	5.6 Receiver/Exciter Board Alignment	5-29
4.7.1 General	4-39	5.6.1 V. H. F. Mixer Board (1A3A1)	5-29
4.7.2 28VDC Regulator	4-39	5.6.2 IF/Filter Board (1A3A2)	
4.7.3 12 VDC and 5 VDC Regulators	4-40	5.6.3 Sideband Generator Board (1A3A3)	5-29
4.7.4 Regulator Transistor Locations	4-40	5.7 Fault Analysis Table	5-30
4.7.5 D. C. Inverter - 1A6A2	4-40	5.8 Module Removal	5-38
		5.8.1 Removal of Filter Module - 1A5	5-38

TABLE OF CONTENTS

Section	Page	Section	Page
I GENERAL INFORMATION			
1.1 Scope	1-1	2.5.4 Broad Band 50 Ohm Antennas	2-10
1.2 Transceiver Description . .	1-1	2.6 Power Requirements	
1.2.1 General	1-1	2.6.1 Operation from All AC Power Sources	2-10
1.2.2 Front Panel - 1A1 . .	1-1	2.6.2 A.C. Operation Under High Line Voltage Conditions	2-10
1.2.3 Antenna Coupler Tuning Control Unit - 1A2 . .	1-2	2.6.3 Operation From D.C. Power Source	2-12
1.2.4 Receiver/Exciter - 1A3 .	1-2	2.7 GRC-951 Audio Remote Control Unit	2-15
1.2.5 Synthesizer - 1A4 . .	1-2		
1.2.6 Filter Module - 1A5 . .	1-2	III OPERATION	
1.2.7 Power Supply - 1A6 . .	1-2	3.1 General	3-1
1.2.8 RF Amplifier - 1A7 . .	1-3	3.2 Operating Controls	3-1
1.3 Technical Specifications . .	1-6	3.3 Rear Apron Fuses and Con- nectors	3-6
1.3.1 General	1-6	3.4 Operating the GSB-900SC into a 50 Ohm Antenna	3-8
1.3.2 Receiver	1-6	3.5 GRC 951 Audio Remote Control Unit	3-12
1.3.3 Transmitter	1-7		
1.4 Equipment Supplied	1-7	IV THEORY OF OPERATION	
1.5 Optional Equipment	1-8	4.1 General	4-1
		4.1.1 Overall Block Diagram	4-1
II INSTALLATION		4.2 Synthesizer 1A4	4-1
2.1 General	2-1	4.2.1 General	4-1
2.2 Unpacking and Inspection . .	2-1	4.2.2 Spectrum Generator . .	4-1
2.3 Reshipping	2-1	4.2.3 Low Digit Generator . .	4-2
2.4 General Installation and Mounting Information	2-2	4.2.4 Translator - 1A4A3 . .	4-5
2.4.1 General Installation . .	2-2	4.2.5 V.H.F. Divider - 1A4A4	4-6
2.4.2 Base Station Installation	2-2	4.2.6 V.C.O. - 1A4A5	4-8
2.4.3 Vehicular Installations .	2-5	4.2.7 Synthesizer Mother Board - 1A4A6	4-10
2.4.4 Marine Installations . .	2-6	4.2.8 Synthesizer Program- ming	4-11
2.4.5 Rack Mounted Installa- tions	2-6		
2.5 Antennas and Ground Systems	2-7		
2.5.1 General	2-7		
2.5.2 Narrow Band 50 Ohm Antennas	2-8		
2.5.3 Random Length Non Resonant Antennas	2-8		

TABLE OF CONTENTS (Cont.)

Section	Page	Section	Page
4.2.9 Frequency Display	4-11	4.8 Filter Module 1A5	4-43
4.3 General	4-14	4.8.1 General	4-43
4.3.1 Memory System Mother Board - 1A1A5	4-14	4.8.2 RF Detector Board	4-44
4.3.2 Band Steering Board - 1A1A6	4-14	4.8.3 Voltage ALC Detector	4-44
4.3.3 Load XMT Pushbutton	4-21	4.8.4 ACC Detector	4-44
4.3.4 Memory Board 1A1A7	4-22	4.8.5 Output Detector	4-44
4.4 Receiver		4.8.6 Key Line	4-44
4.4.1 General	4-30	4.8.7 Reflected Power Detector	4-46
4.4.2 VHF Mixer Board - 1A3A1	4-31	4.9 Meter Panel 1A2	4-46
4.4.3 IF/Filter Board - 1A3A2	4-32	V MAINTENANCE AND REPAIR	
4.4.4 Audio Board - 1A3A4	4-33	5.1 General	5-1
4.4.5 Speaker Driver - 1A1A1	4-34	5.2 Preventive Maintenance	5-1
4.5 Exciter	4-34	5.3 Cover Removal	5-1
4.5.1 General	4-34	5.4 Performance Test	5-1
4.5.2 Sideband Generator Board - 1A3A3	4-35	5.4.1 Test Equipment	5-1
4.5.3 IF/Filter Board - 1A3A2	4-36	5.4.2 Preliminary	5-2
4.5.4 VHF Mixer - 1A3A1	4-38	5.4.3 Power Supply (1A6)	5-3
4.5.5 Receiver/Exciter Mother Board	4-38	5.4.4 Front Panel (1A1) and Main Frame (1A8)	5-3
4.6 R.F. Power Amplifier 1A7A1	4-39	5.4.5 Receiver Test	5-4
4.6.1 General	4-39	5.4.6 Transmitter Test	5-5
4.6.2 Predriver, Driver and Power Amplifier	4-39	5.5 Synthesizer	5-6
4.6.3 Current ALC Detector	4-39	5.5.1 Fault Analysis	5-6
4.6.4 VSWR ALC Detector	4-39	5.5.2 Synthesizer Subassembly Testing and Alignment Procedures	5-12
4.7 Power Supply 1A6	4-39	5.6 Receiver/Exciter Board Alignment	5-29
4.7.1 General	4-39	5.6.1 V.H.F. Mixer Board (1A3A1)	5-29
4.7.2 28VDC Regulator	4-39	5.6.2 IF/Filter Board (1A3A2)	
4.7.3 12 VDC and 5 VDC Regulators	4-40	5.6.3 Sideband Generator Board (1A3A3)	5-29
4.7.4 Regulator Transistor Locations	4-40	5.7 Fault Analysis Table	5-30
4.7.5 D.C. Inverter - 1A6A2	4-40	5.8 Module Removal	5-38
		5.8.1 Removal of Filter Module - 1A5	5-38

TABLE OF CONTENTS (Cont.)

Section	Page	Section	Page
5.8.2 Front Panel Removal	5-38	5.10.9 Ram	5-49
5.8.3 Power Supply Removal	5-42	5.10.10 Voltage Comparator	5-49
5.8.4 Power Amplifier Removal and Servicing	5-44	5.10.11 Operational Amplifier	5-49
5.9 Printed Circuit Boards	5-47	5.10.12 Correct Logic Level Examples	5-50
5.9.1 Printed Circuit Board Repair and Maintenance	5-47	5.10.13 Inverted Signals	5-50
5.10 Logic Notes	5-47		
5.10.1 And Gate	5-47	VI ACCESSORIES	
5.10.2 And-Or-Invert Gate	5-48	6.1 Phone Patch Option	6-1
5.10.3 Nand Gate	5-48	6.1.1 Installation	6-1
5.10.4 Or Gate	5-48	6.1.2 Operation	6-1
5.10.5 J-K Flip Flop	5-48	6.2 Receiver Protector	
5.10.6 Inverter	5-49	5024002491	6-5
5.10.7 Schmitt Trigger	5-49	6.2.1 General	6-5
5.10.8 Prom	5-49	6.2.2 Specifications	6-5

LIST OF TABLES

Table	Page	Table	Page
2.1 Mating Connectors to GSB-900SC and Accessories	2-16	5.3 1 MHz Switch	5-8
4.1 10 MHz Synthesizer Programming Converter	4-26	5.4 100 kHz Switch	5-9
4.2 1 MHz Synthesizer Programming Converter	4-27	5.5 10 kHz Switch	5-9
4.3 100 kHz Synthesizer Programming Converter	4-28	5.6 1 kHz Switch	5-10
4.4 Filter Module (1A5) Filter Band Numbers & Frequency Range Table	4-44	5.7 100 Hz Switch	5-10
5.1 Front Panel Control Test Position	5-2	5.8 Coarse Steering Voltage Readings	5-11
5.2 10 MHz Switch	5-8	5.9 Frequency Coding	5-38
		5.10 Correct Logic Level Examples	5-51
		5.11 Binary Coded Decimal to Decimal Decoder Truth Table	5-51
		5.12 Band Prom Truth Table	5-52

LIST OF ILLUSTRATIONS

Figure	Page	Figure	Page
1.1 GSB-900SC Major Assembly Locations	1-4	3.3 GSB-900SC Power Supply Battery Assembly 1A1A4 . .	3-12
1.2 GSB-900SC Bottom View	1-5	4.1 GSB-900SC Overall Block Diagram	4-3
2.1 Outline Configuration	2-2	4.2 Top View Showing Display . .	4-12
2.2 Base Station Installation (50 ohm Antenna)	2-3	4.3 Synthesizer Block Diagram and Details	4-15
2.3 Base Station Installation (Non-Resonant Antennas).	2-3	4.4 GSB-900SC Memory Board Block Diagram (1A1A7) . .	4-24
2.4 Shock Mount Assembly and Details	2-4	4.5 CA3053 Schematic of U1 and U2	4-33
2.5 Typical Vehicular Installation	2-5	4.6 Voltage and VSWR ALC Control Schematic	4-37
2.6 Rack Mounted Installation	2-6	4.6A 723IC Regulator	4-40A
2.7 Whip Antenna	2-7	4.7 GSB-900SC Transceiver Block Diagram	4-41
2.8 Doublet Antenna	2-8	4.8 D.C. Relay Control Circuit . .	4-43
2.9 Inverted "V" Antenna	2-9	4.9 Filter Module (1A5) Block Diagram	4-45
2.10 Long Wire Antenna	2-9	4.10 Keying Circuit	4-46
2.11 A.C. Line Voltage Range Table	2-10	5.1 GSB-900SC Cover Disassembly	5-1
2.12 115 VAC Power Cord Schematic	2-11	5.1A Power Clear-Low Battery Timing Waveforms . . .	5-35
2.13 230 VAC Power Cord Schematic	2-11	5.1B Master Clear Waveforms . .	5-36
2.14 GSB-900SC Fuse Table	2-12	5.1C GSB-900SC Front Panel to Radio Mother Board Connector Strip	5-37
2.15 Power Supply Wiring - 115 or 230 VAC Inputs	2-13	5.2 Power Supply Regulator Board (1A6A1)	5-42
2.16 Power Supply Wiring - 132 V or 264 VAC Inputs	2-13	5.3 Power Supply Removal (1A6) . .	5-43
2.17 D.C. Inverter Connections to Power Supply Terminal Strip 1A6TB2	2-14	5.4 Power Amplifier Test Setup . .	5-44
2.18 D.C. Power Connector Schematic	2-15	5.5 Current ALC Wave Form . . .	5-45
2.19 GRC-951 Audio Remote Control Unit Interconnect Diagram . .	2-16	5.6 Synthesizer Mechanical Assembly	5-46
2.20 GRC-951 Audio Remote Control Unit Outline Configuration . .	2-17	5.7 GSB-900SC Top View and Table Assemblies	5-53
3.1 GSB-900SC Transceiver Front Panel	3-1	5.8 Secure Channel Front Panel Wiring Diagram	5-55
3.2 GSB-900SC Rear Aprons Components and Connectors . .	3-7	5.9 Display Schematic	5-57
		5.9A Power Supply Battery Schematic	5-57
		5.9B Mother Board Schematic . . .	5-59

LIST OF ILLUSTRATIONS (Cont.)

Figure	Page	Figure	Page
5.9C Band Steering Schematic . . .	5-63	5.22 Sideband Generator Schematic (1A3A3)	5-97
5.9D Memory Board Schematic . . .	5-67	5.22A Sideband Generator Schematic. . .	5-97A
5.10 Main Frame Wiring	5-70	5.23 Receiver/Exciter Mother Board Schematic	5-99
5.10A KW Remote Control (1A2) Schematic	5-72	5.24 RF Power Amplifier Schematic (1A7A1)	5-101
5.10B Schematic Diagram GCU-935 Antenna Tuning Control Unit	5-72	5.25 Power Supply Schematic (1A6) . .	5-103
5.10C Schematic: Antenna Tuning Control Unit	5-73	5.26 D.C. Inverter Schematic (1A6A2)	5-105
5.11 Meter Panel Schematic (1A2) . .	5-73	5.27 Filter Module Assembly	5-106
5.12 Spectrum Generator Schematic (1A4A1)	5-75	5.28 Motor Control Board Schematic . .	5-107
5.13 Low Digit Generator Schematic (1A4A2)	5-76	5.29 Receive Filter Board Schematic . .	5-109
5.14 Translator Schematic (1A4A3) . .	5-81	5.30 Even Channel Filter Schematic (1A5A2)	5-110
5.15 VHF Divider Schematic (1A4A4) . .	5-83	5.31 Odd Channel Filter Schematic (1A5A1)	5-111
5.16 VCO Schematic (1A4A5)	5-85	6.1 GSB-900SC Phone Patch Mount- ing Instructions	6-2
5.17 Synthesizer Mother Board Schematic	5-87	6.2 Manual Phone Patch Schematic Diagram	6-3
5.18 VHF Mixer Schematic (1A3A1) . .	5-89	6.3 GSB-900SC Optional Antenna Tuning/Coupler/KW Control Panels	6-6
5.19 IF/Filter Schematic (1A3A2) . .	5-91	6.4 Blower Kit Installation In- structions	6-7
5.20 Audio Board Schematic (1A3A4) . .	5-93	6.5 GRC-951 Audio Remote Control Unit	6-9
5.21 Speaker Driver Schematic (1A1A1)	5-95		

LIST OF ILLUSTRATIONS (Cont.)

Figure	Page	Figure	Page
5.9C Band Steering Schematic . . .	5-63	5.22 Sideband Generator Schematic	
5.9D Memory Board Schematic . . .	5-67	(1A3A3)	5-97
5.10 Main Frame Wiring	5-70	5.22A Sideband Generator Schematic. . .	5-97A
5.10A KW Remote Control (1A2)		5.23 Receiver/Exciter Mother Board	
Schematic	5-72	Schematic	5-99
5.10B Schematic Diagram GCU-935		5.24 RF Power Amplifier Schematic	
Antenna Tuning Control		(1A7A1)	5-101
Unit	5-72	5.25 Power Supply Schematic (1A6) .	5-103
5.10C Schematic: Antenna Tuning		5.26 D.C. Inverter Schematic	
Control Unit	5-73	(1A6A2)	5-105
5.11 Meter Panel Schematic (1A2) .	5-73	5.27 Filter Module Assembly . . .	5-106
5.12 Spectrum Generator Schematic		5.28 RF Detector Board Schematic . .	5-107
(1A4A1)	5-75	5.29 Receive Filter Board Schematic	5-109
5.13 Low Digit Generator Schematic		5.30 Even Channel Filter Schematic	
(1A4A2)	5-76	(1A5A2)	5-110
5.14 Translator Schematic (1A4A3) .	5-81	5.31 Odd Channel Filter Schematic	
5.15 VHF Divider Schematic (1A4A4)	5-83	(1A5A1)	5-111
5.16 VCO Schematic (1A4A5) . . .	5-85	6.1 GSB-900SC Phone Patch Mount-	
5.17 Synthesizer Mother Board		ing Instructions	6-2
Schematic	5-87	6.2 Manual Phone Patch Schematic	
5.18 VHF Mixer Schematic (1A3A1)	5-89	Diagram	6-3
5.19 IF/Filter Schematic (1A3A2). .	5-91	6.3 GSB-900SC Optional Antenna	
5.20 Audio Board Schematic (1A3A4)	5-93	Tuning/Coupler/KW Control	
5.21 Speaker Driver Schematic		Panels	6-6
(1A1A1)	5-95	6.4 Blower Kit Installation In-	
		structions	6-7
		6.5 GRC-951 Audio Remote Control	
		Unit	6-9

()

()

()

SECTION 1

GENERAL INFORMATION

1.1 SCOPE

This instruction manual contains the necessary information to install, operate and service the GSB-900SC Transceiver.

1.2 TRANSCEIVER DESCRIPTION

1.2.1 GENERAL

The GSB-900SC is a high quality single side-band transceiver with a field programmable memory system providing storage capacity for 100 channels of transmit and receive frequencies in the range from 1.6000 to 29.9999 MHz. Any channel is capable of functioning as a simplex channel (identical transmit and receive frequency) or as a half-duplex channel (dissimilar transmit and receive frequencies). Knowledge of the operating frequencies stored in each of the channels may be restricted using the lockable Secure position of the Frequency Control Mode keylock switch. Transceiver modes of operation are standard and include Lower Sideband (LSB), Upper Sideband (USB), Amplitude Modulation (AM) and Continuous wave (CW). Operation in the Frequency Shift Keying (FSK) and Facsimile (FAX) Modes are also possible with the addition of suitable modems. The transceiver is mechanically and electrically designed to meet stringent military specifications for shock, vibration and protection from outside environments. The unit is completely sealed (dust free) utilizing neither blowers nor ventilating louvers, making it ideal for mobile as well as base station use. It can operate over wide temperature extremes (-30 to + 65 C) and up to 100% relative humidity.

The GSB-900SC is composed of seven major sub-assemblies, (1) front panel 1A1, (2) antenna coupler control panel 1A2 (optional), (3) receiver, exciter 1A3, (4) synthesizer 1A4, (5) filter module 1A5, (6) power supply 1A6, (7) power amplifier 1A7. See Figure 1.1 for major assembly location

1.2.2 FRONT PANEL - 1A1

The Secure Channel front panel contains the standard controls for operation of the transceiver in Lower Sideband (LSB), Upper Sideband (USB), Amplitude Modulation (AM) and Continuous Wave (CW) modes. The panel contains a memory system permitting storage of 100 different transmit frequencies and 100 different receive frequencies. A Load Xmt pushbutton and a Load Rec pushbutton are located on the front panel to permit easy field programming of any transmit or receive frequency in any of the 100 channels available for that purpose. Each channel is accessible using the front panel Channel selector switches.

Any channel may store either a transmit and a receive frequency that are identical (simplex operation) or a transmit and a receive frequency that are different (half-duplex operation). The front panel includes a Frequency Control Mode keylock switch that permits storage of new frequencies into the memory system as well as utilization of the stored frequencies as radio operating frequencies. In addition, the Frequency Control Mode keylock switch permits operation of the transceiver in a locked security mode by blanking the six digit front panel frequency display and restricting knowledge of the operating frequencies. The Frequency Con-

trol Mode keylock switch also permits operation in a conventional control mode employing the six front panel frequency switches to select the operating frequency. Included on the front panel is a Master Clear pushbutton which provides the ability to instantaneously erase all frequencies in memory in the event that all records of operating frequencies require quick destruction. The memory system is composed of two P.C. boards on a mother board, a six digit display, two batteries and a power supply all mounted to the front panel. High reliability of the memory system is provided through the extensive use of both digital and linear integrated circuits.

1.2.3 ANTENNA COUPLER TUNING CONTROL UNIT - 1A2 (optional)

This unit plugs into the front panel and contains all controls necessary to remotely operate an antenna coupler. Tuning status of the coupler is monitored by the meter installed in the tuning unit panel. When the GSB-900SC is operated into a 50 ohm antenna and the coupler is not installed, the transceiver is supplied with a meter panel which indicates receive signal strength and relative power output of the transmitter.

1.2.4 RECEIVER/EXCITER - 1A3

The Receiver/Exciter module contains the low level signal generation circuitry. The 1st I.F. frequency is well above the 30 MHz upper limit of the transceiver-providing the unusually high spurious signal rejection found only in this frequency scheme. The extensive use of integrated circuits provides an unusually high level of reliability. High quality crystal filters are employed both in the "front end" of the radio and in the I.F. section for sideband selection. The Receiver/Exciter is fully contained on four plug-in printed circuit boards plus a mother board and employs fully modularized construction.

1.2.5 SYNTHESIZER - 1A4

Frequency control is by means of a digital frequency synthesizer providing 100 Hz frequency steps. In addition, the operator can select a high stability VFO mode of operation, which provides continuous tuning between the 100 Hz synthesized increments. All frequencies in the transceiver are derived from a Temperature Compensated Crystal Oscillator (TCXO) which provides instant on-frequency operation with no warmup. The frequency stability is better than $\pm 1 \times 10^{-6}$ over the full specified ambient temperature range of the radio. The long term stability is $\pm 5 \times 10^{-7}$ per year; permitting long intervals between calibration.

The Synthesizer is fully modularized for ease of maintenance. High reliability is assured through the extensive use of both digital and linear integrated circuits. The Synthesizer is fully contained on five plug-in printed circuit boards plus a mother board.

1.2.6 FILTER MODULE - 1A5

The filter module is contained on four P.C. boards and is housed in a removable unit. Filter selection is automatically accomplished by front panel memory system outputs which control a D.C. motor. High power low pass filters are used in the transmit mode to remove all unwanted harmonics from the power amplifier output. In the receive mode high pass networks are switched in the filter which in conjunction with the low pass filters yield a bandpass filter. This module also contains circuitry for control and protection of the power amplifier.

1.2.7 POWER SUPPLY - 1A6

The GSB-900SC will operate from power sources of 115 or 230 volt 50-60 Hz A.C. and in addition from 13 or 26 volt D.C. sources (either positive or negative ground) with the optional, self contained, D.C. module. The same transceiver can operate

from both A.C. and D.C. power sources, with the D.C. Module installed, by changing the external power input cable. The selection of 13 or 26 volt D.C. operation is easily accomplished by changing connections on a jumper strip in the power supply. The power supply employs fully modularized construction for ease of maintenance.

1.2.8 RF POWER AMPLIFIER -1A7

The GSB-900SC contains an all solid state broad-band power amplifier which will match 50 ohm loads with voltage standing wave ratios (V.S.W.R.) under 2:1 over the entire frequency range of the radio with no additional operator tuning. Adequate cooling is provided by a conservatively rated heat

sink at the rear of the radio. The power amplifier is rated at 100 watts peak envelope power (P.E.P.) and 100 watts average power output over the entire frequency range. The power amplifier incorporates Automatic Level Control (ALC) which limits the peak power output to 100 watts while increasing the average power with highly varying speech inputs. The ALC also prevents the increase in intermodulation distortion caused by "flat topping" in the P.A. and alleviates the usual critical setting of the transmit gain control. The P.A. employs circuits to protect the amplifier under excess V.S.W.R. or other abnormal conditions. In the A.M. mode, an Automatic Carrier Control (ACC) circuit is engaged which controls the amount of A.M. power output. The power amplifier is easily removable (as a module) from the rear of the radio.

1.3 TECHNICAL SPECIFICATIONS

Electrical and physical specifications of the Sunair GSB-900SC Transceiver are listed below.

1.3.1 GENERAL

FREQUENCY RANGE: 1.6 to 29.9999 MHz (100 Hz increments, plus VFO).

PROGRAMMABLE FREQUENCIES AVAILABLE: 284,000, synthesized.

STORED CHANNELS: 100 (Channel 00 thru Channel 99, Simplex or Half-Duplex).

MEMORY LOCATIONS PER CHANNEL: 2

TOTAL MEMORY LOCATIONS: 200.

FREQUENCY OPERATING MODES: Normal, Load Freq, Read Freq, Secure.

RESOLUTION: Digital, direct readout (100 Hz steps, plus VFO).

FREQUENCY STABILITY: $\pm 1 \times 10^{-6}$ TCXO, over rated temperature range.

OPERATING MODES: USB, LSB, AME, CW, (FSK and FAX with external optional modems).

RF INPUT/OUTPUT IMPEDANCE: 50 ohms nominal, unbalanced.

DUTY CYCLE: Continuous.

ENVIRONMENTAL TEMPERATURE: -30°C to $+65^{\circ}\text{C}$, for 100 watts PEP output, -30° to $+50^{\circ}\text{C}$, for 100 watts Average (Continuous FSK). External blower kit required for continuous FSK service.

HUMIDITY: 100% at 50°C .

SHOCK: Per MIL-STD-810B, Method 516.1, Procedure I, Fig. 516.1.2, Amplitude a Duration c.

VIBRATION: Per MIL-STD-810B, Method 514.1, Procedure VIII, Curve V.

ENCLOSURE: Per MIL-STD-108, table II, (Splash-proof).

METER MONITORS: Relative power output, received signal strength.

FRONT PANEL CONTROLS: Digital Frequency Selectors, Digital Channel Selectors, Frequency Control Mode Keylock Switch, Load Receive Pushbutton, Load Transmit Pushbutton, Master Clear Pushbutton, VFO, Volume, Mode/on-off, RF Gain, Transmit-ter Gain, Light Dimmer, and optional plug-in antenna coupler control panel.

POWER INPUT: AC: 115/230 volts $\pm 15\%$, 50-60 Hz; at 400 watts max.
DC: (optional) 13/26 volts $\pm 10\%$; at 480 watts max.

DIMENSIONS: (CM) 15.2H x 46.6W x 53.7D (INCHES) 6H x 18.25W x 21.125D
WEIGHT: 30 kgs. (66 pounds)

1.3.2 RECEIVER

SENSITIVITY: SSB: 0.5 uv into 50 ohms for 10 db S+N/N.
AM: Not more than 3.0 uv into 50 ohms for 10 db S+N/N.
(2-30 MHz) —
(1.6 to 2.0 MHz) 6db degradation.

AUDIO OUTPUT: 5 watts into 8 ohms (speaker) @ less than 10% distortion; 10 dbm nominal into 600 ohms (internally adjustable).

SELECTIVITY: 300 to 3000 Hz nominal (6db points), standard.

IF REJECTION: Not less than 70 db.

IMAGE REJECTION: Not less than 80 db.

AGC: Fast attack, slow release. Threshold 5 uv nominal, 15 db max audio change for 100 db R.F. input change.

INTERNAL SPURIOUS RESPONSE: 99.5% below equivalent 0.2 uv noise input at antenna terminals.

EXTERNAL SPURIOUS RESPONSE: -65 db, non-harmonically related.

1.3.3 TRANSMITTER

POWER OUTPUT: SSB: 100 watts PEP and average nom.
CW: 100 watts Avg. nom.
AME: 30-40 watt carrier.

HARMONIC SUPPRESSION:

-40 db, second harmonic.
-50 db, all other harmonics.
-60 db, all harmonics, (with antenna coupler)

INTERMODULATION DISTORTION: At least 33 db below PEP., typical.

CARRIER SUPPRESSION: 50 db.

UNDESIRE SIDE BAND SUPPRESSION: 50 db at 1.5 kHz.

HUM AND NOISE LEVEL: -50 db.

1.4 EQUIPMENT SUPPLIED

The following table is a list of equipment, with appropriate Sunair part numbers, supplied with the GSB-900SC Transceiver.

	Sunair Part No.
1.4.1 Transceiver, GSB-900SC with 115/230 volt power supply.	1003680011 Green 1003680038 Gray
1.4.2 Hand Held Microphone Assembly	5024000609
1.4.3 Operation and Maintenance Manual	1004190000
1.4.4 Power Cord Assembly, 115 V A.C. OR Power Cord Assembly, 230V A.C.	5024002091 5024002156
1.4.5 Ancillary Kit	5024000455 115V 5024000498 230V

1.5 OPTIONAL EQUIPMENT-NOT SUPPLIED

The following table of accessories and spares are NOT supplied but are made available by Sunair Electronics, Inc. as compatible equipment for the GSB-900SC. Part numbers and descriptions are given to facilitate ordering.

1.5.1	Antenna Coupler, Remote Controlled, GCU-910A	5024300050	Gray
		5024300092	Green
1.5.2	Automatic Antenna Coupler, GCU-935	6035003095	Green
		6035003052	Gray
1.5.3	Kilowatt Linear Power Amplifier GSL-1900A	6032001091	Green
1.5.4	Control Cable for GCU-910A or GCU-935 (specify length)	0588680001	
1.5.5	Control Cable for GSL-1900A (specify length)	0579240002	
1.5.6	Antenna Coupler Tuning Control (Kilowatt Control) mounts in Front Panel of GSB-900SC.	Refer to Applicable Manual	
1.5.7	Coaxial Cable, type RG58/U (recommended for connecting antennas to the GSB-900SC, or for connecting the GSB-900 to the GCU-910 or GCU-935 where the length will be under 100 feet). SPECIFY LENGTH	0588130001	
1.5.8	Coaxial Cable, type RG8/U (same as 1.5.7 above, but recommended where length will exceed 100 feet). SPECIFY LENGTH	0586640000	
1.5.9	D.C. Inverter Module (Powers the GSB-900SC from either 13 or 26 volt D.C. sources while still permitting operation from 115/230V A.C. mains). Module mounts inside GSB-900SC.	5024021398	
1.5.10	Power Cord Assembly-D.C. (includes 10 feet of connecting cable). For use with item 1.5.9 above. (Supplied with DC inverter above).	5024002296	
1.5.11	C.W. Key (includes 3 foot cable and connector).	5024000994	

1.5.12	Handset Assembly (with coiled cord and connector).	5024000790	
1.5.13	Headset (includes cable and connector).	0840200005	
1.5.14	Desk Type Microphone (includes cable and connector).	5024000897	
1.5.15	Shock Mount Assembly (recommended for mobile applications).	1001680006	
1.5.16	Rack Mount Kit (adapts GSB-900SC to mount in a standard 19 inch rack). Includes rack slides, two piece.	1001690001	Green
		1001690010	Gray
	Rack Mount Kit w/three piece slides	1001700058	Gray
		1001700091	Green
1.5.17	Doublet Antenna Kit	0996240000	
1.5.18	75 foot Long Wire Antenna Kit	0999200003	
1.5.19	150 foot Long Wire Kit	0999210009	
1.5.20	16 foot Mobile Fiberglass Whip Antenna (use with 1.5.21 below).	0712950001	
1.5.21	Heavy Duty Strap-Type Bumper Mount for 1.5.20 above.	0715730002	
1.5.22	Heavy Duty Feed Thru Mount (for 1.5.20 above).	5024402090	
1.5.23	Right Angle Vehicular mount for 1.5.20 above.	5024402596	
1.5.24	35 foot Fiberglass Base Station Whip Antenna.	0715850008	
1.5.25	23 foot Fiberglass Marine Whip Antenna with Flange Base.	0715760009	
1.5.26	23 foot Fiberglass Marine Whip Antenna.	0712980008	
1.5.27	Laydown Mount for above.	0712990003	
1.5.28	Depot Spare Parts Kit for GSB-900SC (to support 3 to 5 units in the field for 2 to 4 years).	1001670001	

SUNAIR GSB-900SC

1.5.29	Field Module Kit for GSB-900 SC (contains p-c board assemblies).	1004030002
1.5.30	GRC-951 Remote Audio/Keyline Control for GSB-900SC.	5024850092
1.5.31	Remote Control Cable for GRC-951 (specify length).	0588690007
1.5.32	Depot Spare Parts Kit for D.C. Inverter Module.	5024902092
1.5.33	Blower Kit 115 VAC (mounts on rear panel).	5024006089 5024006097
1.5.34	Blower Kit 220 VAC (mounts on rear panel).	5024400054 Gray
1.5.35	Manual Phone Patch Assembly (See Page 6-1	5024400097 Green
1.5.36	Service Kit, GSB-900SC	1004180098
1.5.37	Running Spares Kit	5024900197

100 403 0029

SECTION 2

INSTALLATION

2.1 GENERAL

Section two contains all necessary instructions for the unpacking, inspection, and if necessary, reshipping of damaged equipment or parts. In addition, further information regarding location and mounting considerations, power requirements, antenna and ground system hook-ups and final checkouts after installation is also provided.

2.2 UNPACKING AND INSPECTION

Unpack and inspect all parts and equipment as soon as received.

NOTE

Be sure to retain the carton and its associated packing materials should it be necessary to reship damaged equipment.

Do not accept a shipment when there are visible signs of damage to the cartons until a complete inspection is made. If there is a shortage of items or any evidence of damage is noted, insist on a notation to that effect on the shipping papers before signing the receipt from the carrier.

If concealed damage is discovered after a shipment has been accepted, notify the carrier immediately in writing and await his inspection before making any disposition of the shipment. A full report of the damage should also be forwarded to Sunair. Include the following:

- (a) Order number
- (b) Model and serial number
- (c) Name of transportation agency

When Sunair receives this information, arrangements will be made for repair or replacement.

2.3 RESHIPPING

The shipping carton for the GSB-900SC has been carefully designed to protect the transceiver and its accessories during shipment. This carton and its associated packing materials should be used to re-ship the radio.

If the original shipping carton is not available, be sure to carefully pack each unit separately, using suitable cushioning material where necessary. Very special attention should be given to providing enough packing material around controls, connectors, and other protrusions from the radio. Rigid cardboard should be placed at the corners of the equipment to protect against denting.

When returning one or more subassemblies for repair, please ship AIR PARCEL POST consigned to:

SUNAIR ELECTRONICS, INC.
3101 SW 3rd Avenue
Ft. Lauderdale, Florida 33315
U.S.A.

Plainly mark with indelible ink all mailing documents as follows:

U.S. GOODS RETURNED FOR REPAIR
VALUE FOR CUSTOMS - \$100.00

and be sure to mark on all sides of the package

"FRAGILE - ELECTRONIC EQUIPMENT"

NOTE

Before shipping, carefully inspect the package to be sure it is marked properly and is securely wrapped.

2.4 GENERAL INSTALLATION AND MOUNTING INFORMATION

Satisfactory operation of this equipment will depend upon the care and thoroughness taken during installation.

2.4.1 GENERAL INSTALLATION

- a. Carefully plan radio/coupler/antenna locations, observing the following requirements before starting installation.
- b. Provide best possible RF ground for radio and coupler. Use flat copper strap 1" wide or no. 6 or larger wire and connect to ground terminal at rear of transceiver. Leads to ground system should be as short as possible.
- c. Provide separation between coupler output and the radio with its associated wiring. Coupler may be mounted up to 100 ft. from radio if RG58 rf cable is used, or further if RG8 is used.
- d. Antenna lead from antenna coupler to antenna must be insulated for at least 10kv potential. The lead should not run parallel to metal fittings or other metal objects that are bonded to the system ground. The coupler should be as close to the antenna as possible, and never more than 3 ft. distant as this will decrease antenna efficiency.
- e. If the radio is installed on a wood or fiber glass boat, approximately 10 to 12 square feet of metal surface area in contact with the water should be provided for use as an RF ground.
- f. If operated on D.C. power, check for correct polarity before applying power.
- g. The installation should be carefully planned beforehand in accordance with drawings on the following pages.
- h. Linear amplifiers with low level modulation such as used in the GSB-900SC will oscillate if the RF power output is radiated or conducted into the low level stages. Evidence of this situation is erratic

or excessive power output. This is caused by too close proximity of the coupler output and antenna to the transmitter and/or inadequate RF grounds. Carefully following the above procedures will prevent this from occurring.

2.4.2 BASE STATION INSTALLATION

The transceiver is equipped with rubber feet so that it can be set directly on a table, desk or similar flat surface. The front feet are taller than the rear feet in order to tilt the transceiver at a convenient operating angle. Minimum clearances of 1 inch at the sides and 2 inches at the rear and top should be allowed to provide for adequate cooling of the rear panel heat sinks. If extended periods of RTTY transmission are anticipated, forced air cooling of the heat sinks is recommended. Figure 2.1 shows the applicable GSB-900SC outline dimensions for use in this installation. Figures 2.2 and 2.3 show typical Base Station system installations. Refer to section 2.5 for recommendations of suitable antennas. See section 2.4.5 for rack mounted installations.

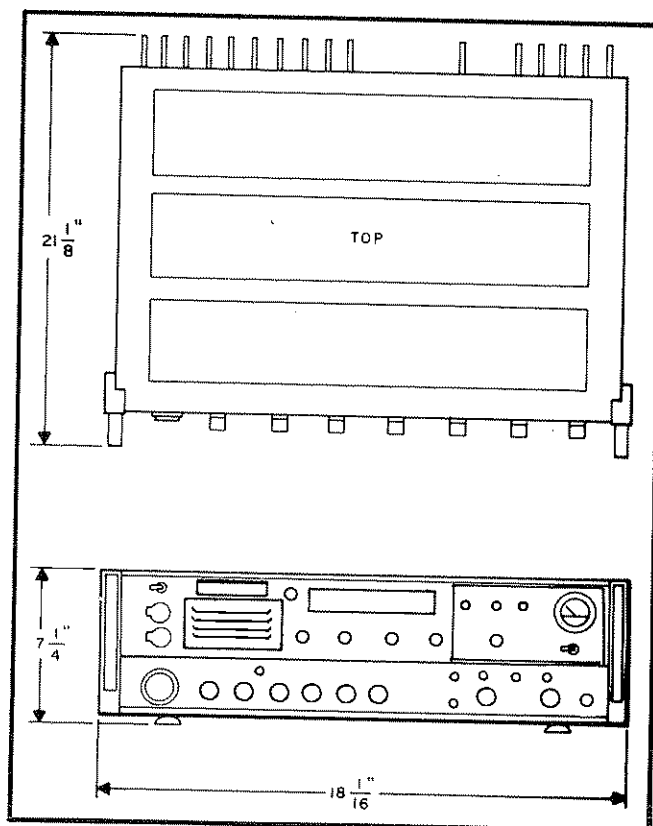


Figure 2.1 Outline Configuration

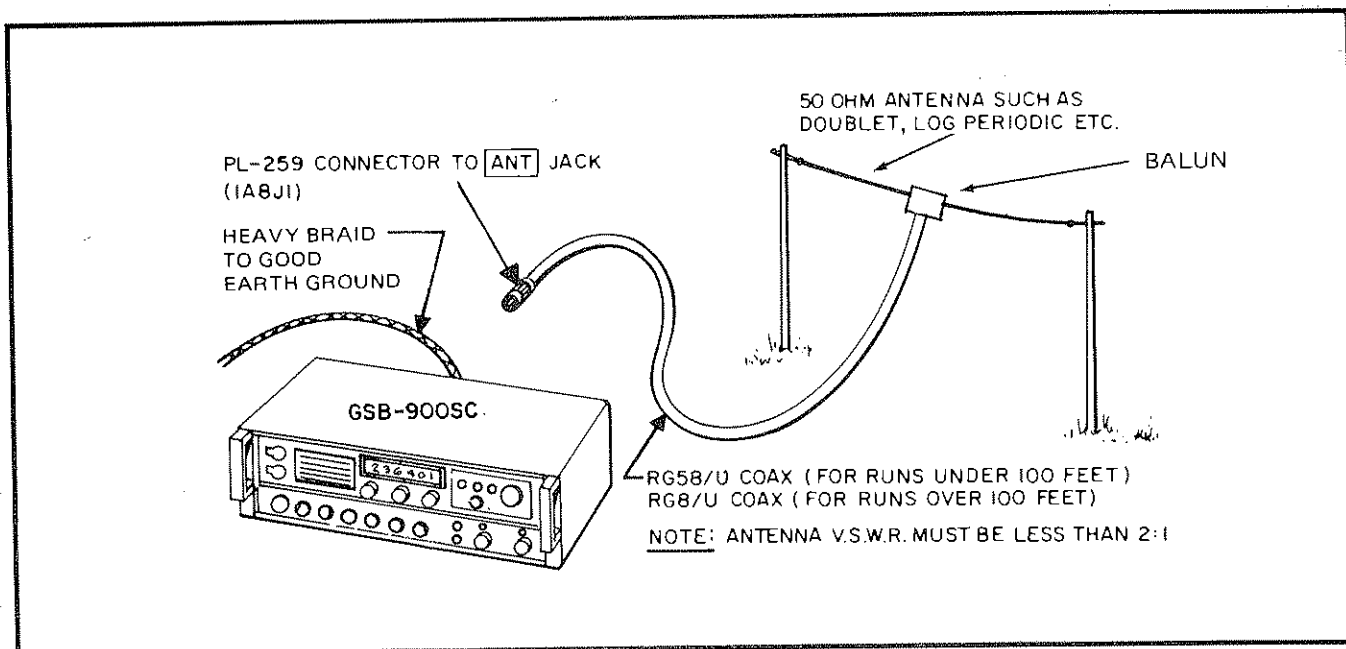


Figure 2.2 Base Station Installation (50 ohm Antenna)

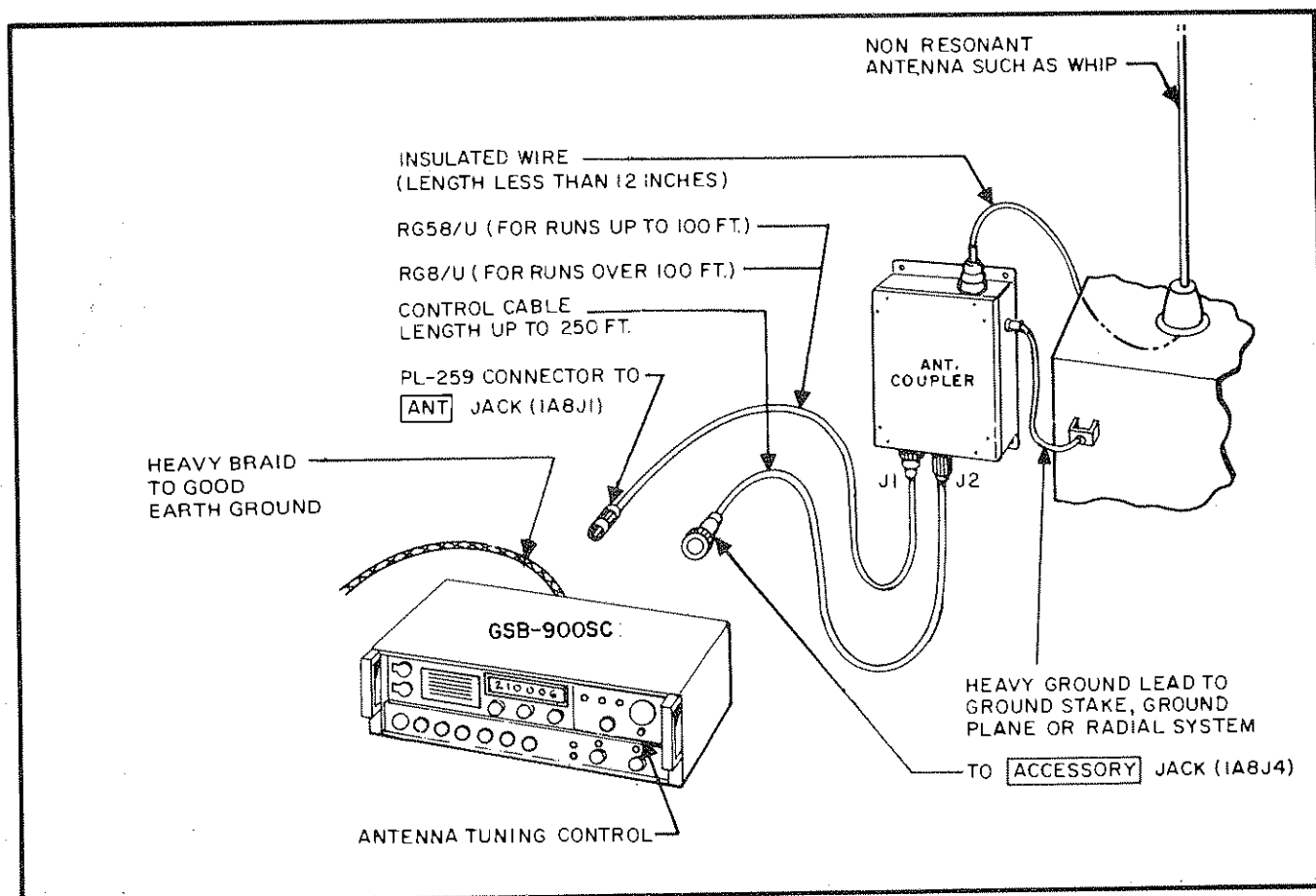


Figure 2.3 Base Station Installation (Non-Resonant Antennas)

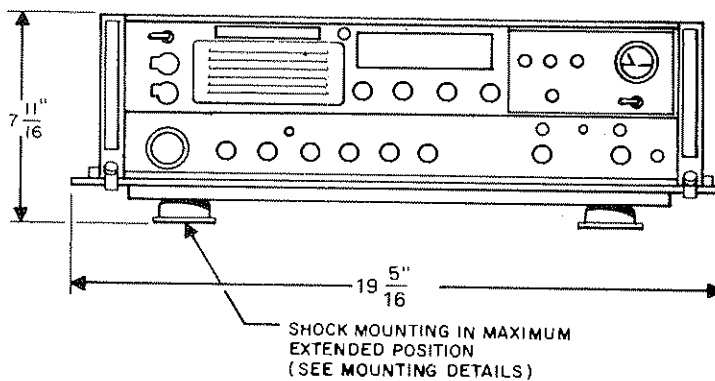
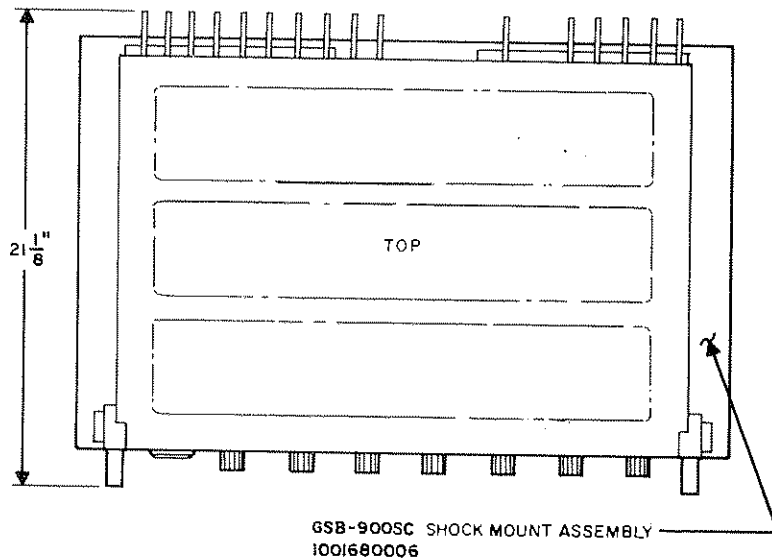
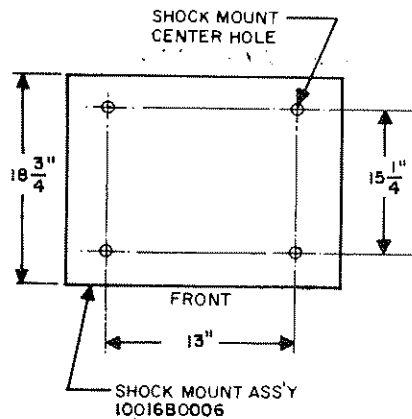
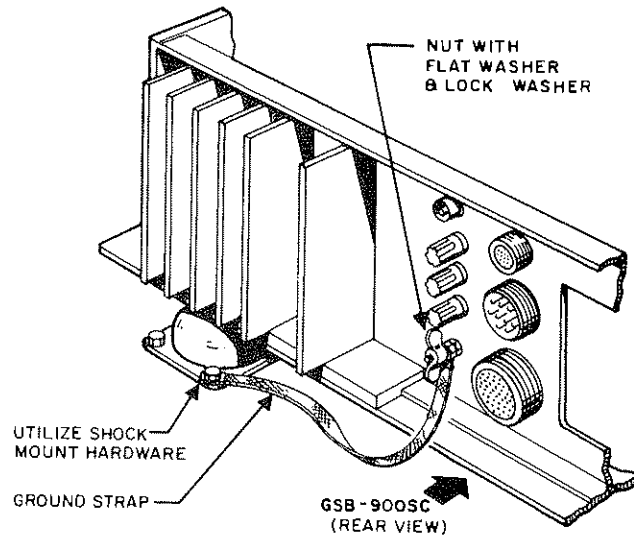
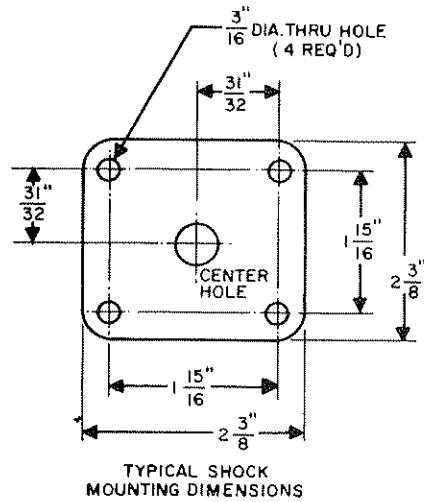


Figure 2.4 Shock Mount Assembly and Details

SUNAIR GSB-900SC

2.4.4 MARINE INSTALLATIONS

In marine installations, follow the same recommendations as outlined in paragraph 2.4.3. If the radio is installed in a wood or fiberglass boat, a ground plate of 12 square foot minimum area in contact with the water should be installed. A heavy ground lead such as 1 inch wide strap or braid should be connected between the ground post on the radio and the ground plate. The length of this ground lead should be held to an absolute min-

imum commensurate with a neat installation.

2.4.5 RACK MOUNTED INSTALLATIONS

The GSB-900SC may be conveniently mounted in a standard 19 inch rack using the Rack Mount Kit. The kit includes a pair of rack slides, associated hardware and filler panel. The GSB-900SC, in the rack mounted configuration, requires a standard panel space seven inches high. Refer to figure 2.6 for assembly details.

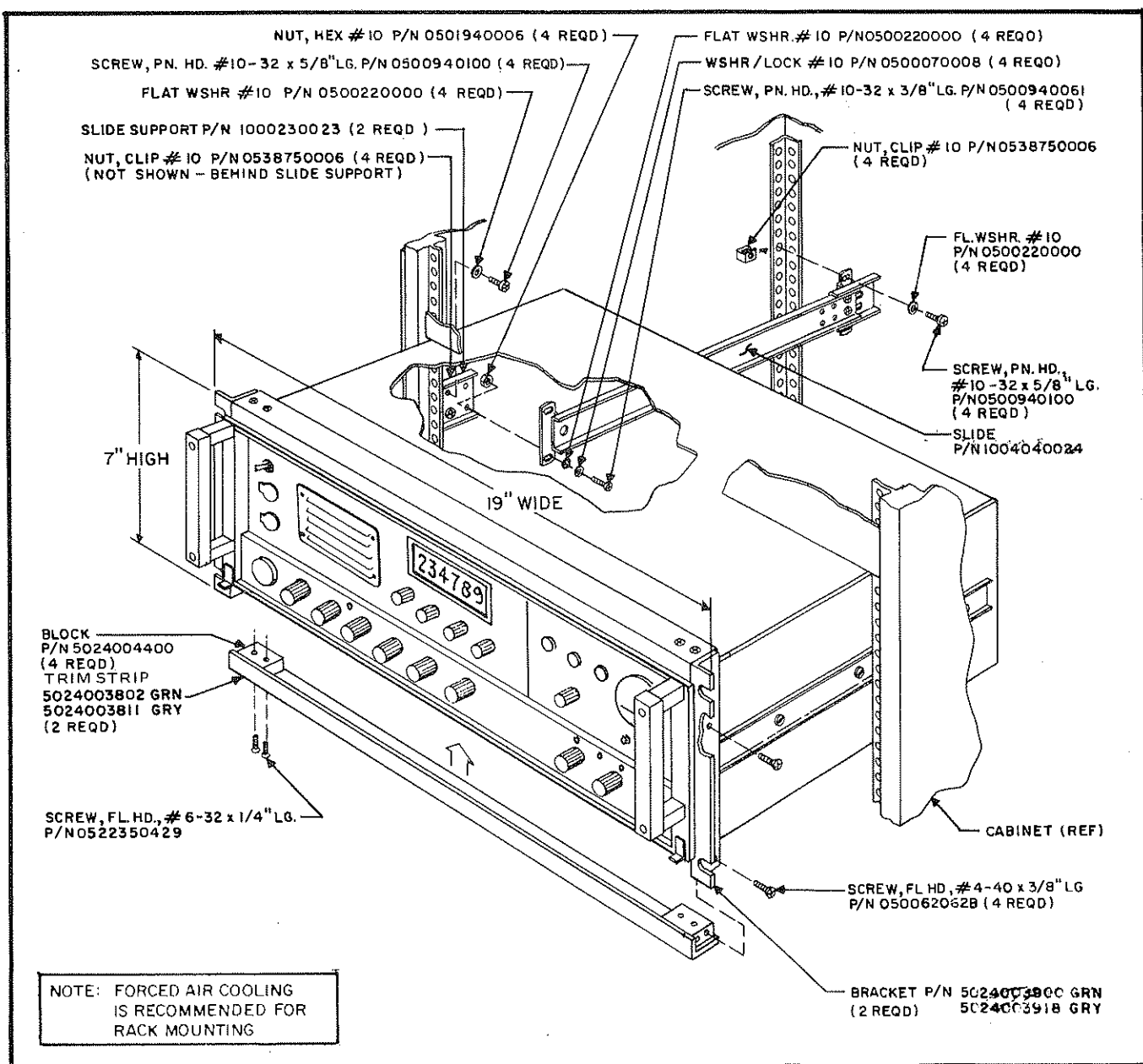


Figure 2.6 Rack Mounted Installation

2.4.3 VEHICULAR INSTALLATIONS

The GSB-900 SC Shock Mount Assembly (Sunair Part No. 1001680006) is designed to mount the Transceiver in vehicular installations. Figure 2.4 gives the applicable outline dimensions for the GSB-900SC coupled with the shock mount. Figure 2.5 shows a typical vehicular installation. See section

2.5 for specific antenna recommendations. In order to minimize R.F. pickup, it is important that the ground strap supplied with the shock mount be securely fastened between the ground post on the radio and the bottom of the right rear shock isolator (see detail, figure 2.4). It is also important to ground the antenna coupler to the frame of the vehicle by the shortest possible path.

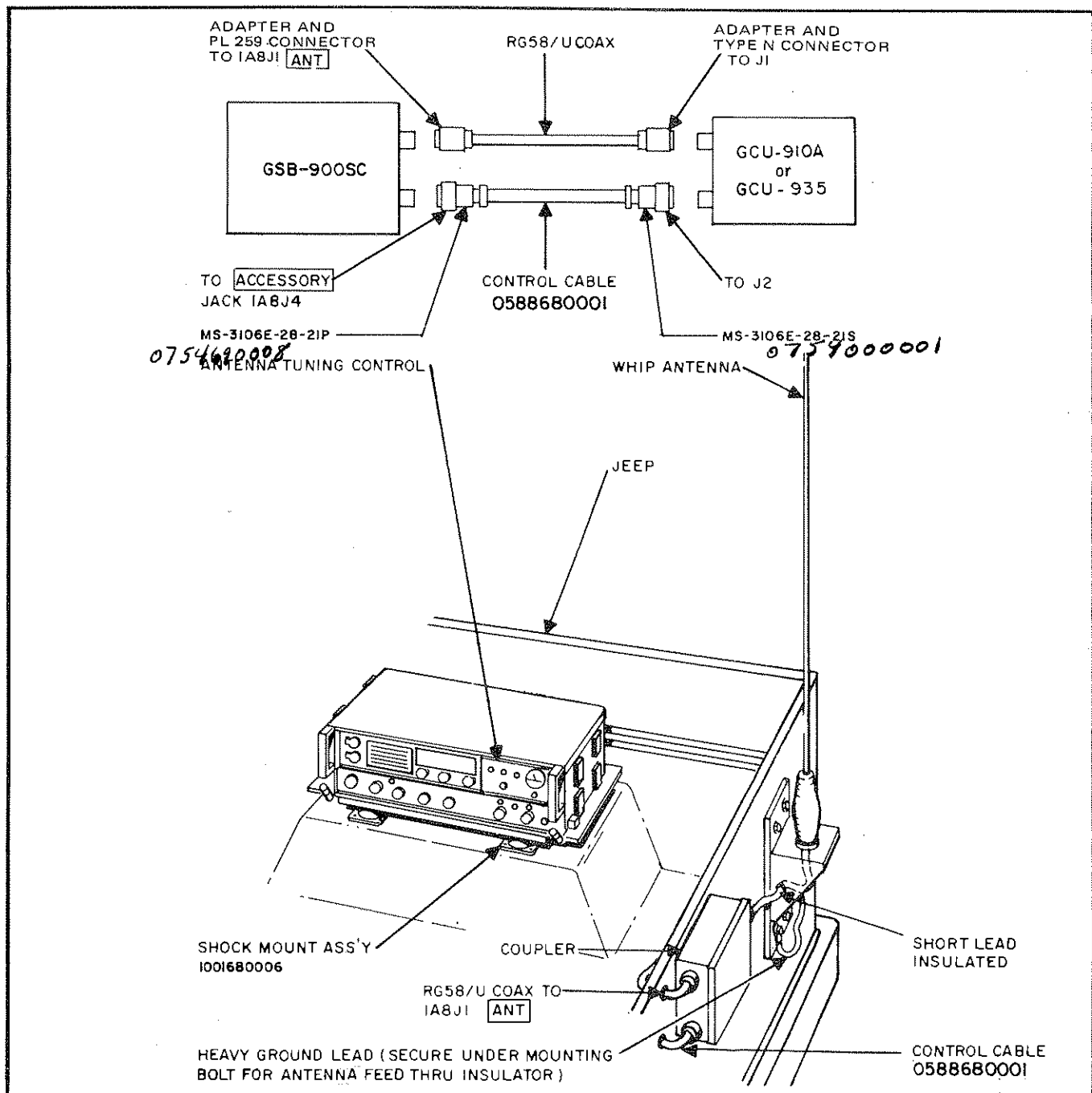


Figure 2.5 Typical Vehicular Installation

2.5 ANTENNAS AND GROUND SYSTEMS

2.5.1 GENERAL

The GSB-900SC is designed to operate into a 50 ohm resistive antenna system with a maximum voltage standing wave ratio (V.S.W.R.) of 2:1. When used with the GCU-910A, or GCU-935 Antenna Coupler, the system will match antennas ranging from 15 foot whips to 150 foot long wires. The couplers will also efficiently match 9 foot whip antennas at frequencies above 4 MHz.

As there are numerous types of antennas, a complete discussion is beyond the scope of the manual. Antennas for use in the 1.6 to 30 MHz spectrum generally fall into three categories:

- (a) Narrow band 50 ohm antennas
- (b) Random length non resonant antennas
- (c) Broad Band 50 ohm antennas

Several popular antennas falling into each of the above categories are discussed below. For specific recommendations, consult our experienced Field Service Organization.

DEPARTMENT

Some general "DO'S" and "DONT'S" of antenna installation are listed below:

a. The antenna should be clear of all large objects such as trees and buildings.

b. Although the GCU-910A or GCU-935 coupler will match electrically short antennas (i.e. those under $1/8$ wavelength), such antennas are not efficient radiators. If the installation permits, antennas over $1/8$ wavelength long at the lowest operating frequency should be used. Antenna length generally limits system performance in vehicular applications at frequencies below 10 MHz as the size would be prohibitive.

c. When using whip antennas, the ground system actually forms part of the radiating system. Where space permits (such as in a base station installation) a good ground plane or radial system should be installed at the base of the antenna. (See Figure 2.7)

NOTE

An inadequate ground system is most often responsible for disappointing performance when using a whip antenna.

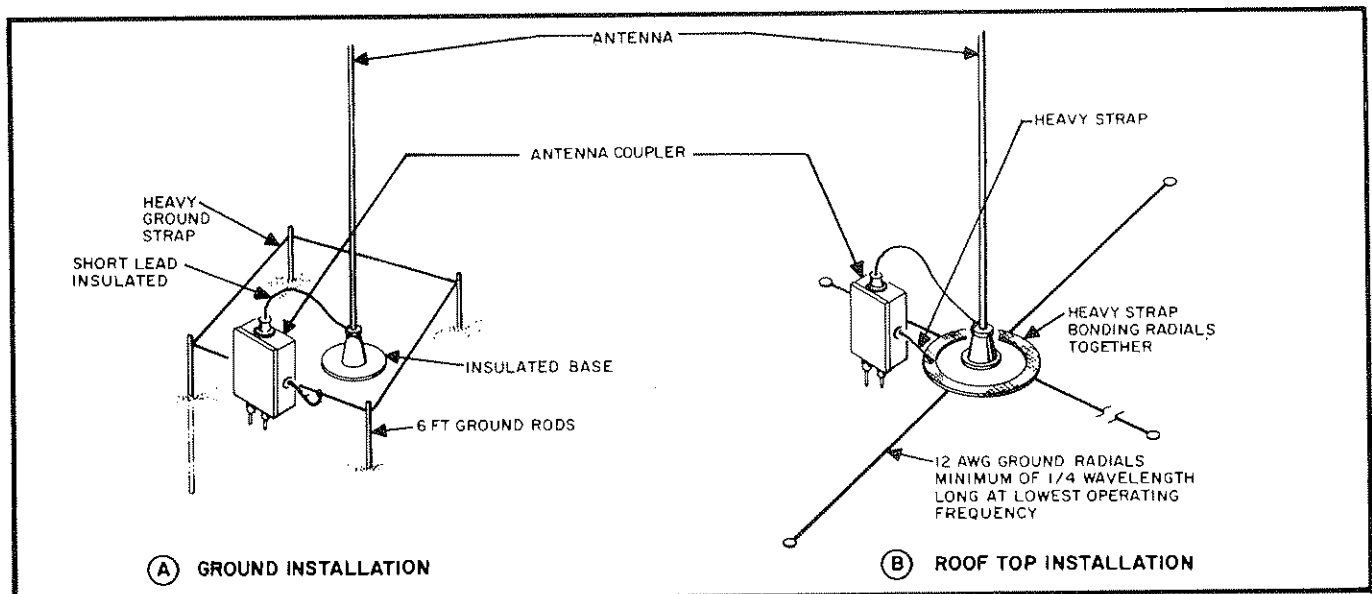


Figure 2.7 Whip Antenna

d. In vehicular installations and marine installations in a metal hull ship, 1 inch wide strap or braid should be connected between the antenna coupler ground and the frame of the vehicle. The length should be as short as possible. In an installation aboard a wood or fiberglass boat, a ground plate with at least 12 square feet in contact with the water should be attached to the hull and a short, 1 inch wide strap should be connected between the coupler ground post and the plate. As previously mentioned this ground lead should be as short as possible.

2.5.2 NARROW BAND 50 OHM ANTENNAS

Typical of this type of antenna are the doublet and the inverted V illustrated in Figures 2.8 and 2.9 respectively. Both types of antennas may be assembled from the Sunair Doublet Antenna Kit (part #0996240004). Their operation is efficient for only a narrow band of frequencies within approximately 2 1/2% of their center frequency. The antenna coupler is NOT generally required if the above frequency span is not exceeded. Separate antennas must be erected for each small band of frequencies to be used. Both antennas exhibit somewhat directional characteristics. The direction of maximum radiation is perpendicular to the antenna wire. The inverted V antenna is particularly suitable for communication with nearby mobile stations (with vertical antennas) since a portion of the radiation is in a vertical direction.

2.5.3 RANDOM LENGTH NON RESONANT ANTENNAS

Whips and long wires are popular non resonant antennas. The whip antenna (illustrated in Figure 2.7) is often used in mobile, marine, portable or semi portable installations because it is rugged and self supporting. The antenna impedance is strongly dependent on the operating frequency and an antenna coupler, therefore, must be used to match the antenna to the transceiver. Best radiation efficiency will be obtained if the antenna is at least 1/8 wavelength long at the lowest operating frequency; however, this requirement does not result in a practical size antenna for low frequency operation. Thirty-five foot whip antennas offer a good compromise between practical height and good electrical performance at low frequencies. The Antenna Couplers are designed to efficiently match whip antennas of 15 foot length or greater. An efficient match may also be obtained for a 9 foot whip above 4 MHz. The whip's performance is greatly influenced by its ground system. For temporary base station installations, a minimum of four six foot long ground rods should be driven into the ground symmetrically placed around the antenna base. The rods should be bonded together with heavy strap and then connected to the antenna coupler ground by another short heavy strap. If the antenna is mounted on the roof of a building, where a short ground lead to the coupler cannot be obtained, a minimum of 4 symmetrically placed

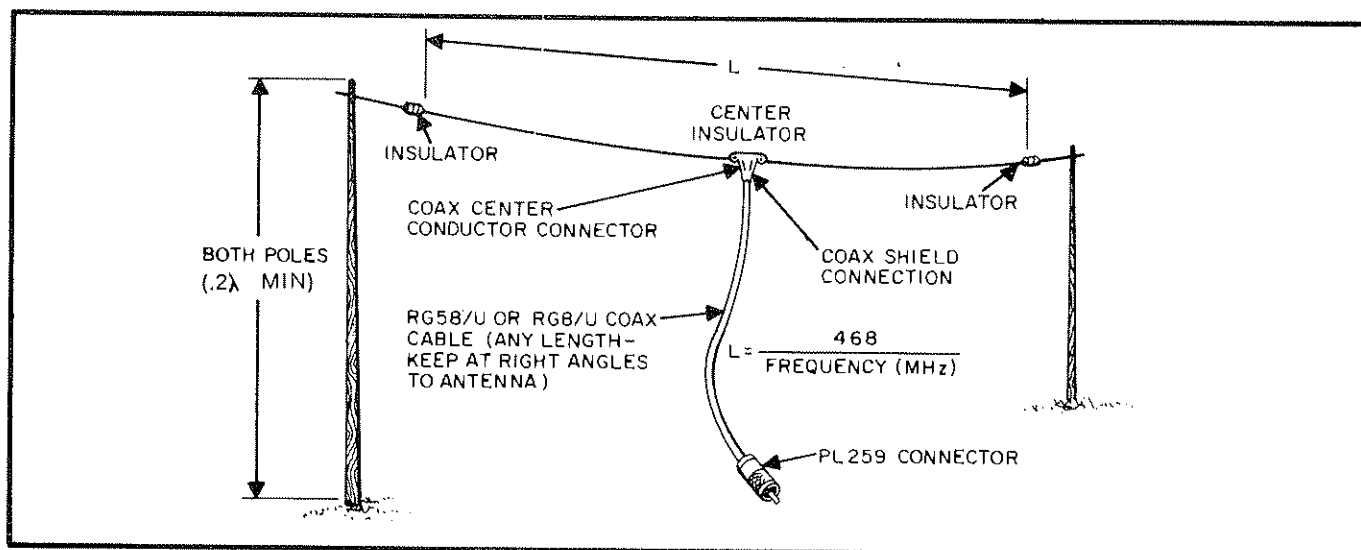


Figure 2.8 Doublet Antenna

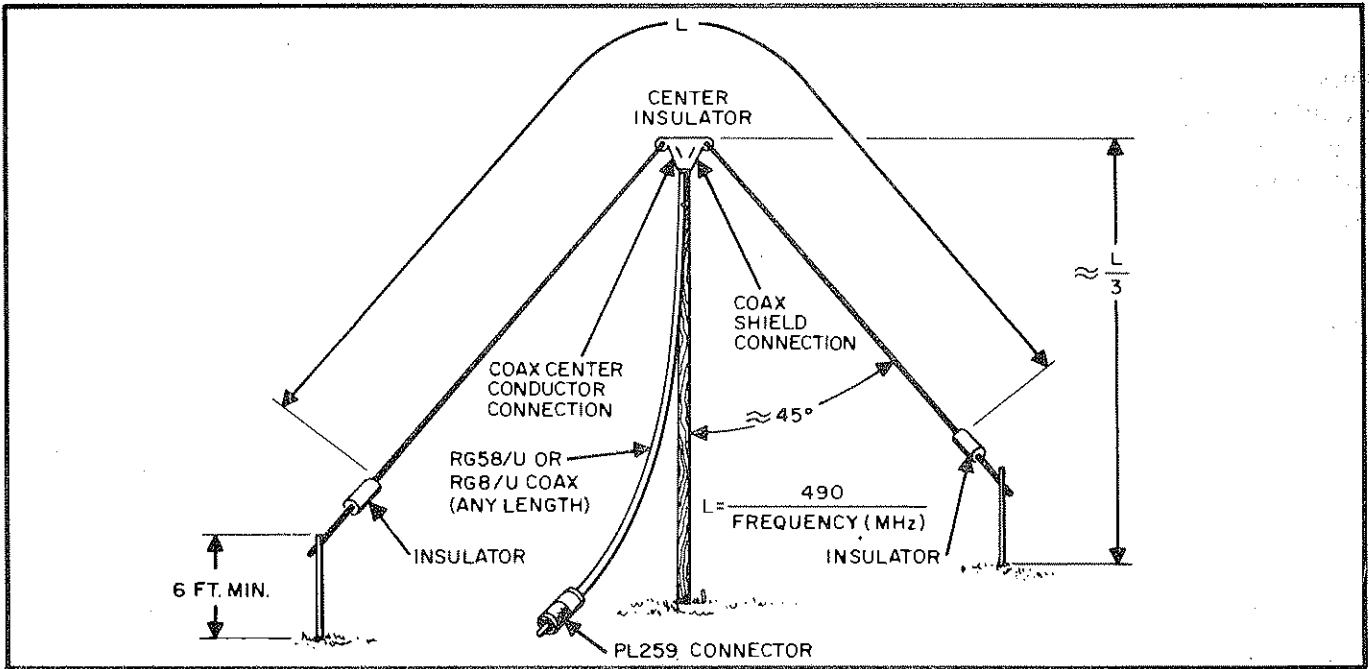


Figure 2.9 Inverted "V" Antenna

ground radials should be installed at the base of the antenna, bonded together, and connected to the antenna coupler ground post. The radials should be made of number 12 gauge wire or larger and should be at least $1/4$ wave long at the lowest operating frequency. The whip's radiation pattern is omni-directional in the azimuthal plane.

The long wire antenna, illustrated in Figure 2.10, is a popular base station antenna where a wide range of operating frequencies are used. The antenna

impedance varies greatly with frequency and, therefore, must be matched to the transceiver with an antenna coupler. The antenna couplers will efficiently match long wire antennas up to 150 feet in length. The radiation pattern of the long wire antenna is also a function of operating frequency. The two most popular length long wire antennas, 75 and 150 foot (available from Sunair as part numbers 0999200003 and 0999210009 respectively) exhibit excellent low frequency radiation efficiency.

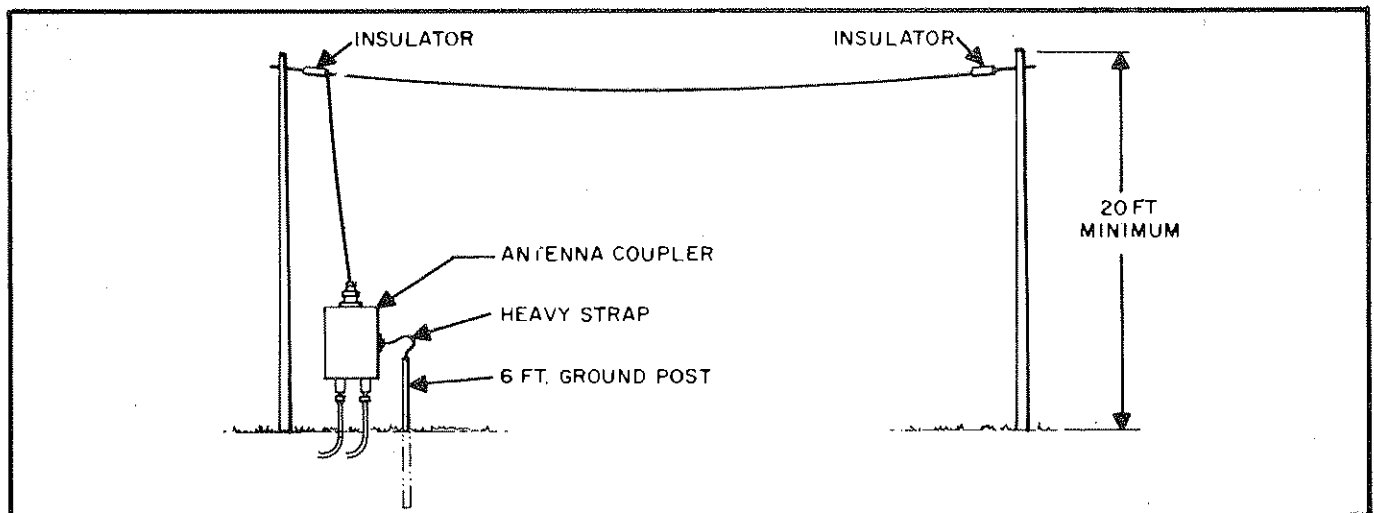


Figure 2.10 Long Wire Antenna

2.5.4 BROAD BAND 50 OHM ANTENNAS

These are generally complex, expensive antennas requiring a large area for installation. Their use is usually limited to high performance base station installations which must operate at diverse frequencies. As this class of antennas has approximately 50 ohm output impedance over the rated band of frequencies, an antenna coupler is NOT required. Some common examples are:

- a) Discone (a vertical antenna with an omnidirectional pattern)
- b) Log-Periodic (a broadband antenna with a directional pattern). This antenna is often made in a rotatable configuration.

Consult the Sunair Field Service department for specific recommendations.

2.6 POWER REQUIREMENTS

2.6.1 OPERATION FROM ALL A.C. POWER SOURCES

As supplied from the factory, the GSB-900SC is wired for continuous operation from 115 or 230 volt $\pm 15\%$, 50-60 Hz, single phase A.C. power mains. The selection of 115 or 230 volt nominal line voltage is made by the appropriate wiring in the connector of the A.C. power cord assembly. The line voltage range may therefore be easily altered by changing the power cord, (See Table 2.11). The nominal line voltage is normally specified by the customer at the time of ordering and the proper

A.C. power cord is shipped with the radio. Figure 2.12 shows the line cord assembly wiring for 115 volt operation while Figure 2.13 shows the 230 volt wiring.

CAUTION

Check the tag on the line cord before connecting the radio to power mains to insure that the correct voltage has been selected. Permanent damage to the radio may occur if the incorrect power cord is used. Refer to Table 2.14 and check fuses F1 and F2 on the rear apron to make sure the proper value has been inserted in the fuse holders.

2.6.2 A.C. OPERATION UNDER HIGH LINE VOLTAGE CONDITIONS

The GSB-900SC power supply a-c transformer has provision for high line connection. If the a-c power mains are normally high (132 or 264 vac) the high line connection should be used as the radio will dissipate less power and operation will be more reliable.

The radio may be wired for high line voltage operation by changing connections on terminal strip 1A6TB1 on the power supply (refer to Figures 2.15 and 2.16). The GBS-900SC is normally wired at the factory for the nominal 115/230 volt connections.

NOMINAL LINE VOLTAGE	LINE VOLTAGE RANGE	POWER CORD IN USE	REFER TO FIGURES
115	98 to 132	115V	2.12, 2.15
*132	112 to 152	115V	2.12, 2.16
230	196 to 264	230V	2.13, 2.15
*264	224 to 304	230V	2.13, 2.16

* High Line Connections

Figure 2.11 A.C. Line Voltage Range Table

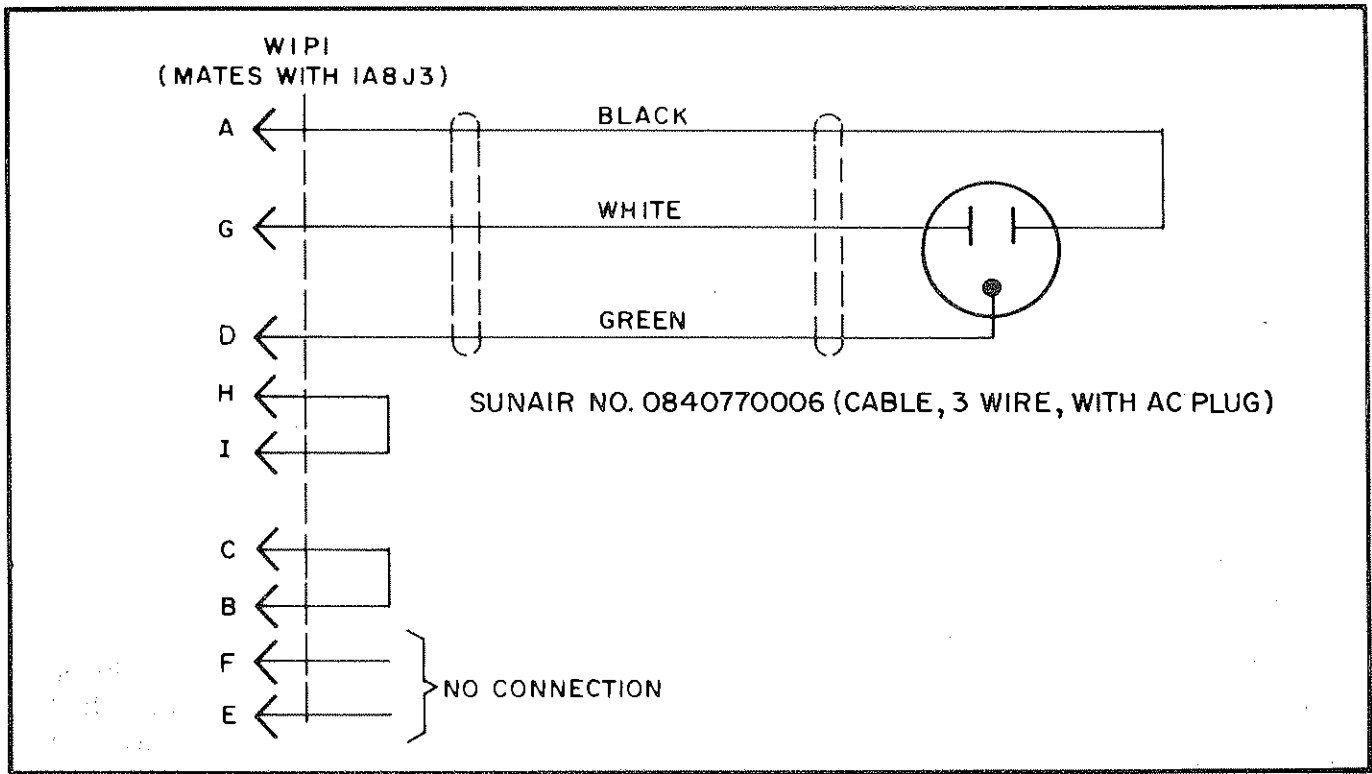


Figure 2.12 115 VAC Power Cord Schematic

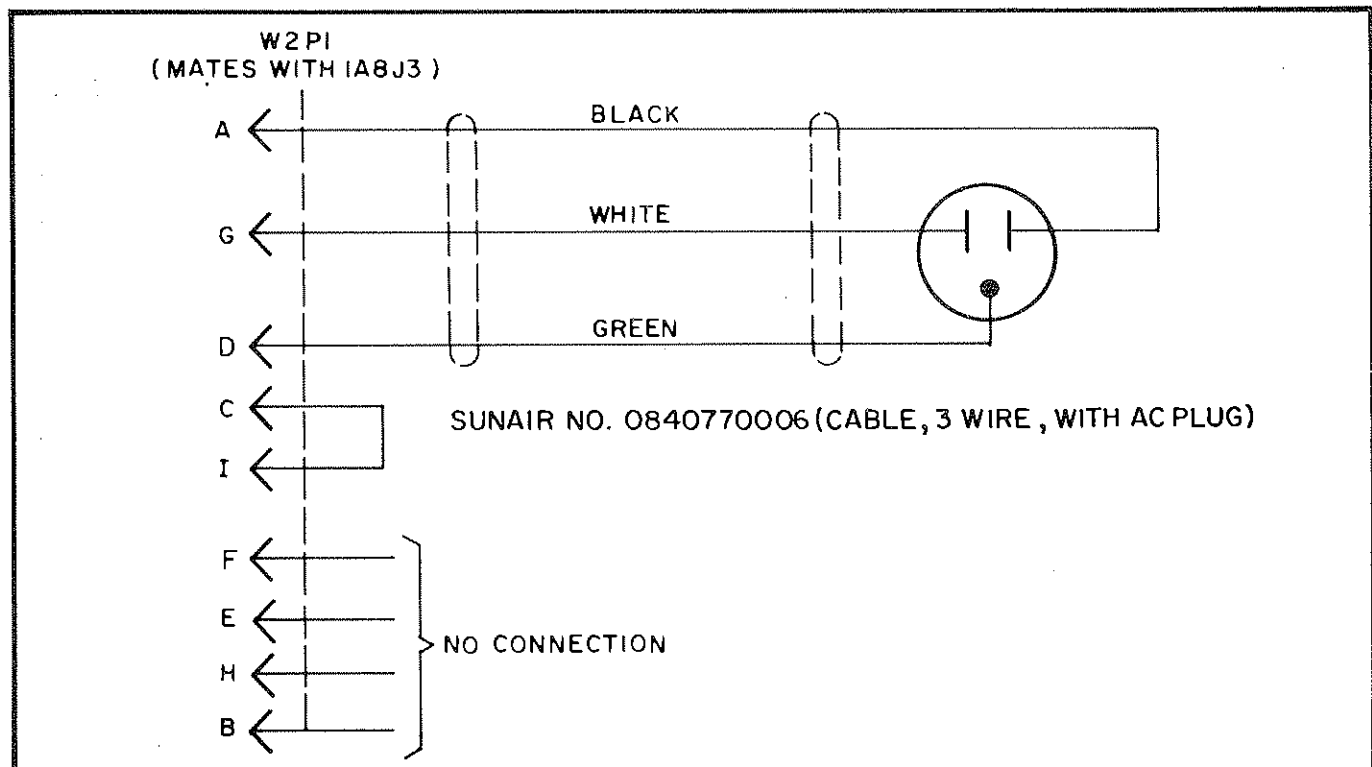


Figure 2.13 230 VAC Power Cord Schematic

NOTE

The high line voltage connections must either be requested at the time of ordering or the radio must be rewired in the field to provide for continuous high line voltage operation (see figure 2.16).

on the D.C. Inverter assembly 1A6A2. The Power Cord wiring for D.C. operation is shown in figure 2.18.

CAUTION

Before connecting the radio to the D.C. power source, check the marker tag on the regulator heat sink at the rear of the radio to make sure that the proper voltage range has been selected. Permanent damage to the radio can occur if the wrong range is selected.

2.6.3 OPERATION FROM D.C. POWER SOURCE

If the GSB-900SC is equipped with the optional D.C. Inverter Module (Sunair part #5024021398) operation from D.C. power sources of 13 or 26 volts $\pm 10\%$, positive or negative ground, is possible. The GSB-900SC is unique in that both D.C. and A.C. power supplies can be left in the radio at all times. Selection of D.C. or A.C. operation is accomplished by the wiring in the connector of the Power Cord Assembly. The selection of operation from nominal 13 or 26 volt power sources is accomplished by changing connections on terminal strip 1A6TB2 (see figure 2.17) on the power supply and

The GSB-900SC incorporates reverse polarity protection when fed from D.C. power sources. If the radio does not operate, check the polarity of the D.C. power connections. Refer to the accessory section of the manual for detailed installation instructions of the D.C. Inverter Module. The D.C. Power

DESIGNATOR	FUNCTION	LOCATION	TYPE AND RATING
1A8F1, 1A8F2	A.C. Line	Rear Apron	For nominal 115V input, use type MDL (SLO-BLO), 5 amp. PN 0858660008 For nominal 230V input, use type MDL (SLO-BLO), 3 amp. PN 0896660001
1A8F3	D.C. Line	Rear Apron	For nominal 13V input, use type MDL(SLO BLO), 30 amp. PN 0846300001 For nominal 26V input, use type MDL(SLO BLO), 15 amp. PN 0848500008
1A6F1	+28V	Power Supply	Type AGC, 15 amp. PN 0848740009
1A6F2	+12V	Power Supply	Type AGC, 3 amp. PN 1002550009
1A6F3	+5V	Power Supply	Type AGC, 3 amp. PN 1002550009

Figure 2.14 GSB-900SC Fuse Table

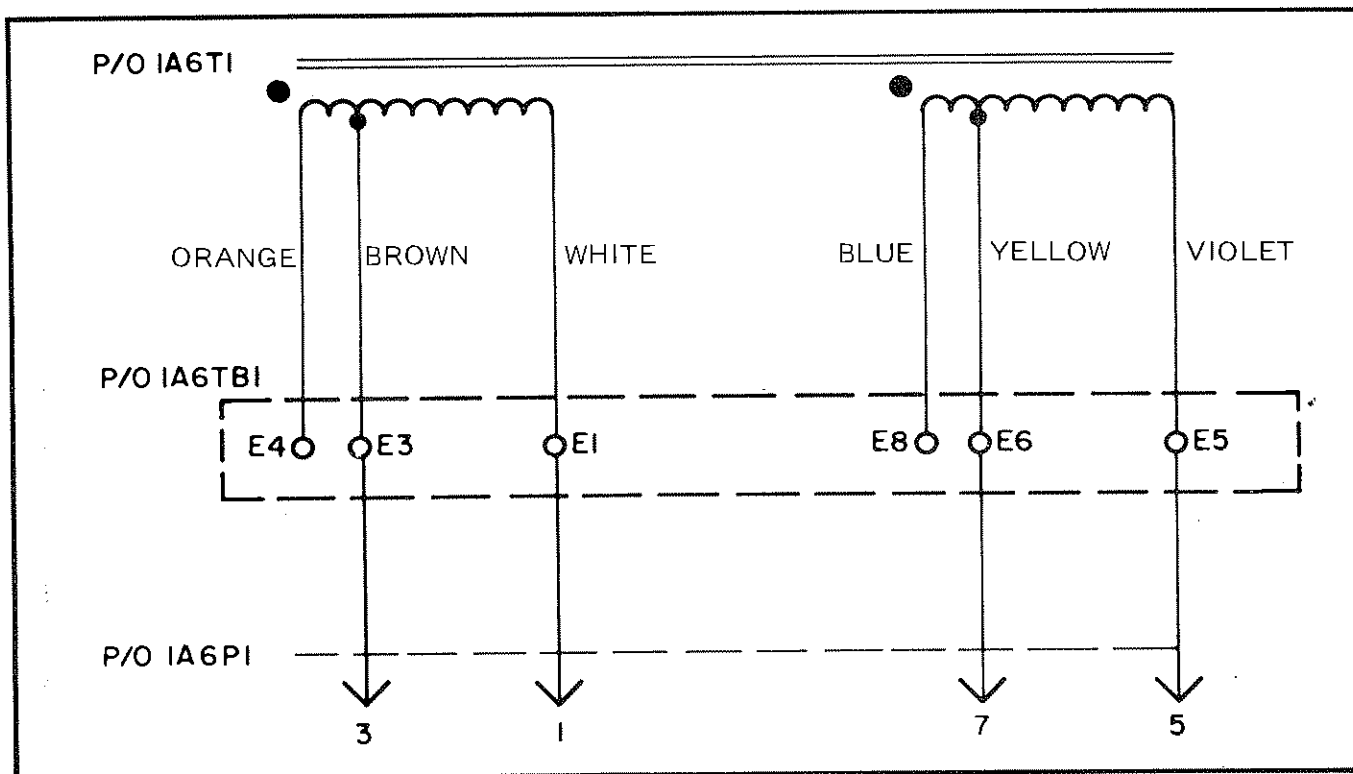


Figure 2.15 Power Supply Wiring - 115V or 230 VAC Inputs

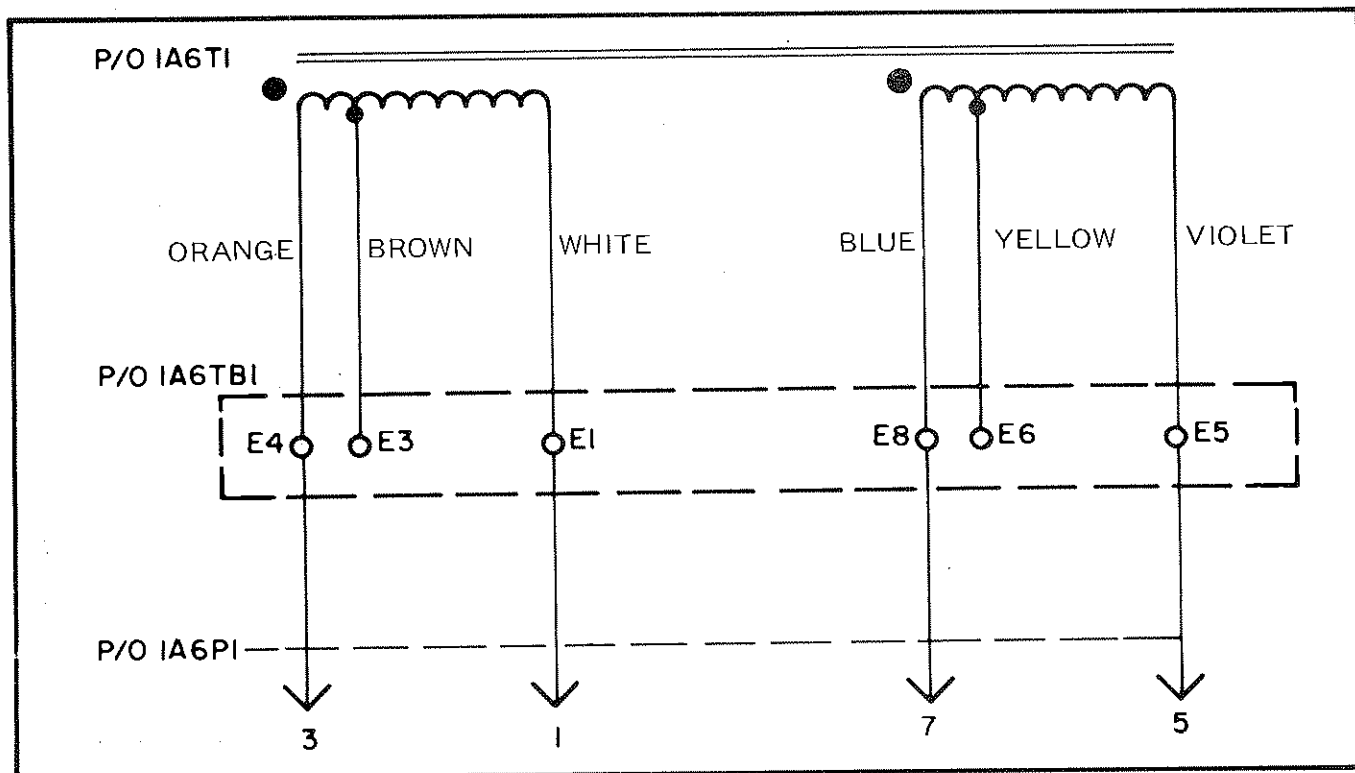
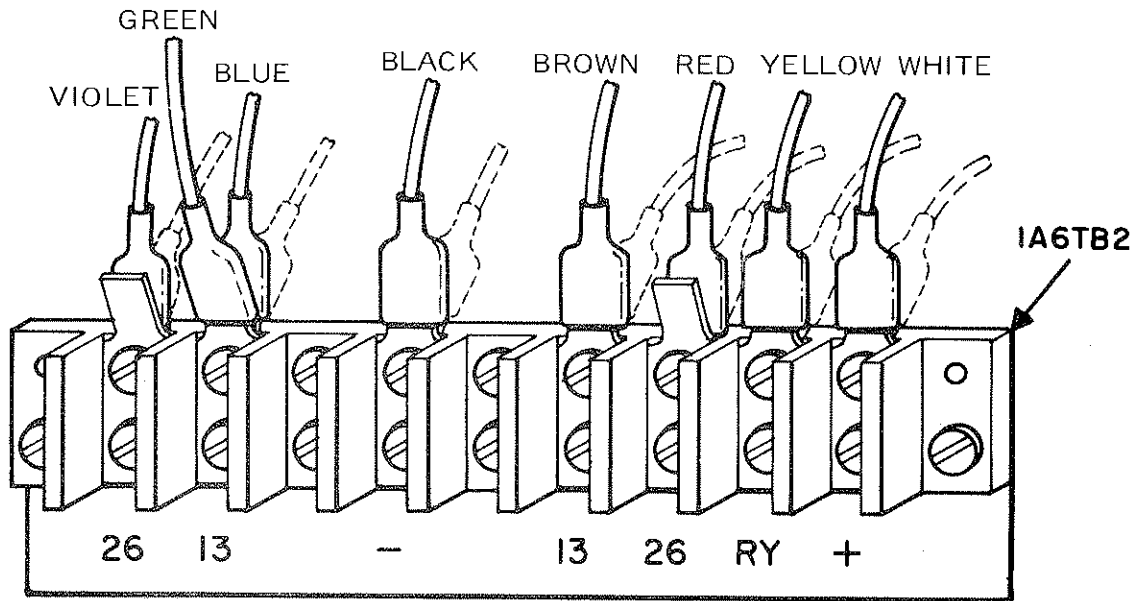
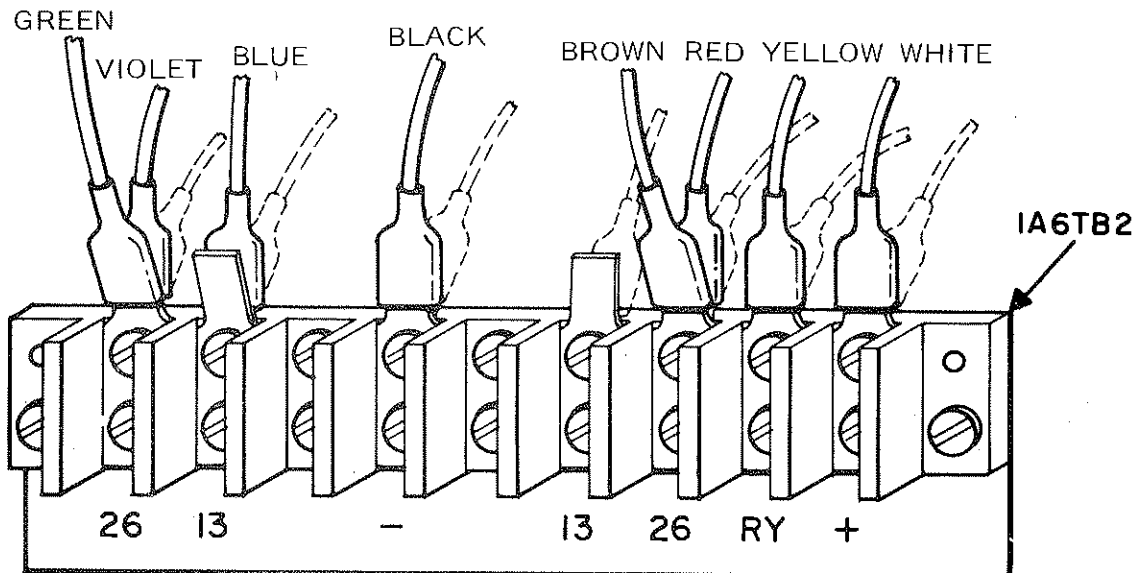


Figure 2.16 Power Supply Wiring - 132 V or 264 VAC Inputs



CONNECTIONS SHOWN ABOVE FOR 13 VDC OPERATION
 NOTE: S1 MUST BE IN 13VDC POSITION ON DC
 INVERTER BOARD



CONNECTIONS SHOWN ABOVE FOR 26 VDC OPERATION
 NOTE: S1 MUST BE IN 26VDC POSITION ON DC
 INVERTER BOARD

Figure 2.17 D.C. Inverter Connections to Power Supply Terminal Strip 1A6TB2

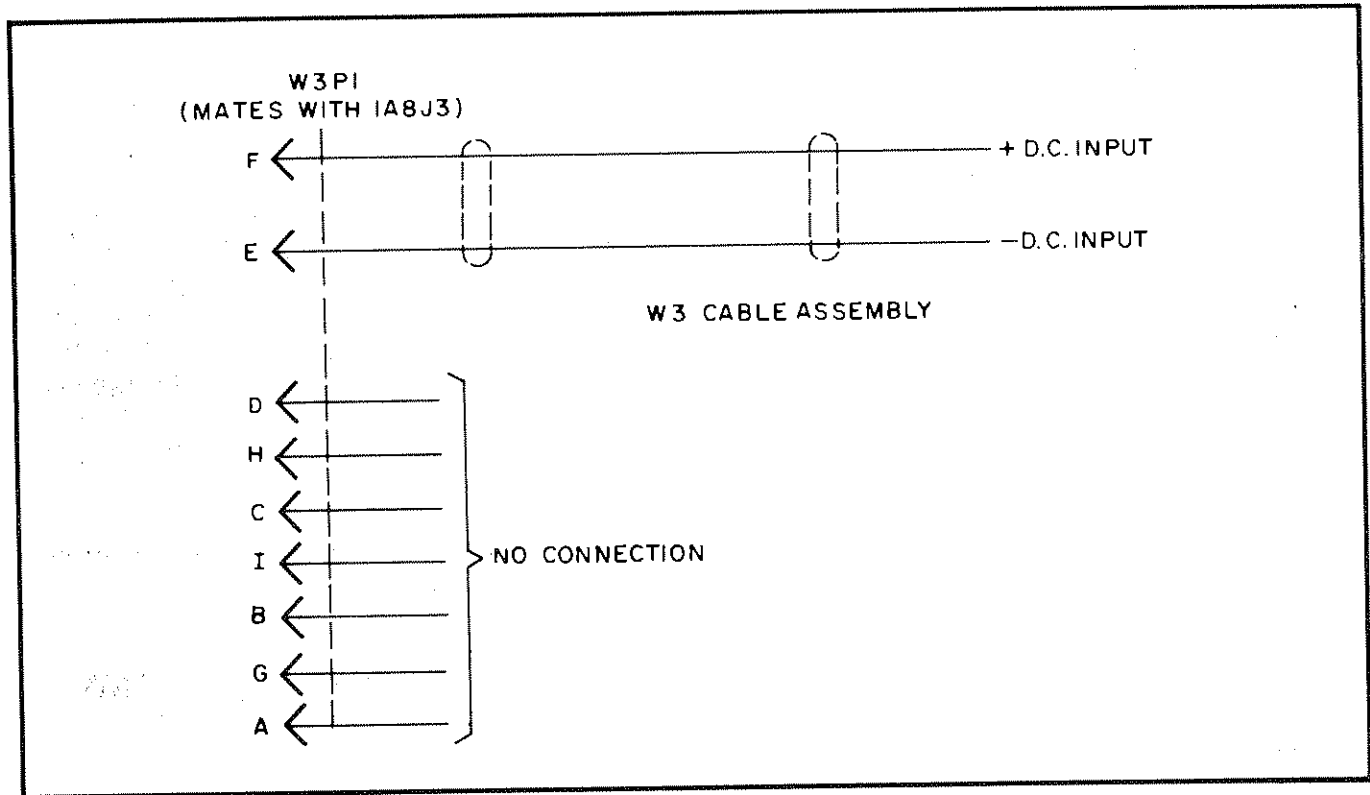


Figure 2.18 D.C. Power Connector Schematic

Cable Assembly is supplied from the factory with approximately 10 feet of connecting cable. However, if the installation permits, the cable should be trimmed to minimum length consistent with a neat installation. This will ensure minimum voltage drop in the cable under the high input currents present when in transmit (particularly with 13 volt input).

NOTE

Before applying power to the radio, refer to table 2.14 and check that the correct value of fuse F3 (on the rear apron of the radio) has been inserted in its fuse holder.

2.7 GRC-951 AUDIO REMOTE CONTROL UNIT

The GRC-951 Audio Remote Control unit provides for remote control of GSB-900SC audio and keyline functions at separations of up to 200 feet from the transceiver. The GRC-951 outline drawing is shown in figure 2.20. A universal swivel-

type mounting bracket is supplied with the unit, permitting installation in a variety of locations. To install the GRC-951, proceed as follows:

- Select the mounting location and mount universal mounting bracket.
- Route control cable (0588690007) through any conduits, walls, etc. Trim off any excess cable.
- Refer to figure 2.19 and wire connectors P1 and P2. Note that the cable shield is grounded to Pin A only at the end connected to the transceiver.
- Secure GRC-951 to the universal mounting bracket.
- Connect P2 to the GRC-951 remote control and P1 to the GSB-900SC. Connect Power cord and antenna to the GSB-900SC.

NOTE

The internal adjustments in the GSB-900SC have been set at the fac-

SUNAIR GSB-900SC

tory to supply proper audio levels to the GRC-951, in case of insufficient audio levels, perform the following adjustments.

f) Remove the top cover and receiver/exciter module top cover from the GSB-900SC.

g) Set the VOLUME control of the remote control to the middle of its range. Connect a microphone to the remote control.

h) Turn REMOTE AUDIO LEVEL control 1A3A-4R48 on the AUDIO board in the GSB-900SC at least 10 turns counterclockwise.

i) Turn REMOTE TRANSMIT AUDIO LEVEL control 1A3A4R58 on the AUDIO board in the GSB-900SC at least 10 turns counterclockwise.

j) Apply power to the GSB-900SC. Tune in a moderately strong signal on the GSB-900SC (using local speaker). Advance 1A3A4R48 clockwise until a comfortable listening level is achieved in the GRC-951 speaker.

k) Select the highest transmit frequency anticipated (normally 29.9999 MHz), refer to section 3 and check out transmit operation using local controls.

l) Depress the push-to-talk (PTT) button on the microphone connected to the remote control. Speaking in a normal voice, carefully advance 1A3A4R58 on the AUDIO board clockwise until no further increase in power output on the meter of the GSB-900SC is noted (this is the threshold of ALC). Advance 1A3A4R58 two turns beyond this point.

m) Replace the receiver/exciter module top cover and the GSB-900SC top cover.

THE UNIT IS NOW READY FOR OPERATION

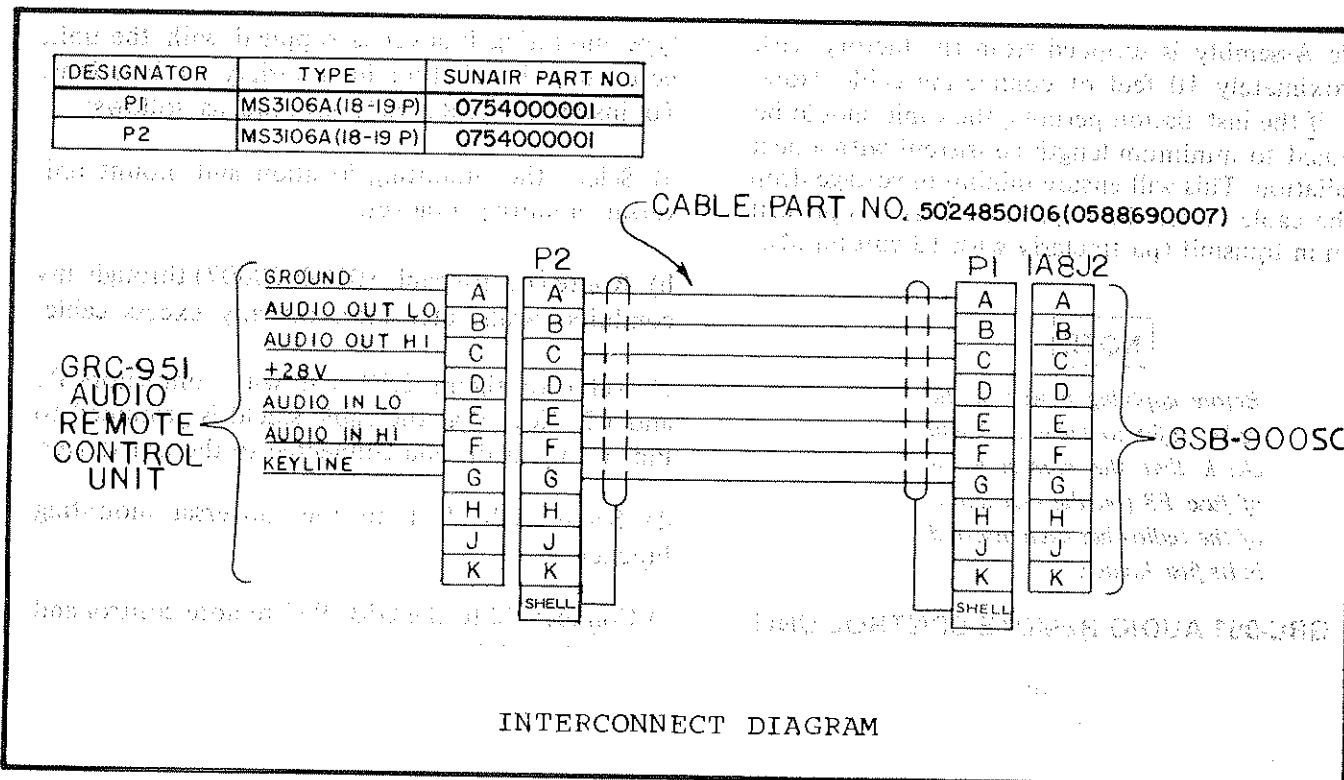


Figure 2.19 GRC-951 Audio Remote Control Unit Interconnect Diagram

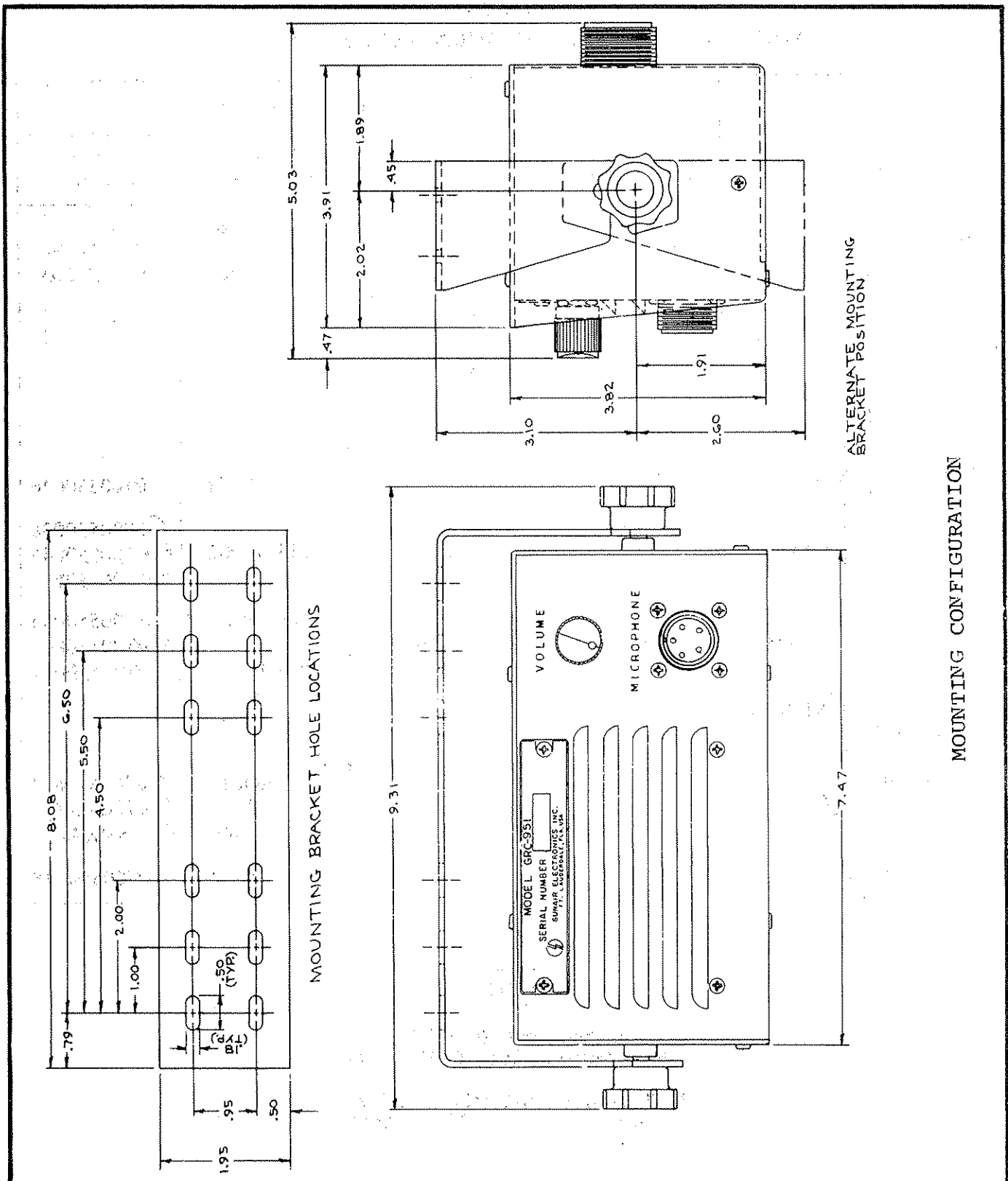


Figure 2.20 GRC-951 Audio Remote Control Unit Outline Configuration

Table 2.1
MATING CONNECTORS TO GSB-900 SC AND ACCESSORIES

DESCRIPTION	DESIGNATOR	MATING PARTS			
		Connector	Cable Clamp	Rubber Boot(s)	
		Sunair Part Numbers			
GSB-900SC {	Microphone	1A1J1	0753570009	0754450007	0700550038
	Phone	1A1J2	0754010007	—	—
	Key	1A1J3	0754010007	—	—
	Antenna	1A8J1	0742190005 (Note 1)	—	—
	Audio	1A8J2	0754000001	0740250001	0700550046
	Power	1A8J3	0753580004	0754570002	{ 0700550038 0700550046 0700550054
	Accessory	1A8J4	0754690008	Included with Connector	{ 0700550054 0700550062 0700550071
GCU-910 or GCU-935 {	RF Input	J1	0747020001 (Note 2)	—	—
	Control Unit	J2	0747640009	Included with Connector	{ 0700550054 0700550062 0700550071
GRC-951 {	Audio	J1	0754000001	0740250001	0700550046

NOTE

1. When used with RG-58/U Coax, use Adapter No. 0742070000.
2. When used with RG-8/U Coax, use connector No. 0754140008.

SECTION 3

OPERATION

3.1 GENERAL

This section provides installation and instructions required for proper operation of the Secure Channel front panel.

3.2 OPERATING CONTROLS

3.2.1 Listed in the next pages are descriptions of all controls, indicators and connectors located on the Secure Channel front panel. They are illustrated in Figure 3.1.

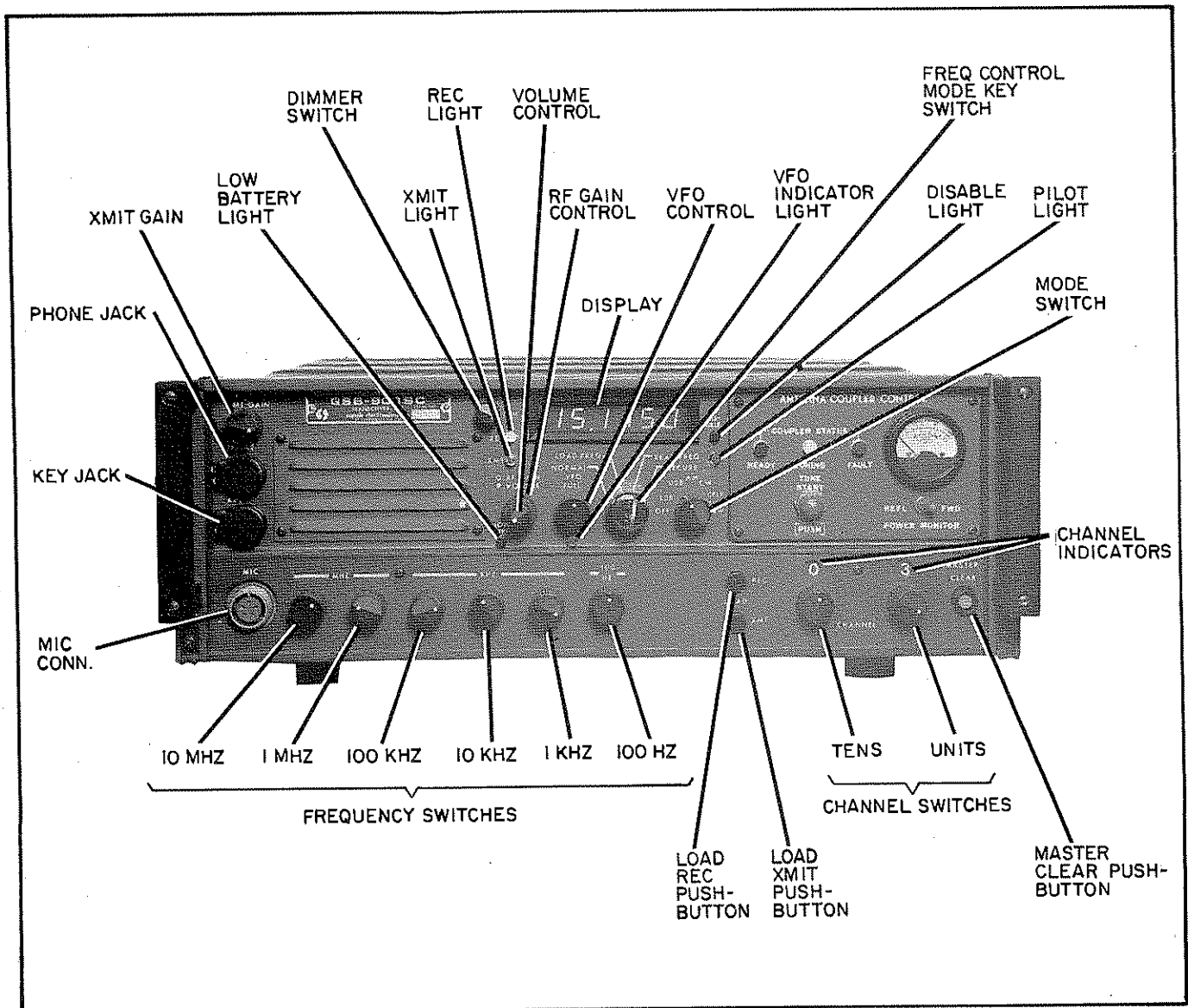


Figure 3.1 GSB-900SC Transceiver Front Panel

	SWITCH POSITION	EQUIPMENT RESPONSE
MODE SWITCH	OFF	Disconnects Primary Power
	LSB	a) Applies Primary Power b) Select Lower Sideband Mode
	USB	a) Applies Primary Power b) Selects Upper Sideband Mode
	AM	a) Applies Primary Power b) Selects Amplitude Modulation Mode
	CW	a) Applies Primary Power b) Selects Continuous Wave Mode. A CW key must be connected to the key jack on the front panel.
	CPLR TUNE KW	a) Applies Primary Power b) Disconnects microphone and CW key. c) Keys the radio in AM mode. IF AN ACCESSORY GCU-910A, GCU-935, OR GSL-1900A IS CONNECTED IN THE SYSTEM: d) Energizes the accessory.
VOLUME (outer knob)		Controls the level of the receive audio signal to the speaker and PHONE jack.
RF GAIN (inner knob)		Controls gain of the RF and IF amplifiers in the receive mode. Counter clockwise rotation decreases the gain.
FREQ CONTROL MODE SWITCH	NORMAL	a) Six frequency switches select simplex operating frequency. b) Display contains frequency switch settings. c) The following controls are disabled: Load Xmt Pushbutton, Load Rec Pushbutton, Channel Selector Switches, Master Clear Pushbutton. d) Rec Light is on when radio receives. e) Xmt Light is on when radio transmits.
	LOAD FREQ	a) Six frequency switches select programming frequencies to be loaded into the memory system. b) Display contains frequency switch settings. c) Channel Selector Switches select memory locations to be loaded with desired transmit and receive frequencies. d) Load Rec Pushbutton, when depressed, loads selected receive frequency into receive frequency memory location of selected channel.

FREQ CONTROL MODE SWITCH	SWITCH POSITION	EQUIPMENT RESPONSE
	LOAD FREQ (Cont.)	e) Load Xmt Pushbutton, when depressed, loads selected transmit frequency into transmit frequency memory location of selected channel. f) Rec Light is on unless Load Xmt Pushbutton is depressed. When Load Xmt is depressed, Xmt Light turns on. g) Radio is disabled in this mode. Disable Light is on.
	READ FREQ	a) Channel Selector Switches select memory locations in which operating frequencies are stored. b) Display contains operating frequencies stored in memory location of selected channel. c) The following controls are disabled: Six Frequency Switches, Load Rec Pushbutton, Master Clear Pushbutton. d) Load Xmt Pushbutton causes transmit frequency, which is stored in transmit frequency location of selected channel to be displayed. Radio does not transmit since this operation is designed only to verify the stored transmit frequency. e) Xmt Light is on any time the radio is transmitting as a result of keying the Microphone or pressing the CW Key. Display will contain the transmit frequency. Xmt Light also is on when Load Xmt Pushbutton is pressed even though radio only displays transmit frequency and does not actually transmit. f) Rec Light is on at all times when the Xmt Light is not on.
	SECURE	a) All responses same as in Read Freq Mode except that display is blank preventing any front panel indication of operating frequencies.
FREQUENCY SWITCHES (6)		10 MHz switch, 1 MHz switch, 100 kHz switch, 10 kHz switch, 1 kHz switch, 100 Hz switch.

EQUIPMENT RESPONSE

FREQUENCY SWITCHES (6) (Cont.)	a) Selects the simplex operating frequency in the Normal Frequency Control Mode. b) Selects the programming frequencies to be loaded into the memory in the Load Freq Mode. c) Disabled in the Read Freq and in the Secure mode.
CHANNEL SELECTOR SWITCHES (2)	Channel Tens switch, Channel Units switch. a) Disabled in the Normal mode. b) Selects the memory locations to be loaded with desired transmit and receive frequencies in Load Freq mode. c) Selects for frequency control the memory locations containing the required transmit and receive frequencies in both Read Freq and Secure mode.
LOAD REC PUSHBUTTON	a) Disabled in Normal, Read Freq and Secure mode. b) Loads selected receive frequency into receive frequency memory location of selected channel in Load Freq mode.
LOAD XMT PUSHBUTTON	a) Disabled in Normal and Secure Mode. b) Loads selected transmit frequency into transmit frequency memory location of selected channel in Load Freq mode. c) Causes transmit frequency to be displayed without causing radio to transmit in Read Freq mode for the purpose of verifying stored transmit frequency.
MASTER CLEAR PUSHBUTTON	a) Disabled In Normal, Read Freq and Secure mode. b) Instantaneously erases all frequencies in Load Freq mode.
REC LIGHT	a) Lights when radio is receiving in Normal and in Secure mode. b) Lights when Load Xmt Pushbutton is not being pressed in Load Freq mode. c) Lights when receive frequency is displayed and radio is receiving or when Load Xmt Pushbutton is not being pressed in Read Freq mode.

EQUIPMENT RESPONSE

XMT LIGHT	a) Lights when radio is transmitting in Normal and in Secure mode. b) Lights when transmit frequency is being stored by pressing Load Xmt Pushbutton in Load Freq mode. c) Lights when radio is transmitting in Read Freq mode as a result of the Microphone being keyed or the CW key being pressed. d) Lights when Load Xmt Pushbutton is pressed in Read Freq mode to verify a stored transmit frequency.
LOW BTRY LIGHT	Lights when radio turns on if batteries that retain the contents of the memory system when the radio is off are low enough to require replacement with fresh batteries.
XMIT GAIN	Controls microphone input level to the transceiver in TRANSMIT mode.
KEY JACK	Accepts standard 1/4 inch 2 circuit plug (such as PJ-055B) from CW telegraph key.
PHONE JACK	Accepts standard 1/4 inch 2 circuit plug from earphones. Automatically disconnects speaker, when in use.
DIM CONTROL	Provides two level intensity control of LED frequency readout, pilot light, Rec Light and Xmt Light. Provides off-on control of Channel Indicators and meter illumination.
MIC CONNECTOR	For connection of dynamic microphone with built in push-to-talk (PTT) switch. Mates with standard MS connector MS3106A (14S-05P).
VFO (potentiometer control with pull-on, push-off switch)	a) VFO OFF mode (control pushed in): Frequency controlled solely by the FREQUENCY dials. b) VFO ON mode (control pulled out) ± 5 kHz range is provided. "VFO ON" indicator light is lit in this mode.
VFO INDICATOR LIGHT	Lights when in VFO mode.
FREQUENCY DISPLAY	a) Indicates simplex frequency selected by six Frequency Switches in Normal Frequency Control Mode.

EQUIPMENT RESPONSE

FREQUENCY DISPLAY (Cont.)	b) Indicates transmit or receive frequency selected by six Frequency Switches for storage into desired memory location in Load Freq mode. c) Indicates stored receive frequency when the radio is receiving and stored transmit frequency when the radio is transmitting in Read Freq mode. d) Indicates stored transmit frequency in Read Freq mode when Load Xmt Pushbutton is pressed. The radio is not actually transmitting in this case, since the transmit frequency is only displayed for verification. e) Blanked in Secure mode. f) Flashes any frequency under 1.6000 MHz off and on at a rate of once a second.
PILOT LIGHT	Illuminates front panel controls.
DISABLE LIGHT	Lights when a frequency below 1.6000 MHz has been selected. Lights when Load Freq position of Frequency Control Mode switch is selected. The radio is disabled when this light is illuminated.

3.3 REAR APRON FUSES AND CONNECTORS

3.3.1 Refer to Figure 3.2 for location

ANT (1A8J1).....	ANTENNA connector: R.F. input/output of unit. Mates with standard PL-259 RF connector.
AUDIO (1A8J2)	AUDIO connector: for connection of 600 ohm balanced AUDIO OUTPUT and AUDIO INPUT. Mates with standard MS connector MS3106A (18-19P).
POWER (1A8J3).....	POWER connector: for connection of A.C. or D.C. power to the Transceiver (see Section 2.6). Mates with standard MS connector MS3106A (24-11S)
ACCESSORY (1A8J4)	ACCESSORY connector: For connecting accessory equipment such as the GCU-910 Antenna Coupler. Mates with standard MS connector MS3106A (28-21P).

FUSES A.C. and D.C. input line fuses (see Fig. 2.14).
(F1, F2, F3)

GROUND POST Refer to Section 2, paragraph 2.4.1 (b).

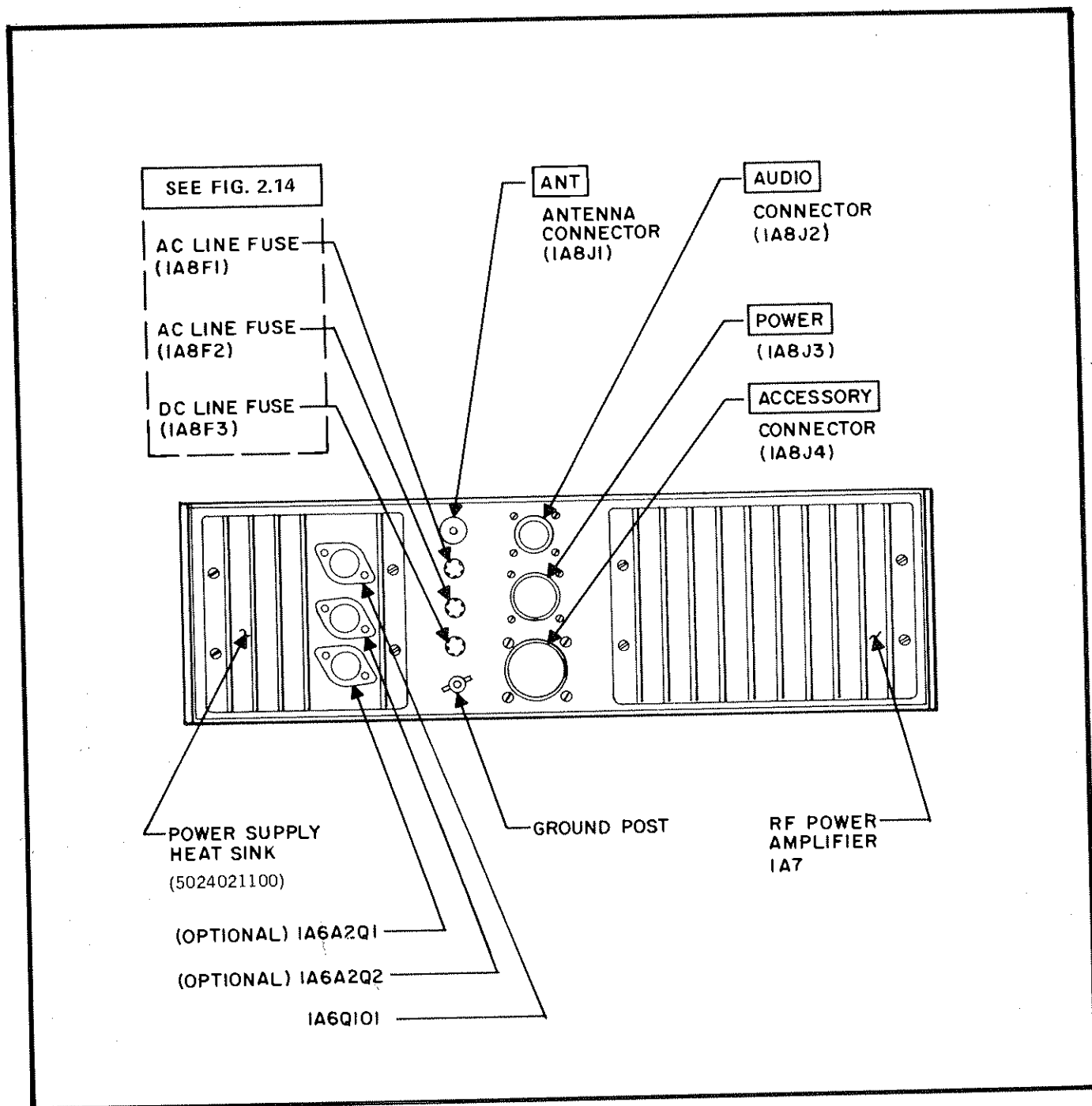


Figure 3.2 GSB-900SC Rear Aprons Components and Connectors

3.4 OPERATING THE GSB-900 SC INTO A 50 OHM ANTENNA

Connect the 50 ohm antenna (or dummy load) to the transceiver. Connect a microphone (to 1A1J1), a CW key (to 1A1J3) or 600 ohm audio source (to 1A8J2).

Follow the steps listed below:

- a) Turn the VOLUME and XMIT GAIN controls fully counter-clockwise. Turn the RF GAIN control fully clockwise.
- b) Set the MODE switch for the desired operating mode (LSB, USB, AM, or CW).
- c) Turn DIM control fully CW. This is the bright or daytime position. (One stop CCW is the dim or night time position. Fully CCW is off.)
- d) Turn the FREQ CONTROL MODE switch to Normal position.
- e) Set the six FREQUENCY dials to the desired operating frequency. Set the VFO control in the "in" (off) position.
- f) Set the VOLUME control for a comfortable listening level.
- g) RF GAIN control: For normal operating conditions, the RF GAIN control may be left set in its maximum clockwise position as this will provide the greatest receiver sensitivity. When receiving a strong signal, background noise may be considerably reduced by setting the RF GAIN control to provide an "S" meter reading (with no-signal) equal to the "signal present" condition.
- h) If being used in LSB or USB modes: key microphone. Speak into the microphone and advance the XMIT GAIN control until no further output (as indicated on the front panel meter) can be obtained. Do not advance the control beyond this point as no further power output will occur and increased background noise will be picked up by the microphone.

If being used in the AM mode: key microphone. Note carrier level (approximately 30 to 40 watts when not talking) on meter. When talking, advance the XMIT GAIN control until the meter "bounces" slightly with voice peaks.

If being used in the CW mode: The level of sidetone to the transmit section is preset at the factory. No adjustment of the XMIT GAIN control is necessary. Automatic switching of the transceiver from receive to transmit will occur when the key is depressed. In addition, a side tone (approximately 1 kHz) should be audible from the speaker whenever the key is depressed.

NOTE

When communicating in CW with a station keying its carrier, rather than a 1 kHz sidetone as in the GSB-900SC, it may be necessary to decrease the GSB-900SC frequency by 1 kHz. When communicating between GSB-900SC's or similar synthesized equipment, no correction is necessary.

If being used with a remote audio input: Potentiometer R58 on the AUDIO board (1A3A4) should be used to adjust the transmit audio level (if required) instead of the XMIT GAIN control on the front panel.

j) VFO operation: When receiving a signal from a transmitter with synthesized frequency control, it is seldom necessary (or desirable) to use the VFO receiver tuning control, and it should be left in its "in" position. When receiving signals from non-synthesized transmitting equipment, some error in transmitted frequency may exist. Pull out the VFO control (note light comes on) and adjust for the most natural quality. Approximately ± 5 kHz range is provided around the set frequency.

k) **Loading Frequencies, Simplex Operation:** Turn the Freq Control Mode Key switch to the Load Freq position. The Disable Light will turn on indicating that the radio is disabled. The Rec Light will be on. Set the two Channel Selector switches to the desired storage channel. Set the six Frequency Selector switches to the desired receive and transmit frequency. Press and release the Load Rec Pushbutton. Next press and release the Load Xmt Pushbutton. The Xmt Light should turn on and the Rec Light should turn off while the Load Xmt Pushbutton is pressed. The channel now contains the desired frequency in both its receive memory location and its transmit memory location. To verify that the channel is loaded with the correct frequency, turn the Freq Control Mode switch to the Read Freq position. The Disable Light should turn off and the display should contain the frequency loaded above. Press and hold the Load Xmt Pushbutton. The Xmt Light should turn on and the Rec Light should turn off. The display should continue to display the frequency loaded above. Release the Load Xmt Pushbutton. The Rec Light should turn on and the Xmt Light should turn off. Leave the Frequency Control Mode switch in the Read Freq position and operate the radio in the same manner as done for the Normal position of the Frequency Control Mode switch. Any desired channel may be loaded with a desired frequency and tested for Simplex operation as above. Any channel from 00 through 99 may be selected and programmed with the same receive and transmit frequency without regard for its former contents. Any previous frequency stored in a channel will be erased if a new frequency is loaded into that channel. If a channel already contains a useful frequency then obviously no new frequency should be stored in it. Instead store the new frequency in some unused channel to preserve the original fre-

quency. To determine if a channel already contains a useful frequency, select the Read Freq mode and observe the display which will contain any receive frequency stored in that channel. Depress and hold the Load Xmt Pushbutton while observing the display. The display will contain any transmit frequency stored in that channel without causing the radio to transmit.

l) **Loading Frequencies, Half-Duplex Operation:** Turn the Freq Control switch to the Load Freq position. The Disable Light will turn on indicating that the radio is disabled. The Rec Light will be on. Set the two Channel Selector switches to the desired storage channel. Set the six Frequency Selector switches so that the display contains the desired receive frequency. Depress and release the Load Rec Pushbutton. Set the six frequency Selector switches so that the display contains the desired transmit frequency. Depress and release the Load Xmt Pushbutton. The Rec Light will turn off and the Xmt Light will turn on while the Load Xmt Pushbutton is depressed. To verify that channel is loaded with the correct receive and the correct transmit frequency, turn the Freq Control Mode switch to the Read Freq position. The Disable Light should turn off and the display should contain the receive frequency loaded above. Press and hold the Load Xmt pushbutton. The Xmt Light should turn on and the Rec Light should turn off. The display should contain the transmit frequency loaded above. Release the Load Xmt button. Leave the Freq Control Mode switch in the Read Freq position and operate the radio in the same manner as done for the Normal position of the Frequency Control Mode switch. Note that the receive frequency is displayed while the radio is receiving and the transmit frequency is displayed while transmitting. As

in simplex operation, any desired channel may be loaded with a desired receive and a desired transmit frequency and tested for Half-Duplex operation as above. Any channel may be selected and programmed with a required receive frequency and a different required transmit frequency without regard for the former contents of the channel. Any previous information stored in a channel will be erased if a new transmit and a new receive frequency are loaded into that channel. If a channel already contains useful frequencies then obviously no new frequencies should be stored in it. Instead store the new frequencies in some unused channel to preserve the original frequencies. To determine if a channel already contains useful frequencies, select the Read Freq mode and observe the receive frequency contained in the display. To read the transmit frequency stored in the channel depress the Load Xmt Pushbutton while observing the display. The display will contain any transmit frequency stored in that channel without causing the radio to transmit.

m) Half-Duplex Limitations: Half-Duplex operation requires one frequency for reception and a separate, discrete frequency for transmission. These two frequencies are normally separated from one another by less than 500 kHz. This is required primarily by the selectivity characteristics of the antenna coupler. The coupler is tuned to the transmit frequency, so received signal strength degrades as the separation between the two frequencies is increased. However, the two frequencies are normally close to each other also because of the propagation characteristic of the two frequencies. The propagation characteristic of two frequencies is such that the greater the separation of the two frequencies, the more variation in path length and the more fading will be noticed. (Typical Marine public correspondence stations have 300 to 400 kHz separation between transmit and receive frequencies.) Conse-

quently, for best Half-Duplex operation, never store in a Half-Duplex channel a transmit and a receive frequency that are more than 500 kHz apart.

The GSB-900SC input and output filter networks, used to reduce harmonics and cross channel interference, are banded for the following frequency ranges:

Band 1	1.6 - 1.9999 MHz
Band 2	2.0 - 2.9999 MHz
Band 3	3.0 - 3.9999 MHz
Band 4	4.0 - 5.9999 MHz
Band 5	6.0 - 8.9999 MHz
Band 6	9.0 - 12.9999 MHz
Band 7	13.0 - 19.9999 MHz
Band 8	20.0 - 29.9999 MHz

In receive mode, these filters are band-pass networks, attenuating the received signal at frequencies above and below the band limits given above. In transmit mode, these filters are low pass networks, attenuating any transmit frequency above its upper band limit given above. If in a Half-Duplex mode the receive frequency is widely separated from the transmit frequency so that both are not in the same filter band, severe degradation of a received or transmitted signal may result if either the transmit or the receive frequency permanently selects the filter band for any Half-Duplex Channel. Further since the memory system of the GSB-900SC is comprised of Random Access Memory capable of producing only one frequency output at a time, any Half-Duplex channel with the transmit frequency in a different band than the receive frequency will select the transmit band filters when transmitting and the receive band filters when receiving. Consequently any Half-Duplex channel with the transmit frequency in a different band than the receive frequency will require several seconds for the radio to select the correct filter network in making the transition from either transmit mode to receive

mode or receive mode to transmit mode. Therefore, in a Half-Duplex channel avoid storing, if possible, a transmit and a receive frequency that are in different bands because the radio will always be ineffective for several seconds during the transition from transmit mode to receive mode or receive mode to transmit mode as it selects the correct filter network.

If the CW mode of operation is selected for a half duplex channel, do not store transmit and receive frequencies that are in different bands. This condition would cause the band select motor to continuously run (seeking either the transmit or receive filter network) as the CW key is depressed and released.

n) Two Frequency Simplex Operation: For simplex operation of two discrete frequencies, such as a day frequency and a night frequency, any channel may be programmed with one frequency and a nearby channel may be programmed with one frequency and a nearby channel may be programmed with the other frequency. Then when the channel selector is rotated from the first channel to the second one, only the antenna coupler, if used, must be retuned since the radio automatically selects the proper filter network for any operating control frequency.

o) Master Clear Operation: Rotate the Frequency Control Mode keylock switch to the Load Freq position. Depress and release the Master Clear Pushbutton using the eraser end of a pencil or some other suitably shaped object that will fit inside the pushbutton guard. When the Master Clear Pushbutton is released, the frequency display should briefly contain all zeros before again displaying the number selected by the frequency switches. Both the Xmt Light and the Rec Light should be dimly illuminated briefly before the Rec Light again turns on at full brightness. The above activity clears to zero the entire contents of the GSB-900SC memory system. The purpose of this feature is to remove from the

memory system all obsolete or forgotten frequencies so that only new and useful frequencies may be added with the knowledge that any unused channel is clean and empty of anything but zero. In this manner a new record of the contents of the memory system may be made in the event that the old record is lost or incomplete. A second purpose of this feature is to provide a means to instantaneously erase all frequencies in memory in the event that all records of operating frequencies require quick destruction. In this event once the Master Clear Pushbutton clears all of the memory system, the Frequency Control Mode keylock switch may be rotated to the Read Freq or the Secure position and the key removed from the keylock switch. This action will lock the radio into a position where it will be useless to anyone who uses it without permission since with every channel containing zero and no way to select the Load Freq mode or the Normal mode to change that fact, the radio will be permanently disabled.

p) Secure Operation: Rotate the Frequency Control Mode keylock switch to the Load Freq position. Depress and release the Master Clear pushbutton if an empty memory is desired for this operation. Select in turn all desired frequencies and load these frequencies into the channel desired for each frequency. Rotate the Frequency Control Mode keylock switch to the Secure position. The frequency display will blank with the exception of the decimal point, which stays illuminated to indicate that the memory system is functioning. Remove the key from the Frequency Control Mode Keylock switch. The radio is now locked into a mode that both restricts knowledge of its operating frequencies and prevents change of any frequencies set in any channel. In this mode an operator must be informed, by channel number, as to which channels to use at all times.

q) Low Battery Light: If the Low Battery Light (LOW BTRY) on the GSB-900SC Front

SUNAIR GSB-900SC

Panel illuminates when the radio is turned on, replace the batteries, located on the Power Supply Battery Assembly behind the front panel. The light indicates that the batteries are weakening, and should be replaced as soon as possible. See Section 4.2.9.3; Power Supply Battery Assembly and Figure 3.3 below.

3.5 GRC 951 AUDIO REMOTE CONTROL UNIT

Before placing the GRC-951 Audio Remote Control unit into operation, make sure that the system adjustments outlined in section 2.7 have been performed. Connect the microphone or handset to connector J1 on the front of the GRC-951. Refer to section 3.5 or 3.6 and tune the GSB-900SC into its antenna at the operating frequency. When

tuneup is complete, adjust the VOLUME control on the GRC-951 for a comfortable listening level.

NOTE

The level in the GRC-951 speaker is not affected by the setting of the GSB-900SC VOLUME control.

To transmit, first check that the MODE switch on the GSB-900SC is placed in the correct operating mode. Depress the push-to-talk (PTT) button on the handset or microphone connected to the GRC-951 and speak in a normal voice. Observe that the meter on the GSB-900SC indicates approximately 1.0 relative power on voice peaks.

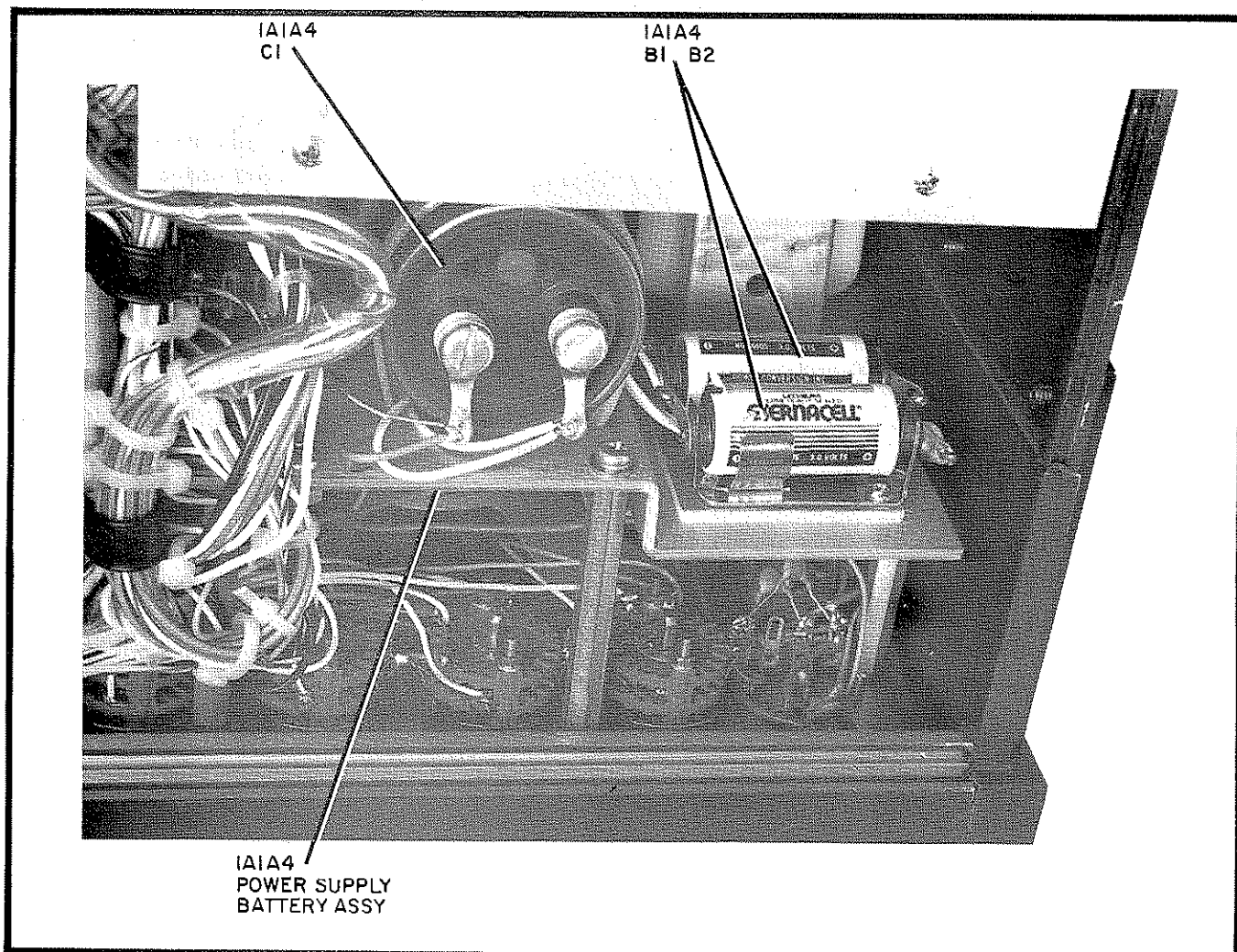


Figure 3.3 GSB-900SC Power Supply Battery Assembly 1A1A4

SECTION 4

THEORY OF OPERATION

4.1 GENERAL

The discussion of the theory of operation of the GSB-900SC will be presented in nine parts: synthesizer, memory system, receiver, exciter, RF power amplifier, power supply, filter module, antenna tuning control, and meter panel. Each part will contain a block diagram discussion followed by a detailed explanation of the circuit theory.

4.1.1 OVERALL BLOCK DIAGRAM

Figure 4.1 shows an overall block diagram of the GSB-900SC. Discussion of the various functions and circuits is presented in the sections following.

4.2 SYNTHESIZER 1A4

This unit consists of six printed circuit boards: Spectrum Generator (1A4A1), Low Digit Generator (1A4A2), Translator (1A4A3), VHF Divider (1A4A4), VCO (1A4A5) and the Synthesizer Mother board (1A4A6). Figure 4.3 shows an overall block diagram of the synthesizer. An isometric drawing of the mechanical components of the synthesizer unit is shown in Figure 5.6.

4.2.1 GENERAL

The synthesizer (1A4) generates the three local oscillator injection frequencies needed to determine the operating frequency of the radio. The synthesizer input is the 5 MHz reference signal from the Frequency Standard. The three local oscillator injection frequencies are obtained from the 5 MHz reference by a combination of direct synthesis and digital phase lock techniques. The frequency accuracy of the radio is therefore solely determined by the accuracy of the Frequency Standard.

The 3rd L.O. (10.5 MHz reference) is derived by direct synthesis techniques (i.e. by dividing and mixing). This local oscillator signal is used as a product detector injection on receive and as a

carrier generator on transmit. This reference is derived in the Spectrum Generator assembly, 1A4A1.

The 2nd L.O. generator consists of a crystal oscillator at a nominal frequency of 80.7500 MHz located in the Translator assembly (1A4A3). This frequency is used in the VHF Mixer assembly (1A3A1), in the Receiver/Exciter, to convert the 1st I.F. frequency of 91.2500 MHz to the 2nd I.F. of 10.5 MHz. Since the 2nd L.O. oscillator is not referenced to the Frequency Standard, a small frequency error can exist on this L.O. However, because of the mixing scheme used in the Translator, this same error appears on the 1st L.O. frequency and is therefore cancelled at the output of the VHF Mixer.

The VCO (1st L.O.) generator is a phase locked oscillator covering the frequency range of 91.2500 to 121.2499 Hz in 100 Hz steps. The exact frequency of the oscillator is given by:

$$F_1 = 91.2500 + F_0 + e \text{ (MHz)}$$

Where: F_1 = 1st L.O. frequency

F_0 = dialed frequency

e = 2nd L.O. error

On receive, the 1st L.O. is used to convert the incoming signal up to the 1st I.F. frequency (91.25 MHz). On transmit, the 1st L.O. is used to convert the transmit signal at the 1st I.F. frequency down to its final operating frequency.

4.2.2 SPECTRUM GENERATOR -1A4A1

Refer to Figure 5.12.

4.2.2.1 GENERAL

The Spectrum Generator (1A4A1) generates the fixed reference frequencies needed in the syn-

thesizer. The input is the 5 MHz reference from the Frequency Standard and the outputs consist of references at the following frequencies: 10.5 MHz (Product Detector), 21 MHz (to Translator), 20 MHz (to Translator), 17 MHz (to Low Digit Generator), 100 kHz (to VHF Divider), and 1 kHz (to Low Digit Generator).

4.2.2.2 20 MHz REFERENCE GENERATOR

The 5 MHz Reference from the Frequency Standard is amplified by U1 and formed into a short pulse by pulse generator U2. The fourth harmonic of this 5 MHz pulse (i.e. 20 MHz) is filtered by the double-tuned circuit (C7, C8, C9, C10, L2 and L3) and is amplified by U3. The output is obtained from U3 through Pi Network (C14, C15, C16, C17, L4) which matches the high output impedance of U3 to 50 ohms. A portion of this signal is also applied to the 17 MHz mixer and to Buffer Amplifier U8.

4.2.2.3 1 MHz, 100 kHz and 1 kHz REFERENCE GENERATOR

The 5 MHz output pulse from U2A is fed to U4, a divide-by-5 counter. The resultant 1 MHz output is fed to three stages of divide-by-10 counters (U5, U6 and U7); thereby producing the desired 100 kHz and 1 kHz outputs.

4.2.2.4 17 MHz REFERENCE GENERATOR

The 1 MHz pulse from U4 is passed through a tuned circuit (L14, C53) which is tuned to 3 MHz (i.e. the 3rd harmonic of the 1 MHz). This 3 MHz signal is amplified by Q5, further filtered by another tuned circuit (L15, C55) and applied as one input to mixer Q6. A portion of the 20 MHz reference is also applied to Q6. The resultant 17 MHz signal is filtered by a double-tuned circuit (L16, C59, C62, L17, C65 and C66) and is applied to a complementary emitter follower (Q7, Q8). The emitter follower matches the high output impedance of mixer Q6 to 50 ohms.

4.2.2.5 21 MHz REFERENCE GENERATOR

The 1 MHz pulse from U4 is passed through a tuned circuit (L7, C30) which filters the pulse into

a 1 MHz sine wave. Complementary emitter follower (Q1, Q2) transforms the impedance to 50 ohms to match the input impedance of the balanced mixer.

The 20 MHz reference from U3 is amplified by U8 and applied as the second input to the balanced mixer. The resultant 21 MHz signal is filtered by triple-tuned circuit (C32, C33, L8, C34, L9, C35, C36, L10, C37, and C38) and then amplified by U9. The output of U9 is matched to 50 ohms by emitter follower, Q9.

4.2.2.6 10.5 MHz REFERENCE GENERATOR

The 21 MHz output from U9 is also fed to flip-flop U10 which generates a 10.5 MHz square wave. The signal is filtered to a sine wave by a double-tuned circuit (L12, C46, C47, L13, C48, and C49) and then matched to 50 ohms by emitter follower, Q4.

The flip-flop (U10) is disabled by switch (Q3) in the AM receive mode to prevent a "beat" note from appearing at the receiver output. +12 volts, applied to the "Blanking Pulse In" line in these modes, saturates Q3; thereby disabling the flip-flop and effectively removing the 10.5 MHz output. At all other times there is no voltage on the "Blanking Pulse In" line. Q3 is therefore cut off and the flip-flop (U10) operates in its normal divide-by-2 mode. A blanking pulse from the L.O. Blanking on Mother board 1A4A6 also disables the flip-flop for approximately 100 milliseconds whenever the setting of the 1 MHz frequency switch on the front panel is changed.

4.2.3 LOW DIGIT GENERATOR — 1A4A2

Refer to Figure 5.13.

4.2.3.1 GENERAL

The Low Digit Generator (1A4A2) generates the 100 Hz, 1 kHz and 10 kHz synthesized frequency steps. The inputs are the 17 MHz reference (from the Spectrum Generator), 1 kHz reference (from the Spectrum Generator), BCD frequency control lines (from the front panel frequency control switches) and the Coarse Steering voltage (from the 10 kHz frequency control switch on the front

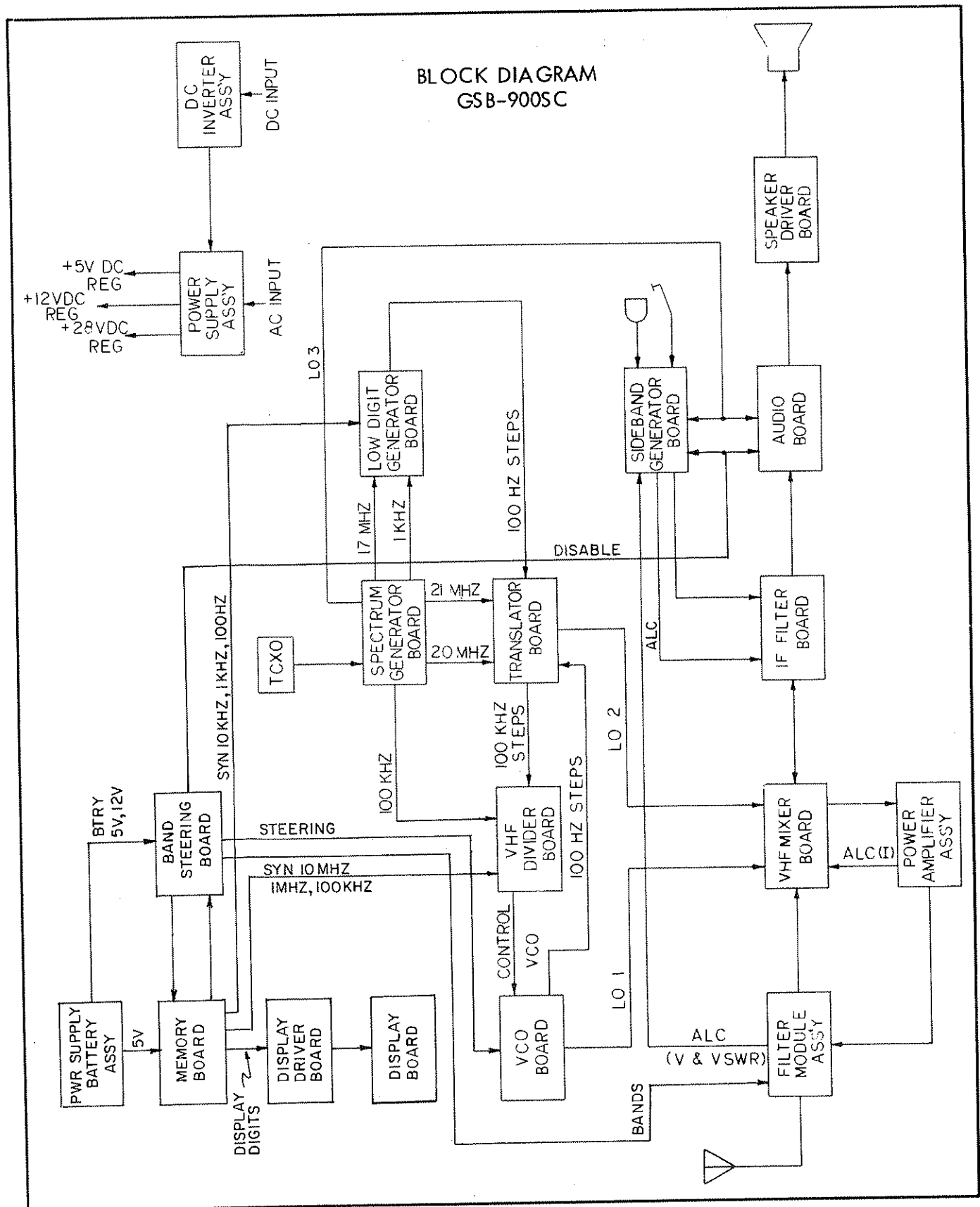


Figure 4.1 GSB-900SC Overall Block Diagram

panel). The output is 1.5000 to 1.5999 MHz in 100 Hz steps and is fed to the Translator as a mixing reference.

4.2.3.2 VOLTAGE CONTROLLED OSCILLATOR

The Voltage Controlled Oscillator or VCO (Q1) is a Colpitts oscillator covering the range of 15.000 to 15.999 MHz. Coarse frequency tuning is provided by the action of the Coarse Steering voltage on varactor diodes CR1 and CR2. Fine frequency control is provided by the Phase Detector (U2) acting through the loop filter (R8, C7, R5 and C3) and 1 kHz notch filter (R4, C6, R6, C5, C4, C68 and R3) on varactor diodes CR3 and CR4. The oscillator output is loosely coupled through C15 to isolation amplifier U1.

The VCO is fed from a voltage regulator (R9, CR5, Q2 and R10) which provides a finely regulated 7.6 volts.

4.2.3.3 MIXER AND PULSE GENERATOR

The mixer (Q3) transforms the VCO frequency to 2.000-1.001 MHz to place the signal in the range of the Preset Counters. The inputs to the mixer consist of the VCO signal (fed from the output of U1) and the 17 MHz reference. The output of the mixer is filtered by a 2.5 MHz low pass filter (C23, C24, L7, C25, C26, L8 and C27) and is then amplified by U6. Quad NAND Gate, U7, connected as a monostable multivibrator, forms the signal into a short pulse to drive the preset counter.

4.2.3.4 PRESET COUNTER

The Preset Counter (U8, U9, U10, U11) is a counter whose division ratio is controlled by the 100 Hz, 1 kHz and 10 kHz Frequency control switches on the front panel. During the normal counting interval, the counter functions as a divide-by-2000 counter. During the Preset interval, the clock is disabled and the counter is loaded (or preset) to a count determined by the settings of the frequency control switches. The frequency control information is entered in binary-coded-decimal (BCD) format and the division ratio, D, is therefore determined by the formula:

$$D = 2000 - (100 N_{10\text{kHz}} + 10 N_{1\text{kHz}} + N_{100\text{Hz}})$$

where:

$N_{10\text{kHz}}$, $N_{1\text{kHz}}$ and $N_{100\text{Hz}}$ are, respectively, the settings of the 10 kHz, 1 kHz and 100 Hz frequency dials.

Or, for example:

DIAL SETTINGS			PRESET	COUNT (D)
10 kHz	1 kHz	100 Hz		
0	0	0	000	2000
0	0	1	001	1999
0	0	2	002	1998
0	1	1	011	1989
1	9	9	199	1801
9	9	9	999	1001

4.2.3.5 PRESET GENERATOR

The preset generator applies a short pulse to the data strobe inputs of the preset counter when a full count is detected. A "look ahead" scheme is employed to eliminate miscounting due to the propagation delays in the counter. When the counter has reached a count of 1999, the inputs to pins 2, 3, 4, 5, 6, 11, and 12 of NAND gate U3 will be in a "one" state. As soon as the clock input to pin 1 of this gate returns to a "one" state, the output of U3 will change to a "zero" state, thereby triggering monostable multivibrator U4. Then U4 presets the counters by applying a "zero" to their data strobe inputs for approximately 100 nsec. The output of U4 will return to a "one" state before the beginning of the next clock pulse.

4.2.3.6 PHASE DETECTOR, LOOP FILTER and 1 kHz NOTCH FILTER

The phase detector compares the frequency of the output of the Preset Counter with that of the 1 kHz reference from the Spectrum Generator. Action of the phase detector is as follows:

If the VCO frequency is high, the output frequency of mixer Q3 will be low. The output frequency of the Preset Counter will, therefore, also be low. The Phase Detector output voltage will decrease until the frequency error is corrected. Conversely, if the VCO frequency is low, the mixer output frequency will be high and the Phase Detector will increase until the error is corrected. If there is no frequency error, the output voltage of the Phase Detector will remain constant. The Loop Filter (R8, C7, R5, and C3) removes any 1 kHz components in the Phase Detector output and also determines the transient response of the loop. The 1 kHz frequency components are further attenuated by twin tee notch filter R3, R4, R6, C4, C5, C6, and C68. The action of this Phase Lock Loop is to make the VCO frequency follow the relationship: $F_{VCO} = 17,000 - D$ (kHz); where D is the count ratio. The VCO will therefore vary from 15.000 to 15.999 MHz in 1 kHz steps.

4.2.3.7 OUTPUT DIVIDER CIRCUITRY

The output from Buffer U1 is further amplified by Q5 and fed to divide-by-10 counter U5. The output of U5 is filtered to a sine wave by a bandpass filter (L11, C39, C40, C41, and L13) and is fed to emitter follower, Q6 which matches the output to 50 ohms. The output from the Low Digit Generator is 1.5000 to 1.5999 MHz in 100 Hz steps and follows the relationship:

$$F_{OUT} = 1.5000(\text{MHz}) + N(\text{kHz})$$

where N=knob settings of the 10 kHz, 1 kHz and 100 Hz (i.e. 0.1 kHz) dials.

4.2.4 TRANSLATOR-1A4A3

Refer to Figure 5.14.

4.2.4.1 GENERAL

The translator (1A4A3) combines the signals from the Low Digit Generator (1A4A2) and VCO (1A4A5) and generates a signal which, after subsequent frequency division in the VHF Divider (1A4A4), is used to phase lock the VCO to the proper frequency. The second L.O. and V.F.O. signals are also generated in this assembly. The

inputs to this assembly are: 20 and 21 MHz references (from the Spectrum Generator); 1st L.O. (from the VCO); 1.5000-1.5999 MHz (from the Low Digit Generator); and the V.F.O. Control and V.F.O. ON/OFF signals from the front panel. The output is the 10.0-39.9 MHz reference signal which is fed to the VHF Divider. In the V.F.O. mode, the internally generated 21 MHz V.F.O. is substituted for the 21 MHz reference from the Spectrum Generator.

4.2.4.2 ERROR CANCELLING

Since the 2nd L.O. is a free running crystal oscillator and is not referenced to the Frequency Standard, a small frequency error can exist. However, because of the mixing scheme employed in this assembly, both the 1st L.O. and 2nd L.O. will have the same frequency error. This error will therefore be cancelled in the VHF Mixer Assembly (1A3A1).

4.2.4.3 V.F.O. AND 21 MHz REFERENCE AMPLIFIERS

The V.F.O. (Q1) is a Colpitts Crystal Oscillator, covering the frequency range of 20.995 to 21.005 MHz and thereby providing approximately ± 5 kHz tuning adjustment around the dialed frequency of the radio. The V.F.O. control voltage, acting on varactor diodes CR6 and CR7 in series with the crystal, "pulls" the crystal's oscillation frequency to provide this small frequency change. The tuned circuit in the collector of Q1 (L23, C101) adjusts the circuit to resonance at 21 MHz. Inductor L22, in series with crystal Y1, compensates for small variations in the oscillation frequency of the crystal thus adjusting the center frequency of the oscillator to 21.0000 MHz. The oscillator output is buffered and amplified by U2 when in the V.F.O. mode. The 21 MHz reference from the spectrum generator is amplified by U1 when the V.F.O. mode is not selected.

In the V.F.O. mode, +12V appears on the V.F.O. ON/OFF input line. This applies base bias to Oscillator Q1 and turns on amplifier U2 through transistor switch Q3. When the V.F.O. mode is not selected, the voltage on the V.F.O. ON/OFF line is removed, amplifier U1 is activated and the oscil-

lator (Q1) and amplifier (U2) are turned off. The 21 MHz reference from the Spectrum Generator therefore controls the frequency of the radio.

Emitter Follower Q2 and the network consisting of R67, R68, R69, CR8, CR9, CR10, and CR13, CR14, CR15 compensate for the nonlinear frequency vs. voltage characteristic of the varactor diodes. The V.F.O. Control voltage from the front panel is applied to varactor diodes CR6 and CR7 through this network, thereby providing the desired small frequency swing around 21 MHz.

4.2.4.4 2nd L.O. CIRCUITRY

The 2nd L.O. (Q7) is a Colpitts crystal oscillator of similar design to the V.F.O. Tuned circuit L17, C46, and C47 tunes the circuit to resonance at 80.75 MHz. A small sample of oscillator output is taken from the junction of C46, C47 and Y2 and is fed to Amplifier Q9. The 2nd L.O. output to the receiver/exciter module is taken from the drain of Q9 through pi network C67, L25 and C68 which matches the output to 50 ohms.

4.2.4.5 100.75 MHz MIXER

The 100.75 MHz mixer (Q8) heterodynes the 2nd L.O. output from Q7 and the 20 MHz reference from the Spectrum Generator. The triple tuned 100.75 MHz bandpass filter selects the desired sum frequency while rejecting the 80.75 MHz and 60.75 MHz components. Tuned circuit L28, C72 prevents loading of the 20 MHz signal by the oscillator. Tuned circuit L27, C71 prevents the loading of the oscillator by the pi network. Pi network C48, L18, C49 transforms the 50 ohm input impedance to 200 ohms thereby increasing the voltage level by approximately 2:1 to ensure adequate mixer drive. Test point TP3 provides a convenient 50 ohm test point for the connection of a spectrum analyzer or any other suitable measuring instrument to aid in bandpass filter alignment.

4.2.4.6. BALANCED MIXER

Depending on the mode selected, the balanced mixer heterodynes the 1.5000–1.5999 MHz output of the Low Digit Generator and either the 21 MHz reference or the V.F.O. The 19.45 MHz bandpass

filter selects the desired difference frequency. The output is fed to U3 where the signal is amplified and further filtered by tuned circuit L5-C17. Automatic Gain Control (AGC) is provided by diodes CR5, CR12 and their associated circuitry to ensure a constant and proper level to the 81.25 MHz mixer, Q11. Test point TP1 provides a well isolated point for observation of the signal without appreciable loading of the tuned circuit.

4.2.4.7 81.25 MHz MIXER

The 81.25 MHz Mixer (Q11) combines the 19.5000–19.4001 MHz signal from amplifier U3 and the 100.7500 MHz signal from mixer Q8 to produce the difference frequency of 81.2500–81.3499 MHz. The 81.25 MHz bandpass filter (L7, C20, L38, C21, L8, C22, C23 and C24) selects the desired difference frequency. A well-isolated test point, TP2, is also provided here to permit observation of the signal with 50 ohm equipment.

4.2.4.8 OUTPUT MIXER AND BROADBAND AMPLIFIER

The output mixer, Q4, heterodynes the 81.25 MHz mixer output and the VCO sample from the VCO assembly (1A4A5). The VCO sample is fed to the mixer through balun transformer T3 which transforms the signal to a 200 ohm impedance level to ensure adequate voltage drive to the mixer. The mixer output is filtered by a 10–50 MHz bandpass filter (L9, C29, L10, C86 and L11) and then transformed to a low impedance by emitter follower Q10. Potentiometer R54 in the base circuit of Q10 permits output level adjustment. The output of Q10 passes through 50 MHz Low Pass Filter (C74, C75, L30, C76, C82, C77, L31) to the broadband amplifier (Q5, Q6). Negative feedback around the amplifier (R17, R19, R6) provides flat gain to well beyond 50 MHz as well as a constant input impedance, stable D.C. operating point, and low output impedance.

4.2.5 V.H.F. DIVIDER—1A4A4

Refer to Figure 5.15.

4.2.5.1 GENERAL

The V.H.F. Divider (1A4A4) contains a divide-by-400 high speed preset counter which forms the 10 MHz, 1 MHz and 100 kHz frequency steps. A phase detector compares the frequency and phase of the output of this counter with that of the 100 kHz reference from the Spectrum Generator (1A4A1) and develops a fine steering correction voltage which is fed back to control the frequency of the VCO (1A4A5). This "phase lock loop", by controlling the VCO frequency, forces the input to the V.H.F. Divider to follow the relationship:

$$F_{in} = 10.0 + 10 N_{10 \text{ MHz}} + N_{1 \text{ MHz}} + 0.1 N_{100 \text{ kHz}}$$

where: $N_{10 \text{ MHz}}$ = the 10 MHz digit

$N_{1 \text{ MHz}}$ = the 1 MHz digit

$N_{100 \text{ kHz}}$ = 100 kHz (i.e. .1 MHz) digit

and F_{in} is given in MHz

The input frequency therefore varies from 10.0 to 39.9 MHz in 100 kHz steps. The 10 MHz input corresponds to dial settings of "000" whereas the 39.9 MHz input corresponds to dial settings of "299" on the 10 MHz, 1 MHz and 100 kHz dials respectively.

The inputs to the V.H.F. Divider are: the 100 kHz reference (from the Spectrum Generator); the output signal from the Translator; the frequency control lines from the 1 MHz and 100 kHz switches on the front panel (8 wires); and the 10 MHz preset lines (from the V.C.O.). The output is the fine steering voltage which is fed back to the V.C.O.

4.2.5.2 BROADBAND AMPLIFIER

The broadband amplifier consists of a two stage feedback amplifier (Q1,Q2) followed by a complementary emitter follower (Q3,Q4). The negative feedback network, (R6,R7,R4) around Q1 and Q2, provides flat gain to well beyond 50 MHz, a constant input impedance over the frequency range, and stable D.C. operating point. R1 establishes the input impedance of this amplifier at 50 ohms. The output of the feedback amplifier is fed to the

complementary emitter follower (Q3,Q4). This emitter follower provides a low driving impedance for the subsequent high speed prescaler, and also establishes the proper logical zero and logical one levels to be compatible with the subsequent TTL logic integrated circuits.

4.2.5.3 PRESCALER

The prescaler (U2) is a high speed dual flip-flop connected in a conventional divide-by-four configuration. Its output is buffered by NAND gate A1C so as not to place excessive loading on U2.

4.2.5.4 PRESET COUNTERS

The preset counters (U3, U6, U7) consist of two stages of preset decade counters (U3, U6) followed by a preset divide-by-four dual flip-flop (U7). U7 is preset by quad two input NAND gate U13 and the A and B sections of quad two input NAND gate U8. During the normal counting mode (that is, when the counters are not being preset) the data strobe (D_s) lines on U3 and U6 are held in a "1" state by preset flip-flop U10. This permits these counters to function in their normal divide-by-ten mode. Similarly, the 10 MHz preset bus is held in a "0" state by U10. This forces the outputs of gates U8A and U8B and, therefore, the preset inputs to dual flip-flop U7, to be in a "1" state. Also the outputs of U13C and U13D, and therefore the clear inputs to U7 are forced to a "1" state. U7, therefore, counts in its normal divide-by-four mode. During the preset interval, the D_s lines to U3 are held in a "0" state by U10 and the inputs to U8A, U8B, U13C and U13D are held in a "1" state by U10. The clock pulse to the counters is inhibited and the preset information from the 10 frequency control lines is entered into counters U3, U6 and U7.

4.2.5.6 100 kHz CARRY GENERATOR

When all four 100 kHz preset lines are programmed to a "0" state by the front panel switches (corresponding to a dial setting of 0 on the 100 kHz frequency control), a special "carry" signal must be generated to program the counters to the correct division ratio.

Mathematically, this is necessary because a dial

setting of zero requires the input counter, U3, to divide by zero—an impossible operation. The count is corrected by programming U3 to divide-by-ten in this state and then subtracting one count from the next decade counter. Note that this is the same mathematical operation of “borrowing” when, for example, one subtracts nine from ten.

Quad two input NAND gate U4 is connected as a quad inverter with a common output. One of the four 100 kHz input lines is connected to each section of the gate. This special gate is of the “open collector” type enabling all four outputs to be connected together. The output of U4 is inverted by U5A. If all four inputs to U4 are zero, (dial set to “0” on the 100 kHz switch), the output of U4 will be in a “one” state and the U5A output will be a “zero”. If any of the 100 kHz inputs are in a “1” state, the U5A output will also be a “1”.

4.2.5.7 PRESET GENERATOR

During the normal counting interval, the Q output of flip-flop U10 is in a “1” state, the preset bus is in a “1” state and the 10 MHz preset bus is in a “0” state. In order to count properly, the pre-setting must occur between input clock pulses. A “look ahead” scheme is therefore employed to eliminate the propagation delays through the various counters.

First assume that the 100 kHz dial is not in the “0” position (that is, that the output of U5A is in a “1” state). When the preset counter has reached a count of 399 (that is, one count from being filled); counter U3 will have a count of “9” (or binary 1001), U6 will have a count of “9” (or binary 1001) and U7 will have a count of “3” (or binary 11). The output of 8 input NAND gate U9 will sense this unique state and will go to a “0” state. U8C inverts this output to a “1” state, making the K1 input to master/slave flip-flop U10 a “1”. On the next transition of the U3 input clock to a “0” state, the Q output of U10 will toggle to a “0” state and, therefore, the preset bus will be in a “0” state and the 10 MHz preset bus will be in a “1” state. Presetting will therefore occur. On the next transition of the U3 input clock back to a “1” state, the output of U8D will transition from a “1” to a “0” state, applying a “0” to

the preset input (P) of U10 and forcing the Q output of U10 back to a “1” state. This terminates the preset cycle, and the normal counting sequence is restored.

If the 100 kHz dial is set in the “0” position, the U5A output will be in a “0” state. The output of carry gate U5B will therefore always be in a “1” state and will not follow the Q_A output of U6. Flip-flop U10 will now be “armed” at the 389th counter state instead of at the 399th state. The desired “carry” of ten counts will therefore occur.

4.2.5.8 PHASE DETECTOR

The 100 kHz reference from the Spectrum Generator is divided in frequency by four to 25 kHz by dual flip-flop U11. In the phase detector (U12), the frequency and phase of the output of the preset counter is compared with that of the 25 kHz reference and a fine steering correction voltage is fed back to control the frequency of the V.C.O. (1A4A5). This feedback voltage changes in the correct direction to bring the V.C.O. into phase lock. The phase detector operates in the following manner: If the frequency of the preset counter output is greater than that of the 25 kHz reference, the phase detector output will decrease in voltage. If the frequency of the preset counter output is less than that of the 25 kHz reference, the phase detector output will increase in voltage. If the two frequencies are exactly the same, the phase detector output will remain constant.

4.2.6 V.C.O.—1A4A5

Refer to Figure 5.16.

4.2.6.1 GENERAL

The V.C.O. (1A4A5) generates the variable frequency 1st L.O. signal which controls the operating frequency, F_O , of the radio. This signal is generated in three voltage controlled oscillators each covering a 10 MHz frequency range, and selected by the 10 MHz switch on the front panel of the radio. The frequency ranges of the oscillators are (assuming a 2nd L.O. frequency of nominal 80.7500 MHz):

OSCILLATOR	F _O RANGE (MHz)	VCO FREQUENCY RANGE (MHz)
Band 0	0.0000 to 9.9999	91.2500 to 101.2499
Band 1	10.0000 to 19.9999	101.2500 to 111.2499
Band 2	20.0000 to 29.9999	111.2500 to 121.2499

The actual oscillator frequencies will deviate from the above by an amount equal to the difference between the actual 2nd L.O. frequency and its nominal 80.7500 MHz.

The exact operating frequency of the oscillators is controlled by two independent D.C. voltages, designated coarse and fine steering. Each steering voltage is applied to a voltage variable capacitance diode (varactor) connected across the oscillator tank circuit. The coarse steering voltage is derived from a precision voltage divider located on the 1 MHz frequency control switch on the front panel. This voltage sets the oscillator frequency within the acquiring range of the phase lock loop. The fine steering voltage is derived from the phase detector on the V.H.F. Divider (1A4A4) after subsequent filtering by the loop filter. This voltage is the D.C. feedback within the phase lock loop which forces the oscillator to the correct frequency.

The oscillator outputs are buffered by two independent amplifiers: one providing the output to the Receiver Exciter module (1A3) and the other providing the oscillator sample to the Translator (1A4A3). Two transistor switches develop the 10 MHz preset signals for the V.H.F. Divider (1A4A4).

4.2.6.2 OSCILLATORS

The three oscillators are of identical design and, therefore, only the "Band 0" Oscillator will be discussed. The "Band 0" Oscillator is a conventional Colpitts oscillator employing a low noise dual gate MOSFET(Q6). The resonant tank circuit consisting of C20, C21, L1, C16, CR3 and CR4 determines the oscillation frequency of the circuit. Feedback is provided by C20 and C21. Two point tracking of the oscillator frequency is provided by L1 at the low frequency end of the band and C16

at the high frequency end. The coarse steering voltage from a resistor string on the 1 MHz switch is applied to voltage variable capacitance diode (varactor) CR3⁴ through the filter network (C10, R26, C11, and R27) and RF bypass network (R28, C12, R29 and C13). Fine steering voltage from the phase detector in the VHF Divider assembly, 1A4A4, is applied to varactor diode CR4³ through the loop filter (R23, C7, R24, C8, R25, and C9) and the 25 kHz twin tee notch filter (R20, C5, R22, C3, C4, R21 and C6). The output is taken from the drain of Q6 through C22. Hot carrier diodes CR5 and CR6 prevent the RF signal from biasing the varactor diodes into their conducting region.

4.2.6.3 OUTPUT BUFFER AMPLIFIER

The output of each oscillator is fed to the output buffer amplifier (Q9, Q10). This amplifier is a conventional cascode configuration providing high input impedance, high isolation, and negligible feedback. The output of the amplifier is fed through bandpass filter (C46, L11, L12, C48, L13, and C50) and matching transformer (T1) to the Receiver/Exciter module.

4.2.6.4 TRANSLATOR BUFFER AMPLIFIER

The translator buffer amplifier (Q11, Q12) is similar in operation to the output buffer. The output is taken from the collector of Q11 through C54 and matching transformer T2.

4.2.6.5 LOGIC SWITCHING

Transistors Q3, Q4 and Q5 apply +12 volts to the appropriate oscillator circuit when the respective band command line is connected to ground by the 10 MHz switch on the front panel. Transistors Q1 and Q2 generate the required 10 MHz preset code

for the VHF Divider (1A4A4) in the following sequence:

10 MHz switch Position	2 ⁰ Preset logic level	2 ¹ Preset logic level
0	0	1
1	1	0
2	0	0

NOTE

The TTL compatible logic levels are as follows:

Logical 0 = less than 0.8 volts

Logical 1 = greater than 2.0 volts but less than 5.0 volts

4.2.6.6 MECHANICAL

Refer to figure 5.6.

The V.C.O. board is secured between two metal plates (front and rear) that serve as a support and an electrical shield. This unit is rigidly mounted to the end plate of the synthesizer card guides to ensure superior performance under extreme vibration and shock conditions. Ability to make alignment adjustments is provided by access holes where necessary.

4.2.7 SYNTHESIZER MOTHER BOARD-1A4A6

Refer to figure 5.17.

The synthesizer mother board consists of five receptacles, and their related components and circuitry. It is mounted on four standoffs located on the chassis, under the synthesizer module, as shown in figure 5.6. The five printed circuit cards (1A4A1, 1A4A2, 1A4A3, 1A4A4, and 1A4A5), described previously in this section, insert into this mother board thereby constituting the entire synthesizer module.

4.2.7.1 L.O. BLANKER CIRCUITRY (PART OF SYNTHESIZER MOTHER BOARD 1A4A6)

The L.O. Blanker Circuitry protects the power amplifier from transients due to a frequency change while in the transmit mode. If the radio operator inadvertently changes the 1 MHz frequency dial on the front panel while in one of the transmit modes, the Synthesizer may momentarily change frequency by several MHz while the switch is between its detent positions. This would result in a large transient on the output and could damage the power amplifier.

When the setting of the 1 MHz switch is changed, the "preset 2⁰ 1 MHz" frequency control line will change from either:

- a) logical "0" (approximately 0.2 volts) to logical "1" (approximately 3 volts) state

or

- b) logical "1" to logical "0" state

In case a) a positive-going differentiated pulse is formed by differentiating network C8, R3, CR2 and R10 and is applied to the base of switch Q2 through R4. Q2 will saturate driving switch Q1 into conduction and generate a 12 volt blanking pulse through isolation diode CR4. The blanking pulse is applied to the Spectrum Generator (1A4A1) to blank the 3rd L.O. (10.5 MHz) output. The blanking duration is approximately 100 to 200 msec and is controlled by the time constant of the differentiating network.

In case b) a negative-going pulse is formed by differentiating network C2, R2, CR1 and R5 and is applied to the base of Q1 through R8. Q1 will saturate, forming the blanking pulse. Blanking duration is 100 to 200 msec and is controlled by the time constant of the differentiating network.

In the AM RECEIVE mode, +12 volts is applied to the output through isolation diode CR3. This blanks the 3rd L.O. while in this mode and prevents a beat note between the 3rd L.O. and the carrier of the received signal.

4.2.8 SYNTHESIZER PROGRAMMING

Figure 5.8 shows a wiring diagram of the front panel.

Synthesizer Programming is accomplished by circuitry located on the Memory Board, 1A1A7, of the Secure Channel memory system which is part of the front panel assembly of the GSB-900SC. The six Frequency Selector switches on the front panel control the Synthesizer Programming through the Memory Board, 1A1A7, when the Frequency control mode keyswitch is in either the Normal position or the Load Freq position. However, since the radio is disabled in the Load Freq mode to facilitate the loading of frequencies into the memory system, the synthesizer or its programming is meaningless in that case. In the Read Freq or the Secure mode, Synthesizer Programming is accomplished by the contents of the memories on the Memory Board, 1A1A7. The entire memory system and the six frequency switches operate in a Binary Coded Decimal (BCD) mode. However, since the 10 MHz, the 1 MHz and the 100 kHz inputs to the Synthesizer require programming other than BCD programming, the Memory Board, 1A1A7, contains Synthesizer Programming converters to produce the correct programming for those synthesizer inputs that do not require BCD. The Memory Board produces Inverted Decimal Programming for the Synthesizer 10 MHz input as illustrated in Table 5.9. The Memory Board produces Nines Complement Programming for the Synthesizer 1 MHz input as illustrated in Table 5.9. Finally the Memory Board produces Tens Complement Programming for the Synthesizer 100 kHz input as illustrated again in Table 5.9. In addition, the Memory Board, 1A1A7, provides BCD information to program the 10 kHz, the 1 kHz and the 100 Hz Synthesizer inputs. See Table 5.9. The Memory Board, 1A1A7, produces the correct Synthesizer Programming regardless of whether the Memory Board is

operating from the six Frequency Selector switches or its own internal memory contents.

4.2.9 FREQUENCY DISPLAY

A schematic of the frequency display is shown in Figure 5.9. Figure 4.2 shows the location of the frequency display boards.

4.2.9.1 DISPLAY DRIVER

The Memory Board, 1A1A7, supplies information either from the six Frequency Selector switches or from the contents of its own internal memory to the Display Driver Board, 1A1A2, so that the LED display may be properly programmed. The LED display drivers, U1 through U6, all require a BCD (binary coded decimal) code to properly light the display. Since the entire memory system and the six frequency switches operate in a BCD mode, this BCD information is supplied by drivers on the Memory Board to the LED display drivers, U1 through U6, on the Display Driver Board.

The Display Driver Board, 1A1A2, contains circuitry to permit blanking of the displays on the Display Board, 1A1A3. Any time Display Blanking,* which is input 2 of Display Driver Board, 1A1A2, is driven low from Band Steering Board, 1A1A6, the displays on Display Board, 1A1A3, are turned off. When Display Blanking is low, all inputs to Driver U7 are also low which causes outputs 3 and 5 of U7 to drive lows into pin 4 of both U1 and U2. Because Display Blanking is low, pin 4 of U3 through U6 will also be low. Anytime pin 4 of U1 through U6 is a low, all outputs of U1 through U6 become high thus turning off all displays.

Input pins 2 and 6 are grounded on U1 so that it can produce no display outputs great-

* See Logic Notes para. 5.10.13.

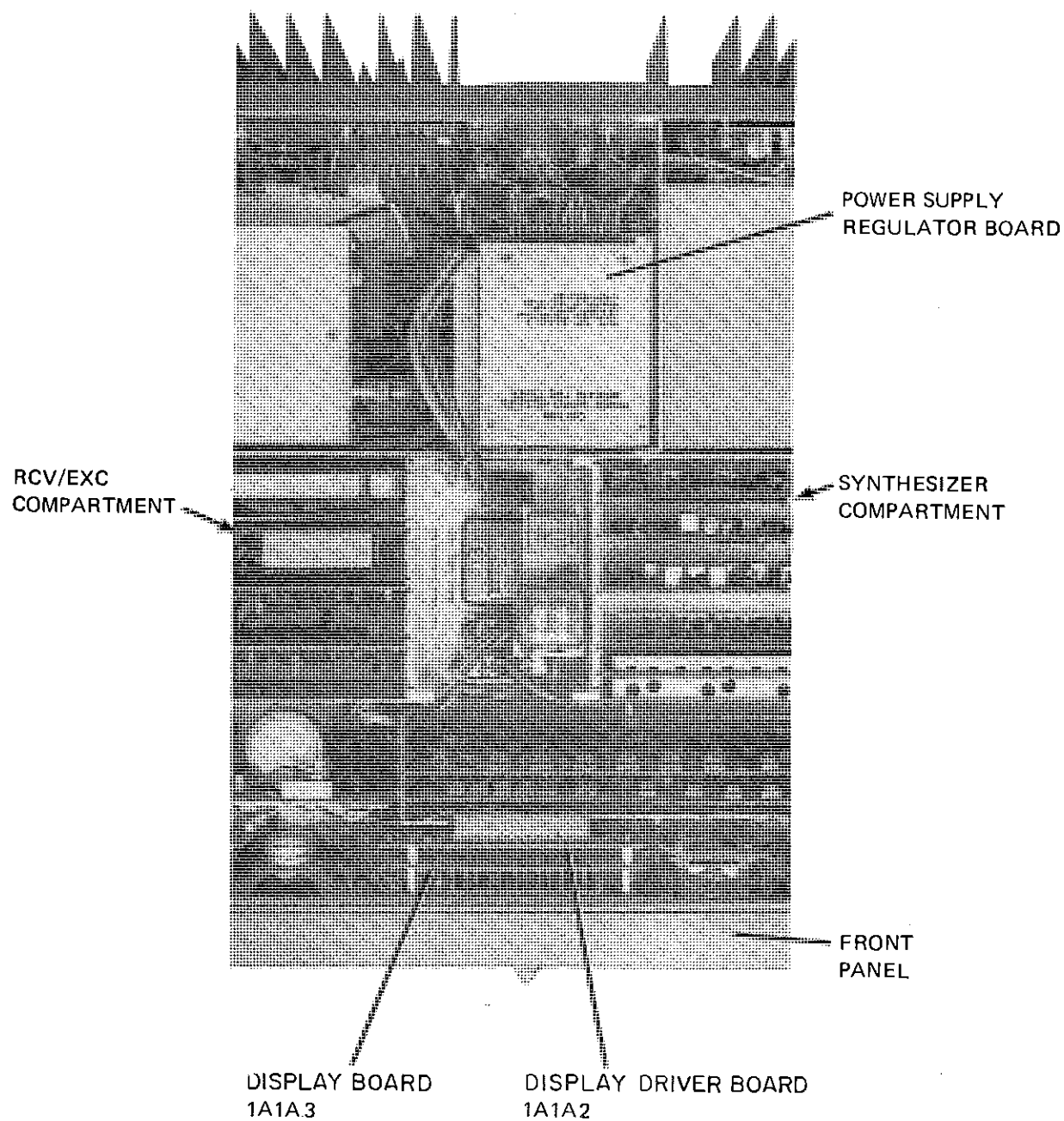


Figure 4.2 Top View Showing Display

er than 3. Input pin 5 of U1 is grounded so that anytime the BCD information associated with U1 is comprised of lows on pins 1 and 7 of U1, the outputs of U1 will all become high thus turning off the display digit driven by U1. This action effectively blanks any leading zero in the display. When input pins 1, 2, 6 and 7 of U1 are low, as they will be if the digit zero is selected in the 10 MHz position of the Memory system, pin 4 of U1 will become low thus forcing pin 5 of U2 low. Consequently, if input pins 1, 2, 6 and 7 are all low on Display Driver U2 when a digit zero is also selected in the 1 MHz position of the memory system, the outputs of U2 will all be high thus blanking the second leading zero of the display. By this mechanism, up to two leading zeros will be blanked by the Display Driver Board, 1A1A2.

The outputs of all six drivers are connected to 1A1A2J1.

4.2.9.2 DISPLAY

The six digit LED display board 1A1A3 plugs into the DECODER board via 1A1A3P1. Each segment is connected through an isolation resistor, R1 through R42, and the decimal point on U3 is energized through R43. The display intensity is changed by adjusting the supply voltage to the display anodes. This is done by S12 on the front panel. In the bright position, 5V is supplied to the LED's; and in the dim position, the voltage is dropped to 3V through CR1, 2 and 3.

4.2.9.3 POWER SUPPLY BATTERY

ASSEMBLY 1A1A4 See Figure 5.9A

4.2.9.4 The Power Supply Battery Assembly, mounted on the Front Panel Assembly supplies to the GSB-900SC memory system an unregulated voltage approximately equal to 10 volts and a regulated voltage equal to 5 volts. Mounted on the assembly are the two batteries that provide power to the memory system when the radio is turned off or primary power is disconnected. The batteries are not rechargeable and should be

replaced as soon as possible after the LOW BTRY light on the front panel illuminates. Under normal use, the batteries should last in excess of one year. The batteries and battery holder should be inspected periodically for dirt and corrosion and cleaned if necessary. Insure that battery polarity is correct when replacing batteries in the battery holder. See Figure 3.3 for correct installation.

NOTE

The batteries provide power to the memory system to enable it to retain previously programmed (stored) frequencies. As the batteries weaken, they will eventually lose their ability to retain frequencies stored in the memories when the radio is turned off. The memory system receives power from the radio when turned on and stored frequencies can be preserved by not turning the radio off until the batteries can be replaced.

If the batteries are replaced immediately after the LOW BTRY lamp illuminates, the radio may be turned off to accomplish the replacement. The memory system has sufficient data retention capability to maintain the stored frequencies for one-half hour after the radio has been turned off and the batteries removed. This retention time should be enough to replace the weak batteries with fresh ones without losing the frequencies stored in the memory system.

If new batteries are not immediately available, or cannot be changed for several days after the LOW BTRY indicator lights, the radio should be left on and the batteries changed with the radio on to insure that the stored frequencies are not changed due to very weak batteries.

In the event that the frequencies stored in the memory system are unavoidably erased, they may be reloaded by following the procedure outlined in the Loading Frequencies section of this manual.

4.3. GENERAL

The GSB-900SC Secure Channel Memory System consists of three printed circuit boards: Memory System Mother Board (1A1A5), Band Steering Board (1A1A6), and the Memory Board (1A1A7). The boards are housed in a metal wrap around assembly mounted on the front panel.

4.3.1 MEMORY SYSTEM MOTHER BOARD 1A1A5 See Figure 5.9B

The Memory System Mother Board (1A1A5) provides the interconnection between the Band Steering Board, the Memory Board, the transceiver and the front panel. An additional location labeled Remote is provided for future applications. Edge connectors allow the boards to be unplugged from the Mother Board.

4.3.2 BAND STEERING BOARD 1A1A6 See Figure 5.9C

4.3.2.1 GENERAL

The Band Steering Board, by using digital logic circuitry, automatically selects the correct band filter in the Filter Module (1A5) by controlling the DC Band Tuning Motor. It also provides the frequency steering voltages to the Synthesizer. The circuitry to switch the memories from battery power to transceiver 5 volt power (Power Discriminator), and the sensing circuit to indicate low battery voltage are located on this board. Disable and display flashing for frequencies less than 1.6 MHz, and selection of operating modes (Normal, Secure, etc.) are provided by a Mode Discriminator circuit. The Master Clear logic to erase all information stored in the Memories, and the transmit and receive frequency memory location circuitry are located on this board.

4.3.2.2 BAND CONVERTER

Selection of the correct band is accomplished by the Band steering Programmable Read Only Memory (PROM) U21 in which is stored the correct band output for each frequency input combination. Binary addressing of the PROM from the Memory Board 1 MHz and 10 MHz display signals causes one output at a time to go to a high state as a function of what input frequency is selected. Any PROM output which is high, in conjunction with the Load Frequency input to U20D being high (Load Freq mode is not selected), causes U9 through U12 to switch one of transistors Q2 through Q9 on, depending on the frequency band selected by the PROM address. This in turn activates the DC band motor located on Motor Control Board 1A5A4 to select the correct band filter. This holds true for Bands 1 through 7. Band 8 is a switch selected band and does not utilize the PROM for band selection. Selecting a 20 MHz frequency produces a high at board input 1A1A6P2-29 and at Inverter in-

5024011627A

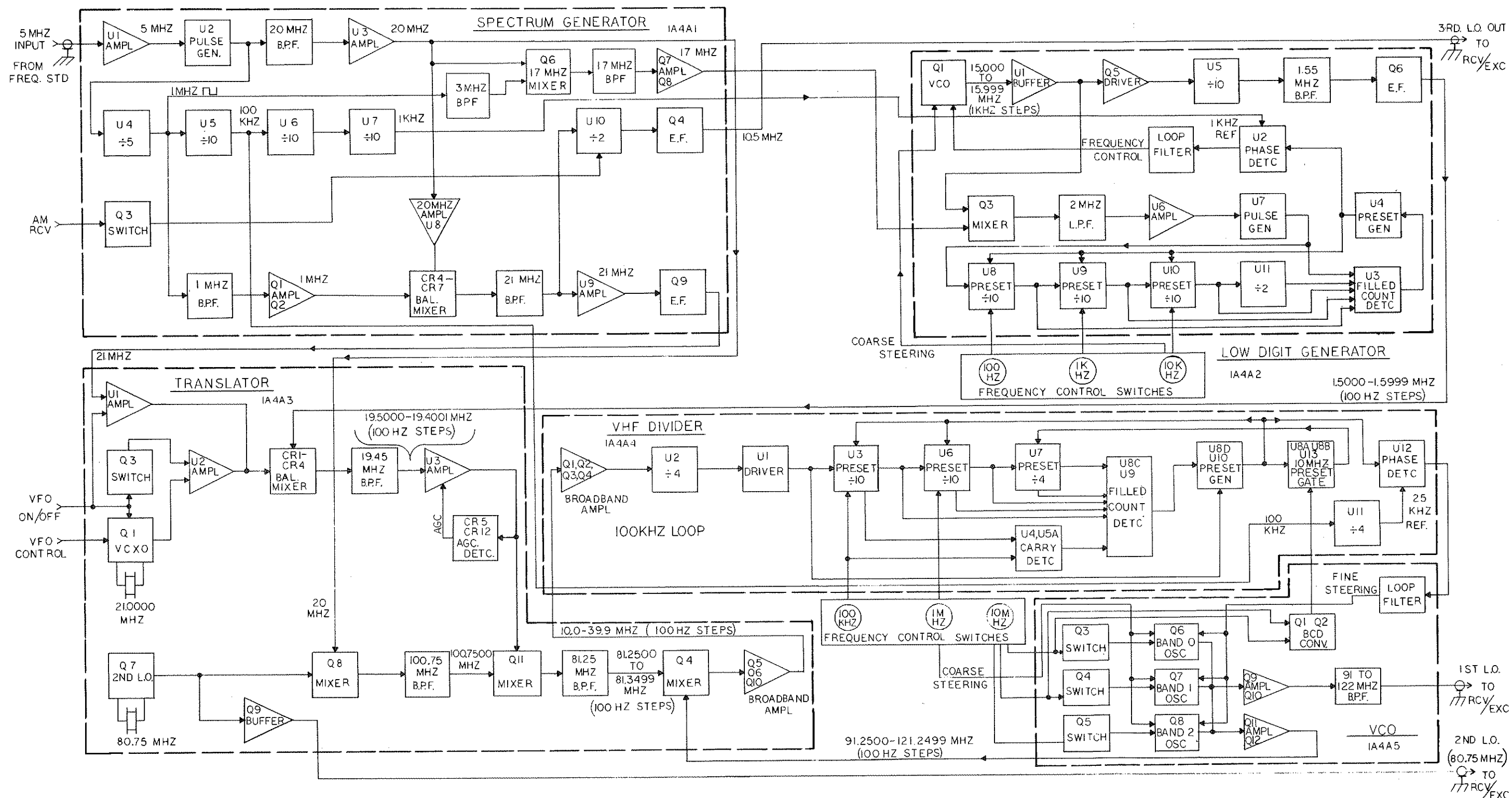
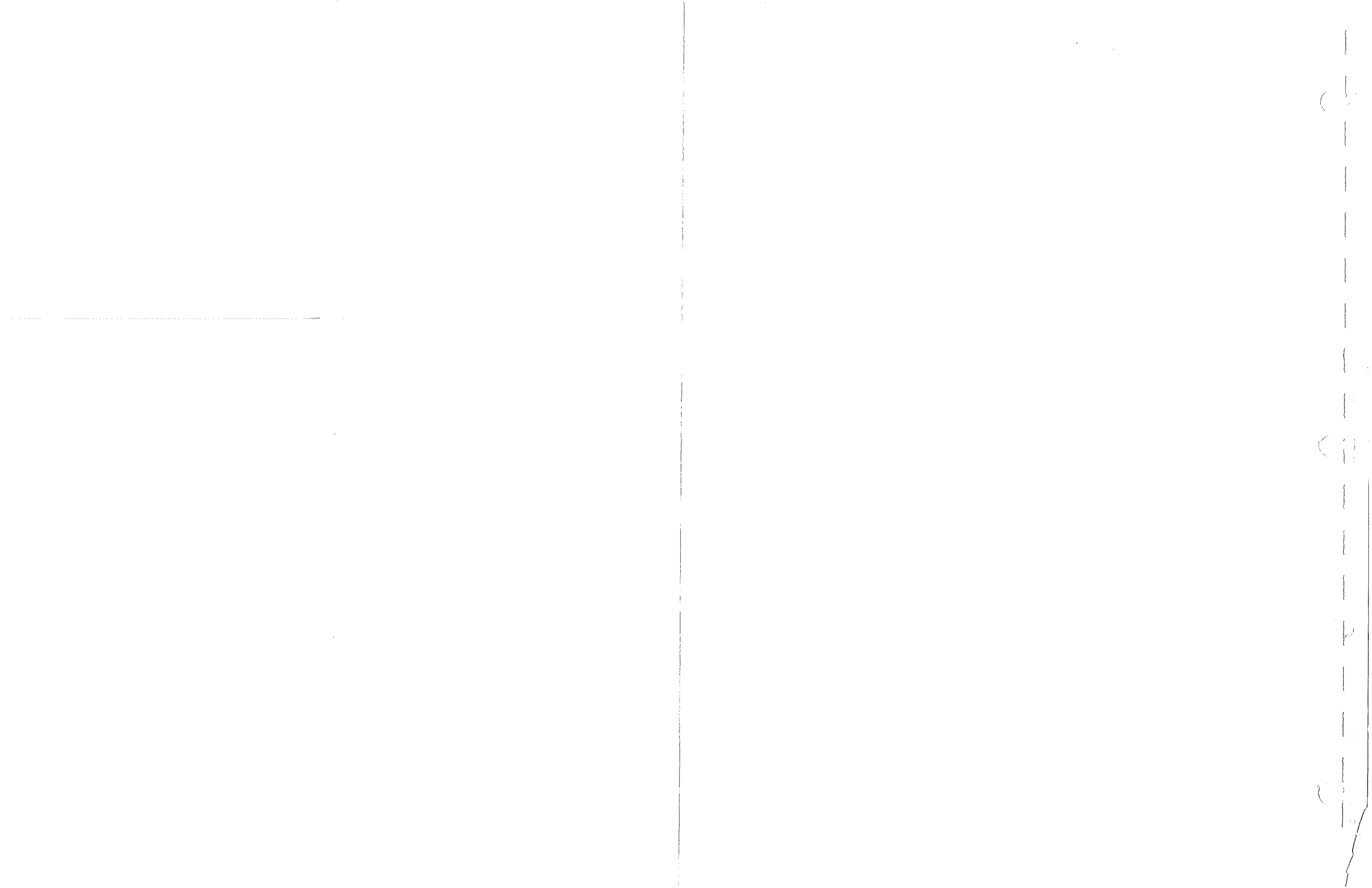


Figure 4.3 Synthesizer Block Diagram and Details



put pin 13 of U7F. The signal being high at pin 13 of U7F enables the Band 8 output at Driver U9 pin 1, while the resulting low at the inverter output, pin 12 of U7F, disables Band 1 through 7 outputs. If the Load Freq input is ever low, which it will be when the Load Freq mode is selected via the Frequency Control Mode keyswitch, the resulting lows at U9, pin 2 and U20D, pin 11 will disable all Band outputs.

4.3.2.3 VHF VCO STEERING

The VHF VCO voltages presented to the Synthesizer are derived by digital to analog (D/A) conversion. This is accomplished by a Binary-Coded-Decimal (BCD) to Decimal decoder, U29. The four binary address inputs which are the four 1 MHz signals produced on the Memory board select 1 of 10 outputs and take it to a Low or On state. The outputs are connected to the bases of PNP transistors. When the base is taken low, the transistor conducts allowing the 12 volt supply voltage connected to the emitter to be divided between the collector precision resistor and a fixed 15 K ohm 1% resistor (R84) to ground. As different frequencies are selected, the decoder turns on different transistors, each having a different value of emitter resistor. These voltages are fed through an operational amplifier, which is configured as a voltage follower, to the voltage controlled oscillator 1A4A5 in the Synthesizer Module to provide the frequency steering voltages. Low Digit Coarse Steering voltages for the Synthesizer are derived in the same manner by BCD to Decimal decoder U28 and its associated transistors and resistor divider networks. The Low Digit Coarse Steering signal produced at Band Steering output 1A1A6P1-6 is sent to the Synthesizer Low Digit Generator board 1A4A2.

4.3.2.4 POWER DISCRIMINATOR

The Power Discriminator is an electronic switching system that provides the method

of changing the Memory System power supply from battery to transceiver power.

When the transceiver power switch is in the Off position, battery power is used to maintain the status of frequencies stored in the memories. Unreg Voltage is supplied to board input 1A1A6P2-73 and the gate of Q15 from the Power Supply Battery Assy 1A1A4. As no voltage appears at the gate of JFET Q15 when the radio is turned off, a low resistance path through the source-drain junction of Q15 and forward biased junction of diode CR7 allows battery power to be applied via output 1A1A6P2-22 to the six Random Access Memories (RAM) on the Memory board to provide data retention. When the radio power switch is turned on, the gate of Q15 is biased positive through diode CR12 turning the transistor off and thereby providing a high resistance path from the batteries to the memories. As this happens, memory power is supplied by the radio +5 volt system through diode CR8.

4.3.2.5 LOW BATTERY INDICATOR

The GSB-900 Secure Channel transceiver features circuitry to sense and indicate when the battery voltage decreases to a level that is insufficient to maintain retention of frequencies stored in the memory system. When the radio is turned on, the Power Clear signal which is initially low becomes high after a time sufficiently long to permit power up transients to die out. Approximately half a second after power up the Power Clear signal goes high. The Power Clear signal on flip-flop U4A pin 3 being low forces the flip-flop to turn on in the reset mode. When Power Clear goes high on pin 3 of U4A, the flip-flop is enabled to set at any time when a positive pulse on pin 1 of U4A occurs while pin 4 of U4A is high. When the Power Clear signal becomes high, pin 10 of inverter U14E and Pin 12 of inverter U14F become low. Approximately 50us later, due to the time-

constant circuit R45, C18, and CR4, pin 1 of inverter U25A becomes low and pin 2 of U25A becomes high. This instantaneous positive going transition at the + side of capacitor C2 causes a corresponding positive going voltage spike at U2C pin 5 which lasts until the capacitor C2 charges through resistor, R4. The positive pulse is squared and inverted by U2C. It is reinverted by U7C into a positive pulse again before being applied to pin 1 of the J-K flip-flop U4A. The trailing edge of the positive pulse will set flip-flop U4A if the battery voltage is low.

At the time when the Power Clear signal goes high the output of inverter U14F which is pin 12 goes low. The time-constant of R46, C19, and CR5 is much longer (200us) than R45, C18, and CR4 (50us), and as C19 discharges, it causes pin 13 of U25F to go low gradually and pin 12 to go high as the switching threshold of the inverter is reached. This causes pin 3 of inverter U7B to go high. Pin 4 of U7B which was high since the radio was turned on now goes low as a result of U7B, pin 3 going high. Due to the time-constant networks, pin 4 of U7B is high from the time the radio is turned on until the Power Clear signal goes high and for 200usec thereafter. This signal produces two conditions. It establishes a high level on pin 10 of AND gate U15C for 200us after the Power Clear goes high and also produces a high level on pin 4 of U15B for the same period. Since pin 5 of U15B goes high when the Power Clear signal goes high, it allows pin 6 of U15B to go high turning on MOSFET Q14 for 200usec only, immediately after Power Clear goes high. This allows the battery voltage to be applied to the V-input of Voltage Comparator U6B for 200usec. If the battery voltage is less than 3 volts, pin 2 of U6B will become positive causing a high level on pin 9 of U15C. Pin 10 of U15C will be high for the same 200 usec so a high level is produced at pin 8 of U15C and pin 4 of U4A. The positive pulse occurs on pin 1 of U4A during the 200usec that pin

4 of U4A is high. This will cause $\overline{Q}$ output, pin 14, to go low, turning on U1A and lighting the Low Battery Indicator lamp. If the battery voltage is above 3 volts, the Voltage Comparator output will remain low during the battery voltage sampling process. Therefore, pin 4 of U4A will be low during the positive pulse on pin 1 of U4A thus preventing the flip-flop from setting. Consequently, if the flip-flop does not set, the Low battery Lamp will remain off.

4.3.2.6 DISABLE

The transceiver is disabled whenever the selected frequency is less than 1.6 MHz and/or the Frequency Control Mode keyswitch is in the Load Freq position. A selected frequency of less than 1.6 MHz will also cause the display to flash on and off at a rate of approximately once a second.

If a frequency of less than 1.0 MHz is selected, the Band PROM address of 1A1A6P2, pins 17, 21, 23, 25 and 27 will enable PROM output B7, which is U21, pin 9, causing it to reach a high state (Low Frequency). This level appears at pin 10 and pin 8 of OR gate U19C and pin 4 of NAND gate U3B. At pin 5 of U3B, a high level is present from inverter U7F pin 12 due to the 20 MHz switch position not being selected. This causes pin 6 of U3B and pin 6 of U8B to be low enabling the Display Flashing Oscillator. The Load Freq input line is high due to the Mode switch not being in the Load Freq mode. This produces a high at Pin 7 of U8B. Pin 6 of U8B is low forcing pin 5 of U8B low and enabling Q1 to switch on thereby disabling the transceiver via output 1A1A6P2-51 which connects to the Receiver/Exciter Sideband Generator Board 1A3A3 and the Receiver/Exciter Audio Board 1A3A4.

If a frequency between 1.0 MHz and 1.6 MHz is selected the Band PROM address will detect 1 MHz and enable output U21, pin 1,

which will be high. The "600 kHz or greater detector" comprised of AND gate U20B and OR gate U19D will produce a low output at U19D, pin 11. Since AND gate U20C sees a high on input pin 9 but a low on input pin 10, its output pin 8 will be low. This will cause U7E, pin 11, to be low and U7E, pin 10 to be high. The resulting high on U15D, pin 12, coupled with the high on U15D, pin 13, will cause the output of AND gate U15D to be high resulting in a high on pin 9 of U19C. Since U19C is an OR gate with one input, pin 9, high, the output of U19C, pin 8, will be high, as will be the input pin 4 of NAND gate U3B. Since 20 MHz is not enabled the input to U7F, pin 13, will be low causing its output U7F, pin 12, to be high along with U3B, pin 5. Since both inputs to NAND gate U3B are high its output pin 6 will be low enabling the Display Flashing Oscillator as well as turning on the output of U8B, pin 5. With the output transistor of Driver U8B pin 5 on, the transistor Q1 will be on applying 12 volts to the Disable line and disabling the transceiver via board output 1A1A6P2-51.

If the Frequency Control Mode keyswitch is in the Load Freq position the signal, Load Freq, will be low driving pin 7 of U8B low and turning on output pin 5 of U8B. With output pin 5 of U8B low or on, transistor Q1 will conduct applying 12 volts to the Disable line and disabling the transceiver.

4.3.2.7 DISPLAY FLASHING

The low level that appears at pin 6 of U3B when a frequency of less than 1.6 MHz is selected also appears at pin 11 and 12 of NAND gate U24D, being utilized as an inverter, causing its open collector transistor output, pin 13, to be off. This ungrounds C8 permitting C8 to charge through R13 and R3. C8 applies its charging voltage to pin 6, the V- input of Voltage Comparator U6A. When this voltage rises to approximately 3.3 volts,

it becomes more positive than the V+ input, pin 7, which is at 3.3 volts due to the high on output pin 1 of U6A applied through the resistor divider network R14, R50 and R51. This causes the output, pin 1, to switch low applying a reference voltage of 1.6 volts to pin 7 of U6A through resistor network R14, R50 and R51. The capacitor then begins to discharge through R13 to a value of 1.6 volts. The output switches high and the process repeats itself. This produces an alternating signal at pin 6 of U1B. Pin 7 of U1B is held high by the Secure input since the transceiver is not in the Secure mode of operation. When pin 6 toggles high and low, the output, pin 5 switches off and on respectively causing the display to flash off and on at a rate of approximately once a second. If the Frequency Mode Keylock Switch is in the Secure position, input 7 of Driver U1B will be low turning on the output pin 5 of U1B which continuously keeps the display blanked.

4.3.2.8 MASTER CLEAR

The Master Clear feature of the GSB-900SC enables the erasure of all frequencies stored in the memory system. This is accomplished by "writing" all zeros in the six Random Access Memories that provide memory storage.

With the Mode switch in the Load Freq position, pin 9 of J-K Flip-Flop U4B is high and pin 12 is low. Pin 8 is high. When the Master Clear pushbutton is pressed and released, a positive clock pulse is applied to U4B, pin 6, by the latch formed by Inverters U26E and U26F. At this time several signal levels change state: the Q output of U4B, pin 10 goes low enabling the outputs of memory addressbus driver U23 making it ready to pass input data to its outputs; the Clear Mode line goes low through OR gate U19B; the Local Clear Mode line, the Clear Mode line, pin 3 of U24A and pin 5 of U24B are preset to a high level; and pin 1 of U8A goes high causing its output, pin 3 to turn off removing the ground from C11.

When U8A pin 3 goes high, capacitor C11 begins to charge through R10 and R20. This voltage is applied to Pin 8, the V-input of voltage comparator U6D. When the voltage rises to approximately 3.3 volts, it becomes more positive than the V+ input, pin 9, which is at 3.3 volts due to the high on output pin 14 of U6D applied through the voltage divider network R17, R18 and R19. This causes the output of the comparator, pin 14, to switch low and begin discharging C11 through R20 to a point where pin 8 becomes less positive than pin 9, or at about 1.6 volts. The output then switches high again and the oscillatory process repeats itself producing a square wave at the output of the comparator. This square wave is applied to pins 12 and 13 of NAND gate U5D, being used as an inverter, and appears inverted at pin 11 of U5D and pin 8, the Clock input of Decade Counter U22.

The Clock input pin 8 of Decade Counter U22 is initially low as the flip-flop U4B is set when the Clear Mode is initiated. Since U22 pin 8 is low U5B pin 5 will be low which will cause the output of Nand gate U5B pin 6 to be high. Consequently, since all inputs to multi-input Nand gate U17 are high its output will be low thus enabling the Receive Memory Location of Channel 00. Channel 00 is selected because outputs 5, 9, 2 and 12 are low at Decade Counters U22 and U13. This produces lows at the Memory Address Bus via U23 pins 3, 5, 7, 9, 11 and 13 as well as pins 1 and 4 of U24A and U24B. Since the Clear Mode continuously enables zeros at the data inputs of the six Random Access Memories on the Memory board used to store frequencies and since the Write command is continuously applied to the memories in the Clear Mode, the Receive Location of Channel 00 will have a zero frequency stored in it. As the clock input to pin 8 of U22 goes high the first time, it will have no influence on the input pin 8 of U22 since U22 clocks only on negative transitions. However, the high at pin 8 of U22 will produce a high at U5B pin 5 which when coupled with

the high on Nand input pin 4 of U5B will produce a low out of pin 6 of U5B. This low will produce a low on input pin 3 of Nand gate U17. Any low input to a Nand gate will produce a high output. Consequently the output of U17 pin 8 will become high, thus selecting the Transmit Location of Channel 00 which is immediately loaded with zeros. The first time the clock makes a high to low transition on pin 8 of Counter U22, the counter will increment producing a high at output pin 5 which selects Channel 01. Since the clock signal is low, U17 pin 8 will be low selecting the Receive Location of Channel 01 for entering of zeros. As the clock continues to oscillate, it alternately selects Transmit and Receive Locations of each channel from 00 through 09. These locations in the memory are each filled with zeros as they are addressed by Counter U22 and Nand gate U17. When Counter U22 fills to capacity, which is after nine clock pulses, its output, pin 12, will be high after going high on the eighth clock pulse. On the tenth clock pulse, Counter U22 will overflow to zero again, which will cause output pin 12 to go low. This negative going transition will clock Counter U13 to one. The result will be the selection of the Receive Location of Channel 10 which is filled with zeros. Each time Counter U22 is filled and overflows, Counter U13 will be incremented one count. This continues until both the Receive and Transmit Locations of every Channel from 00 through 99 are selected by the oscillating clock frequency through Counters U22 and U13 and Nand gate U17. Finally, after the Clock into pin 8 of U22 is high for the hundredth time, it will go low for the final time during this particular example of a Clear Mode sequence. When it does, output pin 12 of Counter U13 will go low after going high for the first time when Channel 80 was addressed.

When U13, pin 12, goes low, applying this level to pin 3 of inverter U2B, the output of U2B, pin 4, goes high. This high going trans-

ition produces a positive voltage spike at U2A, pin 1, which lasts until capacitor C4 charges from the output of U2B which is pin 4. The positive pulse at pin 1 of Inverter U2A applies a negative Clear pulse to pin 8 of U4B. This makes the flip-flop Q output, pin 11, go low, allowing U8A pin 3 to go low stopping the voltage comparator-clock U6D and thereby halting the count sequence. Also, the Q output, pin 10 of U4B, goes high disabling the memory address bus driver, U23. At the same time pins 3 and 5 of Nand gates U24A and U24B respectively, go low, which disables outputs 1 and 4 entitled Bus 80 and Bus 40 to the Memory Board.

4.3.2.9 KEYLINE

The Keyline is operated from the 12 volt supply and therefore must be transformed into a 5 volt level to be compatible with the digital logic used in the transceiver control circuitry. This is accomplished by a voltage comparator, U6C, and its associated components. When the Keyline is brought low at 1A1A6P1-5, the V-input, pin 10, of the Voltage Comparator becomes less positive than the V+ input, pin 11. The V+ input, pin 11, is biased above ground to 2.5 volts by the resistor divider network R21, R52 and R53. When the Keyline goes low, the comparator output switches to a 5 volt level through R22. At this time, the V+ input is pulled higher through R21, reinforcing the output switching. This output level is applied to Nand gate U5A, pin 2. Pin 1 of U5A should also be high because the Load Frequency Mode is not selected in this example. Consequently with two high inputs, the output of U5A, pin 3, should be low. The outputs of U3C, U3D, U5B and U5C will be high since at least one input to each of those Nand gates is low at this time. Since only one input which is pin 3 of U17 is low, the output of U17, which is pin 8, will be high, enabling the Transmit Memory location and transmitting the frequency stored in that location. Also,

through Inverter U7D and Driver U18, this high level switches the RCV lamp off and the XMT lamp on, indicating that the transmitter is keyed.

4.3.3.1 LOAD XMT PUSHBUTTON

With the Frequency Control Mode Keyswitch in the Load Freq position, when the Load XMT pushbutton is depressed, the output of the latch comprised of inverters U26C and U26D goes to a high state applying a positive pulse to pin 10 of NAND gates U3C and pin 13 of U3D. Also, when the latch goes high, a positive going spike is applied to pin 3 of AND-OR-INVERT gate U16. Pin 2 of U16 is high at the same time since the Load Freq mode is selected. At least one input of each of the other input pairs to U16 is low. Consequently, as pin 3 of U17 pulses high, pin 8, goes low, enabling the memory Read/Write line low and storing the selected frequency in memory. As this is happening, the signal that is present at U3C and D causes output pin 8 and 11 respectively to go low depending on whether the Load Freq or the Read Freq mode is selected. At least one input to U5A, B and C is also low, so a high appears at each of their outputs. With all inputs high at U17 except either pin 1 or 12 which goes low, the output of NAND gate U17, pin 8, goes high causing the XMT memory location line to become high and assigning the frequency a selected channel transmit location. As C20 charges, the positive pulse at U16, pin 3, becomes low, causing the output, pin 8, to become high, disabling the Memory Write function. When the Load XMT pushbutton is released, the latch resets to a low state. This causes U17, pin 8, to go low, resetting the XMT/RCV memory location line so that the Receive location is enabled.

4.3.3.2 LOAD RCV PUSHBUTTON

With the Frequency Control Mode Keyswitch in the Load Freq position, the XMT/RCV

memory location line is low due to the Load XMT pushbutton latch presenting a low level to NAND gates U3C and U3D. The XMT/RCV memory location line must be low to enter a selected Receive channel frequency. When the Load RCV pushbutton is depressed, the output of the latch, comprised of inverters U26A and U26B, becomes high. This level is applied to an AND-OR-INVERT gate U16, pin 1. Pin 13 of U16 is high at the same time since the Load Freq mode is selected. At least one input of each of the other input pairs to U16 is low. Consequently as pin 1 of U16 goes high, a low level appears at the output, pin 8. This enables the memory Read/Write line to go low, allowing the selected frequency to be written (stored) in the channel selected by the Channel Selector switches on the Front Panel. When the Load RCV pushbutton is released, the latch output returns to a low level and causes the Read/Write line to go high and end the Write cycle.

4.3.4 MEMORY BOARD 1A1A7

See Figure 5.9D

4.3.4.1 GENERAL

The Memory printed circuit board, 1A1A7, contains the circuitry that stores the frequencies programmed by the Front Panel Frequency Selector switches. It also provides the method of by-passing the memory elements when the Frequency Control Mode Keyswitch is in the Normal position, thereby allowing direct selection of operating frequencies from the Frequency Selector switches on the front panel. The converters that are necessary to provide the correct programming information for the synthesizer are contained on this board. Also, the circuitry that allows the memories to be disabled to conserve power drawn from the batteries when the radio is off is located on this board. The Random Access Memories (RAMs) that are the frequency storage ele-

ments, are Complementary Metal-Oxide Semiconductors (CMOS) devices that operate with very low power consumption and high reliability. Due to the low standby power required (60uA total) by the RAMS, the life expectancy of the batteries is in excess of one year if the radio is never turned on during that year, and at least 3 years if the radio is frequently used. The batteries are only used to retain stored frequencies when the radio is turned off since an electronic switching circuit selects the transmitter 5 volt power source and disconnects the batteries when the radio is turned on.

Within the RAMS, U3 through U8, on the Memory Board 100 channels of storage are available, with each channel capable of storing one transmit and one receive frequency. Each RAM stores one digit of any stored frequency. RAM U8 always stores the 10 MHz digit. RAM U7 stores the 1 MHz digit of every frequency. RAMS U6 through U3 store the 100 kHz digit through the 100 Hz digit respectively. Data is entered, or "written", into the RAMS during the following input conditions: Chip Enable 1 low ($\overline{CE1}$), Chip Enable 2 ($CE2$) high, output disable (O.D.) high, and the Read/Write (R/W) input low. The data entered on the data inputs, pins 9, 11, 13 and 15 of any RAM, can be high or low (a one or a zero). During the Write operation, the outputs are in the high-impedance, or off state, because the Output Disable input pin 18 of each RAM will be high. Pin 18, the Output Disable input, is driven from Memory Board input 1A1A7P1-57 called Read Freq+Secure. This signal, Read Freq+Secure, is high anytime either the Read Freq or the Secure mode is not selected which is anytime the radio operates in the Normal or the Load Freq mode. Therefore, the output of the RAMS U3-U8 are disabled in the Normal or the Load Freq mode since pin 18 of each RAM is high at that time.

Information is entered into the RAMS, U3-U8, by the six Frequency Selector switches according to the addressing provided by the two

Channel Selector switches. The Binary Coded Decimal (BCD) information presented by the Channel Selector switches is converted to Binary data by the two BCD to Binary Converters U1 and U2. The outputs of the converters select the RAM addresses A2 through A7. RAM address A1 is selected directly from the least significant bit of the Channel Selector Units switch at Memory Board input 1A1A7P1-60 since that input is the same in BCD or Binary. A0 is used to define a Receive or Transmit frequency location when the Load RCV and Load XMT push-buttons are pressed. This XMT/RCV signal, found on input 1A1A7P1-15 of the Memory Board, selects either of two locations in memory for each of the 100 channels available for frequency storage. Consequently, a total of 200 memory locations are available if all 100 (00 to 99) channels are programmed.

The six Frequency Selector switches program BCD data into the RAM data inputs. The Memories can also be by-passed allowing the Frequency Selector switches to be used to program the synthesizer and displays directly by selecting the Normal position of the Frequency Control Mode Keyswitch.

To read data out of the RAMS after it has been stored, the Read/Write input of 1A1A7P1-19 to the Memory Board must be high thus providing a high on input pin 20 of each RAM, U3-U8. The Read/Write input is generated on the Band Steering Board, 1A1A6. Also the Output Disable input, pin 18, of each RAM must be low as a result of a low on the Memory Board input 1A1A7P1-57 which is called Read Freq + Secure. The signal Read Freq + Secure will be low anytime either the Read Freq mode or the Secure mode is selected. With the Output Disable input low on pin 18 of each RAM, the data outputs of each RAM will be enabled so that they can program the display and the synthesizer. Each data output will be either a one or a zero depending

on whether a one or a zero was stored in the RAM initially.

Figure 4.4 shows a simplified block diagram of the memory system. Portions of the system are enabled or disabled at certain times depending on the mode selected by the Frequency Control Mode Keyswitch.

4.3.4.2 FREQUENCY SELECTOR SWITCH INTERFACE DRIVERS (DRIVERS #1)

The Frequency Selector Switch Interface Drivers are designated as Drivers #1 in Fig. 4.4 which is a block diagram of the Memory Board 1A1A7. The Frequency Selector Switch Interface Drivers are comprised of Hex Bus Drivers U23, U24, U25 and U26A. These Drivers pass the BCD Frequency Selector Switch information into the Memory Board except when their outputs are forced into a high impedance state by the presence of a high on the Clear Mode input pin 15 of U23, U24, U25 and U26A. Consequently the BCD Frequency Selector Switch information is always passed into the Memory Board for processing except when the Clear Mode signal indicates that the Master Clear button has been pushed and that zeros are being loaded into all the memory locations. In that case the BCD Frequency Switch information is blocked from entering the Memory Board because the Band Steering Board, 1A1A6, is producing a high on Memory Board input 1A1A7P1-63 called Clear Mode which disables Drivers #1 and prevents any influence by the Frequency Switch information.

4.2.4.3 MEMORY ERASE INPUT DRIVERS (DRIVERS #2)

The Memory Erase Input Drivers are designated as Drivers #2 in Fig. 4.4, the Memory Board block diagram. The Memory Erase Input Drivers are comprised of Hex Bus Drivers U11, U12, U13 and U14. These Drivers produce high impedance outputs continuously

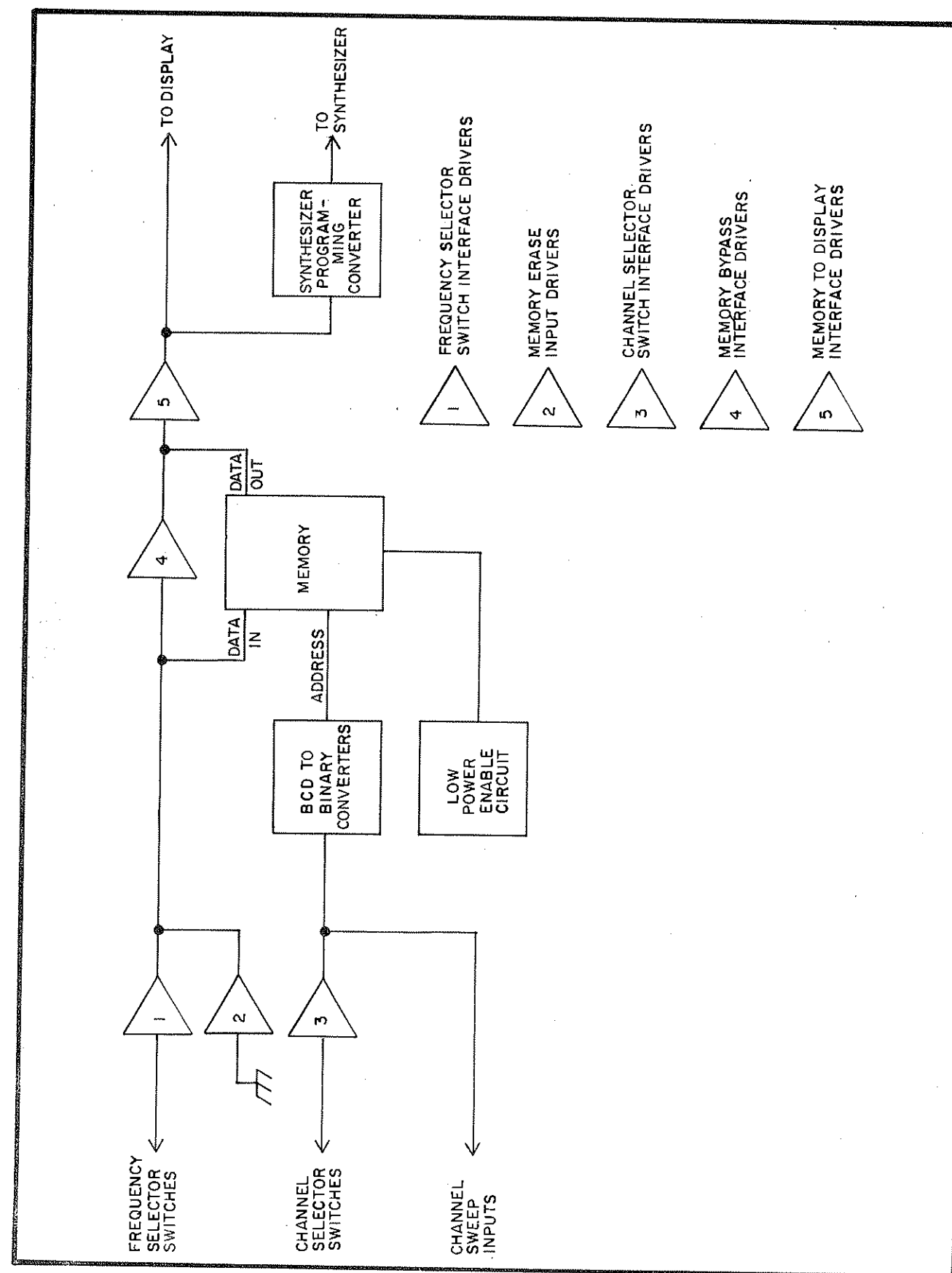


Figure 4.4 GSB-900SC Memory Board Block Diagram (1A1A7)

except when they are enabled by a low on the Clear Mode line on input 1 of U11, U12, U13 and U14. The Clear Mode input, which is low whenever the Master Clear button has been pressed in the Load Freq mode, will produce a low on the Band Steering Board, 1A1A6, which will pull input 1A1A7P1-3 low on the Memory Board. When this signal is low Drivers #2 are enabled such that their grounded inputs pass zeros through to their outputs and produce lows on all the Memory Data Inputs to load zeros in all memory locations. At the same time, the front panel Frequency Switches would be prevented from influencing the Memory Data Inputs because Drivers #1 would be disabled.

4.3.4.4 CHANNEL SELECTOR SWITCH INTERFACE DRIVERS (DRIVERS #3)

The Channel Selector Switch Interface Drivers are designated as Drivers #3 in Fig. 4.4. The Channel Selector Switch Interface Drivers includes Hex Bus Drivers U22 and U26B. These drivers pass the Channel Selector Switch information into the Memory Board at the same time the Frequency Selector Switch Interface Drivers pass the Frequency Switch information into the Memory Board. This is because Drivers #3, comprised of U22 and U26B, are enabled by a low on the Clear Mode input pin 15 of U22 and U26A. However, just as with Drivers #1, when the Clear Mode input on 1A1A7P1-63 of the Memory Board is high, the outputs of Drivers #3 become high impedance preventing the Channel Selector Switches from influencing the Memory Addressing Inputs. This action permits the Channel Sweep Inputs seen in Fig. 4.4 to control the Memory Addressing Inputs so that each memory address may be selected in sequence to facilitate the loading of zeros in all memory locations during the Clear Mode.

4.3.4.5 MEMORY BYPASS INTERFACE DRIVERS (DRIVERS #4)

The Memory Bypass Interface Drivers are designated as Drivers #4 in Fig. 4.4. The Memory Bypass Interface Drivers are comprised of Hex Bus Drivers U15, U16, U17 and U18. If inputs 1 and 15 of U15, U16, U17 and U18 are low, the Memory Bypass Interface Drivers will permit the BCD information simultaneously present both on their inputs and on the Memory Data Inputs to bypass the Memory RAMS, U3 through U8. The outputs of Drivers #4 will appear as outputs on the Memory Data Output lines even though they do not originate within the memories. Inputs 1 and 15 of U15 through U18 are called Read Freq and Secure, respectively. They originate on the Band Steering Board, 1A1A6, and enter the Memory Board at 1A1A7P2-75 and 1A1A7P2-77, respectively. Both signals will be low permitting the Memory RAMS to be bypassed if neither the Read Freq mode nor the Secure mode are selected via the front panel Frequency Mode Keylock switch, S9. If the radio is operating in either the Read Freq or the secure mode, Drivers #4 will be disabled and the contents of the Memory RAMS, U3-U8, will instead be present on the Memory Data Output lines. If the radio is operating in either the Read Freq or the Secure mode, then either inputs 1 or 15 of Drivers U15 through U18 will be high thus causing their outputs to become high impedance. Since the RAM Memory Data Outputs are enabled only during the Read Freq or the Secure Mode and are high impedance during the Normal or the Load Freq mode, the Memory Data Output lines will contain the BCD Frequency switch input data during the Normal and the Load Freq mode and the BCD Memory contents during the Read Freq or the Secure mode.

4.3.4.6 MEMORY DISPLAY INTERFACE DRIVERS (DRIVERS #5)

The Memory to Display Interface Drivers are designated as Drivers #5 in Fig. 4.4. The Memory to Display Interface Drivers are comprised of Hex Buffer/Drivers U27,

U28, U29 and U30. These drivers are always enabled. They provide output drive capability for whatever BCD data is found on the Memory Data Output lines. They send the BCD data on the Memory Data Output lines, whether it represents the Frequency Switch inputs or the contents of Memory, to the Display Driver Board, 1A1A2. The Memory to Display Interface Drivers send the 10 MHz, 1 MHz, 100 kHz and 10 kHz Memory Board output data to the Band Steering Board, 1A1A6, where it drives the two Synthesizer Steering Networks as well as the Band Converter Circuits. On the Memory Board itself, the 10 MHz, 1 MHz and 100 kHz BCD outputs of the Memory to Display Interface Drivers provide control inputs to the Synthesizer Programming Converter seen in Fig. 4.4. The Synthesizer Programming Converter changes the 10 MHz, 1 MHz and 100 kHz BCD output data of the Memory to Display Interface Drivers to Inverted Decimal, Nines Complement and Tens Complement data for the 10 MHz, 1 MHz and 100 kHz Synthesizer inputs, respectively.

4.3.4.7 SYNTHESIZER PROGRAMMING CONVERTER

The Synthesizer Programming Converter in Fig. 4.4 changes the 10 MHz, 1 MHz and 100 kHz BCD output data of the Memory to Display Interface Drivers to Inverted Decimal, Nines complement and Tens Complement data for the 10 MHz, 1 MHz and 100 kHz

Synthesizer inputs, respectively. The 10 MHz Synthesizer Programming Converter is comprised of Hex Buffer Drivers U21A, U21B and U21C as well as Nor Gate U20D. The 10 MHz Synthesizer Programming Converter changes the 10 MHz BCD information found in the Memory System to 10 MHz Inverted Decimal Information required by the Synthesizer 10 MHz input. Table 4.1 describes this conversion.

Note in Table 4.1 that pin 3 of U21B and pin 5 of U21C carry BCD information while pin 4 of U21B, pin 6 of U21C and pin 2 of U21A display Inverted Decimal outputs. The signal levels on pins 2, 4 and 6 of U21A, U21B and U21C, respectively, will measure approximately 12 volts in a radio when a Logical 1 is indicated. They will measure between zero and 0.4 volts when a Logical 0 is indicated. All other signal levels in Table 4.1 are TTL compatible logic levels.

NOTE

The TTL compatible logic levels are as follows:

Logical 0 = greater than 0.0 volts but less than 0.8 volts.

Logical 1 = greater than 2.0 volts but less than 5.0 volts.

10 MHz Display	U21B-3	U21C-5	U20D-13	U21B-4	U21C-6	U21A-2
0	0	0	1	1	1	0
1	0	1	0	1	0	1
2	1	0	0	0	1	1

Table 4.1, 10 MHz Synthesizer Programming Converter

4.3.4.8 The 1 MHz Synthesizer Programming Converter is comprised of Schmitt Triggers U19A, U19B, U19C and U19D as well as Binary Adder U31. It changes the 1 MHz BCD information found in the Memory System to 1 MHz Nines Complement information required by the Synthesizer 1 MHz input. Table 4.2 describes this conversion. In Table 4.2 all signal levels are TTL compatible logic levels.

4.3.4.9 The 100 kHz Synthesizer Programming Converter includes Hex Buffer Driver Inverters U21D and U21E, Nor Gates U20A and U20B, Nand Gate U9A and Binary Adder U32. It changes the 100 kHz BCD information found in the Memory System to 100 kHz

Tens Complement Information required by the Synthesizer 100 kHz input. Table 4.3 describes this conversion. All signal levels are TTL compatible Logical 1's and Logical 0's.

4.3.5.1 The Synthesizer 10 kHz, 1 kHz and 100 Hz inputs require BCD information which is provided by the outputs of Drivers U27, U28, U29A and U29B. These Driver outputs also control the 10 kHz, 1 kHz and 100 Hz displays.

4.3.5.2 Referring again to Fig. 4.4 , the Memory Board Block Diagram, note that portions of the system are enabled or disabled at certain times depending on the mode

	BCD				Inverted BCD				Nines Complement			
1 MHz Display	U19A Pin 1	U19B Pin 3	U19C Pin 5	U19D Pin 9	U19A Pin 2	U19B Pin 4	U19C Pin 6	U19D Pin 8	U31 Pin 10	U31 Pin 13	U31 Pin 1	U31 Pin 4
0	0	0	0	0	1	1	1	1	1	0	0	1
1	0	0	0	1	1	1	1	0	1	0	0	0
2	0	0	1	0	1	1	0	1	0	1	1	1
3	0	0	1	1	1	1	0	0	0	1	1	0
4	0	1	0	0	1	0	1	1	0	1	0	1
5	0	1	0	1	1	0	1	0	0	1	0	0
6	0	1	1	0	1	0	0	1	0	0	1	1
7	0	1	1	1	1	0	0	0	0	0	1	0
8	1	0	0	0	0	1	1	1	0	0	0	1
9	1	0	0	1	0	1	1	0	0	0	0	0

Table 4.2 1 MHz Synthesizer Programming Converter

selected by the Frequency Control Mode Key switch. The numbered drivers in Fig. 4.4. will define the paths of signals in the following mode descriptions.

4.3.5.3 NORMAL MODE

With the Keyswitch in the Normal position, Drivers #1, #4 and #5 are enabled. This allows data from the Frequency Selector switches to control the synthesizer and the displays. The Read Freq + Secure line is high, so the memory output disable (O.D.) input is high, placing the memories in the high impedance (disabled) output state. The synthesizer frequency is controlled by the front panel Frequency Selector switches

through the Synthesizer Programming Converter.

4.3.5.4 LOAD FREQ MODE

In the Load Freq mode, Drivers #1, #4 and #5 are enabled. The memory outputs are disabled due to the Read Freq + Secure input being high. In the Load Freq mode the radio is disabled. The memory address locations are selected by the Channel selector switches through Drivers #3, which are enabled. The frequencies to be programmed into memory, and the displayed frequencies, are controlled by the front panel Frequency switches. The Load XMT and Load RCV pushbuttons are depressed in turn to exercise the Write memory input line and store the frequency information in memory.

	BCD				Inverted BCD					Tens Complement			
100 kHz Display	U21D Pin 9	U21E Pin 11	U20A Pin 2	U20B Pin 5	U21D Pin 8	U21E Pin 10	U20A Pin 1	U20B Pin 4	U9A Pin 6	U32 Pin 10	U32 Pin 13	U32 Pin 1	U32 Pin 4
0	0	0	0	0	1	1	1	1	0	0	0	0	0
1	0	0	0	1	1	1	1	0	1	1	0	0	1
2	0	0	1	0	1	1	0	1	1	1	0	0	0
3	0	0	1	1	1	1	0	0	1	0	1	1	1
4	0	1	0	0	1	0	1	1	1	0	1	1	0
5	0	1	0	1	1	0	1	0	1	0	1	0	1
6	0	1	1	0	1	0	0	1	1	0	1	0	0
7	0	1	1	1	1	0	0	0	1	0	0	1	1
8	1	0	0	0	0	1	1	1	1	0	0	1	0
9	1	0	0	1	0	1	1	0	1	0	0	0	1

Table 4.3 100 kHz Synthesizer Programming Converter.

4.3.5.5 READ FREQ MODE

In the Read Freq mode, Drivers #3 and #5 are enabled. The frequencies previously programmed into memory are selected by the Channel Selector switches. The synthesizer and the display are controlled by the memory outputs which are enabled due to the Read/Write memory input being high. The Receive frequency is displayed. When the transceiver is keyed, the Transmit frequency is displayed.

4.3.5.6 SECURE MODE

In Secure mode, Drivers #3 and #5 are enabled in the same manner as in the Read Freq mode. However, since the Secure Signal on the Band Steering Board is low, this forces pin 2 of 1A1A2P2 low, blanking the display with the exception of the decimal point. The Channel Selector switches are operational since Drivers #3 are enabled.

NOTE

All connections labeled REMOTE are physically installed and are intended for a possible future application.

4.3.5.7 LOW POWER ENABLE

The Low Power Enable circuit places the memories in the standby, or low power mode of operation. This is accomplished by bringing the CE2 RAM inputs, which are found on pin 17 of U3B through U8B, to a low state, thereby forcing the outputs of the RAMS to a high impedance state and the RAMS themselves to a low power standby condition. This is done when the transceiver is turned off causing Unregulated voltage at 1A1A7P1 pin 78 to begin to decay. As the Unregulated voltage decays, the voltage drop across resistor R6 decreases proportionately while

the voltage across Zener Diode CR1 remains constant. Eventually, as the Unregulated voltage continues to drop, no voltage drop exists across R6 as the base of Q1 reaches 5 volts while the voltage across CR1 remains constant at approximately 2 volts. Consequently, as the Unregulated voltage drops further, the emitter to base voltage on Q1 starts to decrease until it is no longer great enough to sustain Q1 in the on state. Q1 turns off permitting R1 to apply a ground to the CE2 inputs of the RAMS, thus placing the RAMS in a disabled condition. As the Unregulated voltage decreases beyond this point, the 5 volts starts to follow it to ground until the only voltage on the Memory Board is the Battery Voltage on pin 22 of each RAM. This is because as the Unregulated voltage decreased after the transceiver was turned off, pin 73 of 1A1A6P2 on the Band Steering Board went low, switching Q15 of the Band Steering Board on and allowing battery power to be applied to the Memory Power bus, pin 22 of Memory Board 1A1A7P2. Due to the decay time-constant of the front panel power supply, the CE2 input of each memory RAM is switched low by Q1, turning off the memory RAM's before the Memory Board 5 volts starts to decay.

This timing sequence is necessary to prevent alteration of the information previously programmed in the memory system when the transceiver is turned off.

When the transceiver is turned on, the Unregulated voltage and the 5 volt power supplies start to rise to their normal operating levels. As this occurs, pin 73 of 1A1A6P2 on the Band Steering Board rises and turns off Q15 of the Band Steering Board 1A1A6, disconnecting the battery supply from the memories and permitting the 5 volt transceiver supply voltage to forward bias CR8 of the Band Steering Board and assume support of the memory power on 1A1A7P2-22 of the Memory Board. Simultaneously, the Unregulated voltage at 1A1A7P1-78, and the 5 volt supply at

1A1A7P1-1 rises. The 5 volt supply turns Q1 on as the Unregulated voltage rises high enough with respect to the radio 5 volts to produce a turn on voltage drop from emitter to base of Q1 after the drop across Zener Diode CR1 is satisfied. When Q1 switches on, the Unregulated voltage would be applied to CE2 input of the RAMS through CR1, Q1 and voltage divider R2 and R1. However, this point is held low by buffer U10A until sufficient positive going voltage at U19F pin 13 causes its output to switch low and U19E pin 10 to turn on allowing CE2 to go high, changing the memories from standby to operating mode. This switching sequence is necessary to prevent alteration of information stored in the memories when the transceiver is turned on. The signal at U19E, pin 10, is presented also to the input of Driver U10B. The output of Driver U10B which is pin 4 is the source of the PWR CLEAR signal produced at Board output 1A1A7P1-65. This does not go high for approximately half a second or until the voltage on Schmitt trigger U19F pin 13 becomes high as a result of the slow time constant charge of capacitor C9 through R24. When U19F pin 13 switches high, U19F pin 12 switches low forcing U19E pin 10 to switch high and permitting the output of U10B, pin 4, to switch high after all the radio turn on transients have died out. This PWR CLEAR signal is used to disable certain critical areas of the Memory System until the power up transients decay. Diode CR3 and Resistor R23 are used to rapidly discharge C9 into the 5 volt supply as it decays. This is done so that C9 is quickly discharged and ready to produce the next PWR CLEAR signal in the event the radio is quickly turned on again.

4.4 RECEIVER

The receiver electronics are divided among four printed circuit boards: VHF MIXER (1A3A1), IF/FILTER (1A3A2), AUDIO (1A3A4), and SPEAKER DRIVER (1A1A1). The first three boards are interconnected by plugging into the RECEIVER/

EXCITER MOTHER BOARD, (1A3A5). The SPEAKER DRIVER is located on the front panel. The block diagram is shown in figure 4.7.

4.4.1 GENERAL

Received signals are first passed through a band pass filter network in the filter module, then are fed into an 11 pole high pass filter on the VHF mixer board. This filter is a very sharp cut off broadcast band rejection network. The signal is then amplified and mixed in a balanced mixer with the first local oscillator, providing an output on 91.25 MHz.

In addition to 91.25 MHz, the mixer output contains several other significant mixing products, but because of the high frequencies involved they are separated in frequency from 91.25 MHz by a relatively large amount. The unwanted products are removed by passing the mixer output through a narrow band 91.25 MHz crystal filter. The resulting 91.25 MHz signal is then amplified and mixed again in another balanced mixer with the second local oscillator (80.75 MHz), which yields an output at 10.5 MHz. High frequency products from this mixing are removed by a low pass filter.

The 10.5 MHz I.F. signal is amplified, then fed to a diode gating network which selects the upper sideband filter (USB), lower sideband filter (LSB), or amplitude modulation filter (AM). These filters determine the receiver's bandwidth and reduce the interference from adjacent channels. The filtered I.F. signal is passed through another diode gate, then is highly amplified in two integrated circuit I.F. amplifiers. The output of the second I.F. amplifier is coupled to a product detector when receiving sideband signals and to a fixed amplifier and an envelope detector for receiving amplitude modulated signals. The fixed amplifier also feeds into the AGC detector which develops a D.C. voltage proportional to the received signal amplitude. The AGC voltage is amplified and used to control the voltage gain of the RF amplifier and the two integrated circuit I.F. amplifiers.

The product detector combines the 2nd I.F. signal with the 3rd local oscillator (10.5 MHz), giving an audio signal which reproduces the original transmitted audio. The audio is fed to a 600 ohm line

driver and to a fixed audio amplifier. The envelope detector detects the amplitude of the received signal reproducing the audio on a transmitted AM signal. The resultant audio is also fed to the 600 ohm line driver and to the fixed audio amplifier.

The output of the fixed audio amplifier is connected to the VOLUME control, then to the speaker driver (located on the front panel), which supplies up to five watts of audio to the speaker.

The AGC voltage also is used to vary the current through the front panel meter to give a visual indication of relative signal strength received.

The front panel RF GAIN control acts to vary the gain of an amplifier which shuts back the AGC voltage, reducing the gain of the RF amplifier and the two integrated circuit I.F. amplifiers. This greatly reduces background noise when receiving strong signals.

The following subparagraphs describe circuit operation of the individual circuits by printed circuit board.

4.4.2 VHF MIXER BOARD -1A3A1

Figure 5.18 consists of a front view (component side) and a rear view (foil side) plus a schematic of the VHF MIXER printed circuit board. In addition a complete parts list is provided on the reverse side of the fold out page.

4.4.2.1 BROADCAST FILTER

The R.F. input signal appears on pin 15 of 1A3A1-P1, and is passed through the broadcast band filter network, starting with C9 and ending at C13, to stepup transformer T1, which matches the R.F. amplifier (Q2) input impedance to the 50 ohm characteristic impedance of the broadcast band filter.

4.4.2.2. RF AMPLIFIER

The R.F. amplifier is a dual gate MOSFET with protection diodes built into the input gate to prevent burnout under overload. The input signal is applied to gate 1 and the amplified signal is taken from the drain through transformer T3. The source (gate 1

through R8) is biased positively by 3.6V to increase the dynamic gain range when Gate 2 voltage is varied. The 40673 transistor can now be practically cut off when gate 2 voltage is taken to zero. Gate 2 derives its voltage from the automatic gain control (AGC) line, which varies between +8V at no signal to approximately +2V for an extremely strong signal.

The output of T3 passes through diode CR3 to the input of the balanced mixer. Since the +12R voltage is +12V during receive (and ground during transmit) and the +12T voltage is ground during receive (and +12V during transmit), diode CR3 is switched on (conducts) by the voltage on T3, through the mixer, and R14 to the +12T line (which is at ground potential). Likewise, diode CR1 is turned off during receive and has no effect on the operation.

4.4.2.3 1st LO AMPLIFIER AND BALANCED MIXER

Local oscillator number 1 is injected at pin 18 of 1A3A1-P1 into amplifier Q5. The amplified L.O. is applied to the balanced mixer pin 8. The injected R.F. signal at pin 1 now mixes with the L.O. signal to provide several outputs, one of which is 91.25 MHz. The balanced mixer is used to minimize the number of mixing products because of its inherent ability to virtually eliminate the even harmonics of the mixing frequencies and their sums and differences, as well as the mixing frequencies themselves. Therefore, the primary mixer output is L.O. number 1 plus the R.F. signal and L.O. number 1 minus the RF signal. L.O. number 1 frequency is variable between 92.85 MHz and 121.25 MHz, corresponding to 1.6 to 29.999 MHz selected by the front panel frequency dials. In the GSB-900SC the difference frequency is selected and a first I.F. of 91.25 MHz was picked to minimize spurious frequencies within the transceiver. Note that at the lowest frequency of operation, 1.6 MHz, the sum and difference frequencies in the mixer output are 3.2 MHz apart making it a simple task to remove the sum frequency with a narrow band crystal filter.

For instance, if the received signal is on 10.000 MHz, the first L.O. frequency is 101.25 MHz, and

R.F. carrier energy for switching the balanced modulator is supplied through pin F of 1A3A3-P1 and amplified by Q1.

4.5.2.3 AUTOMATIC CARRIER CONTROL (ACC)

A small amount of 10.5 MHz carrier is supplied to the automatic carrier control amplifier Q5 through a diode gate, CR1, CR2. This gate prevents carrier energy from being transmitted in USB, LSB, or CW modes, but allows the carrier to be passed and amplified in the AM mode.

The +12 AM(T) signal, on pin 5 of 1A3A3-P1, turns CR1 on and CR2 off. It also supplies operating voltage for ACC detector amplifiers Q2 and Q3, and carrier control gate Q5.

Detected R.F. voltage from the ACC detector (in the Amplifier/Coupler Unit) is applied to Q2 through threshold control R1. The amplified D.C. voltage has the audio frequency removed by R9, C39, so it will maintain an average power characteristic and not follow the peak envelope of the output wave-form. C4 provides a "soft" initial carrier turn-on. The dc control voltage is inverted in Q3 and applied to ALC amplifier Q9. This controls the system gain and maintains a constant carrier level. Switch Q11 is required to disable the voltage ALC stage Q10, preventing unwanted ALC interaction.

4.5.2.4 600 OHM TRANSMIT AMPLIFIER

The 600 ohm transmit audio is supplied on Pin C of 1A3A3-P1 and passes through amplifier Q14 to the balanced modulator.

4.5.2.5 CW TONE OSCILLATOR

Transistors Q7 and Q8 form the 1 KHz tone oscillator. The frequency is determined by the "Twin T" notch filter C28, C29, C31, R38, R40, and R43. The oscillator is turned on by grounding pin 2 of 1A3A3-P1, causing transistor Q12 to conduct, which grounds the keyline and keys the transmitter. When the CW key is removed from ground, capacitor C37 and resistor R50 hold Q12 on for

approximately one second. This prevents the keying relay from dropping out between normal CW characters and words, but automatically returns the transceiver to "Receive" after a key up of approximately one second. Transistor Q13 prevents the tone oscillator from being energized during normal keyline operation.

Since the tone oscillator output is high impedance, an emitter follower, Q6, is required to drive the low impedance balanced modulator. A sidetone from the tone oscillator is sent out pin D of 1A3A3-P1 to the audio board, 1A3A4, for monitoring purposes.

4.5.2.6 VSWR AND VOLTAGE ALC AMPLIFIERS

Transistors Q9 and Q10 are ALC amplifiers for voltage ALC (Q10) and VSWR ALC (Q9). The VSWR ALC is set by a fixed resistance ratio, but the voltage ALC, which determines the peak power output of the transmitter, is set by potentiometer, R55. Q15 acts with Q10 as a differential amplifier to provide temperature compensation of the ALC.

4.5.3 IF/FILTER BOARD-1A3A2

Refer to Figure 5.19

4.5.3.1 GENERAL

The IF/Filter board accepts the DSB output from the SB generator board, routes the signal through the selected SB filter and amplifies the resultant IF signal. Carrier injection for AM operation also occurs on this board.

4.5.3.2 TRANSMIT IF AMPLIFIER

The double sideband suppressed carrier output from the sideband generator is injected at pin 16 of 1A3A2-P1. Here it is amplified by a fixed gain IF amplifier, Q4. Application of +12 T to pin 10 of 1A3A2-P1 energizes Q4, turns CR18 on and turns CR17 off (+12R goes to ground during xmit, as +12T does during receive).

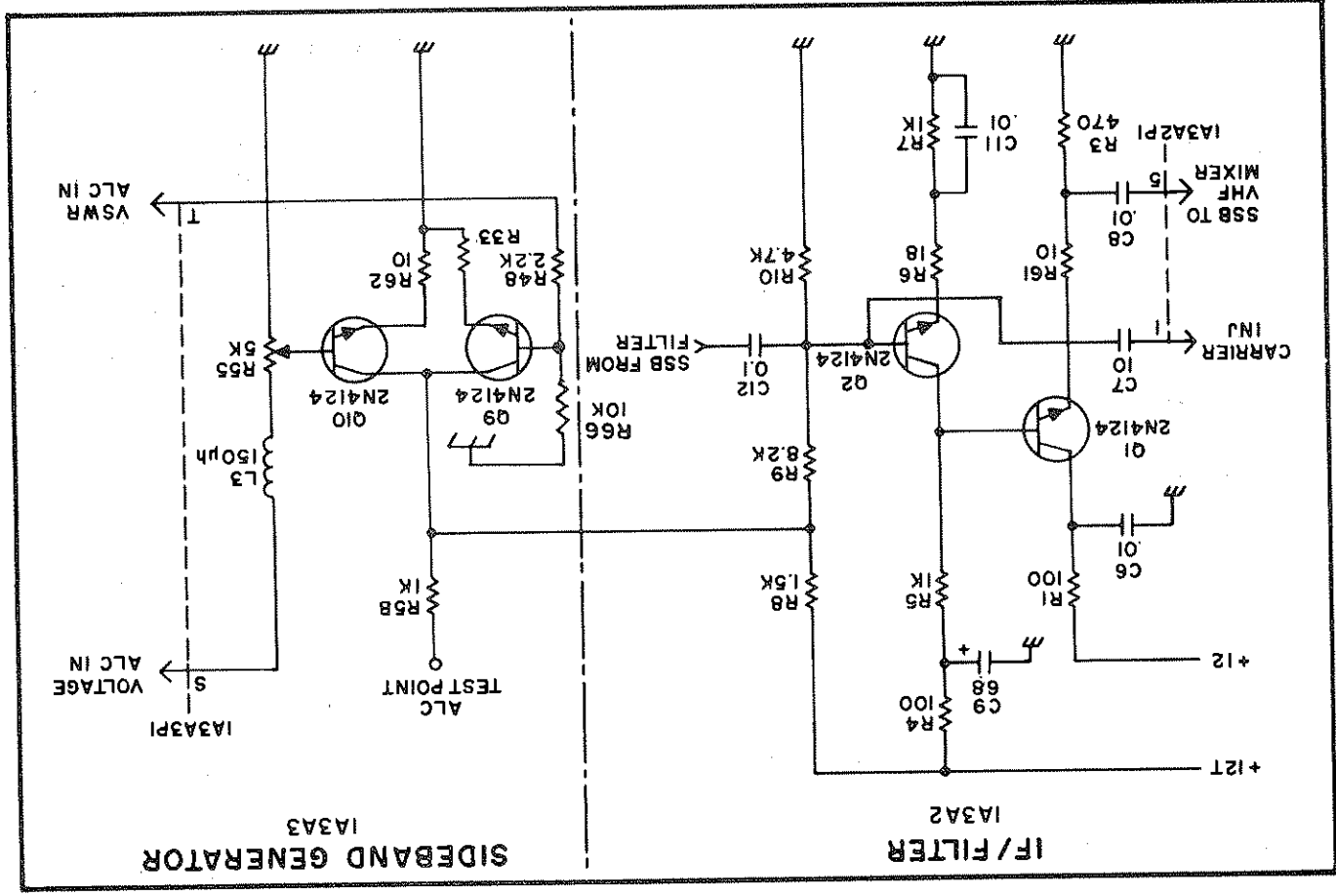


Figure 4.6 Voltage and VSWR ALC Control Schematic

4.5.3.3 TRANSMIT FILTER SELECTION

The front panel MODE switch selects the desired mode of operation, so the DSB signal passes through either the USB filter or LSB filter to eliminate the undesired sideband. Note that in the AM position, the +12AM(T) voltage selects the lower sideband filter in transmit, providing USB at the exciter output (See section 4.4.3.2 for an explanation of sideband inversion).

4.5.3.4 TRANSMIT GAIN CONTROL AMPLIFIER

The SSB signal thus produced is amplified in transistor Q2 and impedance matched to the output by emitter follower Q1. Note that in the bilateral amplifier Q1, Q2, and Q3, transistor Q3 is turned on only in receive, and Q1 and Q2 are turned on only in transmit.

Since the base of Q1 represents a high impedance, it is used as the carrier injection point for AM operation.

ALC controls the gain of transistor Q2 to limit its output when either the transmitter output has reached 100W peak, or the output transistor voltage rating is in danger of being exceeded by a high voltage standing wave ratio (VSWR) at the transmitter output. Figure 4.5 shows the full ALC loop control. When a voltage appears at 1A3A3-P1 pin T or at the base of Q10 of sufficient amplitude to bias either Q9 of Q10 "on", the appropriate transistor conducts through R8, on 1A3A2, causing a large voltage drop to appear across R8. This decreases the bias voltage on the base of Q2, reducing its gain and the output from pin 5 of 1A3A2-P1.

4.5.4 VHF MIXER-1A3A1 (Transmit)

Refer to Figure 5.18.

4.5.4.1 GENERAL

The IF signal from the SB generator board is up converted to 91.25 MHz, filtered and then mixed with the first LO frequency to yield the desired transmit RF output frequency. ALC current control is also performed on this board.

4.5.4.2 LOW PASS FILTER AND BALANCED MIXER

The SSB (or AM) signal from the IF/Filter board enters the VHF mixer board on pin 5 of 1A3A1-P1. From there, it passes through a low pass filter, C62 thru C66, L14 and L15, to attenuate harmonics of the 10.5 MHz signal. Then it is injected into a balanced mixer. Operation of the balanced mixers is described in Section 4.4.2.

4.5.4.3 TRANSMIT BILATERAL AMPLIFIER AND FILTER

The 10.5 MHz signal is converted up to 91.25 MHz and fed to the bilateral amplifier. In transmit, Q7 is activated and Q6 is turned off (again see Section 4.4.3 for discussion). Input to Q7 is at T8, and the output is T7. Capacitors C55 and C56 match between the low impedance of the mixer and the high impedance across T8. At the output, C46 and C47 provide impedance matching into the filter matching network, L11 and C44. The 91.25 MHz signal is filtered by FL1 to remove unwanted mixing products. C41 and L10 match the filter impedance to the balanced mixer.

4.5.4.4 BALANCED MIXER AND RECEIVER SHUT DOWN

The balanced mixer combines the 91.25 MHz signal with the first L.O. providing a difference frequency equal to the desired output frequency. This signal now has the sideband reversed per the earlier discussion, in paragraph 4.4.3.2, and is fed to the pre-amplifier Q3. The +12T voltage at pin 10 of 1A3A1-P1 turns on Q1 and Q3 and turns off

diode CR3. During transmit, +12R goes to ground, but the AGC voltage remains at approximately +9VDC on pin 13 of 1A3A1-P1, which turns diode CR1 on. This drops the voltage on gate 2 of Q2 to approximately +1 VDC, turning off Q2. This prevents transmit loop oscillations by breaking the path between RF input (Receive) on pin 15 of 1A3A1-P1, and input to the transmitter pre-amplifier at C34.

4.5.4.5 EXCITER LINEAR AMPLIFIER

The signal is amplified in Q3 and Q1 and passed through a low pass filter, C10, C11, C12, C19, C20, L6, and L7, to pin 8 of 1A3A1-P1.

4.5.4.6 CURRENT ALC AMPLIFIER

Transistor Q4 is the current ALC control stage which, upon conduction, causes a large voltage drop to appear across R18, reducing the base bias on Q3 thus lowering its gain. During receive, +12R voltage through CR13 and R48 keeps Q4 turned on, and capacitor C36 charges to +12V. When the transmitter is keyed, CR13 is turned off and C36 must discharge through R48 into Q4, keeping Q4 turned on, and Q3 turned off for approximately one millisecond. This allows "Switch On" transients to be dissipated before the P.A. receives the signal.

Whenever the P.A. current exceeds a preset threshold, a DC voltage appears at pin U of 1A3A1-P1. This turns Q4 on, reducing the gain of Q3, which decreases the output and brings the P.A. current back to a safe level.

4.5.5 RECEIVER/EXCITER MOTHER BOARD

The schematic of the Receiver/Exciter mother board is illustrated in Figure 5.23. This unit consists of four receptacles, their circuitry and related components. It is located under the chassis below the Receiver/Exciter module to mount four printed circuit boards (1A3A1, 1A3A2, 1A3A4, and 1A3A5). Refer to Figure 5.7 for proper orientation.

4.6 R.F. POWER AMPLIFIER 1A7A1

4.6.1 GENERAL

The power amplifier consists of three push-pull stages: predriver, driver, and output. The predriver amplifies the 10 milliwatt output from the exciter to the 1 watt level; the driver amplifies this to the ten to twenty watt level, and the output stage amplifies this to the 100 watt level. A schematic diagram of the power amplifier is shown in Figure 5.24.

4.6.2 PREDRIVER, DRIVER AND POWER AMPLIFIER

Input from the exciter is connected to 1A7J1. Transformer T1 converts the single ended exciter input to push-pull to drive the predriver Q1 and Q2. Bias for the predriver (for AB2 operation) is taken from CR1, which is in a forward conduction state. C2, R4 and C3, R5 are feedback networks for gain stabilization. The driver, Q3 and Q4, is driven push-pull through T2, and obtains its bias from CR2. The output stage, Q5 and Q6, is fed push-pull through T4 and obtains its bias from CR3. Note that all bias lines are tied together and are not energized during receive. This minimizes the receive current drain for the GSB-900SC. The single ended output is taken at 1A7J2 from T6.

4.6.3 CURRENT ALC DETECTOR

Transistor Q7 monitors the voltage across resistor R24. The values of R18 and R19 have been chosen to cause Q7 to conduct heavily when a current of 10 amperes or more flows through R24. Thus when Q7 is turned on, a voltage appears across R33 and 1A7A1-J3 Pin B. This voltage controls the current ALC amplifier on the VHF mixer board.

4.6.4 VSWR ALC DETECTOR

A detector circuit, R30, R31, CR4 and C28 is coupled to the collector of Q6 to monitor the collector AC voltage. If the voltage should exceed 65V peak (normally caused by high VSWR), the voltage appearing on pin D of 1A7A1-J3 causes the VSWR ALC amplifier on the sideband gen-

4.7.1 GENERAL

Refer to Figure 5.25.

4.7 POWER SUPPLY 1A6

erator board, 1A3A3, to reduce the transmit I.F. gain to bring the output to within safe limits for the output power transistors.

AC input is brought in through 1A6P1 Pins 1,3,5, and 7. The input windings are appropriately strapped by the power connector; ie, for 115V operation, the primary windings are in parallel, and for 230V operation, the primary windings are in series. For continuous operation at line voltages 15% higher than 115V or 230V, taps are provided on terminal board TB1. Regulated DC output voltages of +28, +12 and +5 volts are provided for operation of the transceiver.

4.7.2 28VDC REGULATOR

The A-C output for the 28V regulator is rectified by 1A6-CR1 thru 1A6-CR4 and filtered by 1A6C5. Transistor Q2 is connected as a constant current source to feed zener diode CR3, and the base of the series regulator transistor, 1A6-Q101.

Two protection circuits are provided to prevent damage to the regulator transistor and to the sections of the GSB-900SC utilizing the +28VDC power. If the +28VDC is inadvertently short circuited or the current drawn from the supply exceeds approximately 16 amperes, the current through resistor R2 causes Q5 to conduct, sending a voltage pulse to SCR Q6, which grounds the base of 1A6-Q101, turning off the regulator. This circuit must then be recycled by shutting off the transceiver input power and waiting approximately 15 seconds for 1A6C5 to discharge.

If the regulator transistor, 1A6-Q101, should ever fail short circuit, approximately 42VDC would appear on the output causing damage to the audio speaker driver and the R.F. power amplifier. CR4 is a zener diode which will conduct when the output voltage reaches 35 VDC, sending a voltage pulse to SCR Q104. This will cause Q104 to conduct, blowing fuse F1 (See Figure 5.25), preventing damage to components using 28 VDC.

4.7.3 12 VDC AND 5 VDC REGULATORS

The +12 VDC and +5 VDC power supplies are very similar in design. Each uses a bridge rectifier assembly, U1 or U3, to obtain DC, then filters the AC component in capacitors C5 or C9. Both supplies use integrated circuit voltage regulators for maximum ripple reduction and excellent regulation. The main circuit differences are the methods in which the I.C. internal reference sources are utilized to obtain the desired output voltage. The integrated circuits drive series regulator transistors Q102 and Q103.

The heart of the 12VDC system is the 723IC regulator. Figure 4.6A is a simplified block diagram of the IC and its associated circuits

CIRCUIT OPERATION

The error amplifier is a high gain differential amplifier. It amplifies the voltage difference between pin 3 and pin 2. Voltage for pin 2 of the IC is provided by the voltage divider R7 and R17. If the voltage pin 2 is not the same as that of pin 3, then the error amplifier output will increase or decrease accordingly.

The purpose of CR9 and R23 in the emitter circuit of QA is to insure that the collector to emitter voltage of QA is high enough for proper operation. C7 is a high frequency compensating capacitor to prevent amplifier oscillation.

Q9, R6, R31, R28, and internal transistor QB comprise the short circuit protection. Load current is monitored by the voltage drop across R6. When the voltage across R6 approaches .5VDC, Q9 starts to conduct. This causes QB to conduct, thereby decreasing the drive to QA. Since the collector current of QA decreases, the voltage at pin 7 increases and Q7 conducts less causing the output voltage to decrease. At loads heavier than maximum, the current through R6 is constant and is approximately equal to 2.3 amps. R31 limits Q9's emitter current and R28 provides a stable thermal circuit for QB.

The 5VDC regulator is similar to the 12VDC.

4.7.4 REGULATOR TRANSISTOR LOCATIONS

The series regulator transistor for the +12 volt supply is physically located on the main power supply chassis. The +28 VDC series regulator, 1A6-Q101, is physically located on the regulator heat sink at the rear of the transceiver.

4.7.5 D.C. INVERTER - 1A6A2

Figure 5.26 shows a schematic of the DC inverter.

Basically, the inverter is a transistor oscillator utilizing a saturable core. Upon application of D.C. voltage to the oscillator, Q1 and Q2, slight differences between the two transistors causes one to conduct more heavily than the other and it quickly reaches saturation. Once this occurs, no further change in current is noted and the field in transformer T1 collapses, driving the "on" transistor to an "off" state and the "off" transistor to an "on" state. When the second transistor reaches saturation, the cycle reverses. The result is a square wave oscillator capable of many amperes of current.

Transistors Q1 and Q2 supply the square wave current to the power transformer primary (1A6T1) for 13V or 26V operation. The saturable core transformer design used here allows only 1A6A2-T1 to saturate, and then at a relatively low current level (minimum power dissipation) and prevents the main power transformer from saturating. This eliminates voltage "spikes" in the output. Initial "turn on" bias is established by R1, R2, and R7. Diodes CR1, CR2 and associated components R5, R6 and C1, form an additional "despiking" network to insure that a clean wave form appears at the output.

NOTE

Refer to paragraph 2.6 for instructions when changing DC operating voltage.

Relay K1 is used to keep the oscillator transistors within allowable ratings during AC operation of

It is basically a voltage regulator which supplies 12VDC to relay 1A8K2 regardless of input voltage, 13V or 26V. Diode CR2 prevents energizing of the circuit if the polarity of the input voltage is incorrect. This prevents damage to the D.C. inverter.

the power supply. This allows the DC modules to remain connected to the power supply without damage during AC operation. Note that for 13 VDC operation, the transistor collectors (Q1 and Q2) are connected to the 13 V power transformer input windings 2 and 6 on TB2. For 26VDC operation, the transistor collectors (Q1 and Q2) are connected to the 26V power transformer input windings 1 and 7 on TB2.

Either positive or negative ground DC sources may be used, since the DC input circuit on the GSB-900SC is floating with respect to ground. Figure 4.8 shows a schematic of the DC relay control circuit.

ure 5.7).

front of the receiver/exciter assembly (See Fig- 1A6-Q101 (See Figure 3.2). The DC relay and control circuit are located on a bracket attached to the directly beneath the 28VDC regulator transistor, rear of the transceiver, and are mounted in a line cally located on the power supply heat sink at the The oscillator transistors, Q1 and Q2, are physi-

rect. This prevents damage to the D.C. inverter. circuit if the polarity of the input voltage is incor- 13V or 26V. Diode CR2 prevents energizing of the 12VDC to relay 1A8K2 regardless of input voltage, It is basically a voltage regulator which supplies

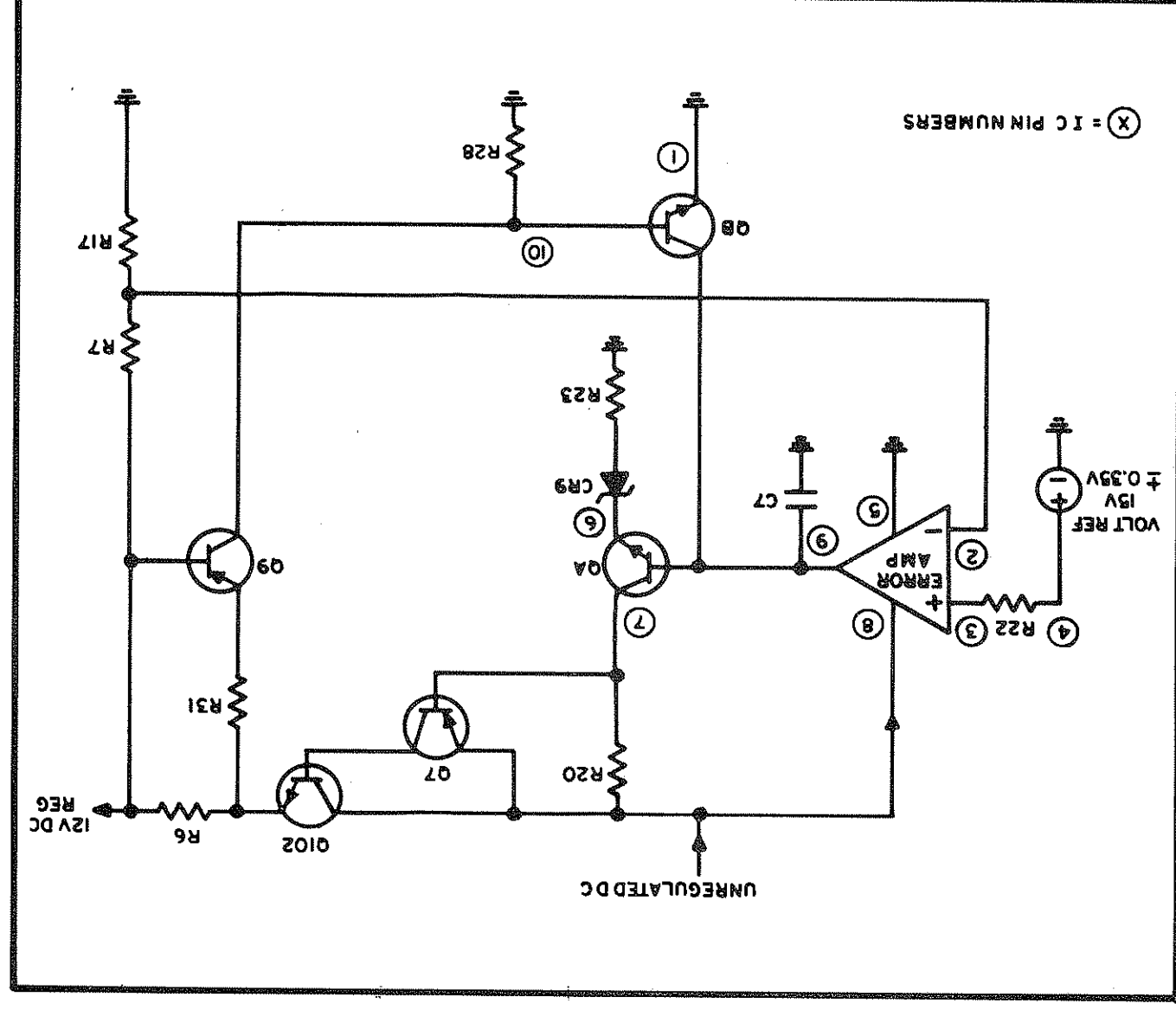


Figure 4.6.A 7231C Regulator

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
84



shows a schematic of the DC relay control circuit. It is basically a voltage regulator which supplies 12VDC to relay 1A8K2 regardless of input voltage, 13V or 26V. Diode CR2 prevents energizing of the circuit if the polarity of the input voltage is incorrect. This prevents damage to the D.C. inverter.

The oscillator transistors, Q1 and Q2, are physically located on the power supply heat sink at the rear of the transceiver, and are mounted in a line directly beneath the 28VDC regulator transistor, 1A6-Q101 (See Figure 3.2). The DC relay and control circuit are located on a bracket attached to the front of the receiver/exciter assembly (See Figure 5.7).

4.8 FILTER MODULE 1A5

A block diagram of the filter module is given in Figure 4.9. The filter module consists of four printed circuit boards: odd channel filter board, even channel filter board, receive filter board, and motor control board. Figure 5.27 shows the position of each board within the module enclosure. An arrow has been etched into each board as an aid in keying all boards together.

4.8.1 GENERAL

The filters are arranged to provide low pass filtering in the transmit mode and band pass filtering in the receive mode by switching in high pass filters during receive mode only. Therefore, only the transmit low pass elements must handle 100 watts of power and the high pass receive elements utilize small low power inductors. The low pass and high pass filters are all 5 pole elliptical design with an ultimate attenuation of 40db. This attenuation is added to that normally present in the RF power amplifier to give excellent harmonic attenuation. Because of the required size of the transmit filter inductors, these filters have been divided among two boards: odd channel filters, 1,3,5, and 7, and even channel filters 3, 4, 6, and 8. Figure 4.9 shows filter band numbers and their frequency ranges.

The bands are automatically selected by the front panel digital frequency control switches.

Schematic diagrams of the filter boards are given in Figures 5.29, 5.30, and 5.31. Note that unused filters are shorted together and taken to ground through 10 ohm resistors. This effectively "de Q's"

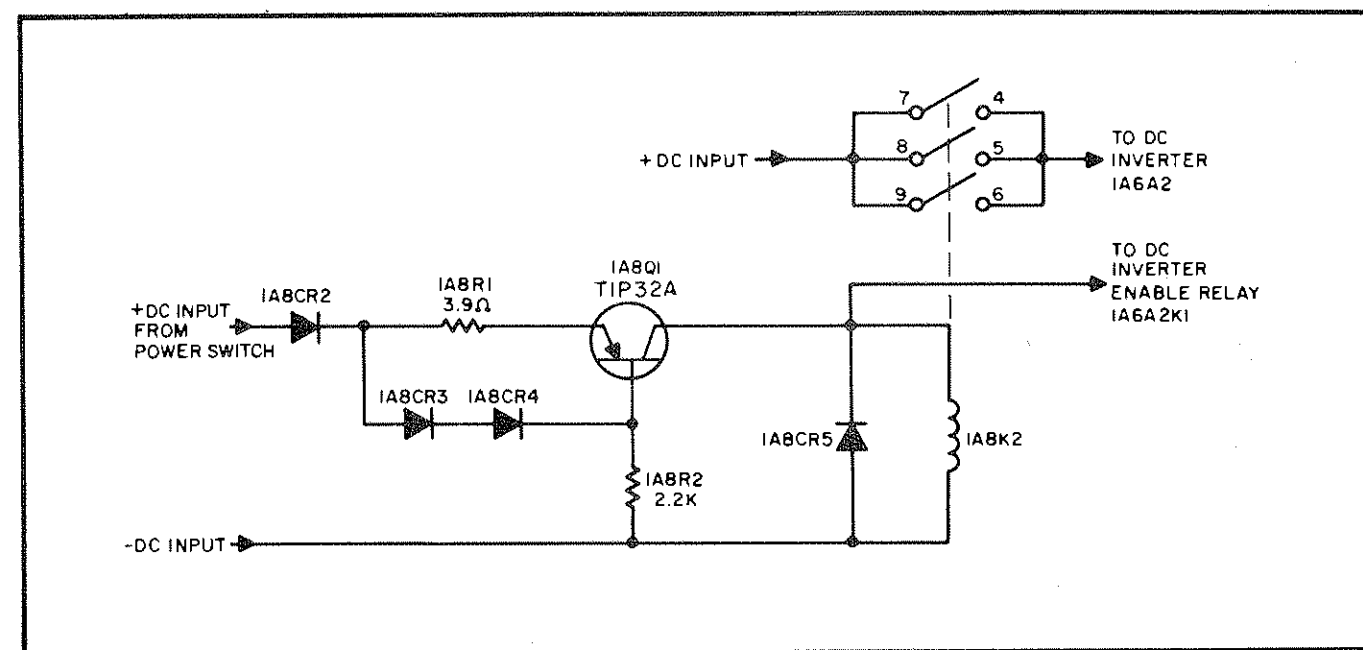


Figure 4.8 D.C. Relay Control Circuit

BAND NUMBER	FREQUENCY RANGE
1	1.6 to 1.9999 MHz
2	2.0 to 2.9999 MHz
3	3.0 to 3.9999 MHz
4	4.0 to 5.9999 MHz
5	6.0 to 8.9999 MHz
6	9.0 to 12.9999 MHz
7	13.0 to 19.9999 MHz
8	20.0 to 29.9999 MHz

Table 4.4 Filter Module (1A5) Filter Band Numbers & Frequency Range Table

The +12VDC is applied through the switch S1 to the top of K1 and to pin 1 on IC U1. U1 is a timer set for approximately 120ms. After 120ms, U1 has a positive output on pin 6 causing Q4 to conduct. This causes the relay, K1, to be energized, in turn energizing the motor, B1, causing the open seeking wafer S1 to rotate until it finds the band line with the +12VDC. At this point the circuit is broken and the relay drops out, shorting out the motor. This provides dynamic braking which stops the motor very rapidly, preventing excessive overshoot. Capacitors C1 and C2, and inductor L1 form a hash filter to remove brush noise from channeling motor.

4.8.3 VOLTAGE ALC DETECTOR

The voltage ALC detector consists of a resistive voltage divider R25 and R26, an RF detector CR17, and emitter followers Q2 and Q3. This combination provides an extremely fast and responsive ALC. The detector output drives the emitter followers to charge capacitor C28, which discharges through R24. The decay is long enough to eliminate the audio modulation from the ALC line. Capacitor C24 is adjusted to provide optimum ALC performance over the complete frequency range of the transceiver.

4.8.4 ACC DETECTOR

The ACC detector derives its output by rectifying

the voltage at the antenna connector with diode CR6 and diode CR12. The voltage is decreased by resistors R4 and R5. This detector has a fast rise and fast decay time at this point, so it is necessary to increase the time constant to maintain a constant carrier level. This averaging network is located on the sideband generator board.

4.8.5 OUTPUT DETECTOR

The output detector CR5 samples the transmit output voltage at the antenna terminal and provides a relative power output signal to the front panel meter when the coupler control panel is not used.

4.8.6 KEY LINE

Relay K2 is used in conjunction with relay 1A8K1 to key the transceiver to transmit mode. A schematic of the keying circuit is shown in figure 4.10. Note that if an interlock feature is required with auxiliary equipment, the jumper between 1A8J4-n and 1A8J4-p may be removed and the interlock performed in the auxiliary equipment.

Whenever the keyline is grounded and the band channeling motor is not running, relay K2 is energized. This switches the RF power amplifier to the low pass filter input, applies +28 VDC to the power amplifier bias circuit and then keys relay 1A8K1. Relay 1A8K1 switches the low voltage

4.8 FILTER MODULE 1A5

A block diagram of the filter module is given in Figure 4.9. The filter module consists of four printed circuit boards: odd channel filter board, even channel filter board, receive filter boards, and RF Detector board. Figure 5.27 shows the position of each board within the module enclosure.

4.8.1 GENERAL

The filters are arranged to provide low pass filtering in the transmit mode and bandpass filtering in the receive mode by switching in high pass filters during the receive mode only. Therefore, only the transmit low pass elements must handle 100 watts of RF power and the high pass receive elements can utilize smaller low power inductors. The low pass and high pass filters are all dual section elliptical design with an ultimate attenuation of 40db. This attenuation is added to that normally present in the RF power amplifier to give excellent harmonic attenuation. Because of the required size of the transmit filter inductors, these filters have been divided among two boards: odd channel filters, 1,3,5, and 7 and even channel filters 2,4,6, and 8. Table 4.4 shows filter band numbers and their frequency ranges.

The bands are automatically selected by the front panel digital frequency control switches.

The transmit filters are switched by special high voltage reed relays energized by +12VDC on the selected band line. The receive filters are switched by pin diodes to preserve the excellent cross modulation characteristics of the receiver. The appropriate filter is selected by +12VDC on the selected band line. Only the correct input and output diodes are turned on, with the selecting voltage reverse - biasing the other diodes, turning the unwanted filters off. Schematic diagrams of the filter boards are given in Figures 5.29, 5.30, and 5.31.

4.8.2 RF DETECTOR BOARD

Refer to Figure 5.28

The RF Detector board (1A5A4) incorporates the voltage ALC detector, the ACC detector, the output level detector and a circuit to break the keyline whenever a filter band is changed. This latter circuit protects the reed relays whenever the frequency band is changed while the transmitter is keyed.

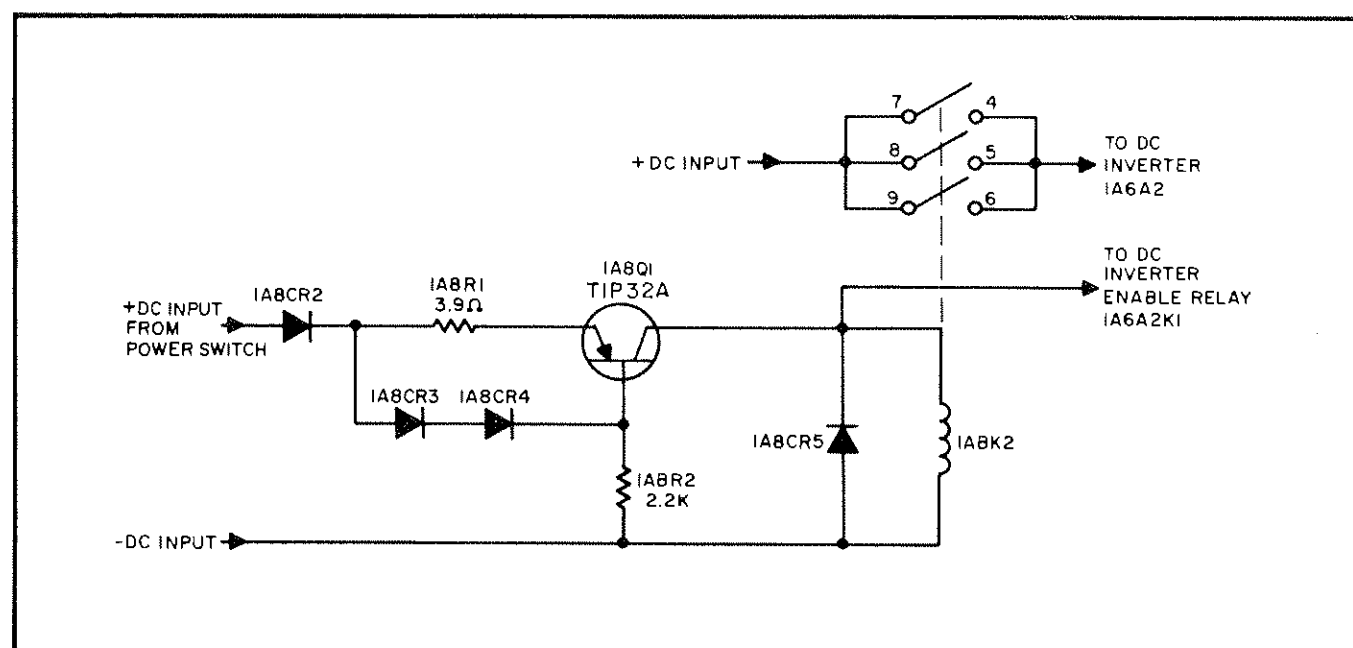


Figure 4.8 D.C. Relay Control Circuit

BAND NUMBER	FREQUENCY RANGE
1	1.6 to 1.9999 MHz
2	2.0 to 2.9999 MHz
3	3.0 to 3.9999 MHz
4	4.0 to 5.9999 MHz
5	6.0 to 8.9999 MHz
6	9.0 to 12.9999 MHz
7	13.0 to 19.9999 MHz
8	20.0 to 29.9999 MHz

Table 4.4 Filter Module (1A5) Filter Band Numbers & Frequency Range Table

Channeling is accomplished by applying ¹²+20VDC to any of the band control lines. This applies a positive going DC pulse through the pulse forming networks into the base of Q1. This energizes reed relay K1 which breaks the keyline so the band switching relays do not make or break with the transmitter keyed. The selected band then switches via reed relays on the even channel or odd channel board. After a delay of approximately 50 usec, relay K1 drops out allowing the keyline to function. (A band change requires approximately 50 usec to accomplish.)

4.8.3 VOLTAGE ALC DETECTOR

The voltage ALC detector consists of a resistive voltage divider R7 and R9 RF detector CR15, and emitter followers Q2 and Q3. This combination provides an extremely fast and responsive ALC. The detector output drives the emitter follower to charge capacitor C15 which discharges through R18. The decay time is long enough to eliminate the audio modulation from the ALC line. Capacitor C12 is adjusted to provide optimum ALC performance over the complete frequency range of the transceiver.

4.8.4 ACC DETECTOR

The ACC detector derives its output by rectifying

the voltage at the antenna connector with diode CR16 and diode CR18. The voltage is decreased by resistors R8 and R10. This detector has a fast rise and fast decay time at this point, so it is necessary to increase the time constant to maintain a constant carrier level. This averaging network is located on the sideband generator board.

4.8.5 OUTPUT DETECTOR

The output detector CR14 samples the transmit output voltage at the antenna terminal and provides a relative power output signal to the front panel meter when the coupler control panel is not used.

4.8.6 KEY LINE

Relay K2 is used in conjunction with relay 1A8K1 to key the transceiver to transmit mode. A schematic of the keying circuit is shown in figure 4.10. Note that if an interlock feature is required with auxiliary equipment, the jumper between 1A8J4-n and 1A8J4-p may be removed and the interlock performed in the auxiliary equipment.

Whenever the keyline is grounded and the band channeling motor is not running, relay K2 is energized. This switches the RF power amplifier to the low pass filter input, applies +28 VDC to the power amplifier bias circuit and then keys relay 1A8K1. Relay 1A8K1 switches the low voltage

5024052471C

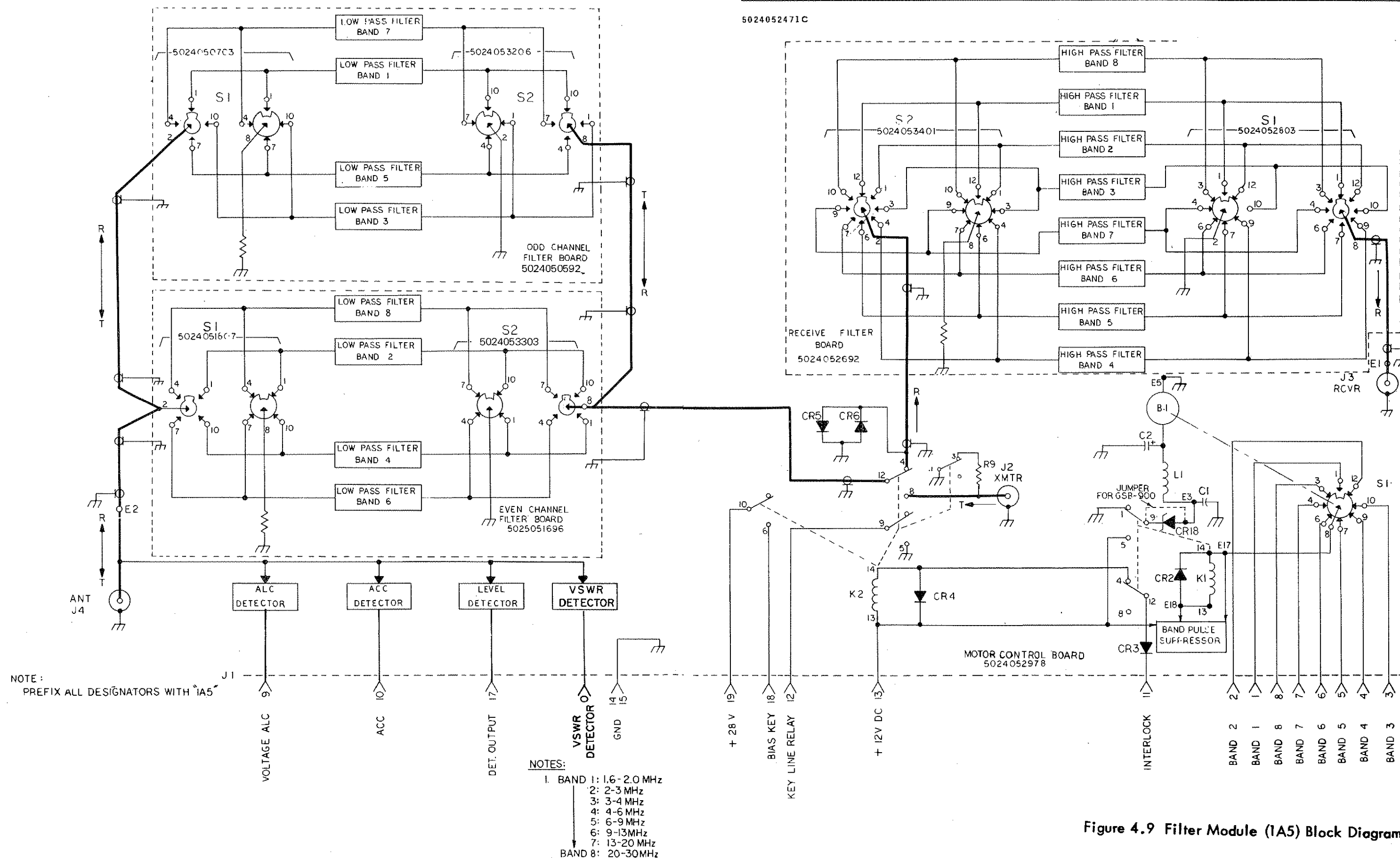


Figure 4.9 Filter Module (1A5) Block Diagram

from receive to transmit (grounds +12R and energizes +12T), and switches the front panel meter from "S" meter to output monitor.

4.8.7 REFLECTED POWER DETECTOR

The Reflected Power Detector provides an ALC output proportional to reflected power (VSWR) to protect the RF power amplifier. If the VSWR is less than 2 to 1, no ALC action is generated. As the VSWR increases above 2 to 1, the ALC voltage increases and reduces system gain, keeping the PA dissipation within safe limits.

4.9 METER PANEL 1A2

A schematic diagram of the meter panel is shown in Figure 5.11. The meter panel is used on GSB-900SC transceivers which do not require an antenna coupler. The meter reads received signal strength in "S" units in the receive mode, and relative forward power output in the transmit mode.

If a control panel is installed in lieu of the meter panel, refer to the appropriate manual for operation and maintenance.

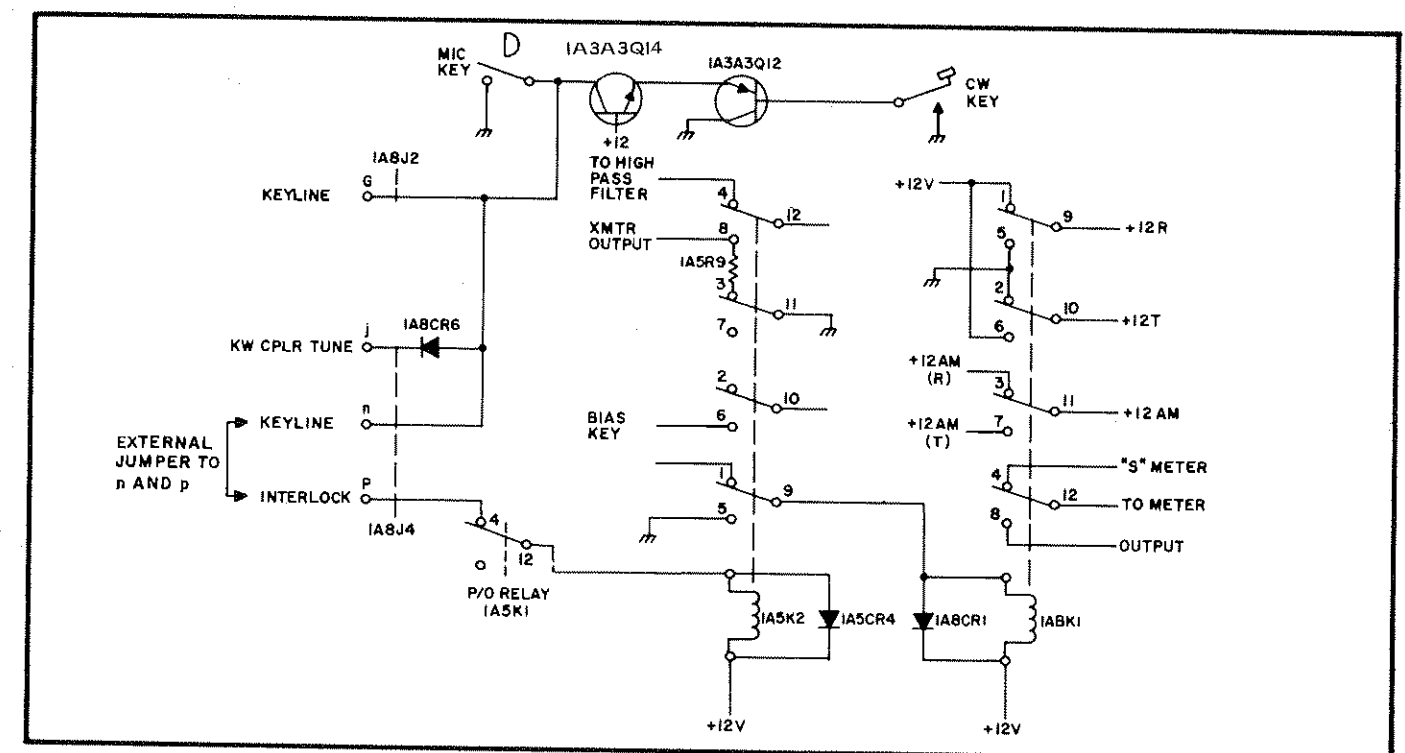


Figure 4.10 Keying Circuit

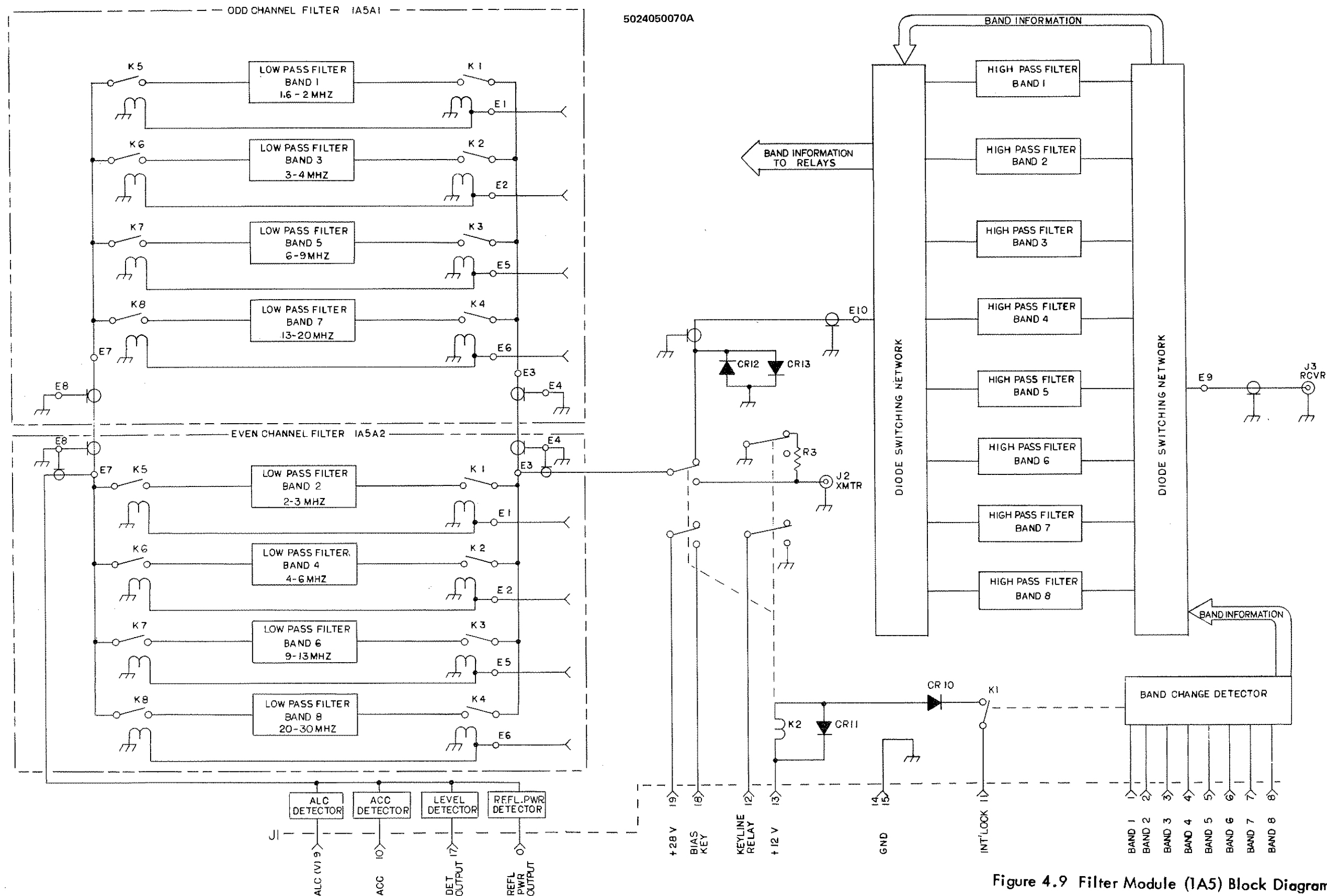


Figure 4.9 Filter Module (1A5) Block Diagram

from receive to transmit (grounds +12R and energizes +12T), and switches the front panel meter from "S" meter to output monitor.

4.8.7 REFLECTED POWER DETECTOR

The Reflected Power Detector provides an ALC output proportional to reflected power (VSWR) to protect the RF power amplifier. If the VSWR is less than 2 to 1, no ALC action is generated. As the VSWR increases above 2 to 1, the ALC voltage increases and reduces system gain, keeping the PA dissipation within safe limits.

4.9 METER PANEL 1A2

A schematic diagram of the meter panel is shown in Figure 5.11. The meter panel is used on GSB-900SC transceivers which do not require an antenna coupler. The meter reads received signal strength in "S" units in the receive mode, and relative forward power output in the transmit mode.

If a control panel is installed in lieu of the meter panel, refer to the appropriate manual for operation and maintenance.

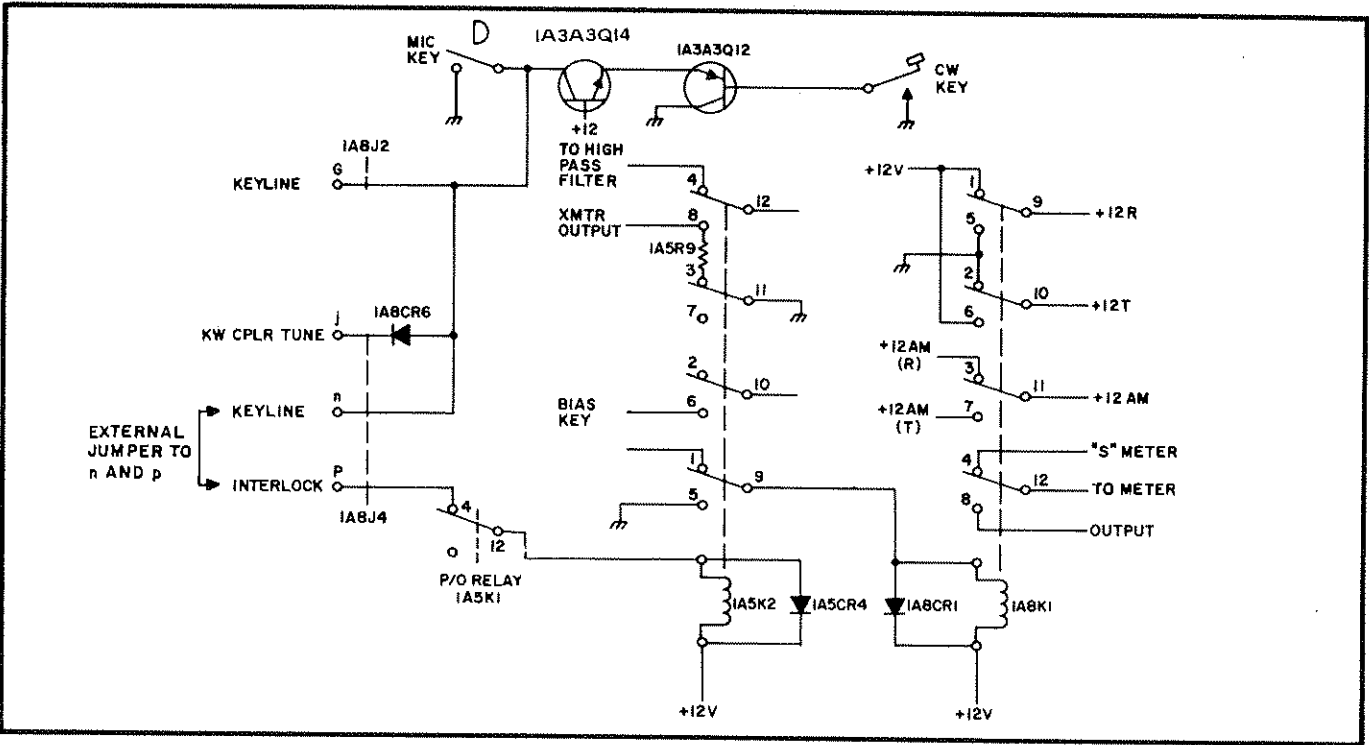


Figure 4.10 Keying Circuit

SECTION 5

MAINTENANCE AND REPAIR

5.1 GENERAL

This section provides test procedures for routine maintenance and evaluation of overall performance. A fault analysis table is included to aid the repairman in isolating a fault to the defective module or subassembly. Also included in this section are module removal procedures.

5.2 PREVENTIVE MAINTENANCE

The equipment should be periodically inspected internally for loose or damaged components, kinked, frayed, or broken wires and loose hardware. All cable connections should be checked for proper mating.

5.3 COVER REMOVAL

To remove the top and bottom covers from the equipment perform the following steps (See Figure 5.1).

- a. Remove the Phillip's screws at the rear of each cover.
- b. Unsnap the two fasteners on each side of the equipment for each cover and pull the cover up and back from the front panel.

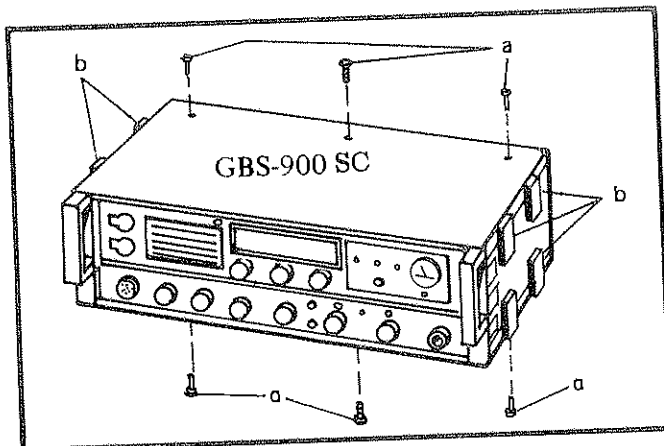


Figure 5.1 GSB-900SC Cover Disassembly

5.4 PERFORMANCE TEST

The following tests will provide overall performance data on this equipment as well as aid in determining specific problems or a deterioration in performance.

5.4.1 TEST EQUIPMENT

The following test equipment or equivalent is required to perform the following procedures:

- a. RF Signal Generator — Wave Tek Model 3001
1-520 MHz
- b. VTVM—HP model 410 C
- c. Dummy load, 50 ohms @ 150W—Bird
model 8135
- d. Coax Tee connector—HP 11042 A
- e. Audio VTVM—HP model 400 D
- f. Oscilloscope, 100 MHz Bandwidth—Tektronix
465B
- g. VOM—Simpson model 260 (20K ohms/volts)
- h. 100 Watt Wattmeter—Bird model 43
- i. RF Voltmeter—Boonton model 92C with both
open circuit probe tip and 50ohm BNC adap-
ter 918A
- j. Frequency Counter—Systron Donner model
6242A/option 12
- k. DC Power Supply—O-40 VDC, 12 A Hewlett
Packard Model 6268B
- l. Spectrum Analyzer (optional)

HP 141T Display Section
HP 8554B RF Section
HP 8552A IF Section.

5.4.2 PRELIMINARY

a. Connect AC power cable to rear panel connector J3 and to a 115 AC, 50 to 60 Hz, 1 phase power source (or 230 VAC, if a 230 VAC power cable is used).

b. Using the coaxial cable, connect the rf signal generator, paragraph 5.4.1 item A, to the rear panel antenna connector, J1.

c. Set front panel controls to the following positions listed in Table 5.1.

Refer to Figure 5.8 for Front Panel wiring and Figure 5.10 for Main Frame wiring diagrams with their appropriate parts lists.

SWITCH or CONTROL	POSITION
FREQUENCY Switches	01.6000 MHz
FREQUENCY Control Mode } Keyswitch	Normal
MODE Switch	LSB
RF GAIN Control	Fully Clockwise
XMIT GAIN Control	Fully Counter Clockwise
DIMMER Control	Fully Counter Clockwise
VFO Control	PUSH IN
VOLUME Control	Fully Counter Clockwise

Table 5.1 Front Panel Control Test Positions

5.4.3 POWER SUPPLY (1A6)

STEP No.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1	Power Turn On		Perform Steps A thru C of paragraph 5.4.2	
2	+5 VDC	VOM on 10 VDC range, common lead on chassis ground, "+" lead on either lead of 0.22 ohm resistor, R14 on regulator board, 1A6A1.	Read Voltage on VOM	VOM should read between +4.75 and +5.25 volts. If not, check line fuses 1A8F1 and 1A8F2, and fuse 1A6A1 F3 on regulator board, and 1A6A1Q4 and associated circuitry.
3	+12 VDC	VOM on 50 VDC range, common lead on chassis ground, "+" lead on either lead of 0.22 ohm resistor, R6, on regulator board, 1A6A1.	Read voltage on VOM	VOM should read between +11.2 and +12.8 volts. First check fuse 1A6A F2 on regulator board, and 1A6A1Q2 and associated circuitry.
4	+28 VDC	VOM on 50 VDC range, common lead on chassis ground, "+" lead on Pin A of power amplifier connector 1A8P1.	Read voltage on VOM	VOM should read between +26.5 and +29.5 volts. If not, check fuse 1A6A1 F1, transistor 1A6Q101, and 1A6A1 Q2 and associated circuitry.

5.4.4 FRONT PANEL (1A1) AND MAIN FRAME (1A8)

1	DIMMER		Advance DIMMER switch fully CW.	Meter and frequency dials should be lighted. If not, check cabling in front panel and main chassis for broken or shorted wires.
2a	LOW LIMIT FREQ. light		Turn frequency switches to 1.5000 MHz	LOW LIMIT FREQ. lights should be lit and "S" meter should read full scale. If not, check cabling around front panel switches S1, S2, and S3.
2b	Same as 2a above		Turn frequency switches to 1.6000 MHz	LOW LIMIT FREQ. light should be out and "S" meter should read zero. If not, check transistor 1A3A4 Q4 on audio board.
3a	VFO Control		Pull out VFO control	Lamp below VFO control should be lighted.
3b	Same as 3a above		Push in VFO control	Lamp below VFO control should be out.
4	AUDIO jack		Adjust VOLUME control approximately 1/2 turn CW.	Noise should be heard in the background coming from the speaker.
5	L.O. Blanker (1A8A1)		Sequence 1 MHz Frequency control switch through each of its positions (both clockwise and counterclockwise) with MODE switch in USB.	Brief blanking of receiver noise whenever switch position is changed. If faulty, refer to schematic and check voltages and waveforms.

5.4.5 RECEIVER TEST

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1	Sensitivity	Audio VTVM on phone jack on front panel for steps 2 through 7.	Perform steps a thru c of par. 5.4.2.	Peak indication. If none, consult sections 4.3.2, 4.3.3, and 4.3.4. Check for synthesizer outputs at LO 1, LO 2, and LO 3 on Receiver/Exciter Mother Board 1A3A5. See section 5.5.
2	Same		Turn VOLUME control to 1/4 CW. Set RF signal generator to 50 microvolts at 16.0 MHz and adjust frequency for a peak audio signal on audio VTVM.	-10db on 30 MV scale.
3	Same		Remove coax cable from RF signal generator output. Adjust GSB-900SC VOLUME control for audio VTVM reading of -10db on 30 MV scale.	Minimum 10db increase over level in step 3. If not, realign VHF mixer board (1A3A1) and IF/Filter Board (1A3A2). See par. 5.6.1 and 5.6.2.
4	Same		Reconnect coax cable to RF generator and set generator to 0.5 microvolts (into 50 ohms).	If no output, check MODE switch wiring for broken wire and check switching diodes on IF/Filter Board (1A3A2).
5	Same		Set MODE switch to USB and repeat steps 3 and 4 above.	-10db on 30 MV scale. If no output, check MODE switch wiring for broken wire and check switching diodes on IF/Filter Board (1A3A2).
6	Same		Adjust RF signal generator frequency for "zero beat", and increase output to 3 microvolts (into 50 ohms). Set MODE switch to AM position and adjust VOLUME control for audio VTVM reading of -10db on 30 MV scale.	Minimum 10db increase over level in step 6.
7	AM Sensitivity		Turn on 30% modulation at 1 kHz on RF signal generator.	VOM should read between +7.5 and +9.0 VDC, and "S" meter should read zero. If "S" meter reads full scale, check wiring around RF gain control and transistor Q4 on the audio board, (1A3A4).
8	AGC Control	Audio VTVM on PHONE jack on front panel and VOM set on 10 VDC range, between test point 1A3A4 TP1, on audio board and chassis ground for steps 8 thru 12.	Remove 1 kHz modulation and set signal generator or output to zero, set MODE switch to USB.	VOM should read down scale and "S" meter should begin to read upscale.
9	Same		Set signal generator output to 5 microvolts and adjust frequency for peak audio VTVM reading.	-10db on 1 volt scale.
10	AGC Control		Adjust GSB-900SC VOLUME control for audio VTVM reading of -10db on the 1 volt scale.	VTVM should increase 15db or less from reading in step 10, and "S" meter should read full scale. If not, check 1A3A4 Q5 and associated circuitry.
11	Same		Increase RF signal generator output to 500,000 microvolts.	Reading on VTVM should decrease at least 30db from reading in step 11. If not, check wiring on RF GAIN control and 1A3A4 Q12.
12	RF GAIN control		Turn RF GAIN control fully counter clockwise.	"S" meter should remain at full scale.
13	Same		Turn RF signal level to zero.	"S" meter reading should decay to zero.
14	Same		Turn RF GAIN control fully clockwise.	Audio present at speaker.
15	SPEAKER		Turn RF signal generator level to 5 microvolts and turn SPEAKER switch to ON.	
16	600 ohm AUDIO OUTPUT	Audio VTVM between pins E and F of rear panel AUDIO connector 1A3A2.	Set RF signal generator to 100 microvolts. Adjust potentiometer, R48, on the audio board (1A3A4), to provide a VTVM level of '0' dBm (800 MV RMS).	'0' dBm reading. If not, check integrated circuit, 1A3A4 U1, and associated circuitry.

5.4.6 TRANSMITTER TEST

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1		Dummy load connected through coaxial cable to rear panel ANT connector, 1A8J1 through coax-tee connector. HP410B VTVM connected to remaining port of coaxtee for steps 1 thru 8.	Frequency dials set for 16.0000 MHz, mode switch at LSB, XMIT GAIN fully counterclockwise	
2	AM Carrier check & adjustment		Turn mode switch to COUPLER TUNE. Adjust potentiometer, R18 (ACC Control), on sideband generator board (1A3A3) to give a VTVM reading of 42 VRMS.	VTVM should read 42 VRMS. If not, check relays 1A8K1 and 1A5K2, Diode 1A8CR6 (on rear panel ACCESSORY connector 1A8J4), see sections 4.4 and 4.5. If RF power amplifier is suspected, see section 5.8.4.
3	CW Power output check & adjustment sidetone check		Turn MODE switch to CW position, insert CW key in KEY jack on front panel. Turn SPEAKER switch ON and adjust VOLUME control to 1/3 CW. Depress CW key and adjust ALC control, R55, on sideband generator board (1A3A3) to give a VTVM reading of 71 VRMS.	VTVM should read 71 VRMS. If not check Q6, Q7, Q8 and Q12, and associated circuitry on sideband generator board (1A3A3). A 1 kHz tone should be heard through the speaker when the key is depressed and the transmitter should remain keyed for approximately one second after the CW key is released. If not, check 1A3A3 Q12 and associated circuitry.
4	CARRIER NULL		Insert microphone into MIC connector on front panel. Turn XMIT GAIN fully CCW. Turn MODE switch to USB and depress microphone push to talk switch. Adjust carrier balance controls R34 and C26 on the sideband generator (1A3A3) for the best null.	VTVM should read less than .5 VRMS. If not, check CR3, CR4, CR5, CR6, and associated circuitry on the sideband generator (1A3A3) for defective components.
5	USB		Turn XMIT GAIN control to approximately 1/3 CW. Key microphone and speak in a normal voice, holding microphone within 1/2 inch of lips. Observe VTVM reading.	VTVM should show a peak reading of 70 VRMS. If not, check wiring around MIC connector and chassis and check 1A3A3 Q4 and associated circuitry, check voltage ALC circuits.
6	LSB		Turn MODE switch to LSB repeat step 5 above.	VTVM should show a peak reading of 70 VRMS.
7	AM		Turn mode switch to AM repeat step 5 above.	VTVM should read approximately 42 VRMS until modulation is applied, then will rise to a peak of approximately 70 VRMS.
8	600 ohm input	Connect audio VTVM and audio oscillator, set to 1 kHz, to pins band C of AUDIO connector 1A8J2 located on the rear panel.	Adjust audio oscillator output for '0' dBm on the audio VTVM. Turn XMIT GAIN control full CCW, and MODE switch to USB. Key transmitter with microphone and adjust R58 on audio board 1A3A4, until RF VTVM reads 70 VRMS.	If no output is obtained, check cabling, 1A3A4 T2, 1A3A4 R58, 1A3A3 Q11, and associated circuitry.
9	I.F. Gain adjustment	Same as in 1 above	Set FREQUENCY dials for 29.99 MHz. Extend VHF Mixer out of card basket using extender card. Turn 1A3A1R16 fully CCW. Place MODE switch in CW and depress CW key. Turn 1A3A1R16 CW until power output levels off. Advance 1A3A1R16 approx. 15° beyond this point. Replace VHF Mixer in card basket.	VTVM reading between 67 and 71 volts RMS.

5.5 SYNTHESIZER

The following paragraphs provide troubleshooting and fault isolation information for those problems peculiar to the synthesizer.

5.5.1 FAULT ANALYSIS

The Synthesizer Fault Analysis Table, contained in the following

subparagraphs, is designed to isolate a faulty assembly first and then a faulty stage. If the defective assembly has been isolated by substitution, then the technician may proceed directly to the appropriate paragraph to isolate the faulty stage. Once a defective stage has been found, refer to the appropriate circuit diagram and make voltage checks to isolate the faulty component.

5.5.1.1 PRELIMINARY CHECKS

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE	IF FAULTY, CHECK-
1	Freq. Std. output	Oscilloscope probe at X1A4A1 pin 5.	Check for proper wave form.	300 to 900 mv p-p sine wave, 200 nsec. rep. rate	a) Freq. Std. (1A8U1) and associated wiring. b) Spectrum Gen. (1A4A1) for shorted input.
2	Freq. Std. Alignment	Same as step 1 above except connect Frequency Counter to Vertical Output of oscilloscope.	Measure frequency. If out of tolerance: remove access screw at top of Freq. Std., adjust Frequency Trim and replace access screw.	Frequency within ± 5 Hz of 5.000000 MHz.	If proper alignment cannot be obtained, Frequency Standard must be replaced.
3	Low Digit Phase Lock	Oscilloscope probe at test point 1A4A2TP3.	Set all FREQUENCY knobs to "0". Refer to Low Digit Gen. schematic and check waveform.	D.C. level of 1.5V to 2.5V	a) H.F. VCO Coarse Steering Voltage (see table 5.9) If faulty, check R12 through R22 located on the back of the 10 kHz switch (1A1S4). Also check associated front panel wiring. b) 1 kHz and 17 MHz references (consult Spectrum Gen., 1A4A1 schematic). If faulty, check Spectrum Gen.

5.5.1.1 PRELIMINARY CHECKS (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE	IF FAULTY, CHECK-
4	VHF Loop Phase Lock	Oscilloscope probe at test point 1A4A4TP1.	Set all FREQUENCY knobs to "0". Consult VHF Divider schematic and check waveform.	D.C. level of 1.5V to 2.5V	c) Frequency Control lines (consult tables 5.2 thru 5.8). If faulty, check Frequency control switches on front panel and associated main frame wiring. d) Low Digit Gen. voltage readings (consult schematic). e) Low Digit Gen. alignment (See section 5.5.2.2). a) VHF VCO Coarse Steering Voltage (see table 5.8). If faulty, check R1 thru R11 located on the back of the 1 MHz switch (1A1S2). Also check associated front panel wiring. b) Translator output (consult Translator schematic and if faulty, repair translator section 5.5.2.3). c) Frequency Control lines (consult tables 5.2 thru 5.8) if faulty check Frequency Control switches on front panel and associated wiring. d) VHF Divider voltage readings (consult schematic). If faulty repair VHF Divider. e) VCO output (consult VCO schematic and section 5.5.2.5). If faulty repair VCO.
5	VFO operation	Oscilloscope probe at 1A4A3U2 pin 6. Connect Vertical Ampl. output of oscilloscope to Frequency Counter (place Translator on extender card)	Pull out front panel VFO control. Rotate control to both extreme positions and measure frequency.	Minimum adjustment range of 20,995 to 21,005 MHz	a) VFO control voltage range at 1A4A3 pin A. Normal range is 4.2V (control CW) to 12V (control CCW). If faulty, check VFO control (1A1R27) on front panel and associated wiring. b) VFO ON/OFF control line. Should be +12V with control pulled out and 0V with control pushed in. If faulty, check VFO control (1A1R27) on front panel and associated wiring. c) Faulty component in Translator VFO circuit. Consult Translator schematic and perform voltage check. d) Misalignment of VFO circuit in Translator. Consult alignment procedure (section 5.5.2.3).

5.5.1.2 FREQUENCY CODING

The following tables (5.2 thru 5.8) are provided to assist in making the preliminary checks described in this section.

10 MHz DIAL	X1A4A5 Pin Numbers (Function)		
	18(Band "0" Command)	17(Band "1" Command)	16(Band "2" Command)
0	0	1	1
1	1	0	1
2	1	1	0

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with VCO (1A4A5) disconnected from X1A4A5

Table 5.2 10 MHz Switch

1 MHz DIAL	X1A4A4 Pin Numbers (Function)			
	J (2^0 1 MHz)	H (2^1 1 MHz)	8 (2^2 1 MHz)	7 (2^3 1 MHz)
0	1	0	0	1
1	0	0	0	1
2	1	1	1	0
3	0	1	1	0
4	1	0	1	0
5	0	0	1	0
6	1	1	0	0
7	0	1	0	0
8	1	0	0	0
9	0	0	0	0

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with VHF Divider (1A4A4) disconnected from X1A4A4.

Table 5.3 1 MHz Switch

100 kHz DIAL	X1A4A4 Pin Numbers (Function)			
	4 (2^3 100 kHz)	5 (2^2 100 kHz)	D (2^1 100 kHz)	E (2^0 100 kHz)
0	0	0	0	0
1	1	0	0	1
2	1	0	0	0
3	0	1	1	1
4	0	1	1	0
5	0	1	0	1
6	0	1	0	0
7	0	0	1	1
8	0	0	1	0
9	0	0	0	1

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with VHF Divider (1A4A4) disconnected from X1A4A4

Table 5.4 100 kHz Switch

10 kHz DIAL	X1A4A2 Pin Numbers (Function)			
	R (2^3 10 kHz)	15 (2^2 10 kHz)	14 (2^1 10 kHz)	S (2^0 1 kHz)
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with Low Digit Generator (1A4A2) disconnected from X1A4A4

Table 5.5 10 kHz Switch

1 kHz DIAL	X1A4A2 Pin Numbers (Function)			
	N (2^3 1 kHz)	13 (2^2 1 kHz)	12 (2^1 1 kHz)	P (2^0 1 kHz)
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with Low Digit Generator (1A4A2) disconnected from X1A4A2

Table 5.6 1 kHz Switch

100 Hz DIAL	X1A4A2 Pin Numbers (Function)			
	L (2^3 100 Hz)	11 (2^2 100 Hz)	10 (2^1 100 Hz)	M (2^0 100 Hz)
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

NOTE

1. A "0" indicates short circuit to chassis ground

2. A "1" indicates open circuit to chassis ground

3. All readings taken with Low Digit Generator (1A4A2) disconnected from X1A4A2

Table 5.7 100 Hz Switch

I H.F. VCO (Low Digit Coarse Steering)

10 kHz DIAL	1A1A6P1 pin 9 VOLTS
0	3.50
1	3.85
2	4.15
3	4.55
4	4.95
5	5.40
6	5.90
7	6.40
8	7.00
9	7.70

II VHF VCO (VCO Coarse Steering)

1 MHz DIAL	1A1A6P1 pin 7 VOLTS
0	1.37
1	1.78
2	2.18
3	2.75
4	3.31
5	4.12
6	4.93
7	6.15
8	7.85
9	9.56

NOTE

*All voltages above measured with
20,000 ohm/volt meter. Variations
of $\pm 5\%$ are permissible*

Table 5.8 Coarse Steering Voltage Readings

5.5.2 SYNTHESIZER SUBASSEMBLY TESTING AND ALIGNMENT PROCEDURES

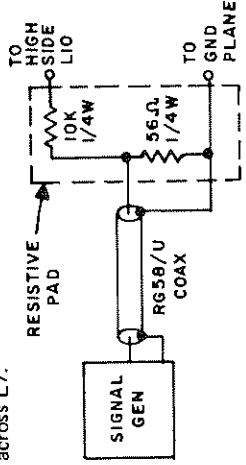
The following paragraphs give the testing and alignment procedures for the synthesizer printed circuit board subassemblies. It is assumed that the defective subassembly has first been isolated either by substitution or by following the preliminary checks of Section 5.5.1.1. During the following tests, the printed circuit board being tested should be extended from the card basket using the extender card (Sunair #5024003098) supplied in the ancillary

kit. At any step in the procedure, if the required result cannot be obtained, refer to the schematic of the subassembly and make suitable voltage measurements to isolate the faulty component. When the faulty subassembly has been restored to operation the preliminary checks of Section 5.5.1.1 should be repeated to ensure full synthesizer operation.

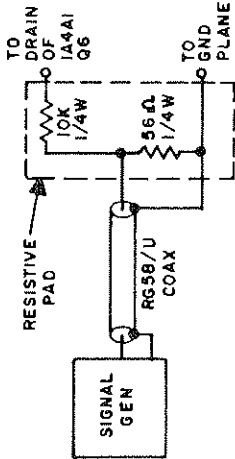
5.5.2.1 SPECTRUM GENERATOR TESTING AND ALIGNMENT

STEP NO.	TEST	TEST EQUIPMENT AND TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1	20 MHz ref. alignment and test	Oscilloscope probe at 1A4A1 pin 1. Connect frequency counter to Vertical Ampl. output of oscilloscope.	Tune L2, L3 & L4 for maximum output. NOTE <i>Adjustments interact and must be repeated until no further increase in output can be obtained.</i>	Minimum output of 300 mv p-p (sine wave) on oscilloscope. Frequency of 20 MHz $\pm$ 20 Hz on Frequency counter. NOTE <i>If proper output cannot be obtained, refer to the schematic and check U1, U2, U3 and their associated circuitry.</i>
2	1 kHz ref. output	Oscilloscope probe on 1A4A1 pin 18	Consult schematic and check waveform	Pulse with following parameters: Rep. rate= 1 millisecond Duty ratio=0.2 Logical "0" level: less than 0.6V Logical "1" level: greater than 2.2V
3	100 kHz Ref. output	Oscilloscope probe on 1A4A1 pin 17	Consult schematic and check waveform	Pulse with following parameters: Rep. rate=10 microseconds Duty ratio=0.2 Logical "0" level: less than 0.6V Logical "1" level: greater than 2.2V

5.5.2.1 SPECTRUM GENERATOR TESTING AND ALIGNMENT (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
4a	21 MHz Ref. alignment and test	RF voltmeter with unterminated tip on 1A4A1 pin 4. Connect signal generator as shown below. Set generator frequency to 21.00 MHz using Frequency Counter. Temporarily short jumper between U8 pin 2 and ground plane of printed circuit board. Similarly solder short jumper across L7. 	Set generator level to 250 mv RMS Tune L8, L9 & L10 for maximum output on RF voltmeter. NOTE <i>Adjustments interact and must be repeated until no further increase in output can be obtained.</i> Tune L10 for maximum output on RF voltmeter	
4b	21 MHz Ref. alignment and test	Same as 4a above except remove 10K resistor from L10 and connect to high side of L9	Tune L9 for maximum output. Repeat L10 for maximum output. Repeat tuning of L9 and L10 until no further output can be obtained	
4c	21 MHz Ref. alignment and test	Same as 4a above except remove 10K resistor from L10 and connect to high side of L8.	Tune L8, L9 and L10 for maximum output. Repeat tuning, in sequence, until no further output can be obtained.	
4d	21 MHz Ref. alignment and test	Leave RF voltmeter connected as in step 4a above. Disconnect the (2) jumpers and resistive pad network added in step 4a.	Carefully repeat L8, L9 and L10 for maximum output. Repeat tuning, in sequence, until no further output can be obtained	Meter indication of 85 mv RMS minimum, when tuning is complete. NOTE <i>If proper output cannot be obtained, refer to schematic and check Q1, Q2, and U8 and their associated circuitry. Also check CR4 thru CR7 and associated circuitry.</i>
5a	3rd L.O. (10.5 MHz Ref.) output	Connect RF voltmeter to 1A4A1 pin 13. Connect oscilloscope to U10 pin 8.	Place MODE switch on front panel in USB position. Refer to schematic and check waveform at U10 pin 8. Disconnect oscilloscope.	a) Proper oscilloscope waveform. b) RF voltmeter indication of 100 mv RMS minimum.
5b	3rd L.O. (10.5 MHz Ref.) output	Same as 5a above	Place MODE switch in AM position	RF voltmeter reading decreases at least 20 dB from that obtained in 5a above

5.5.2.1 SPECTRUM GENERATOR TESTING AND ALIGNMENT (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
6a	17 MHz Ref. alignment and test	RF voltmeter with unterminated tip on 1A4A1 pin 6. Temporarily solder a short jumper between gate #1 of Q6 and the ground plane of the printed circuit board. NOTE Gate #1 is the junction of C56, C61 and R50. Connect the signal generator as shown below. Set generator frequency to 17.000 MHz (using the frequency counter) and set its level to 250 mv RMS. 	Tune L16 and L17 for maximum output on the RF voltmeter. NOTE Adjustments interact and must be repeated until no further increase in output can be obtained.	
6b	17 MHz Ref. alignment and test	Leave RF voltmeter connected as in 6a above. Disconnect resistive pad and jumper.	Tune L14 for maximum output on the RF voltmeter. Carefully repeat L16 and L17 for maximum output.	Minimum output level of 90 mv RMS after tuning is completed NOTE If proper output cannot be obtained, refer to the schematic and check Q5, Q6, Q7, Q8, and their associated circuitry.

5.5.2.2 LOW DIGIT GENERATOR (1A4A2)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1	17 MHz Ref.	Connect RF voltmeter to 1A4A2 pin C	Check RF voltmeter reading	Reading greater than 100 mV RMS. If out of specification, check C28, L9 and R21
2	1 kHz Ref.	Connect oscilloscope to 1A4A2 pin 18	Display waveform on scope	Pulse present with the following parameters: rep. rate=1 msec. Duty ratio=0.2 Logical "0" level: less than 0.6V Logical "1" level: greater than 2.2V If out of specification, check U2 and associated circuitry
3	Phase Lock	Connect oscilloscope to 1A4A2 pin 1. Connect vertical Ampl. output of oscilloscope to frequency counter. Connect V.O.M. to TP3.	Set 10 kHz, 1 kHz and 100 Hz frequency dials on front panel to "0"	V.O.M. should indicate approximately 1.5V.

NOTE

If V.O.M. reads approximately 0.8V or 5V, this is an "out of phase lock" indication. Check:

- Voltage at TP1 (see schematic) if incorrect, check CR5, Q2 and associated circuitry
 - Refer to schematic and check waveform at TP2. If no signal is present, check Q1, U1 and associated circuitry
 - Refer to schematic and check waveforms at U7, U8, U9, U10, U11, and U2.
 - If the waveform at pin 1 of U7A deviates from the correct waveform on the schematic, check U6, Q3 and associated circuitry.
- If "out of Phase Lock" condition does not exist proceed to Step 4.

5.5.2.2 LOW DIGIT GENERATOR (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
4a	Output frequency	Same as Step 3 above	Measure output frequency	Output frequency of 1.5000 MHz ± 2 Hz. If out of tolerance: a) Refer to tables 5.9, 5.10, 5.11 and check 10 kHz, 1 kHz and 100 Hz preset lines. b) Refer to schematic and check waveforms at U3, U4, U7, U8, U9, U10 and U11
4b	Output frequency	Same as Step 3 above	Set 1 kHz and 100 Hz dials at "5"	Output frequency of 1.5055 MHz ± 2 Hz V.O.M. indication of $1.95 \pm 0.25V$. NOTE a) If V.O.M. indication is out of tolerance but frequency is correct, proceed to step 5 and align VCO (Q1). b) If both frequency and V.O.M. readings are out of tolerance, refer to schematic and check U3, U4, U8, U9 and associated circuitry.
4c	Output frequency	Same as Step 3 above	Leave 1 kHz and 100 Hz dials set at "0". Set 10 kHz dial at 9.	Output frequency of 1.5955 MHz ± 2 Hz V.O.M. indication of $1.95 \pm 0.25V$. NOTE a) If V.O.M. indication is out of tolerance but frequency is correct, proceed to Step 6 and align VCO (Q1) b) If both frequency and V.O.M. readings are out of tolerance, refer to schematic and check U10 and associated circuitry.

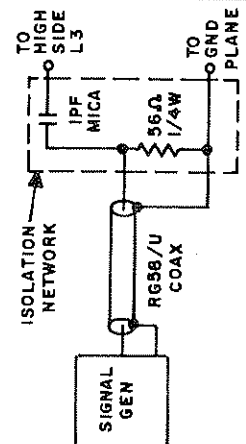
5.5.2.2 LOW DIGIT GENERATOR (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE																														
4d	Output frequency	Same as Step 3 above	Follow the table below and check for required frequencies <table><tr><th>10 kHz DIAL</th><th>1 kHz DIAL</th><th>100 Hz DIAL</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>0</td><td>2</td></tr><tr><td>0</td><td>0</td><td>3</td></tr><tr><td>0</td><td>0</td><td>4</td></tr><tr><td>0</td><td>0</td><td>5</td></tr><tr><td>0</td><td>0</td><td>6</td></tr><tr><td>0</td><td>0</td><td>7</td></tr><tr><td>0</td><td>0</td><td>8</td></tr><tr><td>0</td><td>0</td><td>9</td></tr></table> FREQUENCY (+2 Hz) 1.5001 MHz 1.5002 MHz 1.5003 MHz 1.5004 MHz 1.5005 MHz 1.5006 MHz 1.5007 MHz 1.5008 MHz 1.5009 MHz <i>If the required frequencies cannot be obtained, refer to schematic and check U8.</i>	10 kHz DIAL	1 kHz DIAL	100 Hz DIAL	0	0	1	0	0	2	0	0	3	0	0	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0	9	
10 kHz DIAL	1 kHz DIAL	100 Hz DIAL																																
0	0	1																																
0	0	2																																
0	0	3																																
0	0	4																																
0	0	5																																
0	0	6																																
0	0	7																																
0	0	8																																
0	0	9																																
4e	Output frequency	Same as Step 3 above	Follow the table below: <table><tr><th>10 kHz DIAL</th><th>1 kHz DIAL</th><th>100 Hz DIAL</th></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>0</td><td>2</td><td>0</td></tr><tr><td>0</td><td>3</td><td>0</td></tr><tr><td>0</td><td>4</td><td>0</td></tr><tr><td>0</td><td>5</td><td>0</td></tr><tr><td>0</td><td>6</td><td>0</td></tr><tr><td>0</td><td>7</td><td>0</td></tr><tr><td>0</td><td>8</td><td>0</td></tr><tr><td>0</td><td>9</td><td>0</td></tr></table> FREQUENCY (+2 Hz) 1.5010 MHz 1.5020 MHz 1.5030 MHz 1.5040 MHz 1.5050 MHz 1.5060 MHz 1.5070 MHz 1.5080 MHz 1.5090 MHz <i>If the required frequencies cannot be obtained, refer to schematic and check U9.</i>	10 kHz DIAL	1 kHz DIAL	100 Hz DIAL	0	1	0	0	2	0	0	3	0	0	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0	9	0	
10 kHz DIAL	1 kHz DIAL	100 Hz DIAL																																
0	1	0																																
0	2	0																																
0	3	0																																
0	4	0																																
0	5	0																																
0	6	0																																
0	7	0																																
0	8	0																																
0	9	0																																
4f	Output frequency	Same as Step 3 above	Follow the table below: <table><tr><th>10 kHz DIAL</th><th>1 kHz DIAL</th><th>100 Hz DIAL</th></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>2</td><td>0</td><td>0</td></tr><tr><td>3</td><td>0</td><td>0</td></tr><tr><td>4</td><td>0</td><td>0</td></tr><tr><td>5</td><td>0</td><td>0</td></tr><tr><td>6</td><td>0</td><td>0</td></tr><tr><td>7</td><td>0</td><td>0</td></tr><tr><td>8</td><td>0</td><td>0</td></tr><tr><td>9</td><td>0</td><td>0</td></tr></table> FREQUENCY (+2 Hz) 1.5100 MHz 1.5200 MHz 1.5300 MHz 1.5400 MHz 1.5500 MHz 1.5600 MHz 1.5700 MHz 1.5800 MHz 1.5900 MHz <i>See Note on following page.</i>	10 kHz DIAL	1 kHz DIAL	100 Hz DIAL	1	0	0	2	0	0	3	0	0	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0	9	0	0	
10 kHz DIAL	1 kHz DIAL	100 Hz DIAL																																
1	0	0																																
2	0	0																																
3	0	0																																
4	0	0																																
5	0	0																																
6	0	0																																
7	0	0																																
8	0	0																																
9	0	0																																

5.5.2.2 LOW DIGIT GENERATOR (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
NOTE If the required frequencies cannot be obtained, refer to schematic and check U10.				
5a	Output Level	Same as Step 3 above	Set 10 kHz, 1 kHz and 100 Hz dials to "0"	Output level of 200 mv p-p minimum.
5b	Output Level	Same as Step 3 above	Set 10 kHz, 1 kHz and 100 Hz dials to "9"	Output level of 200 mv p-p minimum.
NOTE If the required results cannot be obtained in Steps 5a and 5b above, refer to schematic and check Q5, Q6, U5 and associated circuitry.				
NOTE The alignment of the VCO, detailed in Step 6 below, should only be necessary if a component has been replaced in the voltage controlled oscillator (VCO) circuit (Q1). All other causes of improper operation should first be checked before proceeding with the alignment.				
6a	VCO alignment	Same as Step 3 above	Set 1 kHz and 10 kHz dials to "5"; Set 10 kHz dial to "0". Tune L3 for a V.O.M. indication of 1.95 ± 0.25 volts.	When tracking is complete, the V.O.M. should read 1.95 ± 0.25 volts at both settings of the 10 kHz dial.
6b	VCO alignment	Same as Step 3 above	Leave 1 kHz and 100 Hz dials set at "5". Tune C8 for a V.O.M. indication of 1.95 ± 0.25 volts.	
6c	VCO alignment	Same as Step 3 above	Repeat 6a and 6b until required performance is obtained.	

5.5.2.3 TRANSLATOR (1A4A3)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
1	21 MHz Ampl. alignment and test	Oscilloscope probe on TP4.	Place front panel VFO control in "IN" position. Tune L13 for maximum output.	Sine wave, 800 mv p-p min. rep. rate=47.6 nsec. NOTE <i>If required output cannot be obtained, refer to schematic and check U1 and associated circuitry.</i>
2a	VFO alignment and test	Same as step 1 above. Except also connect V.O.M. to 1A4A3 pin A. Connect Frequency Counter to Vertical Ampl. output of oscilloscope.	Pull OUT front panel VFO control. Rotate VFO until a reading of 7.6V is obtained on the V.O.M. Tune L23 until the VFO circuit begins to oscillate. Carefully rock the adjustment of L23 back and forth to center the tuning in the middle of the oscillation range.	
2b	VFO alignment (con't'd)	same as 2a above.	Adjust L22 for a frequency counter reading of 21.0000 MHz ± 100 Hz. If this frequency cannot be obtained within the adjustment range of L22, slight adjustment of L23 is permissible to obtain the correct frequency.	Frequency counter reading of 21.0000 MHz ± 100 Hz. Oscilloscope should indicate a sine wave, 700 mv p-p minimum amplitude.
2c	VFO alignment (con't'd)	same as 2a above.	Rotate VFO control over its complete range. When the test is complete, place the VFO control in the "IN" position.	Oscilloscope amplitude should remain greater than 700 mv p-p. The Frequency should vary as a minimum between 20.995 and 21.005 MHz. NOTE <i>If the required results cannot be obtained, refer to the schematic and check Q1, Q3, U2 and their associated circuitry. If the VFO cannot be aligned on frequency, VFO crystal, Y1, should be replaced.</i>
3a	19.45 MHz Ampl.	 Connect RF voltmeter to U3 pin 6. Temporarily unplug the Low Digit Generator, 1A4A2, from the mother board. Temporarily solder a short jumper from U1 pin 2 to the printed circuit board ground plane. Set the signal generator frequency to 19.45 MHz using the Frequency Counter. Set the generator level to 250 mv RMS and connect as shown above.	Tune L3 and L5 for max. RF voltmeter reading. As tuning progresses, reduce signal generator level to keep RF voltmeter reading below 100 mv RMS.	

5.5.2.3 TRANSLATOR (1A4A3) (CONT'D)

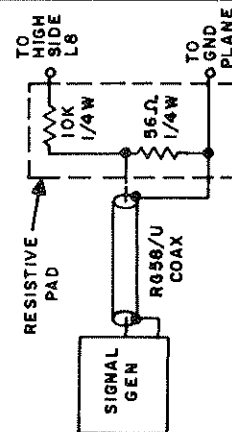
STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
3b	19.45 MHz alignment (cont'd)	Disconnect 1 pf capacitor from high side of L2 and connect to the high side of L1. Set the generator level to 250 mv RMS.	Tune L2 and L3 for max. RF voltmeter reading (adjustments interact). As the tuning progresses, reduce the generator level to keep the RF voltmeter reading below 100 mv RMS.	
3c	19.45 MHz alignment (cont'd)	Disconnect 1 pf capacitor from high side of L2 and connect to the high side of L1. Set the generator level to 250 mv RMS.	Tune L1, L2 and L3 for max. RF voltmeter reading (adjustments interact). As the tuning progresses, reduce the generator level to keep the RF voltmeter reading below 100 mv RMS.	
3d	19.45 MHz alignment (cont'd)	Disconnect the isolation network signal generator and jumper wire added in 3a above. Plug the Low Digit Generator back into the mother board. Place the V.O.M. on the 10V D.C. range and connect to U3 pin 1. Connect the RF voltmeter to TP1. Terminate TP1 in a 50 ohm lead.	Carefully repeak the slugs on L1, L2, L3 and L4. A point will be found where the voltage on the V.O.M. begins to increase. Tune the four inductors for max. V.O.M. indication.	When tuning is complete, the RF voltmeter should read approximately 7 mv RMS.
NOTE <i>If a spectrum analyzer is available, the following tuneup and test procedure may be used in lieu of steps 5a through 5d</i>				
	19.45 MHz Ampl. Alternate Alignment and test (using Spectrum Analyzer)	Connect spectrum analyzer to TP1 using 50 ohm coaxial cable. Set C.F. to 19.45 MHz and Scan width to 1 MHz/div. Set B.W. at 30 kHz. Set control for a Log display.	Tune L1, L2, L3 and L5 for max. output at 19.45 MHz on the spectrum analyzer. A point will be found where the output appears to level off and becomes insensitive to tuning adjustments. This is the onset of Automatic Gain control (AGC) action. Carefully adjust the above inductors for lowest levels of spurious responses.	Approximate output level of -30 dBm at 19.45 MHz. All spurious outputs down at least 40 db from the 19.45 MHz output (typically will be 50 db down).
NOTE <i>The adjustments of L1, L2 and L3 interact and must be repeated, in sequence for best spurious rejection and maximum output.</i>				
NOTE <i>If the required performance cannot be obtained, consult the schematic and check U3, CR1 through CR4 and associated circuitry. Also check the output of the Low Digit Generator (consult schematic).</i>				

5.5.2.3 TRANSLATOR (1A4A3) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
4	2nd L.O. alignment and test	Oscilloscope probe at 1A4A3 pin 11. Connect ground lead of probe to printed circuit board ground plane. Connect Vertical Ampl. output of oscilloscope to frequency counter.	Tune L17 until the circuit breaks into oscillation (as evidenced by a sudden increase in meter reading). Tune L25 for maximum meter indication. Carefully rock L17 back and forth to adjust the circuit to the center of its oscillation range.	Minimum output level of 300 mv p-p. Output frequency of 80.7500 MHz $\pm$ 4 kHz.
NOTE <i>If required output cannot be obtained, refer to schematic and check Q7, Q9 and their associated circuitry. If the frequency is out of tolerance, replace crystal Y2.</i>				
5a	100.75 MHz Band-pass Filter alignment and test	Temporarily solder a short jumper between Q8 gate #1 and the printed circuit board ground plane. Connect RF Voltmeter, terminated in a 50 ohm tip probe, to TP3. Set signal generator to 100.75 MHz using the frequency counter. Connect signal generator as shown below. Set generator level to 250 mv RMS.	Tune L21 for maximum output on RF Voltmeter.	
5b	100.75 MHz Band-pass Filter alignment and test	Disconnect 1 pf capacitor from L21 and connect to the high side of L36	Tune L36 and L21 for maximum output on RF Voltmeter (adjustments interact and must be repeated until no further increase in output can be obtained).	
5c	100.75 MHz Band-pass Filter alignment and test	Disconnect 1 pf capacitor from L36 and connect to the high side of L20.	Tune L20, L36 and L21 for maximum output on RF Voltmeter (adjustments interact)	

5.5.2.3 TRANSLATOR (1A4A3) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
5d	100.75 MHz Bandpass Filter alignment and test	Disconnect 1 pf capacitor, 56 ohm resistor and signal generator. Disconnect jumper added in Step 5a above.	Carefully repeak L20, L36 and L21 for maximum RF Voltmeter indication (adjustments interact). NOTE <i>If a spectrum analyzer is available, the following tuneup and test procedure may be used in lieu of steps 5a through 5d</i> Peak L20, L36 and L21 for maximum amplitude at 100.75 MHz (adjustments interact and must be repeated until no further output can be obtained).	After tuning is complete, RF Voltmeter should read approximately 70 mv RMS.
6a	100.75 MHz Bandpass Filter alignment and test (alternate procedure for use with spectrum analyzer)	Connect spectrum analyzer to TP3. Set C.F. to 100.75 MHz, scan width to 5 MHz/div & bandwidth to 300 kHz. Set display mode to LOG.	Peak L20, L36 and L21 for maximum amplitude at 100.75 MHz (adjustments interact and must be repeated until no further output can be obtained).	After tuning is complete, output level on analyzer at 100.7500 MHz should be approximately -10 dBm. All spurious outputs should be at least 40 db below the 100.75 MHz output.
	81.25 MHz Bandpass Filter alignment and test	Temporarily solder a short jumper between Q11 gate 1 and the ground plane on the printed circuit board. Connect the RF voltmeter to TP2. Set the signal generator frequency to 81.25 MHz, using the frequency counter. Set the generator level at 250 mv RMS. Connect the signal generator as shown below.	Tune L8 for maximum reading on RF voltmeter.	



5.5.2.3 TRANSLATOR (1A4A3) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
6b	81.25 MHz B.P.F. alignment and test	Disconnect the 10K resistor from L8 and connect to the high side of L7.	Tune L7 and L8 for maximum RF voltmeter indication. NOTE <i>These adjustments interact and must be repeated until no further increase in output can be obtained.</i>	
6c	81.25 MHz B.P.F. alignment and test	Disconnect jumper, 10K resistor, 56 ohm resistor and signal generator added in step 6a.	Carefully repeat L7 and L8 for maximum indication on RF voltmeter (adjustments interact). NOTE <i>If required output cannot be obtained, check Q11 and associated circuitry.</i>	Indication of approximately 40 mv on RF voltmeter when tuning is complete.
7a	Output level adjustment	Connect oscilloscope probe to 1A4A3 pin 15 and connect ground lead of probe to the printed circuit board ground plane near pin 15.	Set front panel frequency dials (6) to 29.9999 MHz. Adjust R54 for a reading of 600 mv p-p on oscilloscope.	Oscilloscope display of 600 mv p-p, rep rate of 25 nsec (slightly distorted sine wave)
7b	Output level adjustment	Same as 7a above.	Set front panel frequency dials to 00.0000 MHz	Oscilloscope display of 600 mv p-p minimum amplitude (distorted sine wave), rep rate of 100 nsec.
				NOTE <i>If required results cannot be obtained, refer to schematic and check: Q4, Q5, Q6, Q10 and associated circuitry. Also check the VCO (1A4A5) for proper output (refer to VCO schematic)</i>

5.5.2.4 VHF DIVIDER (1A4A4)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE																														
1a	100 kHz Dial test	Connect Signal Generator to X1A4A4 pin B using 50 ohm coaxial cable. Set generator level to 100 mv RMS.	Connect VOM to TP1. Set signal generator frequency to 9.9 MHz using the frequency counter. Temporarily unplug the Translator (1A4A3) from the card basket. Set 10 MHz, 1 MHz, and 100 kHz dials on front panel to "0".	VOM indication of greater than 4.5 volts																														
1b	100 kHz Dial test	Same as 1a above	Slowly increase generator frequency	At 10.0 MHz ± 1 kHz, VOM indication should abruptly change to an indication of less than 0.9 volts. NOTE If the proper indication in Steps 1a and 1b above cannot be obtained, refer to schematic and check all D.C. voltages and waveforms																														
1c	100 kHz Dial test	Same as 1a above	Follow the table below. In each case, the V.O.M. should indicate greater than 4.5 volts with the generator below the transition frequency and less than 0.9 volts above the transition frequency <table><tr><th>10 MHz DIAL</th><th>1 MHz DIAL</th><th>100 kHz DIAL</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>0</td><td>2</td></tr><tr><td>0</td><td>0</td><td>3</td></tr><tr><td>0</td><td>0</td><td>4</td></tr><tr><td>0</td><td>0</td><td>5</td></tr><tr><td>0</td><td>0</td><td>6</td></tr><tr><td>0</td><td>0</td><td>7</td></tr><tr><td>0</td><td>0</td><td>8</td></tr><tr><td>0</td><td>0</td><td>9</td></tr></table> Transition Frequency (± 1 kHz) 10.1 MHz 10.2 MHz 10.3 MHz 10.4 MHz 10.5 MHz 10.6 MHz 10.7 MHz 10.8 MHz 10.9 MHz NOTE If the required results cannot be obtained, refer to schematic and check U3, U4, U5, U8, U9, U10, U13 and associated circuitry.	10 MHz DIAL	1 MHz DIAL	100 kHz DIAL	0	0	1	0	0	2	0	0	3	0	0	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0	9	
10 MHz DIAL	1 MHz DIAL	100 kHz DIAL																																
0	0	1																																
0	0	2																																
0	0	3																																
0	0	4																																
0	0	5																																
0	0	6																																
0	0	7																																
0	0	8																																
0	0	9																																

5.5.2.4 VHF DIVIDER (1A4A4) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINTS	PROCEDURE	REQUIRED PERFORMANCE																														
2	1MHz Dial test	Same as Step 1a above	Follow the table below. In each case the V.O.M. should indicate greater than 4.5V below the transition frequency and less than 0.9 volts above the transition frequency. <table><tr><th>10 MHz DIAL</th><th>1 MHz DIAL</th><th>100 kHz DIAL</th></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>0</td><td>2</td><td>0</td></tr><tr><td>0</td><td>3</td><td>0</td></tr><tr><td>0</td><td>4</td><td>0</td></tr><tr><td>0</td><td>5</td><td>0</td></tr><tr><td>0</td><td>6</td><td>0</td></tr><tr><td>0</td><td>7</td><td>0</td></tr><tr><td>0</td><td>8</td><td>0</td></tr><tr><td>0</td><td>9</td><td>0</td></tr></table> Transition Frequency (± 1 kHz) 11.0 MHz 12.0 MHz 13.0 MHz 14.0 MHz 15.0 MHz 16.0 MHz 17.0 MHz 18.0 MHz 19.0 MHz	10 MHz DIAL	1 MHz DIAL	100 kHz DIAL	0	1	0	0	2	0	0	3	0	0	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0	9	0	NOTE <i>If required results cannot be obtained, refer to schematic and check U6, U5 and associated circuitry.</i>
10 MHz DIAL	1 MHz DIAL	100 kHz DIAL																																
0	1	0																																
0	2	0																																
0	3	0																																
0	4	0																																
0	5	0																																
0	6	0																																
0	7	0																																
0	8	0																																
0	9	0																																
3	10 MHz Dial test	Same as Step 1a above	Follow the table below. In each case the V.O.M. should indicate greater than 4.5V below the transition frequency and less than 0.9V above the transition frequency <table><tr><th>10 MHz DIAL</th><th>1 MHz DIAL</th><th>100 kHz DIAL</th></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>2</td><td>0</td><td>0</td></tr><tr><td>2</td><td>9</td><td>9</td></tr></table> Transition Frequency (± 1 kHz) 20.0 MHz 30.0 MHz 39.9 MHz	10 MHz DIAL	1 MHz DIAL	100 kHz DIAL	1	0	0	2	0	0	2	9	9	NOTE <i>If required results cannot be obtained, refer to schematic and check U7, U8A, U8B, U13 and associated circuitry.</i>																		
10 MHz DIAL	1 MHz DIAL	100 kHz DIAL																																
1	0	0																																
2	0	0																																
2	9	9																																

5.5.2.4 VHF DIVIDER (1A4A4) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
4a	Max. toggle frequency	Same as Step 1a above	Set 10 MHz dial at "2". Set 1 MHz and 100 kHz dials at "g". Set the signal generator frequency at 45 MHz. Set the generator level at 100 mv RMS.	V.O.M. should indicate less than 0.9V
4b	Max. toggle frequency	Same as Step 1a above	Slowly increase the generator frequency until the V.O.M. indicates greater than 4.5 volts.	Generator frequency greater than 50.0 MHz.

NOTE

If the required results cannot be obtained, refer to schematic and check:
a) Q1 through Q4
b) Waveform at U2 pin 3
If a) and b) above check o.k. U2 should be replaced.

5.5.2.5 V.C.O. (1A4A5)

1a	BAND "0" alignment and test	Connect frequency counter to 1st L.O. output (J1). Connect external +1.95 volts D.C. from power supply to X1A4A5 pin 4.	Set front panel 10 MHz frequency selector switch (1A1S1) to "0". Set 1 MHz frequency selector switch (1A1S2) to "0". Adjust L1 for required performance.	Frequency indication of 91.75 ± 0.2 MHz. If no output present, proceed to steps 2 and 3. If steps 2 and 3 performance is acceptable, check Q3, Q6, and associated circuitry. If no output is obtained in all three steps, -1, 2, and 3- check buffer stage Q9, Q10.
1b	BAND "0" alignment and test	Same as 1a above.	Leave front panel 10 MHz frequency selector switch (1A1S1) set at "0". Set front panel 1 MHz frequency selector switch (1A1S2) to "g". Adjust C16 for required performance.	Frequency indication of 100.75 ± 0.75 MHz
1c	BAND "0" alignment and test	Same as 1a above.	Repeat steps 1a and 1b until both conditions are satisfied.	91.75 ± 0.2 MHz 100.75 ± 0.75 MHz
2a	BAND "1" alignment and test	Same as 1a above.	Set front panel 10 MHz frequency selector switch (1A1S1) to "1". Set front panel 1 MHz frequency selector switch (1A1S2) to "0". Adjust L4 for required performance.	Frequency indication of 101.75 ± 0.2 MHz. If no output present, but steps 1 and 3 are correct, check Q4, Q7, and associated circuitry.
2b	BAND "1" alignment and test	Same as 1a above.	Leave front panel 10 MHz frequency selector switch (1A1S1) set at "1". Set front panel 1 MHz frequency selector switch (1A1S2) to "g".	Frequency indication of 110.75 ± 0.75 MHz.
2c	BAND "1" alignment and test	Same as 1a above.	Repeat steps 2a and 2b until both conditions are satisfied.	101.75 ± 0.2 MHz, 110.75 ± 0.75 MHz.

S.5.2.5 VCO (1A4A5) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
3a	BAND "2" alignment and test	Same as 1a above.	Set front panel 10 MHz frequency selector switch (1A1S1) to "2". Set front panel 1 MHz frequency selector switch (1A1S2) to "0". Adjust L7 for required performance.	Frequency indication of 111.75 ± 0.2 MHz. If no output present, but steps 1 and 2 are correct, check Q5, Q8 and associated circuitry.
3b	BAND "2" alignment and test	Same as 1a above.	Leave front panel 10 MHz frequency selector switch (1A1S1) set at "2". Set front panel 1 MHz frequency selector switch (1A1S2) to "9". Adjust C38 for required performance.	Frequency indication of 120.75 ± 0.75 MHz.
3c	BAND "2" alignment and test	Same as 1a above.	Repeat steps 3a and 3b until both conditions are satisfied.	111.75 ± 0.2 MHz, 120.75 ± 0.75 MHz.
4a	1st L.O. output level	Connect R.F. Voltmeter with 50 ohm BNC adapter to 1st L.O. output connector (J1). Connect external +1.95 volts D.C. from power supply to X1A4A5 pin 4. Tack solder 47 ohm 1/4 or 1/2 watt carbon resistor from X1A4A5 pin 2 to ground.	Set front panel 10 MHz frequency selector switch (1A1S1) to "1". Set front panel 1 MHz frequency selector switch (1A1S2) to "6". Adjust L12 (access hole near 1st L.O. output connector J1) for maximum level.	Reading greater than 100 mV rms (225 mV typical).
4b	1st L.O. output level	Same as 4a above.	Set front panel 10 MHz frequency selector switch (1A1S1) and 1 MHz frequency selector switch (1A1S2) to "0". Record this output level.	Reading greater than 100 mV RMS (225 mV typical).
4c	1st L.O. output level	Same as 4a above.	Set front panel 10 MHz frequency selector switch (1A1S1) to "2". Set front panel 1 MHz frequency selector switch (1A1S2) to "9". Record this output level.	Reading greater than 100 mV RMS (225 mV typical).
4d	1st L.O. output level	Same as 4a above.	If necessary, adjust L12 slightly so that the readings of steps 4a, b, and c are within 3 db of each other.	If any reading in steps 4a, b, or c is low, check buffer stage Q9, Q10 and associated circuitry.

5.5.2.5 VCO (1A4A5) (CONT'D)

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
5a	1st L.O. output level to translator	Tack solder 47 ohm 1/4 or 1/2 watt carbon resistor from X1A4A5 pin 2 to ground. Connect open circuit probe tip from R.F. Voltmeter to X1A4A5 pin 2. Place a 50 ohm load on 1st L.O. output connector J1. Connect +1.95 volts D.C. from external power supply to X1A4A5 pin 4.	Set front panel 10 MHz frequency selector switch (1A1S1) to "0". Sequence the front panel 1 MHz frequency selector switch (1A1S2) from "0" through "g".	Reading should remain greater than 100 mV RMS (225 mV typical) in each position of 1A1S2. If proper output cannot be obtained, refer to schematic and check buffer stage Q11 and Q12 and associated circuitry.
5b	1st L.O. output level to translator	Same as 5a above.	Set front panel 10 MHz frequency selector switch (1A1S1) to "1". Sequence the 1 MHz frequency selector switch (1A1S2) from "0" through "g".	Reading should remain greater than 100 mV RMS (225 mV typical) in each position of 1A1S2.
5c	1st L.O. output level to translator	Same as 5a above.	Set front panel 10 MHz frequency selector switch (1A1S1) to "2". Sequence the 1 MHz frequency selector switch (1A1S2) from "0" through "g".	Reading should remain greater than 100 mV RMS (225 mV typical) in each position of 1A1S2.
6a	Logic Outputs	V.O.M. on X1A4A5 pin 17.	Front panel 10 MHz frequency selector switch (1A1S1) position: "0" "1" "2"	less than 0.5 V.D.C. greater than 2.2 V.D.C. less than 0.5 V.D.C.
6b	Logic Outputs	V.O.M. on X1A4A5 pin 18.	Front panel 10 MHz frequency selector switch (1A1S1) position: "0" "1" "2"	greater than 2.2 V.D.C. less than 0.5 V.D.C. less than 0.5 V.D.C. If these readings cannot be obtained, consult the schematic and check logic switches Q1, Q2, and associated circuitry.

5.6 RECEIVER/EXCITER BOARD ALIGNMENT

The following paragraphs provide alignment instructions for the Receiver/Exciter printed boards.

STEP NO.	TEST	TEST EQUIPMENT and TEST POINT	PROCEDURE	REQUIRED PERFORMANCE
5.6.1 V.H.F. MIXER BOARD (1A3A1)				
1	1st IF alignment	Connect RF Signal Generator to Antenna connector 1A8J1 and set frequency for 16.0 MHz.	Remove VHF Mixer Board from RCVR/Exciter card basket by grasping corners of board and pulling upward. Install extender card in slot for connector 1A3J1 and plug VHF mixer into extender card. Set Frequency switches at 16,000. Mode switch at USB, and adjust RF gain Control so that "S" meter reads "S 9". Set RF generator level to 10 MV and adjust frequency until a tone of approximately 1 kHz is heard in the speaker. Adjust capacitors C41 and C44 for peak on the "S" meter. Next adjust Transformer T7 and T8 for peak on the "S" meter. Recheck C44 and T7 for meter peak. Remove extender card and replace VHF mixer board into its connector in the card basket.	If no peaking is observed check E24 and E18 on the RCVR/Exciter Mother board, using a high frequency oscilloscope to determine if 1st L.O. and 2nd L.O. are present (approximately OdBM). If not, check synthesizer sections 4.2 and 5.5. If 1st L.O. and 2nd L.O. are present, check outputs of Q5 and Q8 on VHF mixer board, then check Q2 and associated circuitry.
5.6.2 IF/FILTER BOARD (1A3A2)				
1	2nd IF alignment	Connect RF Signal Generator to Antenna connector 1A8J1, and set frequency for 16.0 MHz.	Remove IF/Filter board from RCVR/Exciter card basket by grasping corners of board and pulling upward. Install extender card in slot for connector 1A3J2, and plug IF/Filter board into extender card. Set frequency switches at 16,000 mode switch at USB and adjust RF GAIN control so that "S" meter reads "S 9". Set RF Generator level to 10 MV and adjust frequency until a tone of approximately 1 kHz is heard in the speaker. Adjust inductors L3 and L4 for peak on the "S" meter. Remove Extender card and replace IF/Filter board in its connector in the card basket.	If no peak is observed, check U1 and U2 plus associated circuitry on IF/Filter board. Also check Q3 and associated circuitry.
5.6.3 SIDEBAND GENERATOR BOARD (1A3A3)				
1	BALANCED MODULATOR TUNING	Connect RF VTVM and dummy load to antenna connector, 1A8J1.	Remove sideband generator board from RCVR/Exciter card basket by grasping corners of board and pulling upward. Install extender card in slot for connector 1A3J3, and plug sideband generator board into extender card. Turn potentiometer 1A3A3, R34, approximately 8 turns. CW. Turn XMIT GAIN full CCW and set mode switch to USB. Key transceiver with microphone and, observing RF VTVM, tune Transformer T1 for maximum output. Remove extender card and replace sideband generator board in its connector in the card basket. Repeat carrier null alignment per par. 5.4.6, step 4.	If no carrier output is observed, check E16 on RCVR/Exciter mother board to determine if 3rd L.O. is present (approximately OdBM). If not, refer to synthesizer sections 4.2 and 5.5. If 3rd L.O. is present, check output of 1A3A3 Q1 and associated circuitry.

5.7 FAULT ANALYSIS TABLE

SYMPTOM	POSSIBLE TROUBLE	CHECKS AND CORRECTIVE ACTION
Receiver inoperative, meter not illuminated.	a. Primary power fuse F1, F2 or (for DC operation) F3 not installed or open. b. +12VDC fuse (1A6A1 F2) open in power supply. c. Power cord defective or not connected. d. Power supply defective.	a. Replace fuse. b. Replace fuse. c. Make continuity check of cable, replace or repair cable. d. Refer to sections 4.7 and 5.4.3. Repair or replace regulator board or entire power supply module if required.
No audio or background noise at speaker or phones jack. Meter indicates RF signal present.	a. 28VDC protective crowbar has operated. b. Speaker switch at OFF or defective. c. Speaker driver board defective. d. Amplifier 1A3A4 Q11 defective.	a. Turn off main power. Wait 15 seconds and re-energize radio. If still no audio, check 28VDC power supply for short circuited output. b. Check position of switch and make necessary continuity checks. c. Refer to section 4.4.5. Repair or replace defective assembly. d. Replace defective transistor.
No audio or background noise at speaker in all modes, meter does not indicate, but is illuminated.	a. +5 VDC fuse open in power supply. b. VHF mixer board defective. c. IF/Filter board defective. d. Audio board defective. e. Synthesizer defective.	a. Replace fuse. If fuse blows again, check +5V line for short circuit. b. Refer to section 4.4.2. Repair or replace defective assembly. c. Refer to section 4.4.3. Repair or replace defective assembly. d. Refer to section 4.4.4. Repair or replace defective assembly. e. Refer to section 4.2. Repair or replace defective assembly.
AM mode normal, other modes inoperative.	a. 3rd L.O. injection absent at 1A3A4 audio board. b. Synthesizer defective.	a. Make continuity test of cable. Repair or replace. b. Refer to section 4.2. Repair or replace defective assembly.
AM, or USB, or LSB, inoperative, other modes operative.	a. Mode switch defective. b. IF/Filter board defective.	a. Make continuity check. Repair or replace switch. b. Check diode switches on IF/Filter board. Check filters. Repair or replace defective parts.
No audio at speaker. Meter at full scale.	a. RF GAIN control fully CCW or defective. b. Transistor 1A3A4 Q12 defective.	a. Adjust RF GAIN control CW. Replace defective component. b. Replace defective component.
Distorted audio at speaker. Meter remains at full scale.	a. Transistor 1A3A4 Q4 defective.	a. Replace transistor.
Received signals weak in all modes "S" meter also low.	a. Filter module defective or does not channel. b. VHF mixer board defective.	a. Refer to section 4.9. Repair or replace defective component. b. Refer to section 4.4.2. Repair or replace defective assembly.

5.7 FAULT ANALYSIS TABLE (CONT'D)

SYMPTOM	POSSIBLE TROUBLE	CHECKS AND CORRECTIVE ACTION
Received signals weak in all modes- Cont.	c. IF/Filter board defective. d. Local oscillator injection levels low. e. Coaxial cables defective.	c. Refer to section 4.4.3. Repair or replace defective assembly. d. Refer to section 4.2. Repair or replace defective assembly. e. Make continuity tests, repair or replace defective cable.
Transmitter will not key.	a. Defective microphone. b. 1A5K2 or 1A8K1 defective. c. Jumper between pins n and p missing on accessory socket-1A8J4.	a. Repair or replace. b. Replace defective part. c. Replace jumper.
Transmitter keys but no output or output low in all modes.	a. Defective sideband generator board. b. Defective IF/Filter board. c. Defective VHF mixer board. d. Defective or disconnected coaxial cables. e. Defective RF power amplifier module. f. Defective filter module.	a. Refer to section 4.5.2. Repair or replace defective assembly. b. Refer to section 4.5.3. Repair or replace defective assembly. c. Refer to section 4.5.4. Repair or replace defective assembly. d. Check all coaxial fittings. Perform continuity test on coaxial cables and repair or replace. e. Refer to sections 4.6 and 5.8.4. Repair or replace defective assembly. f. Refer to section 4.8. Repair or replace defective assembly.
Transmitter keys, output ok in CW, carrier ok in AM, but no modulation or output in USB or LSB.	a. Defective microphone. b. Broken or shorted wire between microphone and RCVR/Exciter mother board.	a. Repair or replace. b. Perform continuity check. Repair broken wire.
Transmitter keys, output ok in CW, USB, LSB. No carrier in AM.	a. Defective ACC.	a. Check 1A3A3 Q2, Q3, Q5 and associated circuitry.
Too much carrier in AM, can not adjust.	a. Defective ACC. b. Defective ACC potentiometer. c. Defective ACC detector.	a. Check 1A3A3 Q2, Q3, and Q5 and associated circuitry. b. Replace 1A3A3 R18. c. Check ACC detector on 1A5A4. Repair and replace defective component.
SSB or CW output too high or too low.	a. ALC control adjusted incorrectly.	a. Adjust 1A3A3 R55 in CW mode for 71 VRMS into 50 ohms at 16,0000 MHz.
AM Carrier level too high or too low.	a. ACC control adjusted incorrectly.	a. Adjust 1A3A3 R18 in AM mode for 42 VRMS.

5.7 FAULT ANALYSIS TABLE (CONT'D)

SYMPTOM	POSSIBLE TROUBLE	CHECKS AND CORRECTIVE ACTION
AM operation or coupler tune causes 28VDC crowbar to act, disabling 28V.	a. Inoperative or defective current ALC loop.	a. Check transistor 1A7Q7 and associated circuitry. Check 1A3A1 Q4 and associated circuitry. Continuity test cable between 1A3A1 P1 U and 1A7J3 B.
No CW or side tone.	a. Defective or inoperative tone oscillator.	a. Check 1A3A3 Q6, Q7, Q8, and associated circuitry.
Sidetone ok, but XMTR does not key in CW mode	a. Defective CW keying transistor. b. Defective T/R relay.	a. Check 1A3A3 Q12, CR7, CR8, and associated circuitry. b. Check relays 1A8K1 and 1A5K2.
Unit inoperative with DC main power applied.	a. Main source polarity reversed. b. DC module not installed or installed improperly. c. DC module defective.	a. Switch + and - leads to DC source. b. Refer to section 2.6.3. c. Refer to section 4.7.2 and repair or replace defective module.
Power output ok, but no meter indication, meter ok on receive.	a. Inoperative or defective output detector circuit. b. Broken wire in cable line.	a. Check detector 1A5CR5 and associated circuitry. b. Make continuity checks and repair.
ANTENNA COUPLER PROBLEMS		
Power output ok, but no meter indication, meter ok on receive.	a. Defective or disconnected coaxial cable between transmitter and coupler. b. Defective or inoperative detector in coupler. c. Broken wire in cabling.	a. Continuity test and repair or replace. b. Repair or replace defective device. Consult coupler handbook. c. Continuity test and repair.
Coupler does not tune - any control.	a. +28VDC missing in coupler. b. Coupler tune line not grounded in coupler tune mode. c. Mode switch is not in coupler tune position.	a. Continuity test and repair. b. Check mode switch wiring and continuity of cable and repair. c. Check position of mode switch.

5.7 FAULT ANALYSIS TABLE (CONT'D)

SYMPTOM	POSSIBLE TROUBLE	CHECKS AND CORRECTIVE ACTION
SECURE CHANNEL FRONT PANEL PROBLEMS		
Incorrect Band Selection	a. Defective Band Prom. b. Defective Output Drivers.	a. Check 1A1A6 U21 per Truth Table 5.12. Replace defective component. b. Check 1A1A6 U9 thru U12 and associated circuitry for proper operation on each band. Replace defective component.
Incorrect VCO Steering	a. Defective BCD to Decimal Decoders. b. Defective Voltage Divider components.	a. Check 1A1A6 U28 and U29 per Truth Table 5.11. Replace defective component. b. Measure HF and VHF steering voltages per Table 5.8. Check transistor-resistor network associated with improper voltage reading at Frequency Selector switch position. Replace defective component.
Will not load RCV frequencies.	a. Defective Memory interface circuitry.	a. Check operation of 1A1A6 U26A, U26B, U16, and 1A1A7 U10C as Load RCV pushbutton is actuated to isolate defective device. Replace defective component.
Will not Load XMT frequencies.	a. Defective Memory interface circuitry.	a. Check operation of 1A1A6 U26C, U26D, U3C, U17, and 1A1A7 U10F as Load XMT pushbutton is actuated to isolate defective device. Replace defective component.
Frequencies load into incorrect channel locations.	a. Defective Memory Address drivers. b. Defective Memory Address converters.	a. Check input and output levels of 1A1A7 U22, U26B, U10E and U10F. The respective input and output levels should be the same. Replace defective component. b. Check for proper operation of 1A1A7 U1 and U2 by using Table 5.10 for correct logic levels at Address inputs. If incorrect, replace U1 and U2.
Master Clear inoperative	a. Defective Counter-Oscillator circuitry.	a. Measure Ram Data Input pins on 1A1A7 U3A, U4A, U5A, U6A, U7A and U8A after releasing Master Clear pushbutton. Logic levels should be briefly low ("0" state). Measure outputs levels of U4B, U8A, U6D, U13 and U22. Refer to section 4.3.2.8 and use Timing Waveforms FIG. 5.1B. Replace defective component.

5.7 FAULT ANALYSIS TABLE (CONT'D)

SYMPTOM	POSSIBLE TROUBLE	CHECKS AND CORRECTIVE ACTION
Secure Mode Inoperative	a. Defective Display Blanking circuitry.	a. Check logic levels on 1A1A6 U1B, U14D and U25D. Refer to section 4.3.2.7. Replace defective component.
Short Battery Life	a. Excessive Memory Standby Current drain. b. Battery switching circuitry does not operate.	a. Measure voltage across 1A1A7 R17 thru R22 with transceiver turned off. Readings should be less than 100uV each. Replace defective Ram. b. Check for Unreg. Voltage at 1A1A6P2-73. Check devices 1A1A6 CR12, Q15, CR7 for proper operation. Refer to section 4.3.2.4. Replace defective components.
Low Battery Light on with fresh batteries installed.	a. Defective Power Clear circuit. b. Faulty Low Battery Detection Circuitry.	a. Check components 1A1A7 R24, C9, U19F, U19E and U108 for proper operation. Refer to section 4.3.5.7. Replace defective component. b. Check components Q15, U68, U158, U7C, U15C, U4A and U1A for proper operation. Refer to section 4.3.2.5 and Timing Waveforms Fig. 5.1A. Replace defective Component.
Synthesizer does not program properly	a. Defective Synthesizer Programming Converter.	a. Check output levels of components U9A, U19A, U198, U19C, U19D, U20A, U208, U20D, U21, U31 and U32. Refer to Table 5.9 for the 10 MHz, 1 MHz and 100KHZ Frequency Coding. Replace defective component.

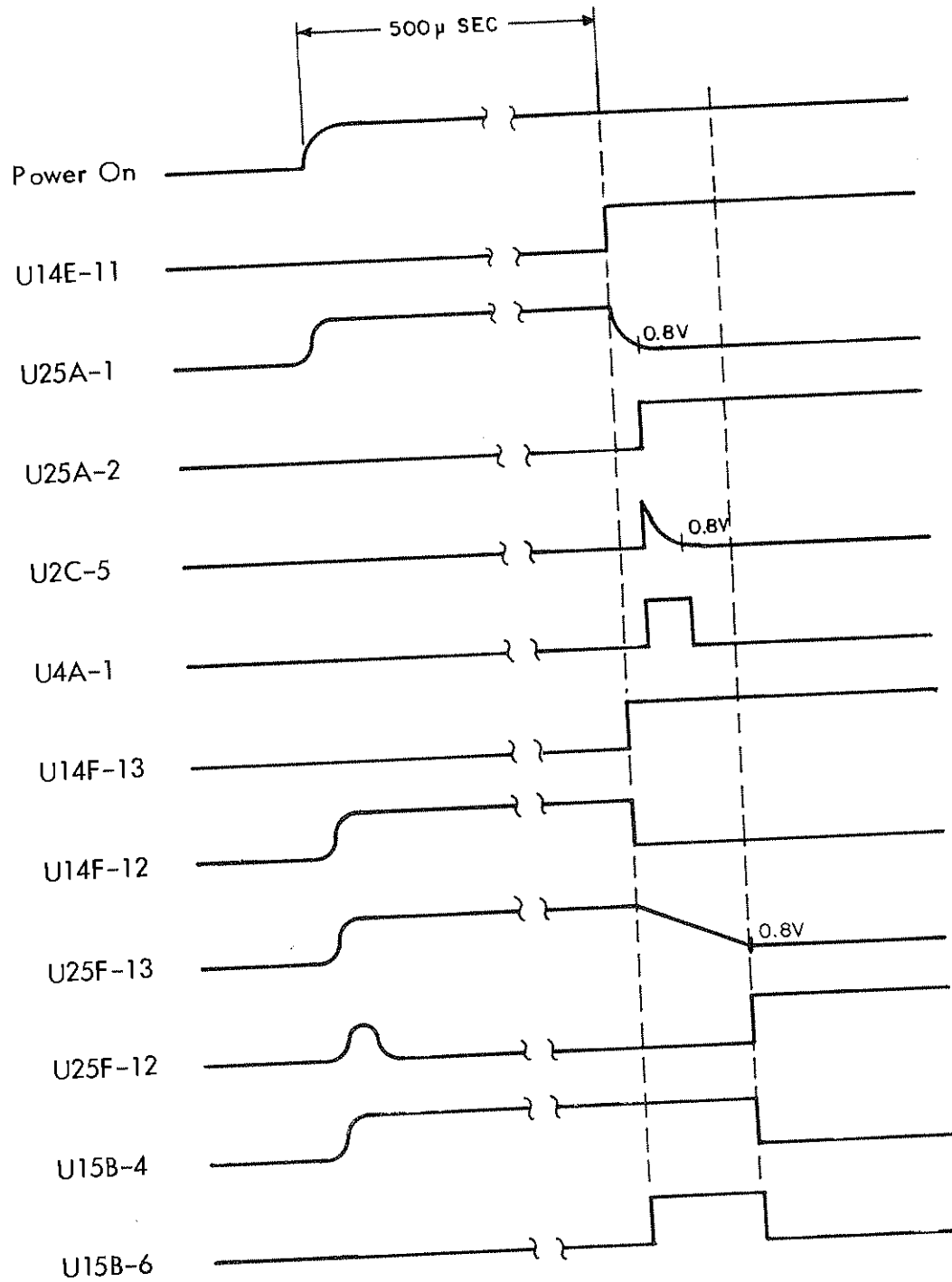


Figure 5.1A Power Clear-Low Battery Timing Waveforms

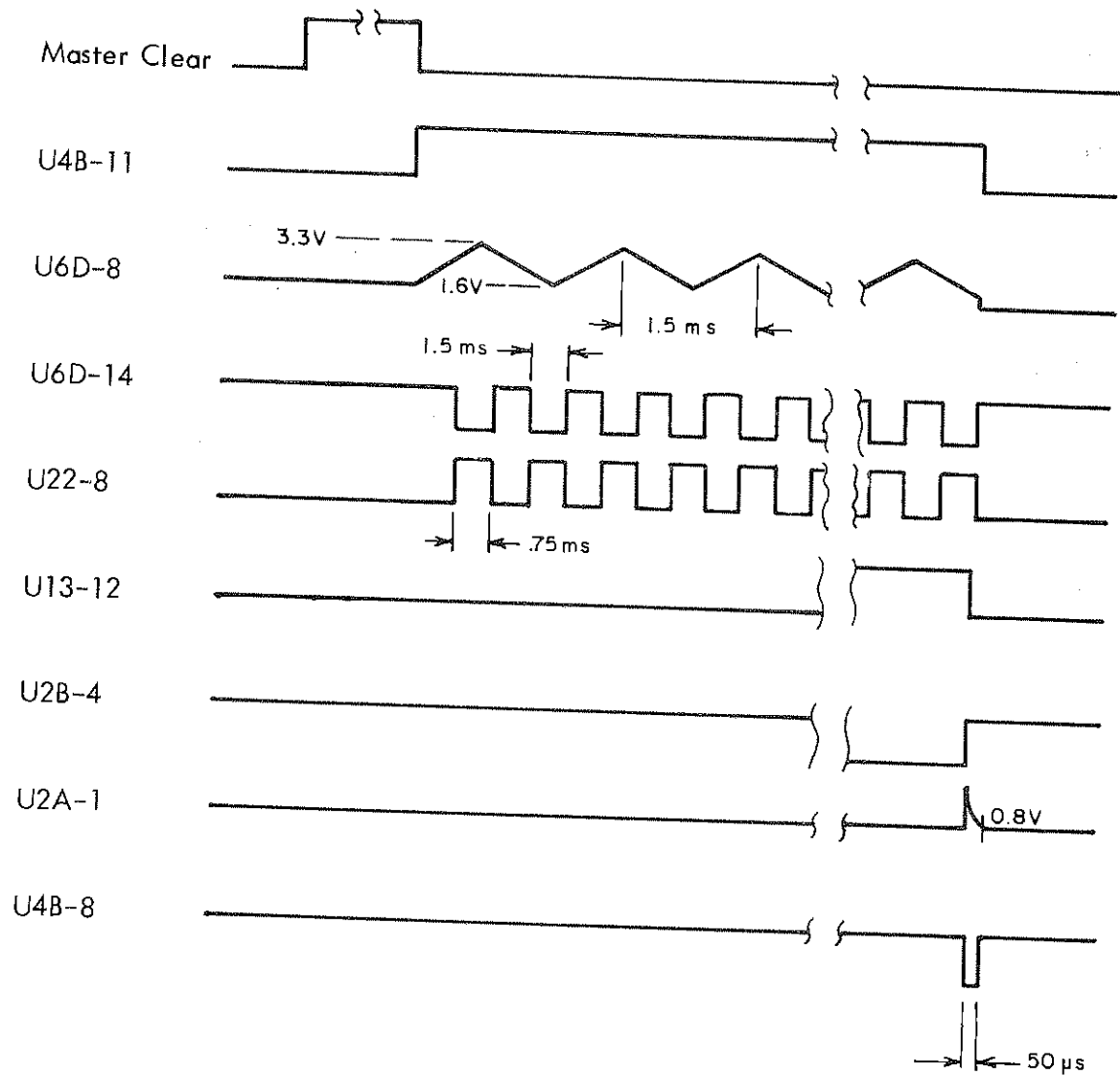


Figure 5.1B Master Clear Waveforms

1A1P8 TO RADIO

BLK	1
	2
BRN	3
RED	4
ORN	5
YEL	6
W-BU	7
GRN	8
RED	9
BLU	10
W-GY	11
W-BN	12
W-GN	13
ORN	14
VIO	15
GRN	16
YEL	17
W-BK	18
W-YL	19
BRN	20
W-RD	21
GRY	22
W-OR	23
WHT	24
W-BK-BN	25
BK/BK-WHT	26
GY	27
W-BN	28
W/YEL	29
W-BK-RD	30
	31
BLU	32
VIO	33
GRY	34
W-RD	35
W-YL	36
W-OR	37
BN	38
	39
BLUWHT	40
RED	41
	42
GRN	43
W-VIO	44
BK	45
	46
	47
	48
	49
	50
	51
	52
	53
	54
	55
	56
	57
	58
	59
	60
	61
	62
	63
	64
	65
	66
	67
	68
	69
	70
	71
	72
	73
	74
	75
	76
	77
	78
	79
BLK	80

MOTHER BOARD
BOTTOM VIEW

1	BLU
2	
3	
4	
5	
6	
7	
8	W-BU
9	GRN
10	WHT
11	ORN
12	RED
13	BRN
14	BLK
15	YEL
16	W-GY
17	W-VIO
18	W-BU
19	W-GN
20	W-YL
21	W-OR
22	W-RD
23	W-BN
24	BLK
25	WHT
26	GRY
27	BLU
28	GRN
29	YEL
30	ORN
31	
32	BLU
33	BRN
34	RED
35	W-OR
36	W-YL
37	W-RD
38	RED
39	W-GN
40	WHT
41	VIO
42	GRY
43	W-BN
44	W-BK
45	GRN
46	WHT
47	BLU
48	W-RD
49	W-BK-RD
50	W-BK-BN
51	RED
52	BRN
53	VIO
54	W-GRY
55	ORN
56	YEL
57	BRN
58	W-GN
59	GRY
60	W-BK
61	W-BN
62	W-VIO
63	W-GY
64	VIO
65	YEL
66	WHT
67	ORN
68	GRN
69	BLU
70	W-RD
71	W-OR
72	W-YL
73	W-BK-RD
74	W-BU
75	RED
76	BLK
77	W-BK-BN
78	W-BK-BK
79	
80	

1A1P7 TO FRONT PANEL

Figure 5.1C GSB-900SC Front Panel to Radio Mother Board Connector Strip

5.8 MODULE REMOVAL

This section provides special test information and module removal instructions.

5.8.1 REMOVAL OF FILTER MODULE-1A5

5.8.1.1 Disconnect all cables from the motor control board (1 power connector, 3 coax connectors).

5.8.1.2 Turn transceiver upside down and remove four screws holding filter module.

5.8.1.3 To remove filter assembly from its case, remove four flathead screws around case periphery and pull assembly out from the case.

5.8.2 FRONT PANEL REMOVAL

To remove the front panel from the transceiver:

- Remove bottom covers from the RCVR/EXCTR and SYNTH compartments.
- Carefully disconnect the mother board connectors (1A1P2 on the RCVR/EXCTR side and 1A1P3 on the SYNTH side).
- Disconnect the two connectors that plug into the top of the transceiver chassis (1A1P1 and 1A1P6).
- Remove the three rear screws from each front panel away from the rest of the unit.
- To replace the front panel, reverse the above procedure, being careful not to kink,

break, or pinch wires, particularly around the digital switches.

5.8.2.1 MEMORY SYSTEM MOTHER BOARD ASSEMBLY 1A1A5

The Memory Board and Band Steering Board are interfaced to the radio and front panel by a printed circuit Mother Board using connectors 1A1P7 and 1A1P8. Connections 1A1P7, pin 1-80, and 1A1P8, pins 1-80, are each made to the Mother Board by means of several connector strips of different sizes. Correct placement of the strips and wire color coding is shown in Figure 5.1C. Care should be used in connecting the strips to the Mother Board so that pin damage does not result. In the event that the Mother Board Assembly requires removal, note that proper orientation of the board is labeled to show which connector should face the Radio and which connector should face the Front Panel.

5.8.2.2 FREQUENCY CODING

NOTE

To test frequency coding, the FREQUENCY MODE KEY-LOCK SWITCH must be in the NORMAL position. "0" indicates ground, "1" indicates open circuit.

10 MHz Dial	1A1A7P2			1A1A2 U1	
	Pin 16	Pin 8	Pin 14	Pin 1	Pin 7
0	0	1	1	0	0
1	1	0	1	0	1
2	1	1	0	1	0

Table 5.9 Frequency Coding

1 MHz Dial	1A1A7P2				1A1A2 U2			
	Pin 18	Pin 20	Pin 24	Pin 26	Pin 6	Pin 2	Pin 1	Pin 7
0	1	0	0	1	0	0	0	0
1	1	0	0	0	0	0	0	1
2	0	1	1	1	0	0	1	0
3	0	1	1	0	0	0	1	1
4	0	1	0	1	0	1	0	0
5	0	1	0	0	0	1	0	1
6	0	0	1	1	0	1	1	0
7	0	0	1	0	0	1	1	1
8	0	0	0	1	1	0	0	0
9	0	0	0	0	1	0	0	1

100 kHz Dial	1A1A7P2				1A1A2 U3			
	Pin 6	Pin 4	Pin 10	Pin 12	Pin 6	Pin 2	Pin 1	Pin 7
0	0	0	0	0	0	0	0	0
1	1	0	0	1	0	0	0	1
2	1	0	0	0	0	0	1	0
3	0	1	1	1	0	0	1	1
4	0	1	1	0	0	1	0	0
5	0	1	0	1	0	1	0	1
6	0	1	0	0	0	1	1	0
7	0	0	1	1	0	1	1	1
8	0	0	1	0	1	0	0	0
9	0	0	0	1	1	0	0	1

Table 5.9 Frequency Coding (Con't.)

10 kHz Dial	1A1A7P2				1A1A2 U4			
	Pin 43	Pin 41	Pin 39	Pin 27	Pin 6	Pin 2	Pin 1	Pin 7
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	0	0	0	1	0
3	0	0	1	1	0	0	1	1
4	0	1	0	0	0	1	0	0
5	0	1	0	1	0	1	0	1
6	0	1	1	0	0	1	1	0
7	0	1	1	1	0	1	1	1
8	1	0	0	0	1	0	0	0
9	1	0	0	1	1	0	0	1

1 kHz Dial	1A1A7P2				1A1A2 U5			
	Pin 51	Pin 49	Pin 47	Pin 45	Pin 6	Pin 2	Pin 1	Pin 7
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	0	0	0	1	0
3	0	0	1	1	0	0	1	1
4	0	1	0	0	0	1	0	0
5	0	1	0	1	0	1	0	1
6	0	1	1	0	0	1	1	0
7	0	1	1	1	0	1	1	1
8	1	0	0	0	1	0	0	0
9	1	0	0	1	1	0	0	1

Table 5.9 Frequency Coding (Con't.)

100 Hz Dial	1A1A7P2				1A1A2 U6			
	Pin 59	Pin 57	Pin 55	Pin 53	Pin 6	Pin 2	Pin 1	Pin 7
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	0	0	0	1	0
3	0	0	1	1	0	0	1	1
4	0	1	0	0	0	1	0	0
5	0	1	0	1	0	1	0	1
6	0	1	1	0	0	1	1	0
7	0	1	1	1	0	1	1	1
8	1	0	0	0	1	0	0	0
9	1	0	0	1	1	0	0	1

Table 5.9 Frequency Coding (Con't.)

5.8.3 POWER SUPPLY REMOVAL

- 5.8.3.1 Remove four screws securing top cover of power supply.
- 5.8.3.2 To remove Regulator board (1A6A1), take out four large screws holding two capacitors (1A6A1-C5 and C9) as shown in Figure 5.2. Next, unfasten two hold down screws and pull the board forward and slightly upward to remove.
- 5.8.3.3 To take out the entire power supply from the chassis, remove only the screws, shown in Figure 5.2, from the RIGHT SIDE PANEL. DO NOT remove the cover clamps and their associated hardware. Unplug the connector, 1A6P1, from the chassis as illustrated in Figure 5.3. Re-

move the four screws holding the regulator heat sink and then unscrew the transistor 1A6Q101 from the heat sink. If a D.C. Inverter is installed, disconnect its leads from terminal board 1A6TB2. Next remove the screws holding the Power Supply module to chassis. To reach the forward screws it will be necessary to pull out the two rear boards (1A4A1 and 1A4A2) from the synthesizer module. The remaining four screws at the rear of the chassis are easily accessible.

- 5.8.3.4 When reinstalling capacitors 1A6A1C5 and C9, on the regulator board, make sure polarity is correct (polarity is marked on regulator board 1A6A1). The four capacitor mounting screws should be tight against their lock washers but not so tight as to strip the internal threads in the capacitor.

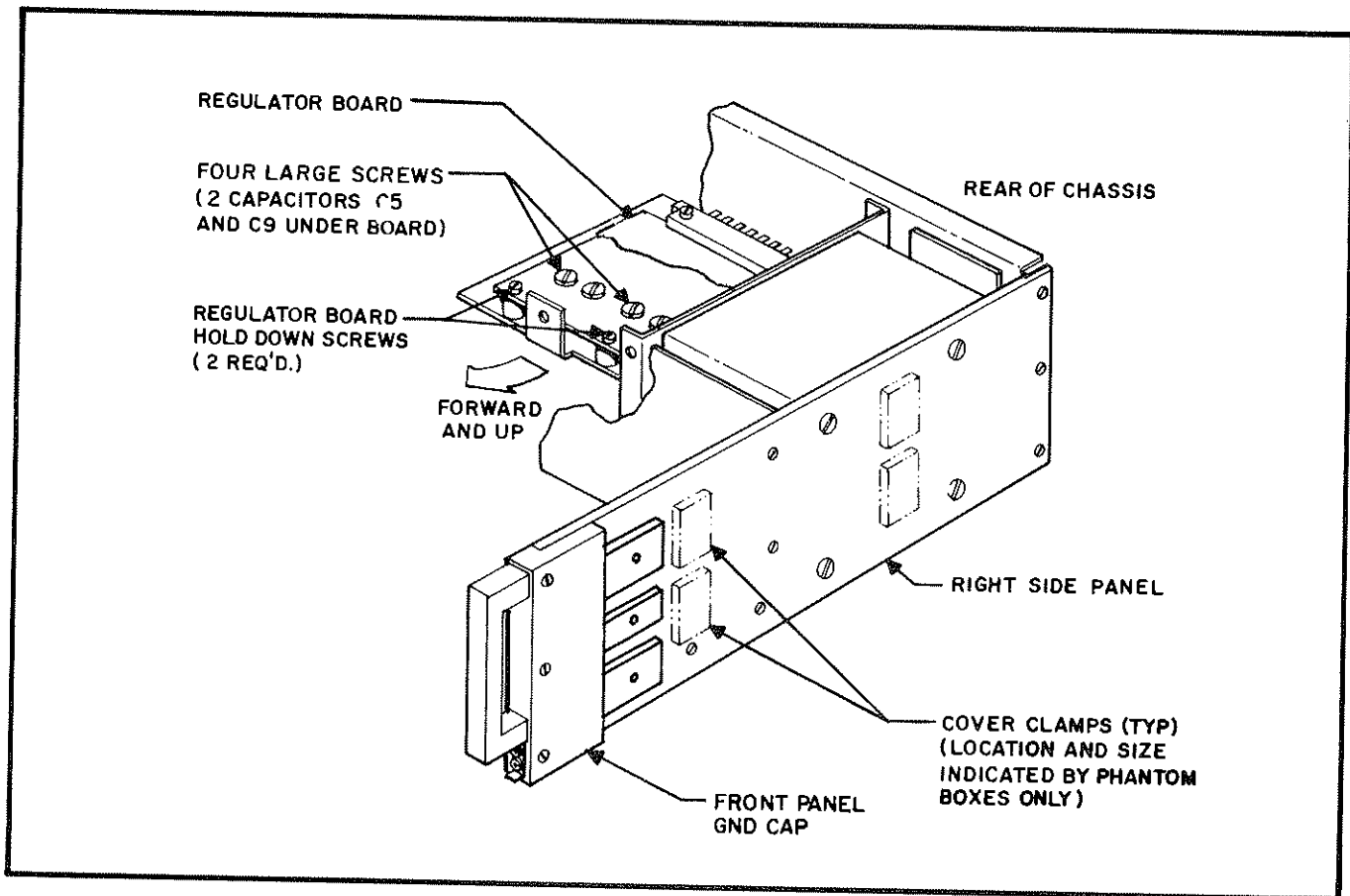


Figure 5.2 Power Supply Regulator Board (1A6A1)

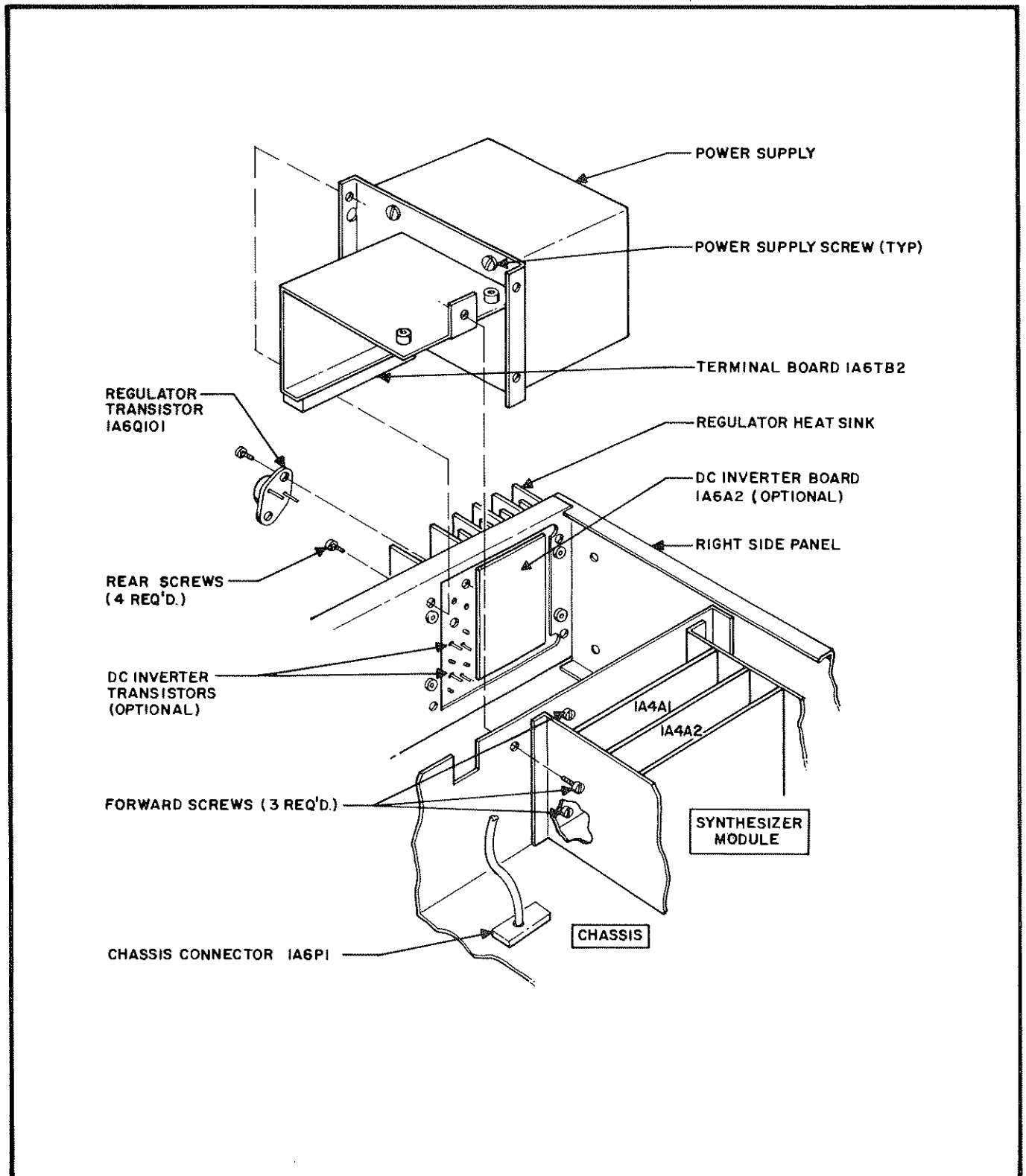


Figure 5.3 Power Supply Removal (1A6)

5.8.4 RF POWER AMPLIFIER REMOVAL AND SERVICING

When a power amplifier failure is suspected, first test the exciter output into 50 ohms at connector 1A3P3 to insure that it is capable of providing approximately 4 volts peak to peak undistorted output on SSB (using hand microphone).

5.8.4.1 To remove power amplifier, disconnect connectors 1A7J1, J2, and J3. Remove the four screws holding heat sink assembly to transceiver rear panel. Power amplifier assembly removes from the rear of the transceiver.

5.8.4.2 For servicing the power amplifier, it is desirable to use an external power source capable of 28VDC at 12 amperes, continuously variable from 0 to 28 VDC. If such a power source is not available, the transceiver power supply can be used. A typical test set up is shown in Figure 5.4.

CAUTION

When using a HP 606 or other RF signal generator to test the power amplifier, extreme caution should be exercised to prevent overdriving the unit and needlessly destroying transistors. Remember, the protection circuits are disconnected during tests of this type.

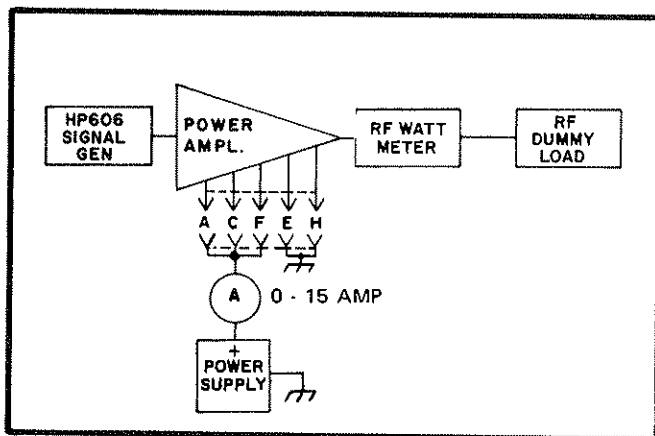


Figure 5.4 Power Amplifier Test Setup

5.8.4.3 Before applying D.C. power, make sure the signal generator output is at zero. Then slowly increase the power supply voltage, observing the ammeter, until +28V is reached. At this point the ammeter should be reading approximately 1 ampere. If, during the increasing of the source voltage, the current rises well beyond the 1 ampere level, a short circuit exists on the line, or one or both output transistors have failed. To determine which output transistor is defective, allow the current to remain at approximately 3 amperes for 30 seconds. Then feel both transistors. The defective one will be much hotter than the good one.

5.8.4.4 If power output is low, the defective stage can be readily determined by observing with an oscilloscope the wave form at the input center tap of T2 (the 10 turnside) for the predriver, T3 for the driver, or T5 for the output stage. Under normal operating conditions, these points will show primarily second harmonic energy, so if a large amount of fundamental frequency energy is present, it means only half of the push pull stage is operational. Now that the defective stage has been located, an observation of the respective collector wave forms will determine the failed transistor. The collector wave form on the good transistor will be much greater in amplitude than that of the defective one.

5.8.4.5 While it is necessary to remove the printed circuit board from the heat sink to replace 1A7Q1 or Q2, it is NOT necessary to remove the board to replace 1A7Q3, Q4, Q5, or Q6. Transistors Q3 and Q4 may be removed by unscrewing the two nuts from the studs on these components and unsoldering four connections on the top of the board for each transistor. The transistors may be removed from the top of the board. Transistors Q5 and Q6 may be removed by unscrewing the four hold down screws (two per transistor), and unsoldering four connections for each transistor. These transistors also remove from the top of the board.

NOTE

If the radio is used for voice only operation, it is permissible to replace only the defective output transistor (Q5 or Q6), leaving the other in place. However, if the radio is used for RTTY or data transmission, both Q5 and Q6 should be replaced as a matched pair, if one is found to be destroyed. Failure to do so will likely cause increased intermodulation products and reduces reliability.

5.8.4.6 Before replacing any or all of the four high power transistors, Q3, Q4, Q5 and Q6, clean the heat sink area thoroughly around each transistor making sure no foreign particles can come between the transistor and the heat sink. Apply a fresh coat of heat sink compound to the transistor and mount the transistor solidly to the heat sink before soldering. Make sure all collector leads point toward the output connector, 1A7J2. Trim the leads to convenient lengths and solder to the printed circuit board. If Q5 and Q6 have been replaced it is recommended that the bias current be checked. This can be done by unsoldering the top wire of inductor L5 from the top of T5/T6. Connect a d-c ammeter from L5 to T5/T6. Apply 28VDC to the P/A and adjust R23 until the meter reads 80 ma. Remove the ammeter and carefully resolder the inductor lead.

5.8.4.7 When transistor replacement is complete, test the power amplifier per test setup shown in figure 5.4. Apply D.C. power and slowly increase signal generator drive until 100 watts is shown on the wattmeter. The ammeter should indicate approximately 8.5 amperes. Allow the amplifier output to

remain at 100 watts for one or two minutes. Remove the signal drive. The ammeter should drop to 1 ampere or slightly greater. If the current drops to 2 amperes or higher and slowly decays toward the 1 ampere level, this means that one or both output transistors has not been properly seated to the heat sink. They should be removed, examined for foreign particles and replaced carefully. Repeat the above test to insure proper installation.

5.8.4.8 After installing power amplifier in transceiver, check current ALC to be sure it is operational. This may be done by placing an oscilloscope probe on the collector of 1A3A1Q4 on the VHF mixer board. Set the vertical range to 2VDC per division, sweep speed at 50 milliseconds per division and set trace at lowest marker division. Set transceiver mode switch to USB and XMIT GAIN fully CCW. Key transceiver and observe voltage rise. Trace should appear as in Figure 5.5A. Now place MODE switch in AM position and key transceiver. Oscilloscope trace should appear as in Figure 5.5B. The additional step in the wave form is evidence that the current ALC is operational and is preventing overdrive to the power amplifier. If this additional step is not observed, trouble shoot the current ALC loop and correct the problem before rekeying the transmitter. Without the current ALC protection, the power amplifier can be destroyed. It is designed to limit the amplifier current to 10 amperes.

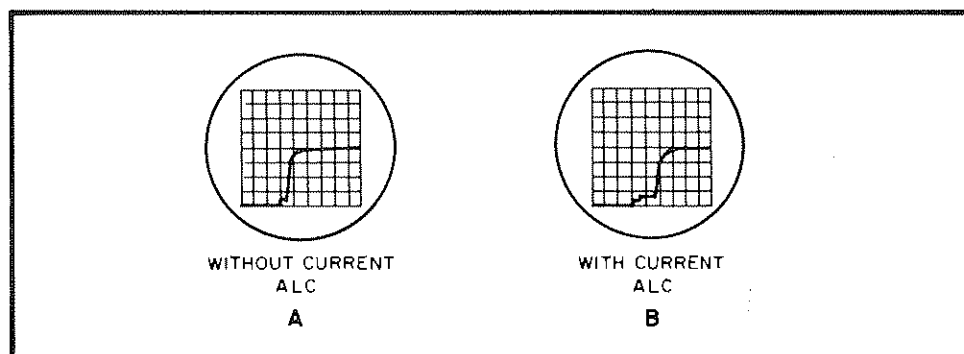


Figure 5.5 Current ALC Wave Form

SUNAIR GSB-900SC

This current can then be monitored across 1A7R24 in the power amplifier or 1A6R2 on the power supply regulator

board. Since these resistors are 0.1 ohm resistance, a voltage of 1 volt across them represents 10 amperes current.

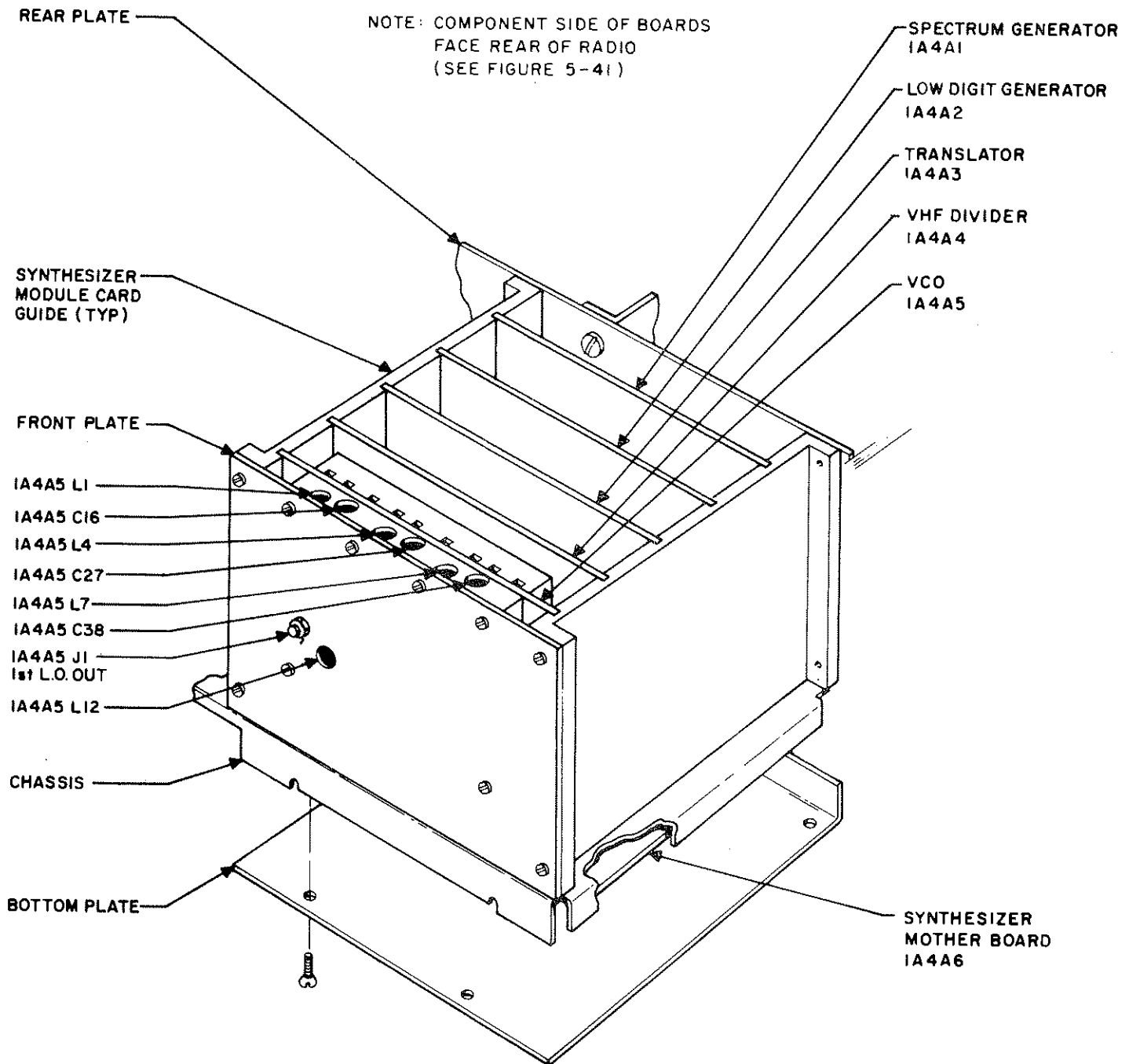


Figure 5.6 Synthesizer Mechanical Assembly

5.9 PRINTED CIRCUIT BOARDS

5.9.1 PRINTED CIRCUIT BOARD REPAIR AND MAINTENANCE

To avoid damage to the printed circuit boards during the replacement of components or integrated circuits, extreme care should be used in soldering and desoldering operations. A low wattage (30 to 50 watts) soldering iron with a narrow tip (1/8" or smaller) should be used. Due to the circuit density on the boards, solder "bridges" or short circuits between adjacent copper foil runs are possible if care is not used during soldering operations. After soldering is completed, the area around the connection should be closely inspected for excess solder or "bridges" between connections and runs with any removed before re-installing the board. A low wattage iron is necessary to prevent the application of excessive heat to the copper foil. Excessive heat will cause the foil to separate from the board rendering the board unrepairable. Only a good electronic-grade rosin core solder should be used in making repairs. **DO NOT USE ACID CORE SOLDER!**

NOTE

Caution should be used when removing the printed circuit boards from their enclosures. A card extractor can be easily made from a length of heavy gauge wire (#10-#12). Form a hook at each end and insert each hook into the holes provided at the top outer edge of each board. Apply gentle upward pressure near each hook to free the board(s) from their edge connectors.

When replacing boards in their edge connectors, insure that the proper

board is in its correct position in the card guides provided at each board edge and gently apply downward pressure to the top edge of the board until it is fully seated in its edge connector.

**DO NOT USE SCREWDRIVERS OR
PLIERS TO REMOVE BOARDS!**

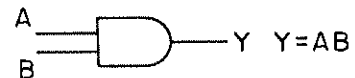
LOGIC NOTES

Various types of digital and linear logic devices are used in the GSB-900SC. A brief description of these devices is presented to explain their basic operation and symbolic notation.

HIGH - a high also known as a logic high or a logic one is a signal in two state 5 volt logic that generally measures between 2.5 volts and 5.0 volts.

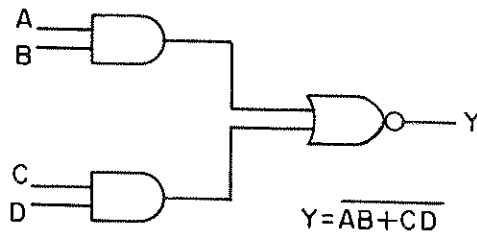
LOW - a low also known as a logic low or a logic zero is a signal in two state 5 volt logic that generally measures between 0 and 0.5 volts.

5.10.1 AND GATE



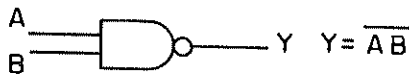
An And gate can have two or more inputs. The level of the output is dependent on the state of all the input levels. For a high level to appear at the output, all of the input levels must be high. If any or all inputs are low, the output will be low. The logic equation is read: Y equals A and B.

5.10.2 AND-OR-INVERT GATE



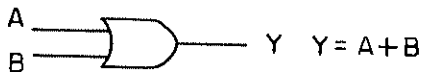
The And-Or-Invert gate may have two or more input pairs. For the output, Y, to be low, both inputs of any pair of inputs must be high. To produce a high output, Y, at least one input of each pair of inputs must be low. The logic equation is read: Y equals A and B or C and D NOT (low).

5.10.3 NAND GATE



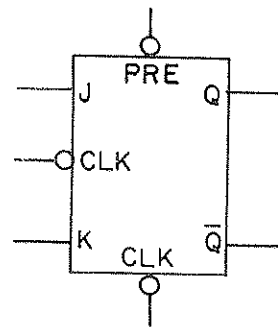
A Nand gate may have two or more inputs. If both inputs are high, the output is low. If either or both inputs are low, the output will be high. The logic equation reads: Y equals A and B NOT.

5.10.4 OR GATE



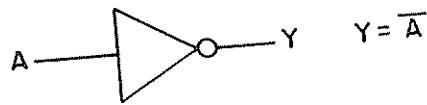
The Or gate has two inputs. The output is high if either or both of the inputs is high. If both inputs are low, the output will be low. The logic equation reads: Y equals A or B.

5.10.5 J-K FLIP FLOP



The J-K Flip Flop is a memory device that records both the status of a single bit of information on an output called Q and the inverse of that bit of information on an output called $\bar{Q}$. The status of the outputs of the device are determined by the levels produced on inputs called J, K, Clock, Clear and Preset. If the Clear input is forced low while the Preset input is high, the output Q will always be low and the output $\bar{Q}$ will be high. The condition of the outputs Q and $\bar{Q}$ will not change after the Clear input becomes high. If the Preset input is forced low while the Clear input is high, the Q output will always be high and the output $\bar{Q}$ will be low. This condition, too, will persist after the Preset input is driven high. If a Clock pulse occurs which first goes high and then back low while the J, Clear and Preset inputs are high and the K input is low, the Q output will become high if it wasn't already and the $\bar{Q}$ input will switch low if it wasn't already. If the same Clock pulse occurs while the J input is low and the K, Clear and Preset inputs are high the Q output will switch low if it wasn't already low and the $\bar{Q}$ output will switch high if it wasn't already high. If the Clock pulse occurs while inputs J and K are low and Clear and Preset are high no output change on Q or $\bar{Q}$ will occur. If J, K, Clear and Preset are high each successive Clock pulse will cause the outputs Q and $\bar{Q}$ to change state or toggle from their former logic state to the inverse of that former logic state.

5.10.6 INVERTER



The Inverter has a single input. The output level is the opposite of the input level or inverted. The logic equation reads: Y equals A NOT.

5.10.7 SCHMITT TRIGGER



The Schmitt Trigger is basically an inverter that exhibits different output switching characteristics for positive and negative going input pulses. The trigger uses hysteresis, or backlash in the switching mode. Hysteresis is the voltage difference between the positive and negative thresholds. A positive going threshold of approximately 1.7 volts will cause the output to switch low, and a negative going threshold of approximately 0.9 volts will cause the output to switch high. The output can be triggered from slow input ramps. This device can handle DC input levels from 0.5 volts to 2.5 volts and still produce a logic output voltage. Standard 5 volt logic devices produce indeterminate output voltages if they see input voltages between 0.8 and 2.0 volts.

5.10.8 PROM

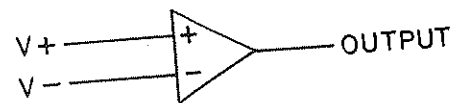
Programmable Read Only Memories (PROMS) are logic elements that are manufactured in many different input and output configurations. Proms are programmed by blowing selected fuse links, and once programmed cannot be altered. Selection of addresses produces an output or number of outputs previously programmed in that memory location. Depend-

ing on the device type, outputs may be factory manufactured with logical 1 or logical 0 outputs. In the case where a device is supplied with logical 1 outputs all desired logical 0 outputs must be programmed. If outputs are supplied as logical 0's, all desired logical 1 outputs must be programmed.

5.10.9 RAM

Random Access Memories (RAMS) are logic elements that are manufactured in many different input and output configurations. Unlike the Prom, a Ram can be re-programmed over again many times and the information stored can be retrieved by utilizing Read/Write, Chip enable and address inputs. The GSB-900SC utilizes six CMOS Rams in the memory system for reliability and low power consumption.

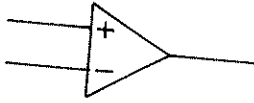
5.10.10 VOLTAGE COMPARATOR



A Voltage Comparator has two inputs, V+ and V-. The V+ input is normally set to a fixed voltage level or reference voltage. The V- input is usually variable. The output is high as long as the V+ input is more positive than the V- input. As the V- input rises, or becomes more positive, and exceeds the V+ input level, the output switches low. If the variable V- input voltage becomes less positive than the V+ reference input, the output switches to a high level once again.

5.10.11 OPERATIONAL AMPLIFIER

The Operational Amplifier generally provides a method of converting a small input signal into a signal of greater magnitude. The output voltage follows the changes that occur at the input terminals. In the case where t



V- input is tied to the operational amplifier output, the output voltage follows the input voltage supplied at the V+ input. This circuit is in fact called a voltage follower circuit. It is a circuit used to convert a high impedance variable voltage output to an equivalent Low impedance variable voltage output which will not be as readily affected by variations in loading as a high impedance output would be.

5.10.12 CORRECT LOGIC LEVEL EXAMPLES

Table 5.10 indicates examples of the correct logic levels that should appear at the pins of the Memory printed circuit board edge connector 1A1A7P1, and at the Address pins of the RAMS with the Channel Selector switches in the positions indicated, and the Frequency Control Mode Keyswitch in the Load Freq position. The individual address inputs to the memories are paralleled (bused) together, so logic levels that appear at an address input pin will appear at the corresponding pins of all six RAMS.

In the Read Freq mode, address A0, pin 4, will indicate a "0", or low logic state to indicate a receive frequency location, and a "1", or high logic state to indicate a transmit frequency location when the Load XMT pushbutton is depressed.

By examining the logic levels and Channel Selector switch positions in the table, the proper address vs. switch position logic can be determined for any of the one-hundred switch position combinations. Note that the 4 bits of information comprising the Channel 10's digit and the 4 bits of information comprising the Channel Units digit are each BCD representations of the Channel switch settings. Note too that the RAM addresses A1 through A7 are the binary equivalent of the Channel 10's and Channel Units two digit decimal representation of channel.

5.10.13 INVERTED SIGNALS

An inverted signal with respect to logic is denoted by the signal title with a bar over the top of the signal title. An inverted signal or one with a bar over its title is a signal that is low when the signal is present and high when it is not present. As an example, if a signal is called Read Freq, then the inverted equivalent of Read Freq would be written as Read Freq and described either as Read Freq Inverted or Read Freq Not.

U28, U29 Binary Coded Decimal to Decimal Decoder Truth Table

OUTPUT Pin #	INPUT PIN#									
	BCD									
	12	13	14	15	DEC#					
1	L	L	L	L	0	L	H	H	H	H
2	L	L	L	H	1	H	L	H	H	H
3	L	L	H	L	2	H	H	L	H	H
4	L	L	H	H	3	H	H	H	L	H
5	L	H	L	L	4	H	H	H	L	H
6	L	H	L	H	5	H	H	H	H	L
7	L	H	H	L	6	H	H	H	H	H
9	L	H	H	H	7	H	H	H	H	H
10	H	L	L	L	8	H	H	H	H	H
11	H	L	L	H	9	H	H	H	H	L

Table 5.11 Binary Coded Decimal to Decimal Decoder Truth Table
H = High Level (Off), L = Low Level (On)

Channel Dial Setting	XMT/RCV	1A1A7P1										1A1A7U3 through U8									
		Channel 10's										Channel Units									
		80 Pin	40 Pin	20 Pin	10 Pin	8 Pin	4 Pin	2 Pin	1 Pin	A7 Pin	A6 Pin	A5 Pin	A4 Pin	A3 Pin	A2 Pin	A1 Pin	A0 Pin				
00	RCV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00	XMT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
09	XMT	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	1				
09	RCV	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0				
10	XMT	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1				
19	RCV	0	0	0	1	1	0	0	1	0	0	1	0	0	1	1	0				
23	XMT	0	0	1	0	0	0	1	1	0	0	1	0	1	1	1	1				
32	RCV	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0				
47	XMT	0	1	0	0	0	1	1	1	0	1	0	1	1	1	1	1				
50	RCV	0	1	0	1	0	0	0	0	0	1	1	0	0	1	0	0				
56	RCV	0	1	0	1	0	1	1	0	0	1	1	1	0	0	0	0				
69	RCV	0	1	1	0	1	0	0	1	1	0	0	0	1	0	1	0				
74	XMT	0	1	1	1	0	1	0	0	1	0	0	1	0	1	0	1				
88	RCV	1	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0				
99	XMT	1	0	0	1	1	0	0	1	1	1	0	0	0	1	1	1				

Table 5.10 Correct Logic Level Examples

1A1A6 U21					CORRESPONDING					1A1A6 U21				
U21 Output Pin #					SELECTED					U21 Input Pin #				
1	2	3	4	5	6	7	9	FREQUENCY		10	11	12	13	14
L	L	L	L	L	L	L	H	0 MHz	L	L	L	L	L	L
H	L	L	L	L	L	L	L	1 MHz	L	L	L	L	L	L
L	H	L	L	L	L	L	L	2 MHz	L	L	L	L	L	L
L	L	H	L	L	L	L	L	3 MHz	H	H	L	L	L	L
L	L	L	H	L	L	L	L	4 MHz	L	L	H	L	L	L
L	L	L	L	L	L	L	L	5 MHz	H	L	H	L	L	L
L	L	L	L	H	L	L	L	6 MHz	L	H	H	L	L	L
L	L	L	L	L	L	L	L	7 MHz	H	H	H	L	L	L
L	L	L	L	H	L	L	L	8 MHz	L	L	L	H	L	L
L	L	L	L	L	H	L	L	9 MHz	H	L	L	H	L	L
L	L	L	L	L	L	L	L	10 MHz	L	L	L	L	L	L
L	L	L	L	L	H	L	L	11 MHz	H	L	L	L	L	L
L	L	L	L	L	L	L	L	12 MHz	L	H	L	L	L	L
L	L	L	L	L	L	L	L	13 MHz	H	H	L	L	L	L
L	L	L	L	L	L	L	L	14 MHz	L	L	H	L	L	L
L	L	L	L	L	L	L	L	15 MHz	H	L	H	L	L	L
L	L	L	L	L	L	L	L	16 MHz	L	H	H	L	L	L
L	L	L	L	L	L	L	L	17 MHz	H	H	H	L	L	L
L	L	L	L	L	L	L	L	18 MHz	L	L	L	H	L	L
L	L	L	L	L	L	L	L	19 MHz	H	L	L	H	L	L

Table 5.12 Band Prom Truth Table. L = Logic Low, H = Logic High.

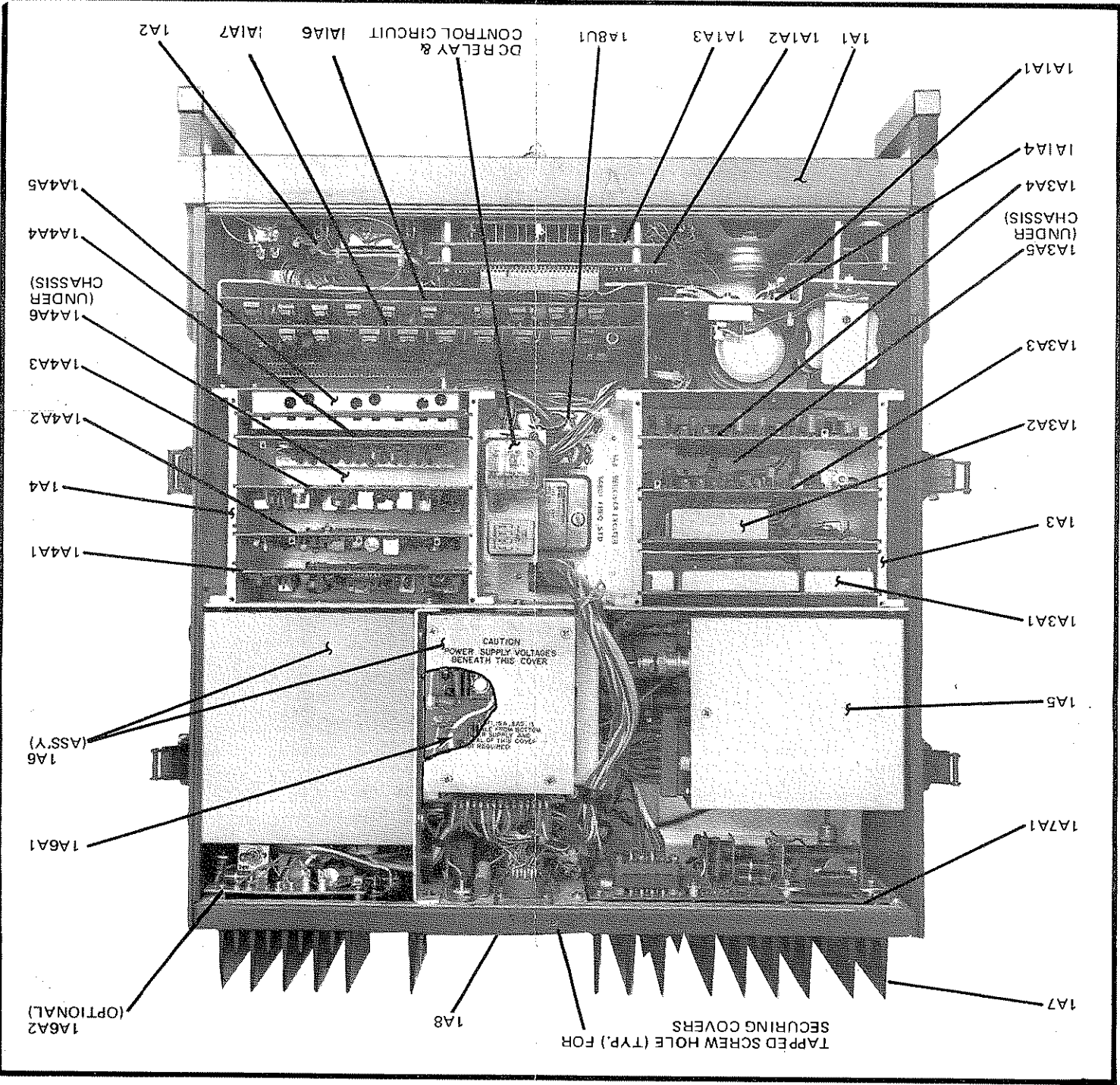


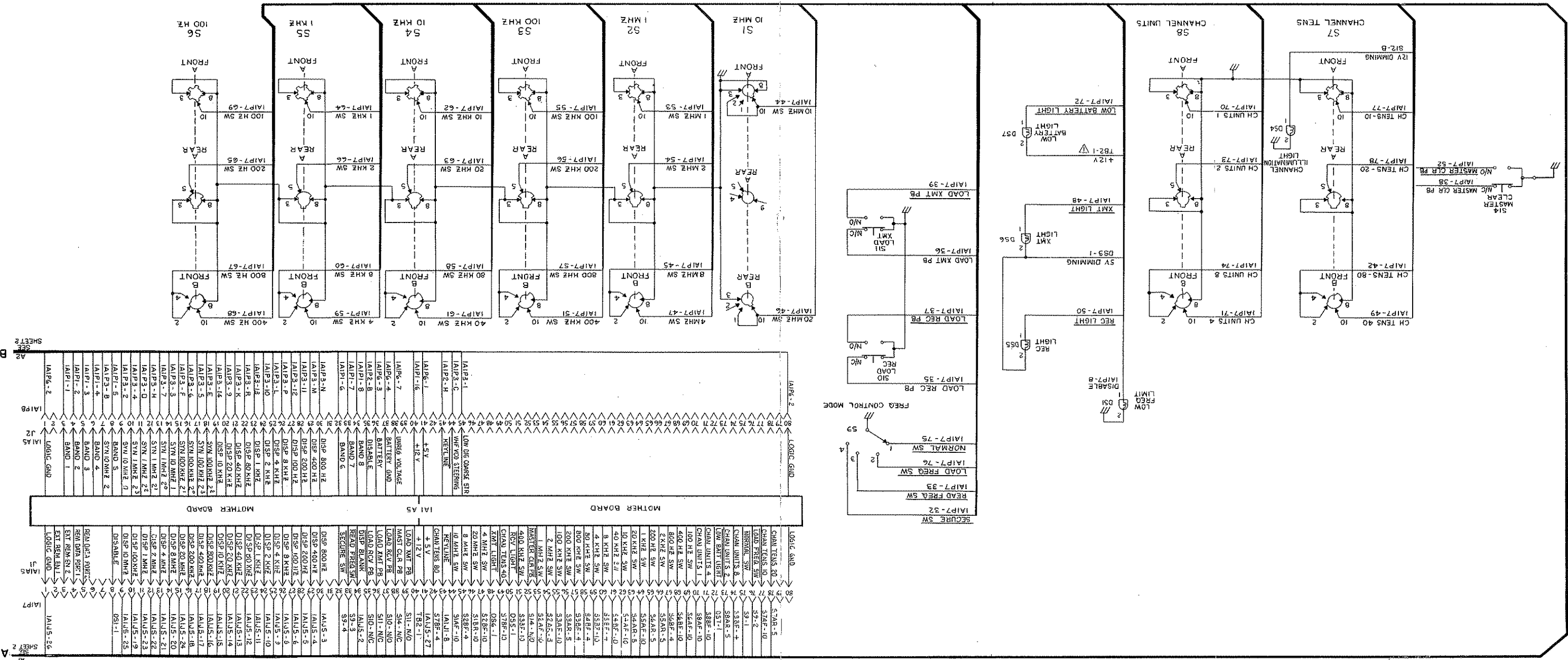
Figure 5.7 GSB-900SC Top View and Table of Assemblies

5.11 SCHEMATIC DIAGRAMS

The following pages contain schematic diagrams, voltage charts, parts lists and depot spare parts requirements for all assemblies of the GSB-900SC.

DESIGNATOR	ASSEMBLY	SUBASSEMBLY	DESCRIPTION	SUNAIR PART NUMBER
1A1		1A1A1 1A1A2 1A1A3 1A1A4 1A1A5 1A1A6 1A1A7	FRONT PANEL ASSEMBLY SPEAKER DRIVER BOARD DISPLAY DRIVER BOARD DISPLAY BOARD POWER SUPPLY - BATTERY MOTHER BOARD BAND STEERING BOARD MEMORY BOARD	1003640010 5024041798 1003670008 5024645596 1003840001 1003650007 1003600000 1003620001
1A2			METER PANEL ASSEMBLY OR ANTENNA TUNING CONTROL ASSY (OPTION)	5024041992 GRN 5024041950 GRN Refer to Applicable Material
1A3		1A3A1 1A3A2 1A3A3 1A3A4 1A3A5	RECEIVER/EXCITER ASSEMBLY V.H.F. MIXER I.F./FILTER SIDE BAND GENERATOR AUDIO BOARD RECEIVER/EXCITER MOTHER BOARD	5024110099 5024120094 8033160209 5024140095 5024011899
1A4		1A4A1 1A4A2 1A4A3 1A4A4 1A4A5 1A4A6	SYNTHESIZER ASSEMBLY SPECTRUM GENERATOR LOW DIGIT GENERATOR TRANSLATOR V.H.F. DIVIDER V.C.O.	5024060091 5024070097 5024080092 5024090098 5024100093 5024011597
1A5		1A5A1 1A5A2 1A5A3 1A5A4	FILTER MODULE ODD CHANNEL FILTER BOARD EVEN CHANNEL FILTER BOARD RECEIVE FILTER BOARD MOTOR CONTROL BOARD	5024050096 5024050592 5024051696 5024052692 5024052994
1A6		1A6A1 1A6A2	POWER SUPPLY REGULATOR BOARD ASSEMBLY D.C. INVERTER (OPTION)	5024020090 1001220005 5024021398
1A7		1A7A1	R.F. POWER AMPLIFIER ASSY. BOARD	5024030095
1A8			CHASSIS ASSEMBLY	5024010094 GRN 5024010051 GRN

NOTES: UNLESS OTHERWISE SPECIFIED:
1. COMMON CONNECTION FOR +12 VDC
2. ALL RESISTORS ARE IN OHMS, 1/2 W.
3. ALL CAPACITORS ARE IN MICROFARADS.



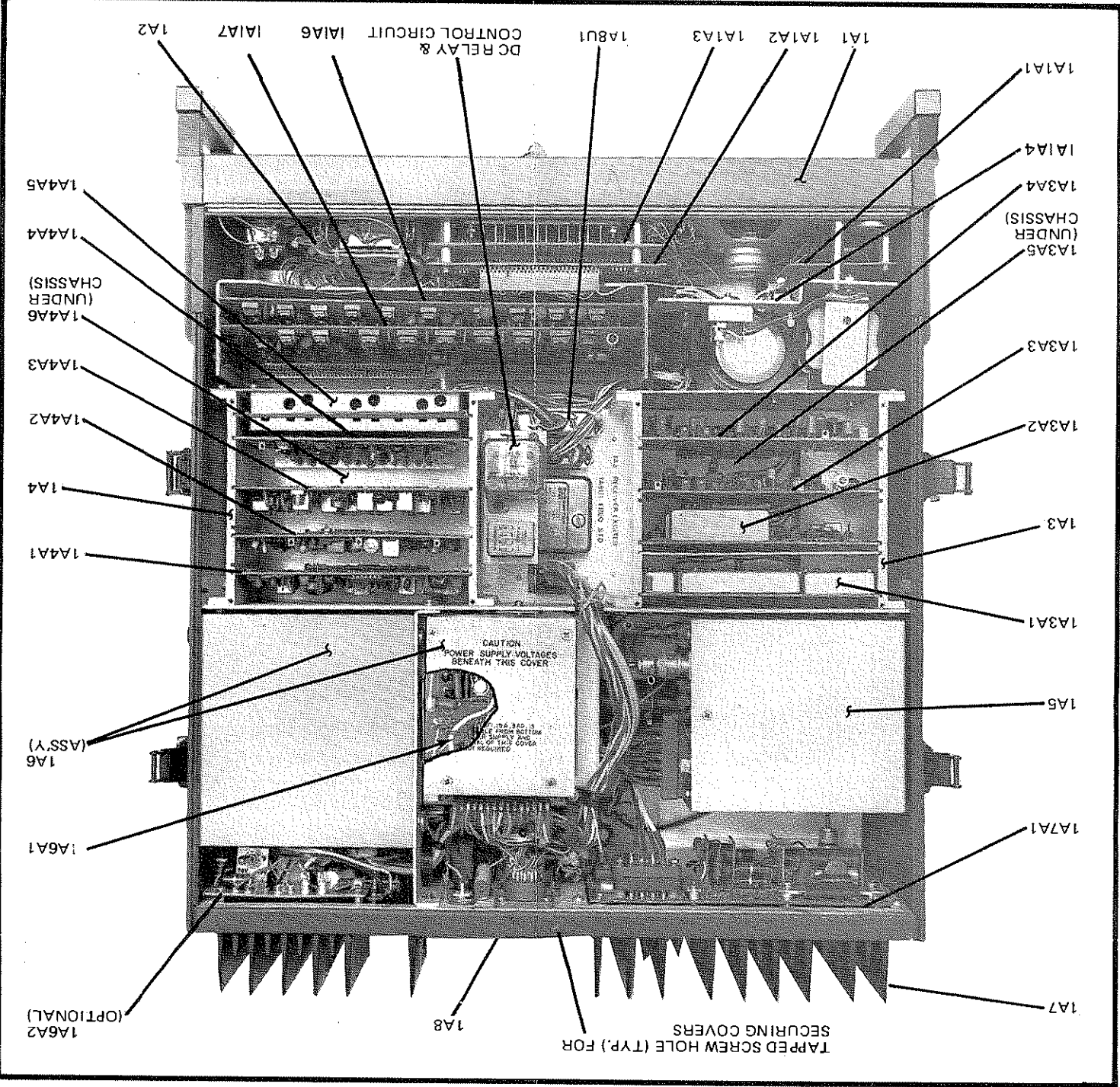


Figure 5.7 GSB-900SC Top View and Table of Assemblies

5.11 SCHEMATIC DIAGRAMS

The following pages contain schematic diagrams, voltage charts, and parts lists requirements for all assemblies of the GSB-900SC.

DESIGNATOR		DESCRIPTION	PART NUMBER
ASSEMBLY	SUBASSEMBLY		
1A1	1A1A1 1A1A2 1A1A3 1A1A4 1A1A5 1A1A6 1A1A7	FRONT PANEL ASSEMBLY SPEAKER DRIVER BOARD DISPLAY DRIVER BOARD DISPLAY BOARD POWER SUPPLY - BATTERY MOTHER BOARD BAND STEERING BOARD MEMORY BOARD	1003640010 5024041798 1003670008 5024645596 1003840001 1003650007 1003600000 1003620001
1A2		METER PANEL ASSEMBLY OR ANTENNA TUNING CONTROL ASSY (OPTION)	5024041992 GRN 5024041950 GRN OR Refer to Applicable Material
1A3	1A3A1 1A3A2 1A3A3 1A3A4 1A3A5	RECEIVER/EXCITER ASSEMBLY V.H.F. MIXER I.F./FILTER SIDE BAND GENERATOR AUDIO BOARD RECEIVER/EXCITER MOTHER BOARD	5024110099 5024120094 8033160209 5024140095 5024011899
1A4	1A4A1 1A4A2 1A4A3 1A4A4 1A4A5 1A4A6	SYNTHESIZER ASSEMBLY SPECTRUM GENERATOR LOW DIGIT GENERATOR TRANSLATOR V.H.F. DIVIDER V.C.O.	5024060091 5024070097 5024080092 5024090098 5024100093 5024011597
1A5	1A5A1 1A5A2 1A5A3 1A5A4	FILTER MODULE ODD CHANNEL FILTER BOARD EVEN CHANNEL FILTER BOARD RECEIVE FILTER BOARD RF DETECTOR BOARD	5024050096 5024057490 5024057791 5024057295 5024057597
1A6	1A6A1 1A6A2	POWER SUPPLY REGULATOR BOARD ASSEMBLY	5024020090 5024024095 5024021398
1A7	1A7A1	R.F. POWER AMPLIFIER ASSY. R.F. POWER AMPLIFIER CIRCUIT BOARD	5024030095 5024030290
1A8		CHASSIS ASSEMBLY	5024010094 GRN 5024010051 GRN

DESIGNATOR	ASSEMBLY	SUBASSEMBLY	DESCRIPTION	SUNAIR PART NUMBER
1A1		1A1A1 1A1A2 1A1A3 1A1A4 1A1A5 1A1A6 1A1A7	FRONT PANEL ASSEMBLY SPEAKER DRIVER BOARD DISPLAY DRIVER BOARD DISPLAY BOARD POWER SUPPLY - BATTERY MOTHER BOARD BAND STEERING BOARD MEMORY BOARD	1003640010 5024041798 1003670008 5024645596 1003840001 1003650007 1003600000 1003620001
1A2			METER PANEL ASSEMBLY OR ANTENNA TUNING CONTROL ASSY (OPTION)	5024041992 GRN 5024041950 GRN Refer to Applicable Material
1A3		1A3A1 1A3A2 1A3A3 1A3A4 1A3A5	RECEIVER/EXCITER ASSEMBLY V.H.F. MIXER I.F./FILTER SIDE BAND GENERATOR AUDIO BOARD RECEIVER/EXCITER MOTHER BOARD	5024110099 5024120094 8033160209 5024140095 5024011899
1A4		1A4A1 1A4A2 1A4A3 1A4A4 1A4A5 1A4A6	SYNTHESIZER ASSEMBLY SPECTRUM GENERATOR LOW DIGIT GENERATOR TRANSLATOR V.H.F. DIVIDER V.C.O. SYNTHESIZER MOTHER BOARD	5024060091 5024070097 5024080092 5024090098 5024100093 5024011597
1A5		1A5A1 1A5A2 1A5A3 1A5A4	FILTER MODULE ODD CHANNEL FILTER BOARD EVEN CHANNEL FILTER BOARD RECEIVE FILTER BOARD MOTOR CONTROL BOARD	5024050096 5024050592 5024051696 5024052692 5024052994
1A6		1A6A1 1A6A2	POWER SUPPLY REGULATOR BOARD ASSEMBLY D.C. INVERTER (OPTION)	5024020090 1001220005 5024021398
1A7		1A7A1	R.F. POWER AMPLIFIER ASSY. R.F. POWER AMPLIFIER CIRCUIT BOARD	5024030095 5024030290
1A8			CHASSIS ASSEMBLY	5024010094 GRN 5024010051 GRN

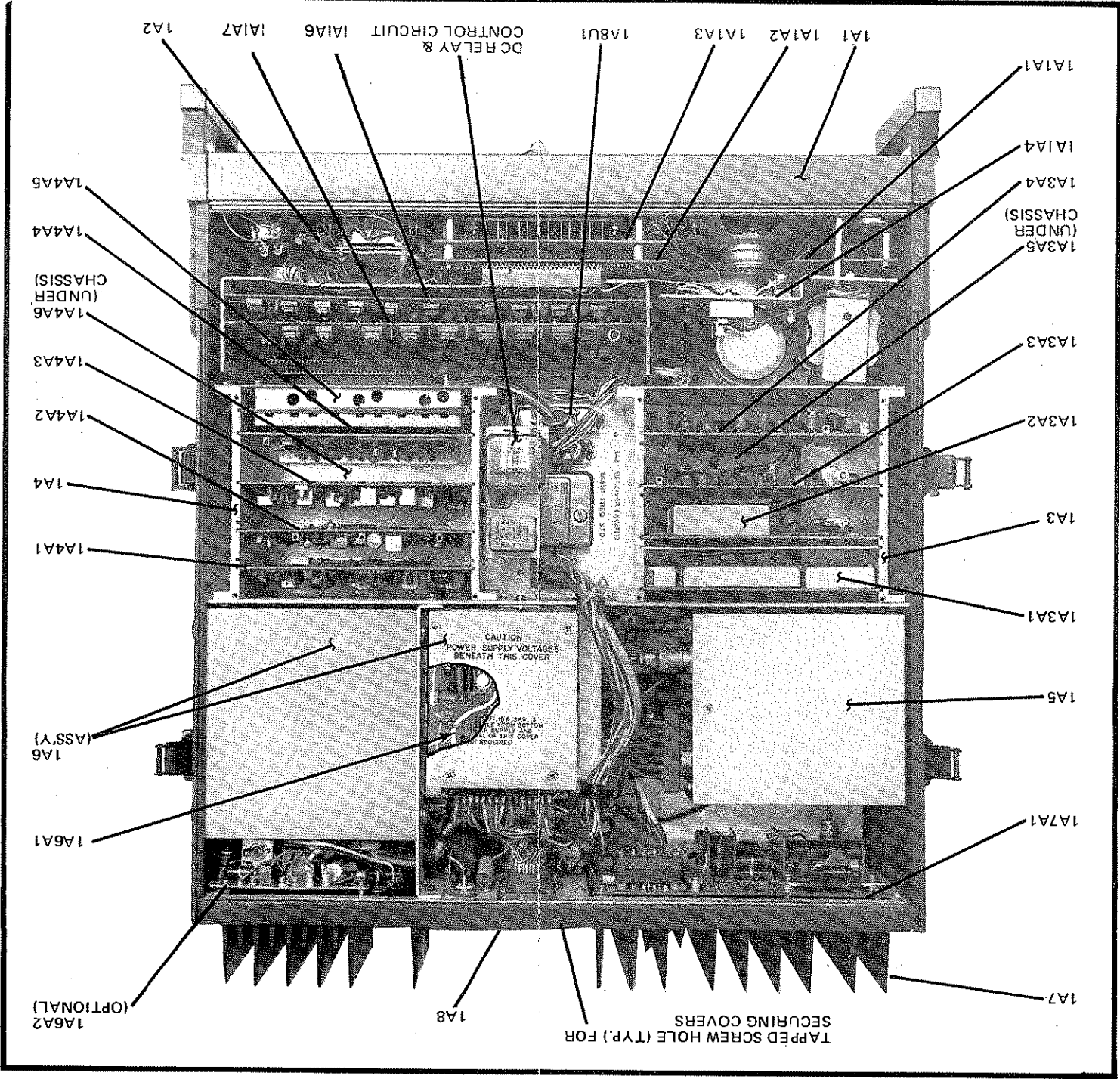
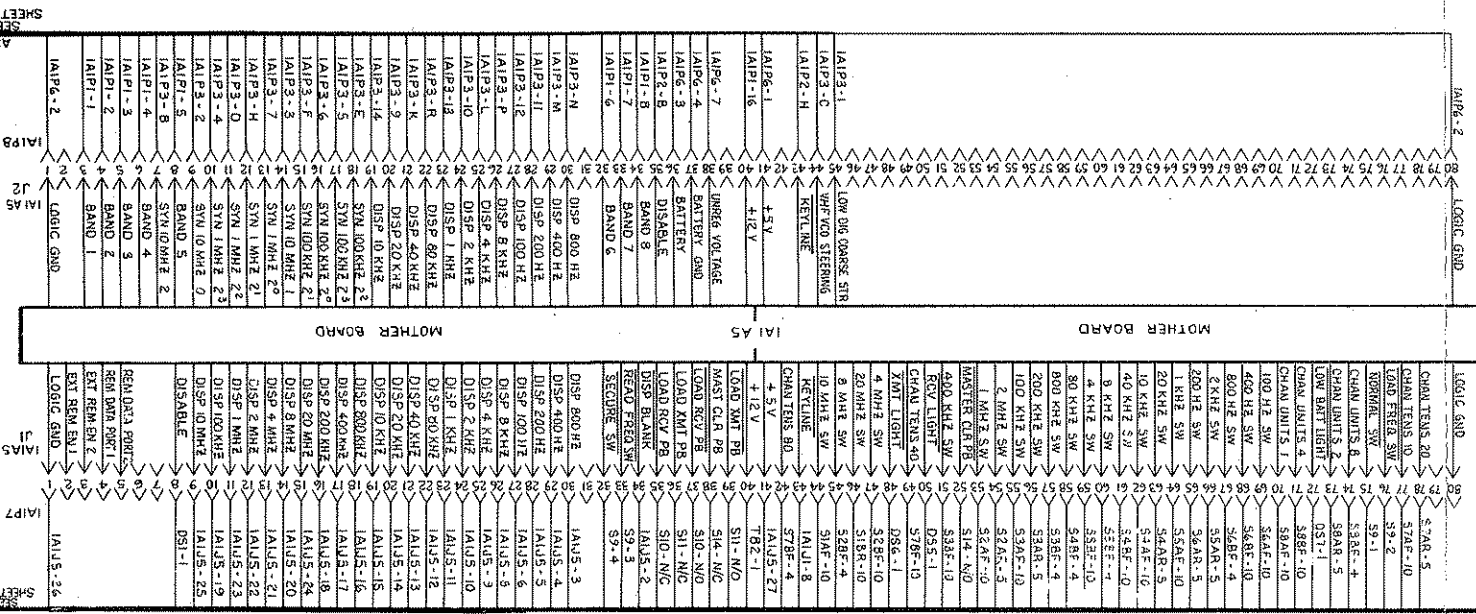
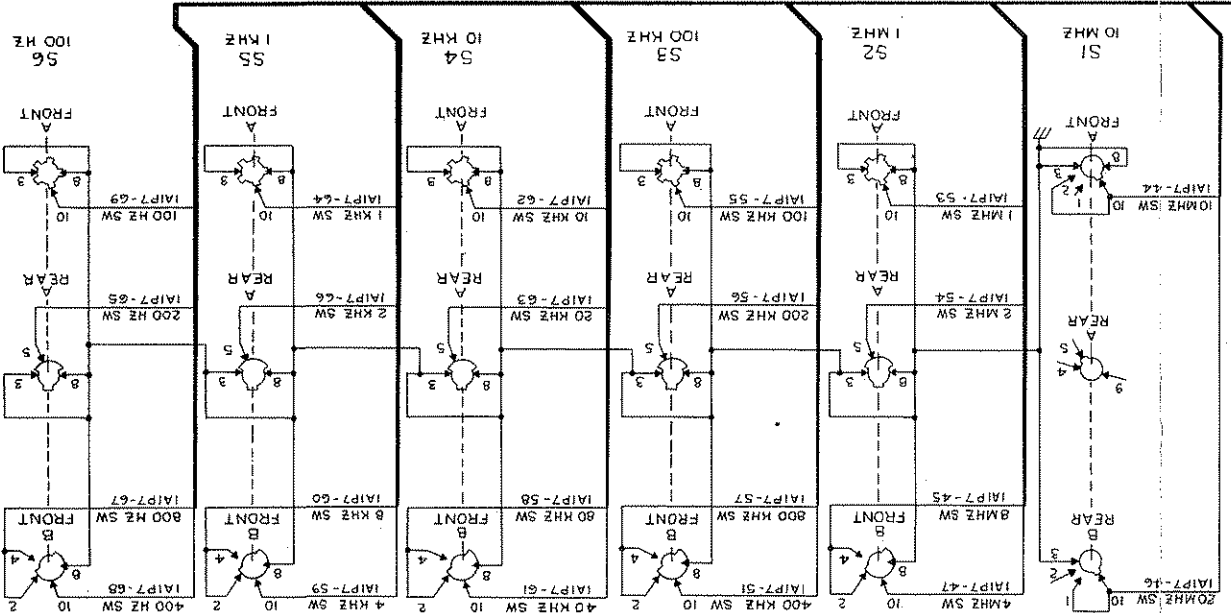
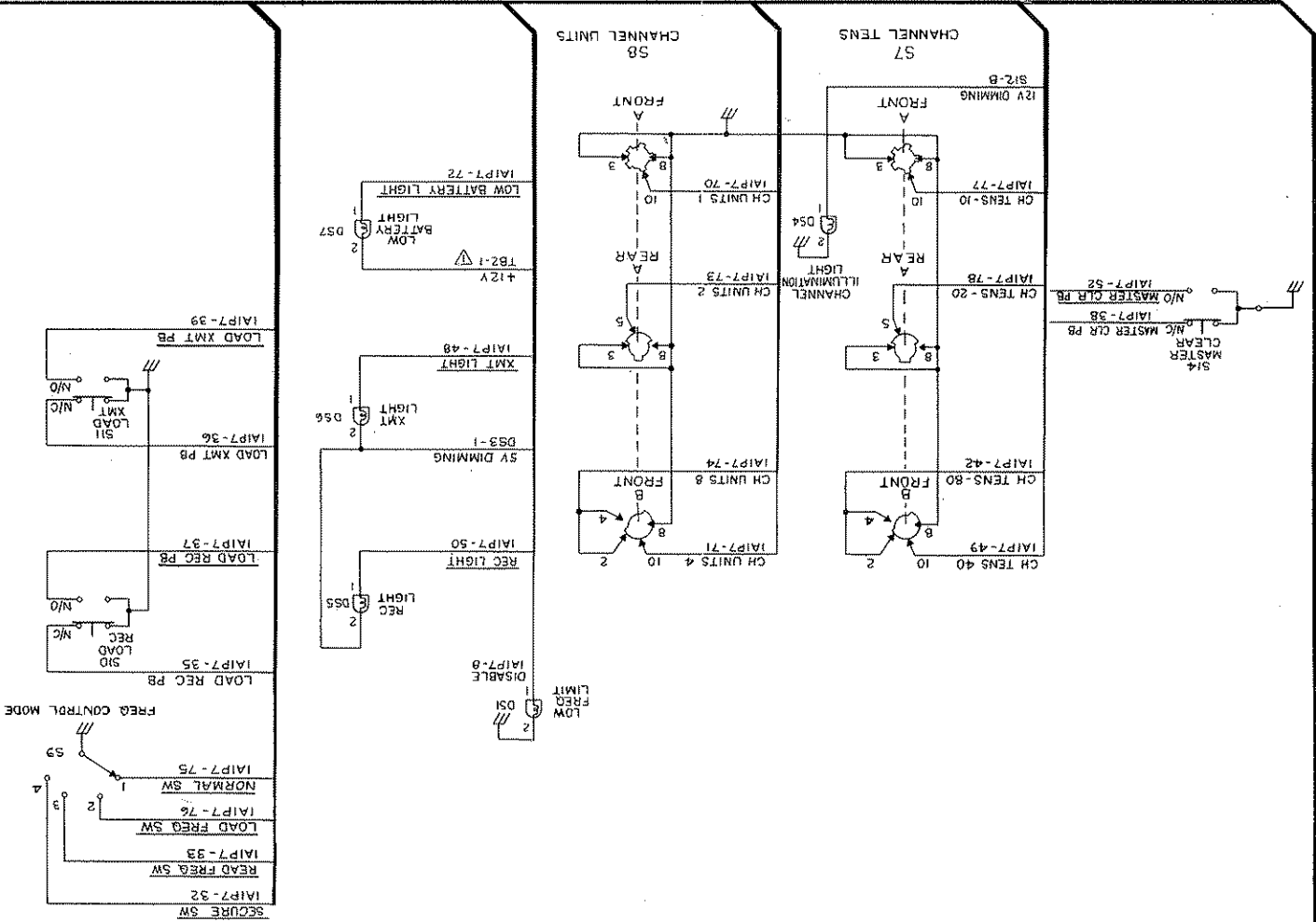


Figure 5.7 GSB-900SC Top View and Table of Assemblies

5.11 SCHEMATIC DIAGRAMS

The following pages contain schematic diagrams, voltage charts, parts lists and depot spare parts requirements for all assemblies of the GSB-900SC.

NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS, 1/2 W.
2. ALL CAPACITORS ARE IN MICROFARADS.



REF	SUNAIR	DESCRIPTION	PART NO.
1A1	1003640001	FRONT PANEL ASSY, GREEN SC	1003640001
1A1A	1003640000	PC Assy, Bnd Steering GSB-900SC	1003640000
1A1A7	1003620001	PC Assy, Memory GSB-900SC	1003620001
1A1J1	0753560003	Connector, Power, 5 Pin Round	0753560003
1A1J3	0754430006	Connector, Phone Jack, 2 Cond.	0754430006
1A1J4	0840850000	Connector, Headphone	0840850000
C1	0283630001	Capacitor, 1 uF, 35 V, T368	0283630001
C2	0281620008	Capacitor, 0.01 uF, 25 V, X55	0281620008
C3	0281620008	Capacitor, 0.01 uF, 25 V, X55	0281620008
C4	0281620008	Capacitor, 0.01 uF, 25 V, X55	0281620008
C5	0281620008	Capacitor, 0.01 uF, 25 V, X55	0281620008
CR1	0405180004	Diode, Rectifier 1N4004	0405180004
CR2	0405180004	Diode, Rectifier 1N4004	0405180004
CR3	0405180004	Diode, Rectifier 1N4004	0405180004
CR4	0405180004	Diode, Rectifier 1N4004	0405180004
CR5	0405180004	Diode, Rectifier 1N4004	0405180004
DS1	0840740000	Lamp Assy, Red	0840740000
DS2	0840870001	Lamp Assy, Amber	0840870001
DS3	0524641523	Lamp Assy, Painted	0524641523
DS4	0840720009	Lamp Assy, Clear	0840720009
DS5	0524641507	Lamp Assy, Amber	0524641507
DS7	0524641507	Lamp Assy, Red	0524641507
LS1	0877970009	Speaker, 3x5 Oval, 8 ohm, 5W	0877970009
R1	0346020000	Pot., 5K, 20%, 1/4 Shaft	0346020000
R2	01637220002	Resistor, 47, 10%, 2W	01637220002
R3	0165660007	Resistor, 33, 10%, 1W	0165660007
R4	0524641400	Pot., Tandem 5K/5K, 20%, 1/2W	0524641400
R5	0524641701	Pot., 5K, Linear	0524641701
R6	0186670001	Resistor, 2.7K, 10%, 1/4W	0186670001
R7	0189540001	Resistor, 8.2K, 5%, 1/2W	0189540001
R8	0524641400	Pot., Tandem, 5K/5K, 20%, 1/2W	0524641400
S1	0524041101	Switch, Rotary, 10 MHz	0524041101
S2	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S3	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S4	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S5	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S6	0524041500	Switch, Rotary, 100 Hz	0524041500
S7	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S8	0524041500	Switch, Rotary, 1 KHz, 100 Hz	0524041500
S9	1003990011	Switch, Rotary, 4 Pos, Keylock	1003990011
S10	1000870014	Switch, Pushbutton, SPDT	1000870014
S11	1000870014	Switch, Pushbutton, SPDT	1000870014
S12	0346600006	Switch, Rotary, Mode	0346600006
S13	50224041607	Switch, Pushbutton, SPDT	50224041607
S14	1000870014	Switch, Pushbutton, SPDT	1000870014

NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS, 1/2 W.
2. ALL CAPACITORS ARE IN MICROFARADS.
3. COMMON CONNECTION FOR +12 VDC.

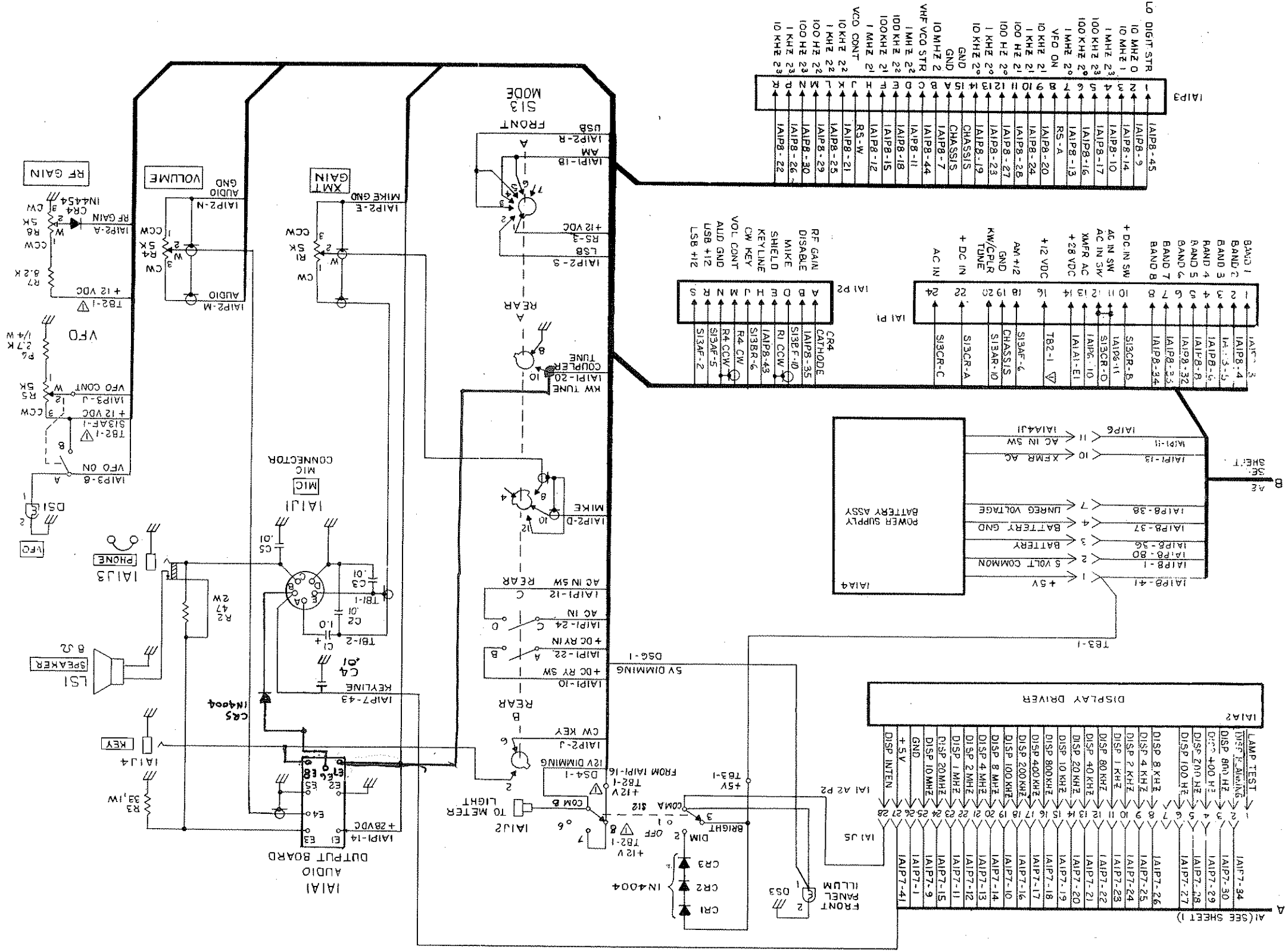
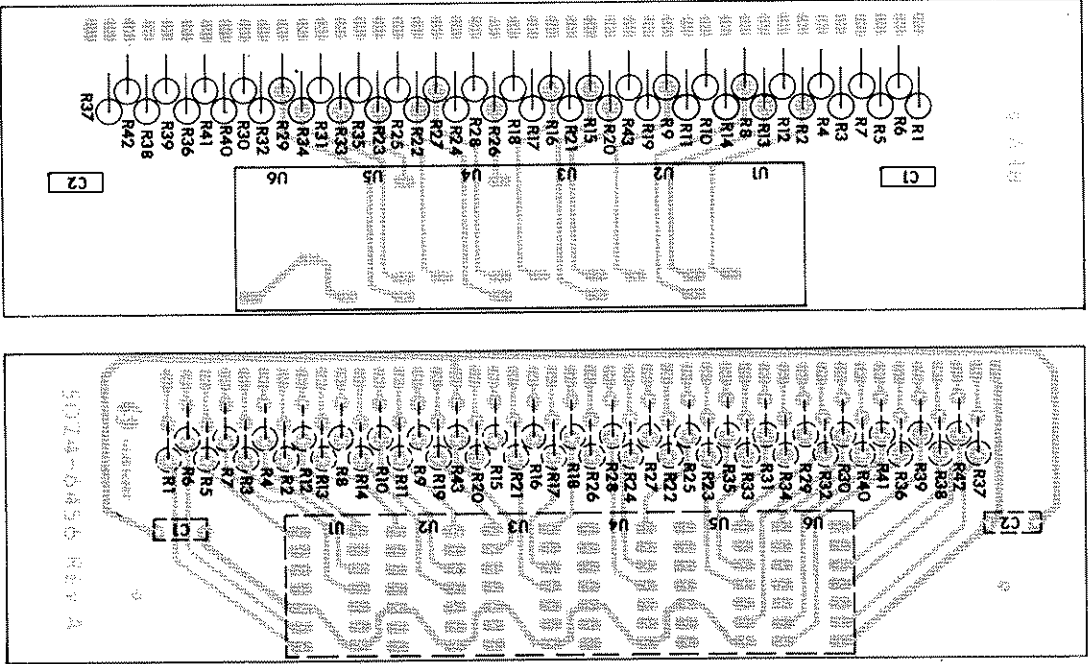


Figure 5.8 Secure Channel Front Panel Wiring Diagram

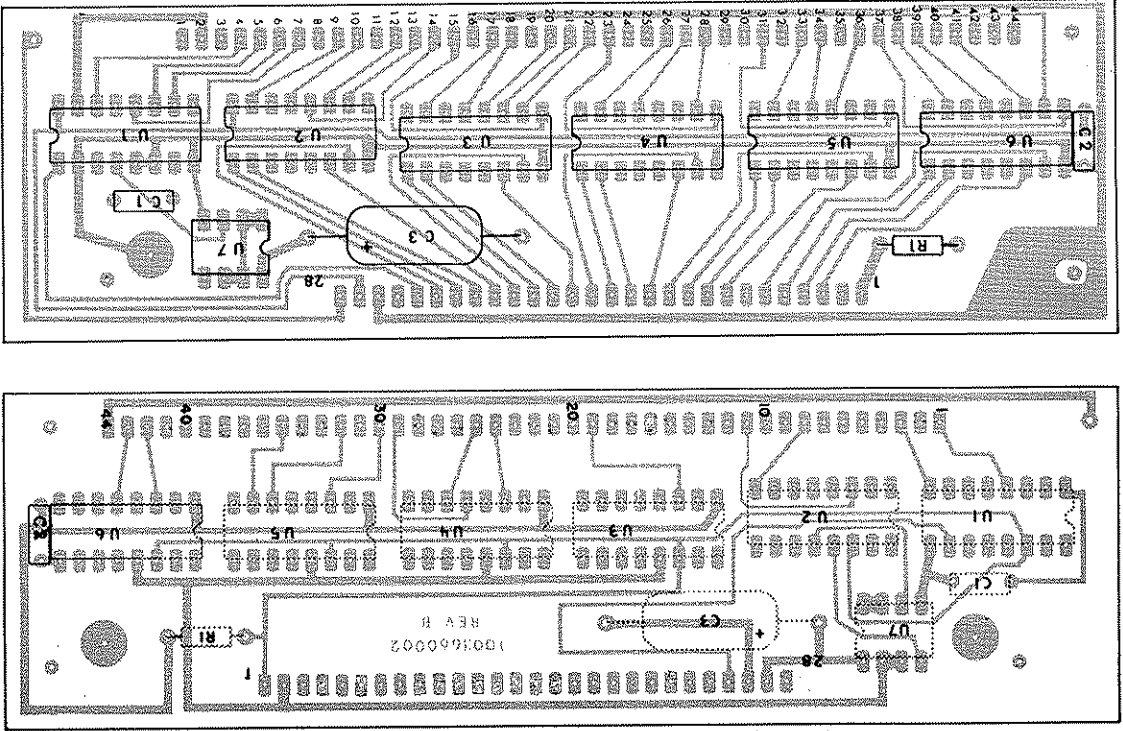
1A1A3 DISPLAY BOARD



5024645596G PC ASSY DISPLAY

REF	SYMBOL	DESCRIPTION	SUNAIR	PART NO.
C1		Capacitor, 0.1UF, 50 V	0281610002	
C2		Capacitor, 0.1UF, 50 V	0281610002	
R1		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R2		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R3		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R4		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R5		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R6		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R7		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R8		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R9		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R10		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R11		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R12		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R13		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R14		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R15		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R16		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R17		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R18		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R19		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R20		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R21		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R22		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	
R23		Resistor, Carbon, 220 ohms, 10%, 1/4W	0171320000	

1A1A2 DISPLAY DRIVER BOARD ASSEMBLY



1003670008A PC ASSY DISPLAY DRV R (ECN

REF	SYMBOL	DESCRIPTION	SUNAIR	PART NO.
I A1 A2 J1		PC ASSY DISPLAY DRV R.	1003670008	
C1		Connector, Power, 11 Pin Rect.	0754360008	
C2		Capacitor, 0.01UF, 25 V, X55	0281620008	
C3		Capacitor, 25 UF, 15 V, TT	0284160008	
R1		Resistor, 4.7K, 5%, 1/4W	0170770001	
U1		IC Digital SN7446A	0448560003	
U2		IC Digital SN7446A	0448560003	
U3		IC Digital SN7446A	0448560003	
U4		IC Digital SN7446A	0448560003	
U5		IC Digital SN7446A	0448560003	
U7		IC Digital SN75451BP	1003950035	
U7		Connector, PC, 36 Pin Female (Cut to 28 Pin)	8033235004	

1003740006C FREQ. DISPLAY ASSY

REF	SYMBOL	DESCRIPTION	SUNAIR	PART NO.
I A1 A2		FREQ. DISPLAY ASSY	1003740006	
I A1 A3		PC ASSY, Display	5024645596	
U1		Diode, Led, 7 Segment, HI Int.	1001260015	
U2		Diode, Led, 7 Segment, HI Int.	1001260015	
U3		Diode, Led, 7 Segment, HI Int.	1001260015	
U4		Diode, Led, 7 Segment, HI Int.	1001260015	
U5		Diode, Led, 7 Segment, HI Int.	1001260015	
U6		Diode, Led, 7 Segment, HI Int.	1001260015	
U6		Standoff, F-F, 6.32 1.000 L	0503920002	
U6		Spacer, .171 ID, .250 OD, .375 L	0509030009	
U6		Socket Assy, Display	0842120009	

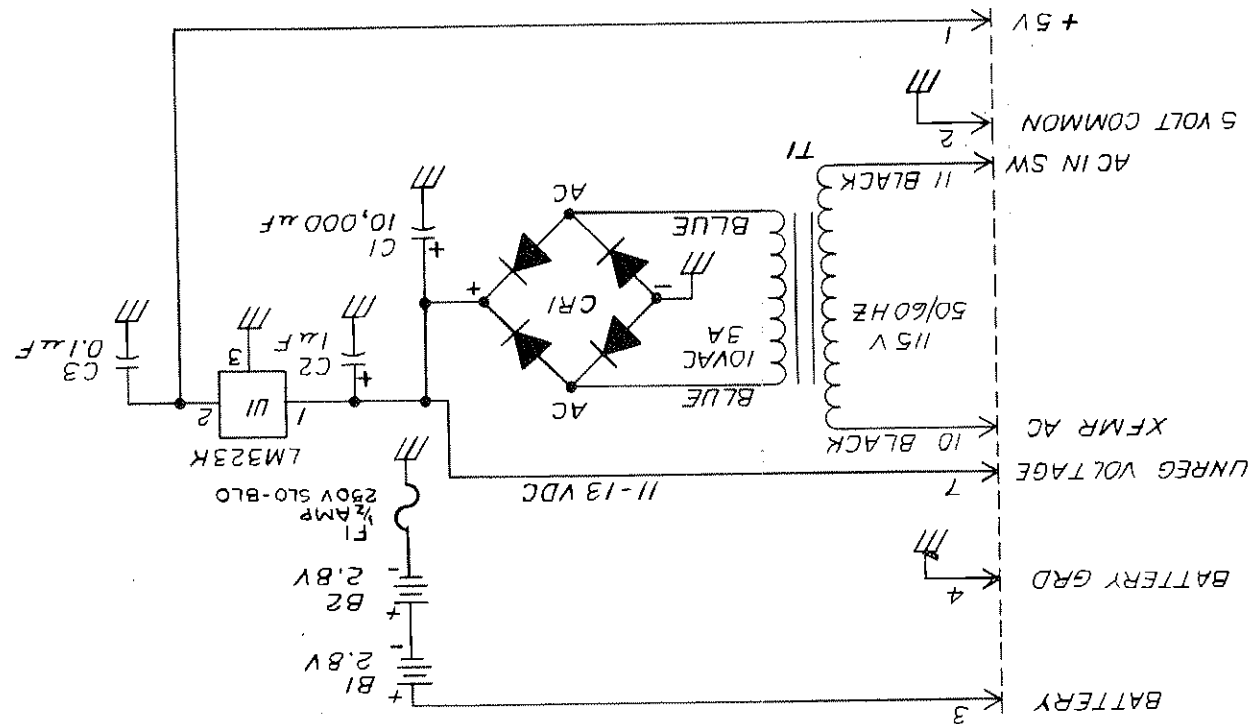
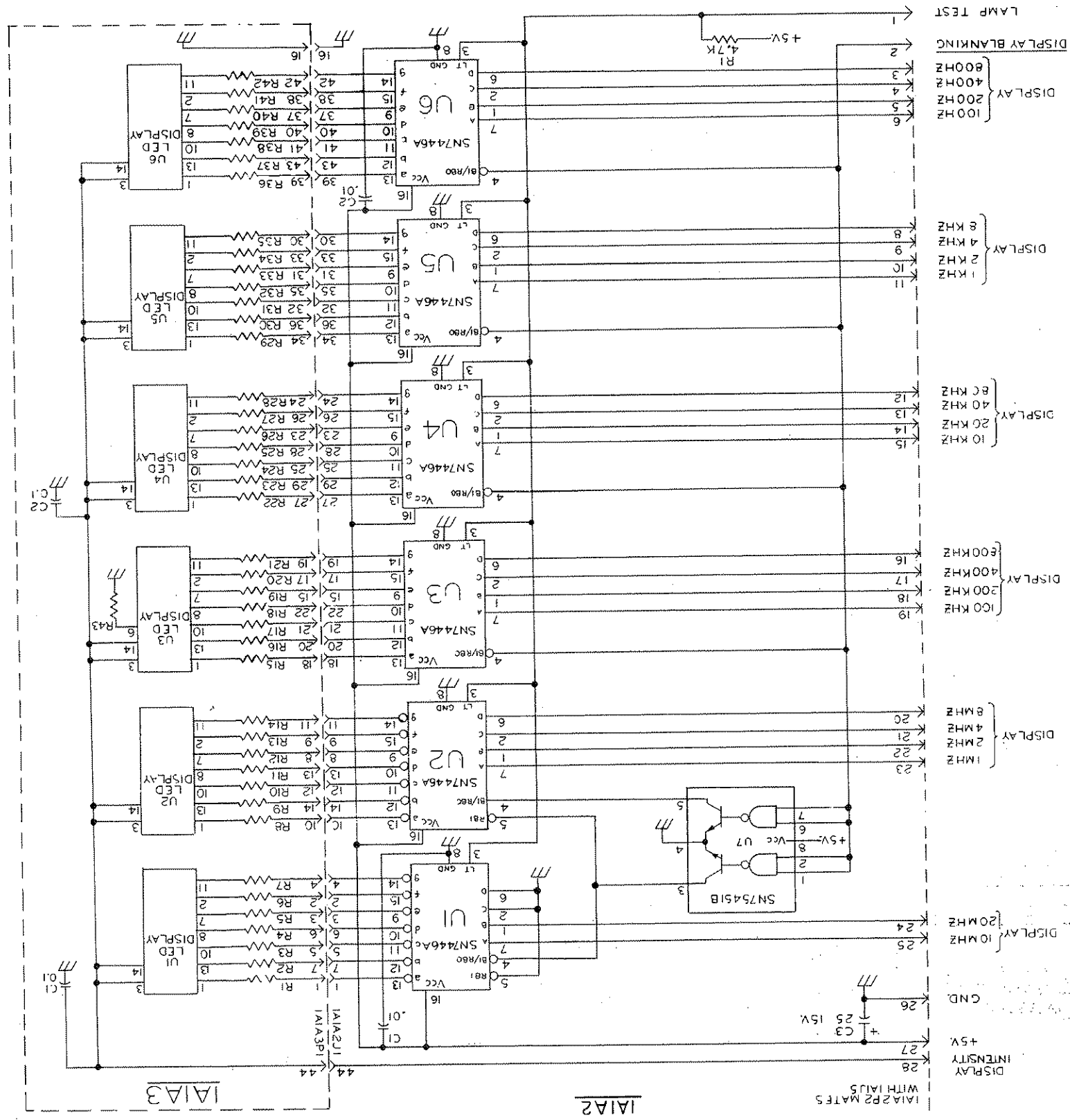


Figure 5.9 Display Schematic

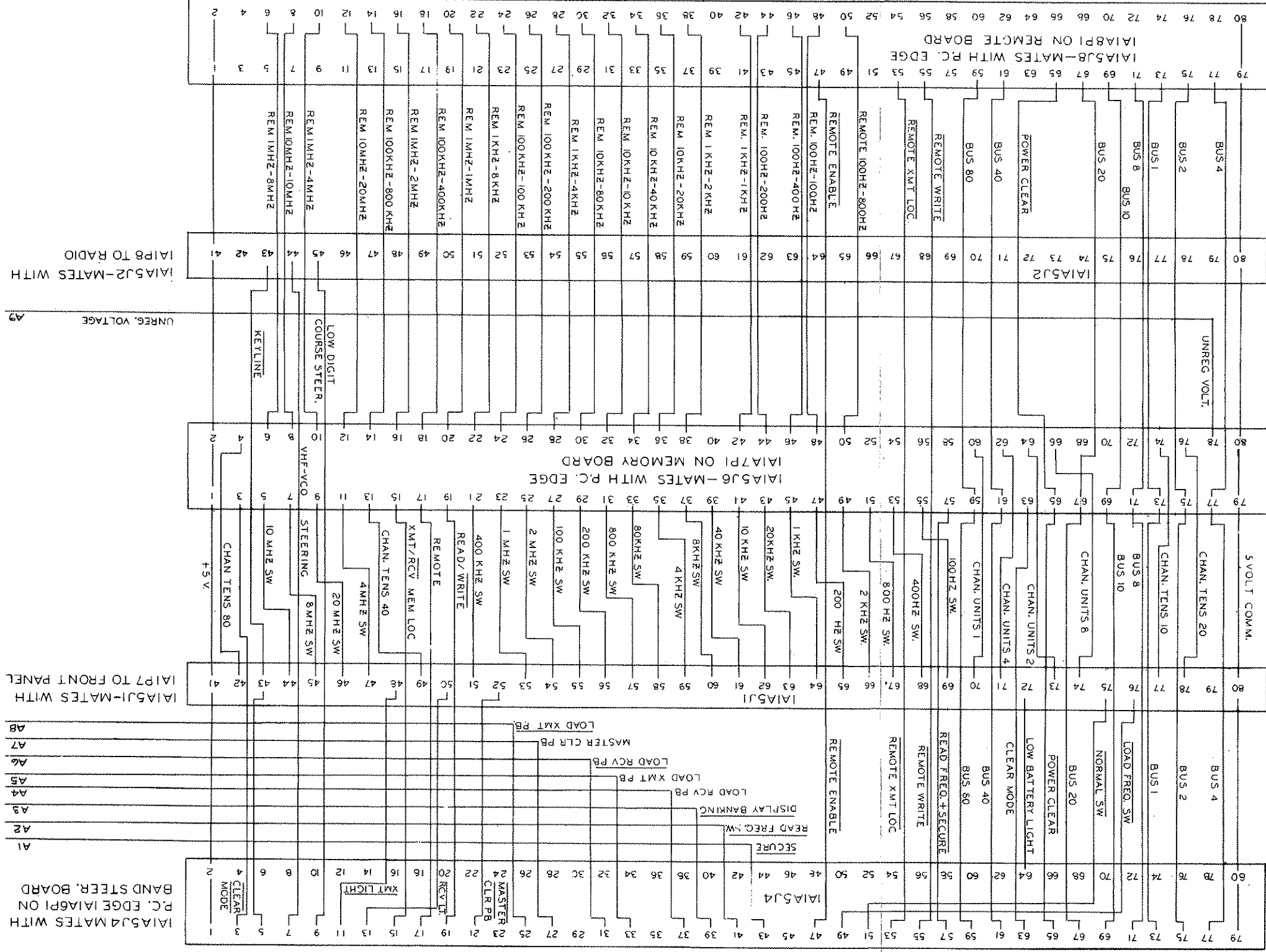
NOTES: UNLESS OTHERWISE SPECIFIED

1. CAP VALUES ARE IN μF .
2. ALL RESISTANCE VALUES ARE IN OHMS $\pm 10\%$ 1/4 WATTS.
3. RESISTORS R1 THRU R43 ARE 220 OHMS.



REF	SYMBOL	DESCRIPTION	PART NO.
1003840001M		POWER SUPPLY BATTERY ASSY GSB-900SC	SUNAIR
81		Battery, Lithium 2.8V 1.2Ah	10033320201
B2		Battery, Lithium 2.8V 1.2Ah	10033320201
C1		Capacitor, 1000uF, 25V, CG	10033980031
C2		Capacitor, 100uF, 35V, T368	02836380031
C3		Capacitor, 0.1uF, 12V, Y5F, 20%	02701100008
CRI		Diode, Bridge, SCBA-1	1002650020
T1		Transformer, 10V RMS, 3A OUT	1003800017
U1		IC Linear, Vol. Reg. LM323K	1003970036
		Capacitor, 1uF, 35V, T368	02836380031
		Lug, Solder, IT No. 8 3/4 L	0502060000
		Lug, Solder, IT No. 10 53/64 L	0502070005
		Tie, Cable, 11 1/2 Lg. 3 Dia.	0508400007
		Fuse, MDL, 1/2 Amp, 250V	08413131009
		Fusemount, 1 Pole W/Terminals	0842490001
		Channel Rubber	0853610002
		Socket, Xsistor TO-3 HI-Pwr	1000130029
		Plate, Battery Holder	10003510001
		Plate, Power Supply, SC	1003720005
		Heatsink, TO-3	1003720021
		Battery Holder, Steel	1003720030
		Wire Kit, Battery Assy	1003840027
		Tie, Cable, 4 Lg. 3/4 Dia.	0600240002
		Shield, Mu-Metal	1005150001

MOTHER BOARD IA1A5



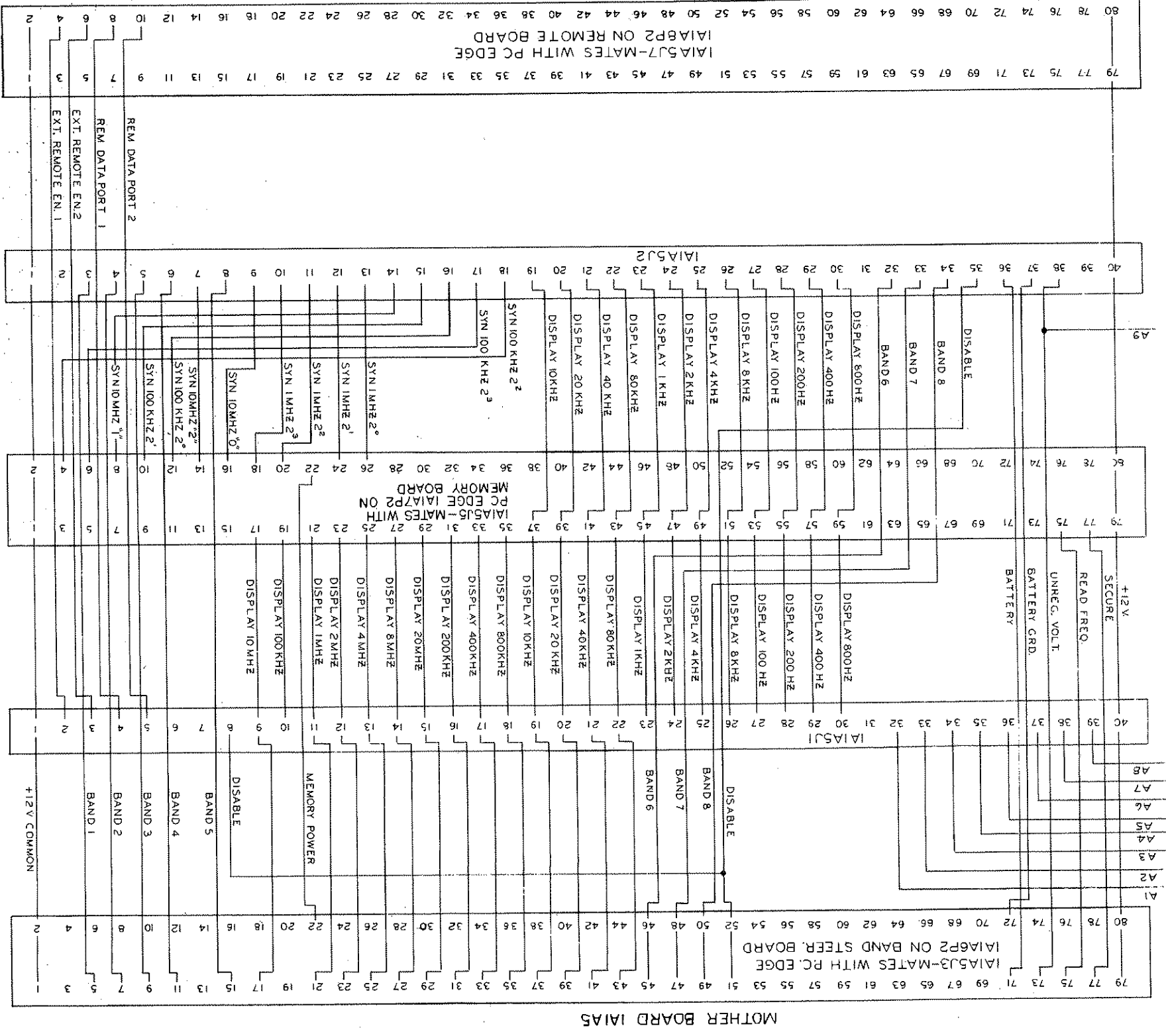
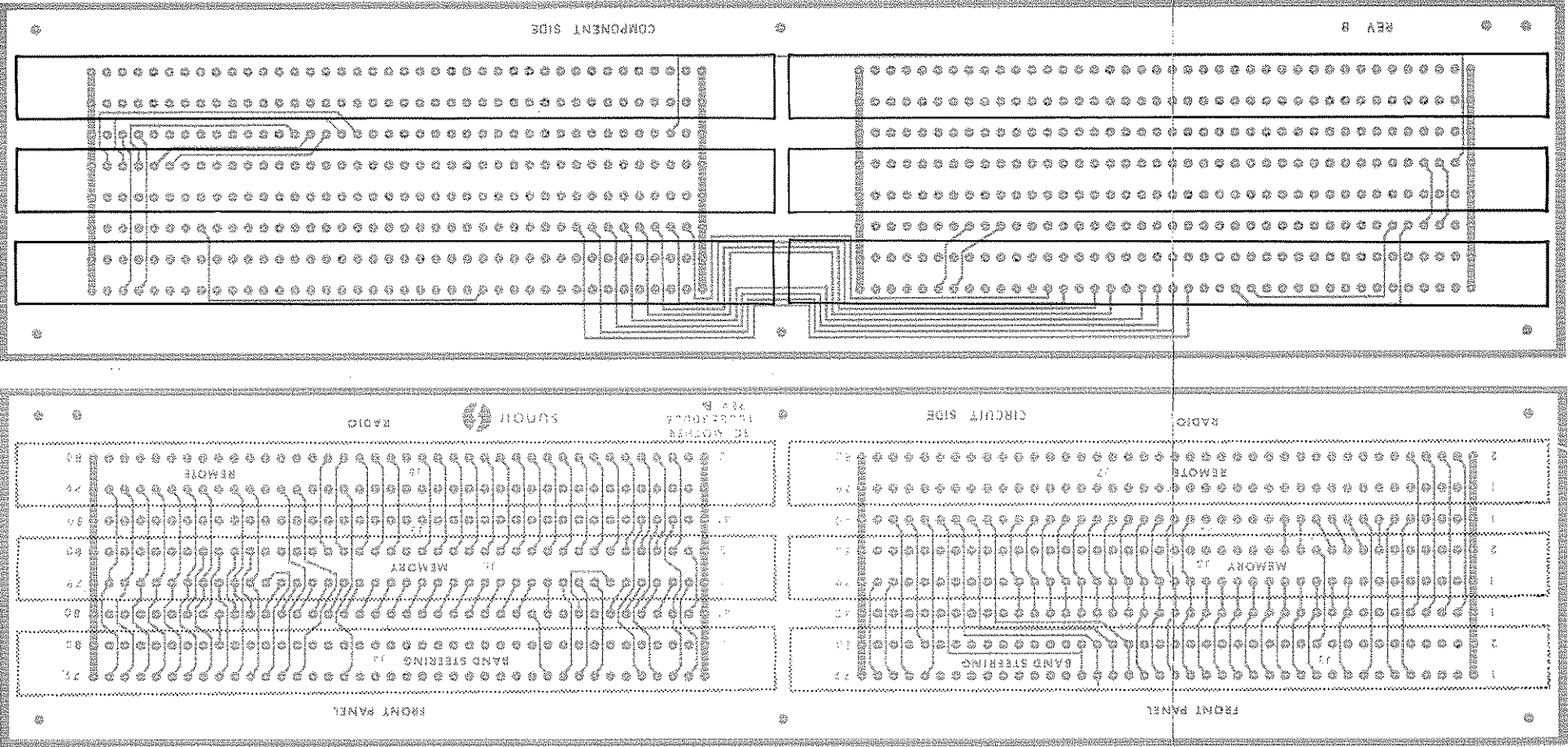


Figure 5.98 Mother Board Schematic

1003650007A MOTHER BOARD ASSY.

REF	DESCRIPTION	PART NO
1A1A5J1	Mother Board Assy, GSB-900SC	1003650007
1A1A5J2	Pin Strip, Right Angle	0754390004
1A1A5J3	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J4	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J5	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J6	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J7	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J8	Connector, Printed Circuit, 80 Pin Female	1003810012
1A1A5J1	Pin Strip, Right Angle, 12 Pin	1003810021
1A1A5J2	Pin Strip, Right Angle, 12 Pin	1003810021

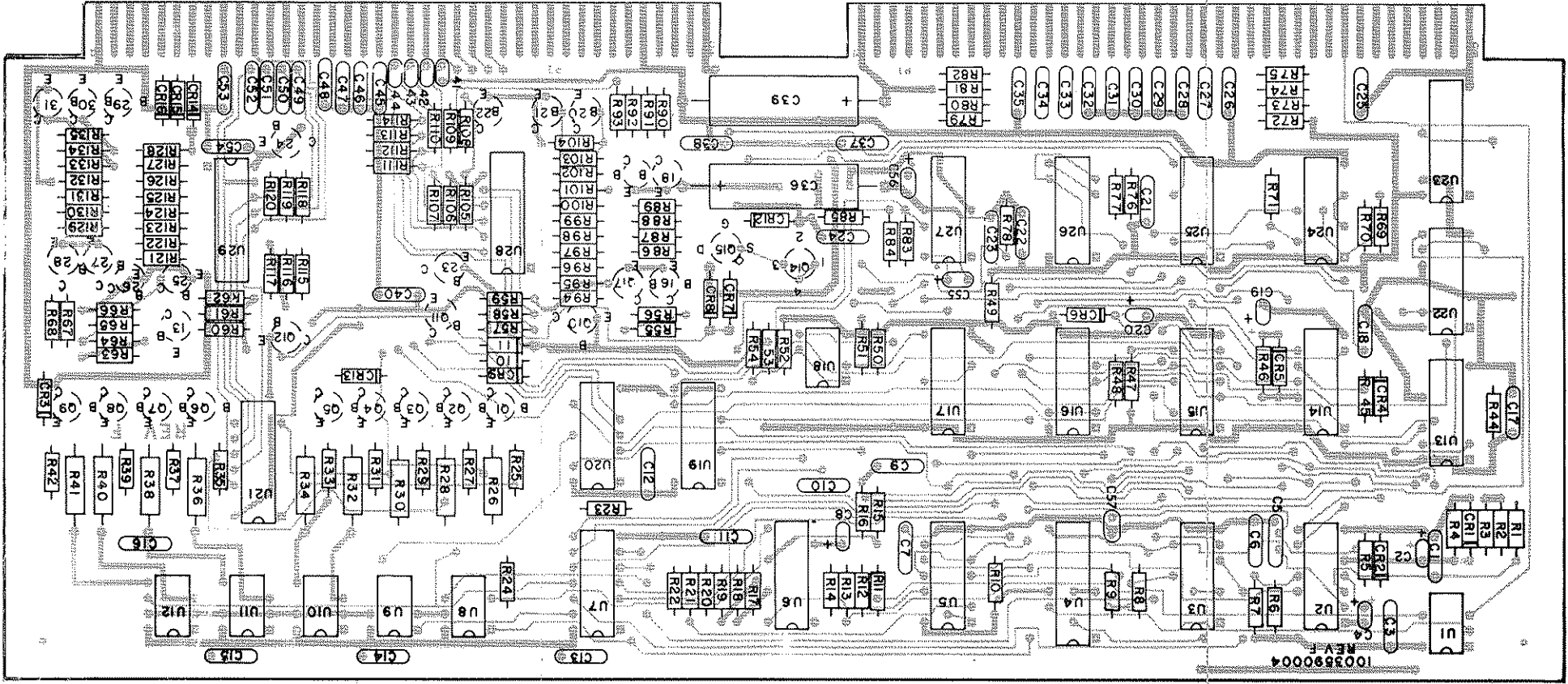
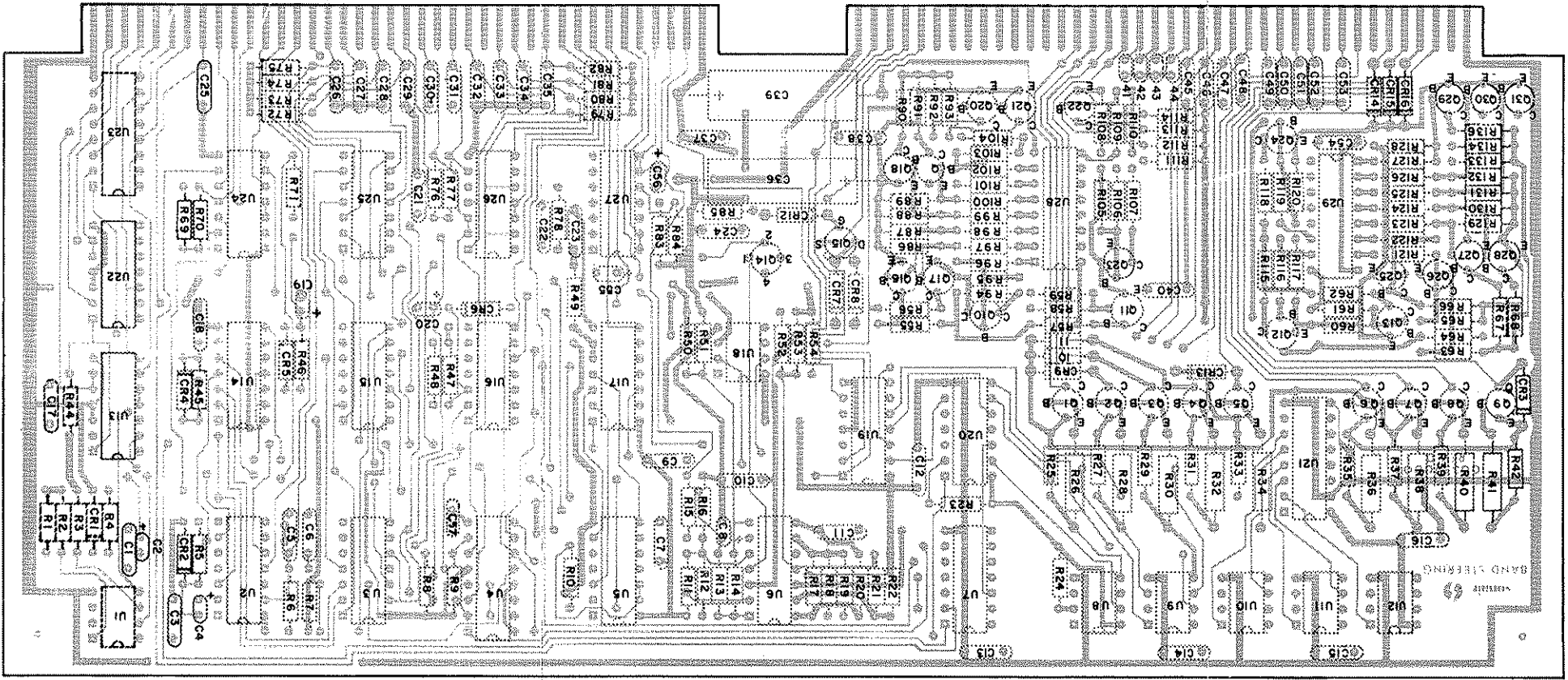


REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C2		Capacitor, .22 uF, 35 V, T368	0283510005
C3		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C4		Capacitor, .22 uF, 35 V, T368	0283510005
C5		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C6		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C7		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C8		Capacitor, 6.8 uF, 20 V, T368	0296780006
C9		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C10		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C11		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C12		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C13		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C14		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C15		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C16		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C17		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C18		Capacitor, 0.01 uF, 12 V, Y5 F, 20%	0270100008
C19		Capacitor, .47 uF, 35 V, T368	0279170009
C20		Capacitor, .22 uF, 35 V, T368	0283510005
C21		Capacitor, 0.1 uF, 12 V, Y5 F, 20%	0270100008
C22		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C23		Capacitor, 0.1 uF, 12 V, Y5 F, 20%	0270100008
C24		Capacitor, 0.01 uF, 50 V, X7 R, 20%	0281610002
C25		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C26		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C27		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C28		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C29		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C30		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C31		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C32		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C33		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C34		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C35		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C36		Capacitor, 50 uF, 50 V, 30 D	0247070009
C37		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C38		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C39		Capacitor, 50 uF, 50 V, 30 D	0247070009
C40		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C41		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C42		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C43		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C44		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C45		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C46		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C47		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C48		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C49		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C50		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C51		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C52		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C53		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C54		Capacitor, 0.01 uF, 100 V, Z5V	0273210009
C55		Capacitor, 1 uF, 35 V, T368	0283630001
C56		Capacitor, 1 uF, 35 V, T368	0283630001
C57		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
CR1		Diode, Signal, Germ. 1N270	0405510004
CR2		Diode, Signal, Germ. 1N270	0405510004
CR3		Diode, Rectifier 1N4004	0405180004
CR4		Diode, Signal, Germ. 1N270	0405510004
CR5		Diode, Signal, Germ. 1N270	0405510004
CR6		Diode, Signal, Germ. 1N270	0405510004
CR7		Diode, Rectifier 1N4004	0405180004
CR8		Diode, Rectifier 1N4004	0405180004
CR9		Diode, Rectifier 1N4004	0405180004
CR10		Diode, Rectifier 1N4004	0405180004
CR11		Diode, Rectifier 1N4004	0405180004
CR12		Diode, Rectifier 1N4004	0405180004
CR13		Diode, Rectifier 1N4004	0405180004
CR14		Diode, Rectifier 1N4004	0405180004
CR15		Diode, Rectifier 1N4004	0405180004
CR16		Diode, Rectifier 1N4004	0405180004

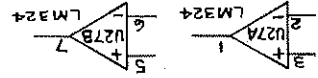
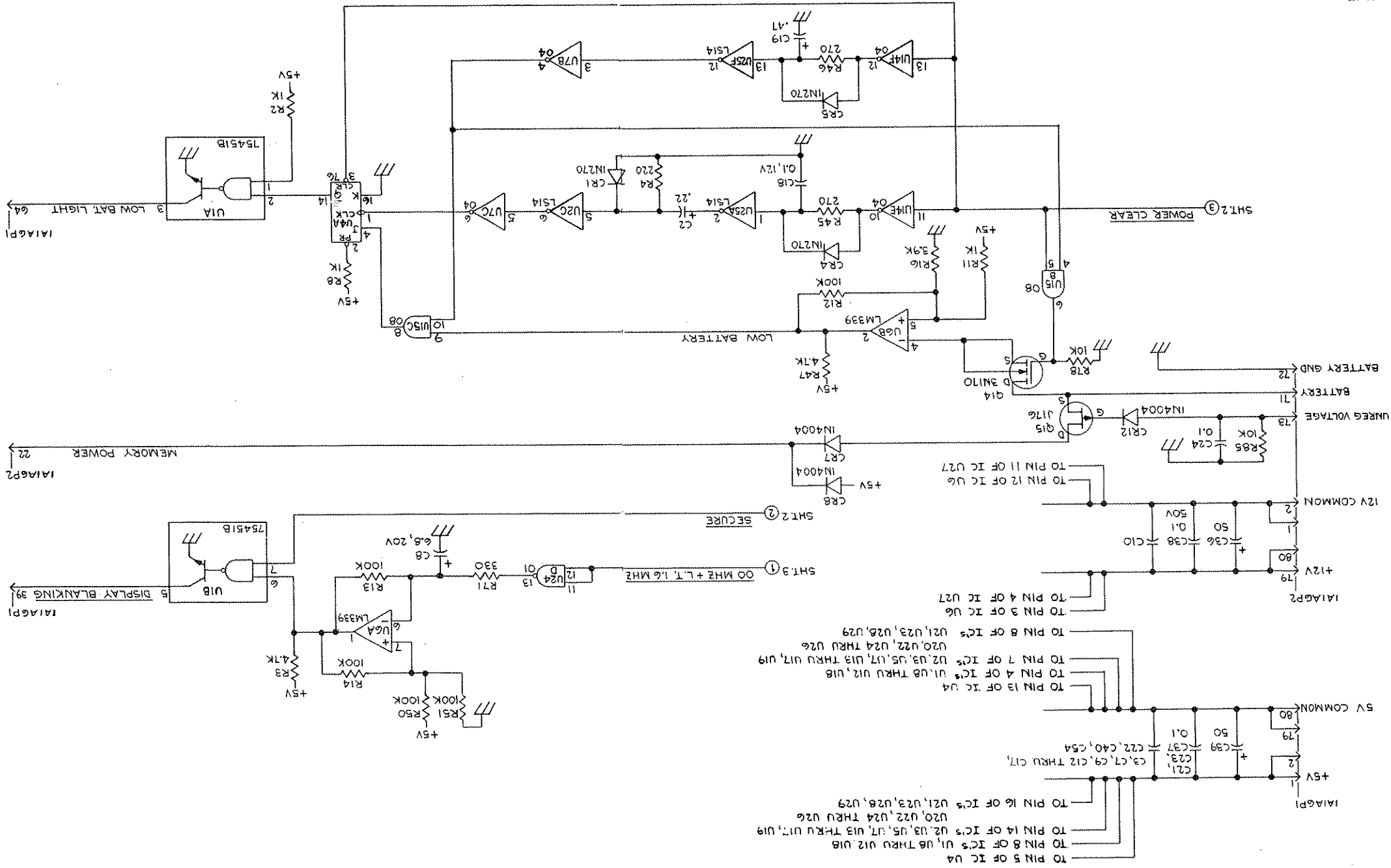
REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
Q1		Transistor, PNP, SI, 2N290A	0448390001
Q2		Transistor, PNP, SI, 2N290A	0448390001
Q3		Transistor, PNP, SI, 2N290A	0448390001
Q4		Transistor, PNP, SI, 2N290A	0448390001
Q5		Transistor, PNP, SI, 2N290A	0448390001
Q6		Transistor, PNP, SI, 2N290A	0448390001
Q7		Transistor, PNP, SI, 2N290A	0448390001
Q8		Transistor, PNP, SI, 2N290A	0448390001
Q9		Transistor, PNP, SI, 2N290A	0448390001
Q10		Transistor, PNP, SI, 2N4126	0448020009
Q11		Transistor, PNP, SI, 2N4126	0448020009
Q12		Transistor, PNP, SI, 2N4126	0448020009
Q13		Transistor, PNP, SI, 2N4126	0448020009
Q14		Transistor, N-CH, Fet 3N170	1003980015
Q15		Transistor, P-CH, Fet J176	1003980007
Q16		Transistor, PNP, SI, 2N4126	0448020009
Q17		Transistor, PNP, SI, 2N4126	0448020009
Q18		Transistor, PNP, SI, 2N4126	0448020009
Q19		Transistor, PNP, SI, 2N4126	0448020009
Q20		Transistor, PNP, SI, 2N4126	0448020009
Q21		Transistor, PNP, SI, 2N4126	0448020009
Q22		Transistor, PNP, SI, 2N4126	0448020009
Q23		Transistor, PNP, SI, 2N4126	0448020009
Q24		Transistor, PNP, SI, 2N4126	0448020009
Q25		Transistor, PNP, SI, 2N4126	0448020009
Q26		Transistor, PNP, SI, 2N4126	0448020009
Q27		Transistor, PNP, SI, 2N4126	0448020009
Q28		Transistor, PNP, SI, 2N4126	0448020009
Q29		Transistor, PNP, SI, 2N4126	0448020009
Q30		Transistor, PNP, SI, 2N4126	0448020009
Q31		Transistor, PNP, SI, 2N4126	0448020009
R1		Resistor, 5.6K, 10%, 1/4W	0171320000
R2		Resistor, 1K, 10%, 1/4W	0171560001
R3		Resistor, 4.7K, 5%, 1/4W	0170770001
R4		Resistor, 220, 10%, 1/4W	0171320000
R5		Resistor, 220, 10%, 1/4W	0171320000
R6		Resistor, 4.7K, 5%, 1/4W	0170770001
R7		Resistor, 4.7K, 5%, 1/4W	0170770001
R8		Resistor, 1K, 10%, 1/4W	0171560001
R9		Resistor, 1K, 10%, 1/4W	0171560001
R10		Resistor, 4.7K, 5%, 1/4W	0170770001
R11		Resistor, 1K, 10%, 1/4W	0171560001
R12		Resistor, 100K, 10%, 1/4W	0170390004
R13		Resistor, 100K, 10%, 1/4W	0170390004
R14		Resistor, 100K, 10%, 1/4W	0170390004
R15		Resistor, 3.9K, 10%, 1/4W	0178830003
R16		Resistor, 100K, 10%, 1/4W	0170390004
R17		Resistor, 100K, 10%, 1/4W	0170390004
R18		Resistor, 100K, 10%, 1/4W	0170390004
R19		Resistor, 100K, 10%, 1/4W	0170390004
R20		Resistor, 100K, 10%, 1/4W	0170390004
R21		Resistor, 100K, 10%, 1/4W	0170390004
R22		Resistor, 4.7K, 5%, 1/4W	0170770001
R23		Resistor, 1K, 10%, 1/4W	0171560001
R24		Resistor, 1K, 10%, 1/4W	0171560001
R25		Resistor, 4.7K, 5%, 1/4W	0170770001
R26		Resistor, 220, 10%, 1/4W	0175600007
R27		Resistor, 4.7K, 5%, 1/4W	0175600007
R28		Resistor, 820, 10%, 1/2W	0175600007
R29		Resistor, 4.7K, 5%, 1/4W	0170770001
R30		Resistor, 820, 10%, 1/2W	0175600007
R31		Not Used	0175600007
R32		Resistor, 820, 10%, 1/2W	0175600007
R33		Resistor, 4.7K, 5%, 1/4W	0170770001
R34		Resistor, 820, 10%, 1/2W	0175600007
R35		Resistor, 4.7K, 5%, 1/4W	0170770001
R36		Resistor, 820, 10%, 1/2W	0175600007
R37		Resistor, 4.7K, 5%, 1/4W	0170770001
R38		Resistor, 820, 10%, 1/2W	0175600007
R39		Resistor, 4.7K, 5%, 1/4W	0170770001
R40		Resistor, 820, 10%, 1/2W	0175600007
R41		Resistor, 820, 10%, 1/2W	0175600007

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R42		Resistor, 4.7K, 5%, 1/4W	0170770001
R43		Not used	0171560001
R44		Resistor, 1K, 10%, 1/4W	0171560001
R45		Resistor, 270, 10%, 1/4W	0178450006
R46		Resistor, 2.7K, 10%, 1/4W	0178450006
R47		Resistor, 4.7K, 5%, 1/4W	0170770001
R48		Resistor, 220, 10%, 1/4W	0171320000
R49		Resistor, 1K, 10%, 1/4W	0171560001
R50		Resistor, 100K, 10%, 1/4W	0170390004
R51		Resistor, 100K, 10%, 1/4W	0170390004
R52		Resistor, 100K, 10%, 1/4W	0170390004
R53		Resistor, 4.7K, 5%, 1/4W	0171060008
R54		Resistor, 1K, 10%, 1/4W	0171560001
R55		Resistor, 28K, 1%, 1/8W	1004050038
R56		Resistor, 31.5K, 1%, 1/8W	1004050020
R57		Resistor, 8.45K, 1%, 1/8W	1004070021
R58		Resistor, 1.8K, 10%, 1/4W	0178190004
R59		Resistor, 220, 10%, 1/4W	0171320000
R60		Resistor, 220, 10%, 1/4W	0171320000
R61		Resistor, 1.8K, 10%, 1/4W	0178190004
R62		Resistor, 14.3K, 1%, 1/8W	1004090013
R63		Resistor, 21.5K, 1%, 1/8W	1004060017
R64		Resistor, 28.7K, 1%, 1/8W	1004090005
R65		Resistor, 220, 10%, 1/4W	0171320000
R66		Resistor, 5.6K, 10%, 1/4W	0171320000
R67		Resistor, 39.2K, 1%, 1/8W	1004080034
R68		Resistor, 49.9K, 1%, 1/8W	1004080026
R69		Resistor, 5.6K, 10%, 1/4W	0183060008
R70		Resistor, 5.6K, 10%, 1/4W	0183060008
R71		Resistor, 4.7K, 5%, 1/4W	0170770001
R72		Resistor, 4.7K, 5%, 1/4W	0170770001
R73		Resistor, 4.7K, 5%, 1/4W	0170770001
R74		Resistor, 4.7K, 5%, 1/4W	0170770001
R75		Resistor, 4.7K, 5%, 1/4W	0170770001
R76		Resistor, 4.7K, 5%, 1/4W	0170770001
R77		Resistor, 4.7K, 5%, 1/4W	0170770001
R78		Resistor, 10K, 10%, 1/4W	0170410005
R79		Resistor, 4.7K, 5%, 1/4W	0170770001
R80		Resistor, 100K, 10%, 1/4W	0170390004
R81		Resistor, 4.7K, 5%, 1/4W	0170770001
R82		Resistor, 4.7K, 5%, 1/4W	0170770001
R83		Resistor, 15K, 1%, 1/8W	1004050003
R84		Resistor, 100K, 10%, 1/4W	0170390004
R85		Resistor, 100K, 10%, 1/4W	0170390004
R86		Resistor, 220, 10%, 1/4W	0171320000
R87		Resistor, 220, 10%, 1/4W	0171320000
R88		Resistor, 220, 10%, 1/4W	0171320000
R89		Resistor, 220, 10%, 1/4W	0171320000
R90		Resistor, 21.5K, 1%, 1/8W	1004060009
R91		Resistor, 21.5K, 1%, 1/8W	1004060017
R92		Resistor, 18.2K, 1%, 1/8W	1004060025
R93		Resistor, 15.4K, 1%, 1/8W	1004060033
R94		Resistor, 36.5K, 1%, 1/8W	1004050011
R95		Resistor, 220, 10%, 1/4W	0171320000
R96		Resistor, 1.8K, 10%, 1/4W	0178190004
R97		Resistor, 1.8K, 10%, 1/4W	0178190004
R98		Resistor, 1.8K, 10%, 1/4W	0178190004
R99		Resistor, 1.8K, 10%, 1/4W	0178190004
R100		Resistor, 1.8K, 10%, 1/4W	0178190004
R101		Resistor, 1.8K, 10%, 1/4W	0178190004
R102		Resistor, 1.8K, 10%, 1/4W	0178190004

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R103		Resistor, 220, 10%, 1/4W	0171320000
R104		Resistor, 220, 10%, 1/4W	0171320000
R105		Resistor, 220, 10%, 1/4W	0171320000
R106		Resistor, 1.8K, 10%, 1/4W	0178190004
R107		Resistor, 10.7K, 1%, 1/8W	1004070012
R108		Resistor, 220, 10%, 1/4W	0178190004
R109		Resistor, 1.8K, 10%, 1/4W	0178190004
R110		Resistor, 13K, 1%, 1/8W	1004070004
R111		Resistor, 4.7K, 5%, 1/4W	0170770001
R112		Resistor, 4.7K, 5%, 1/4W	0170770001
R113		Resistor, 4.7K, 5%, 1/4W	0170770001
R114		Resistor, 4.7K, 5%, 1/4W	0170770001
R115		Resistor, 7.87K, 1%, 1/8W	1004090021
R116		Resistor, 1.8K, 10%, 1/4W	0178190004
R117		Resistor, 220, 10%, 1/4W	0171320000
R118		Resistor, 3.83K, 1%, 1/8W	1004090030
R119		Resistor, 1.8K, 10%, 1/4W	0178190004
R120		Resistor, 220, 10%, 1/4W	0171320000
R121		Resistor, 220, 10%, 1/4W	0171320000
R122		Resistor, 1.8K, 10%, 1/4W	0178190004
R123		Resistor, 1.8K, 10%, 1/4W	0178190004
R124		Resistor, 1.8K, 10%, 1/4W	0178190004
R125		Resistor, 1.8K, 10%, 1/4W	0178190004
R126		Resistor, 1.8K, 10%, 1/4W	0178190004
R127		Resistor, 1.8K, 10%, 1/4W	0178190004
R128		Resistor, 220, 10%, 1/4W	0171320000
R129		Resistor, 220, 10%, 1/4W	0171320000
R130		Resistor, 220, 10%, 1/4W	0171320000
R131		Resistor, 220, 10%, 1/4W	0171320000
R132		Resistor, 220, 10%, 1/4W	0171320000
R133		Resistor, 68.1K, 1%, 1/8W	1004080018
R134		Resistor, 86.6K, 1%, 1/8W	1004080000
R135		Resistor, 115K, 1%, 1/8W	1004070039
U1		IC Digital SN75451BP	1003950035
U2		IC Digital, Hex Inv SN74LS14N	1003940005
U3		IC Digital SN7400N	0448070006
U4		IC Digital SN7476N	0448240009
U5		IC Digital SN7400N	0448070006
U6		IC Linear LM339N	1003970028
U7		IC Digital SN7404N	1003950001
U8		IC Digital SN75451BP	1003950035
U9		IC Digital SN75452BP	1003960014
U10		IC Digital SN75452BP	1003960014
U11		IC Digital SN75452BP	1003960014
U12		IC Digital SN75452BP	1003960014
U13		IC Digital 74LS196N Selected	0448250004
U14		IC Digital SN7404N	1003950001
U15		IC Digital SN7408N	1003950019
U16		IC Digital SN7453N	1003950027
U17		IC Digital SN7430N	0448110008
U18		IC Digital SN75451BP	1003950035
U19		IC Digital SN7432N	1003960019
U20		IC Digital SN7408N	1003950019
U21		IC Band Prom 32 X8 Tri State	1004020007
U22		IC Digital 74LS196N Selected	0448250004
U23		IC Digital SN74LS365AN	1003880002
U24		IC Digital SN7401N	0448230003
U25		IC Digital, Hex Inv SN74LS14N	1003940005
U26		IC Digital Hex Inv SN74LS14N	1003940005
U27		IC Linear LM324N	1003970001
U28		IC Digital SN7445N	1003960022
U29		IC Digital SN7445N	1003960022



BAND STEERING BOARD ASSEMBLY



NOTE:
1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS 1/4W, ±10%
ALL CAPACITOR VALUES ARE 0.01µF
ALL TRANSISTORS ARE 2N4126
2. ALL INTEGRATED CIRCUIT TYPE NUMBERS ARE
PREFIXED WITH '74' EXCEPT IC'S U1, U8 THRU U12, U18.
3. ① INDICATES CIRCUITRY CONTINUED ON OTHER SHEET.
4. CIRCUITS NOT USED:

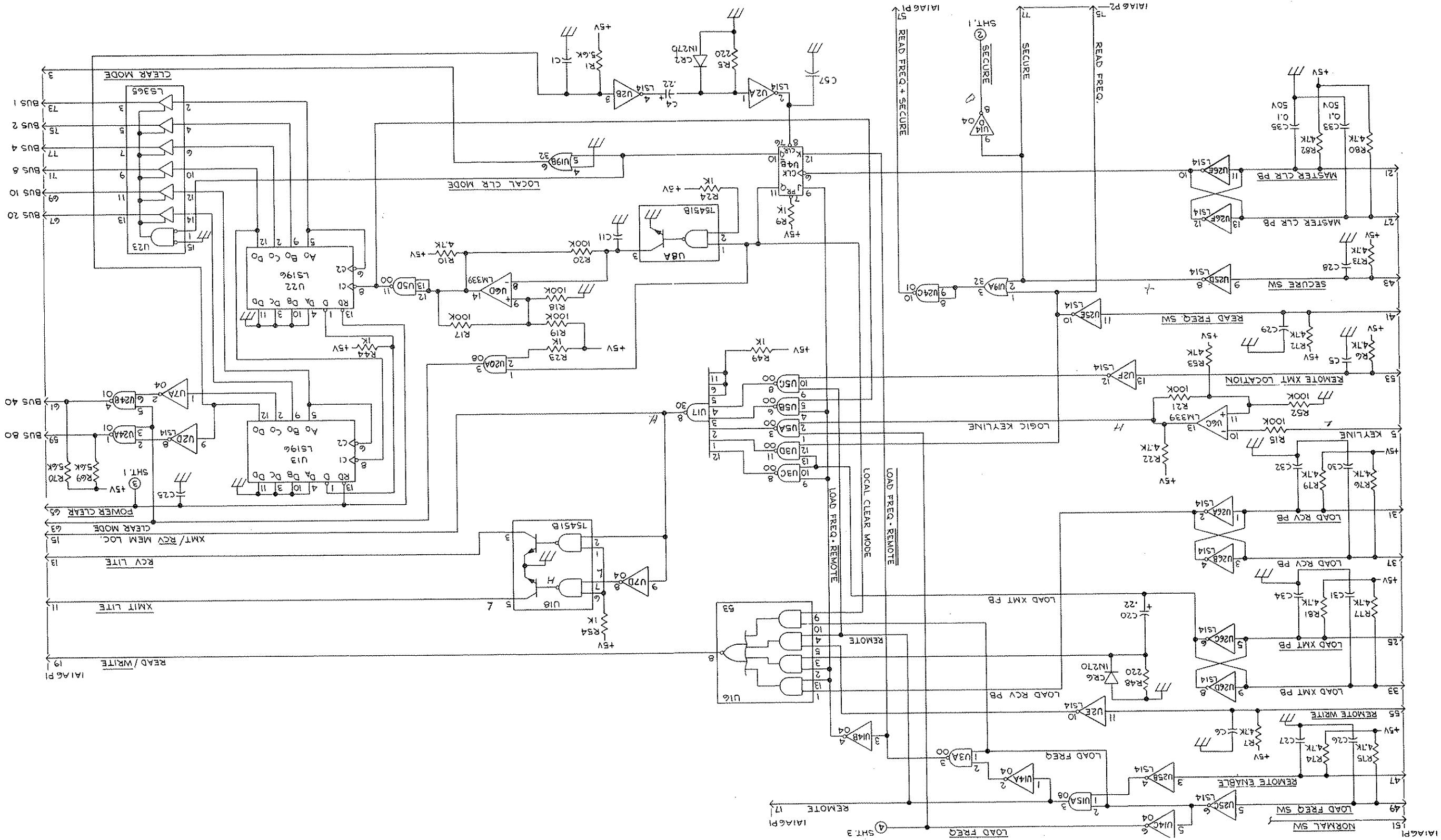
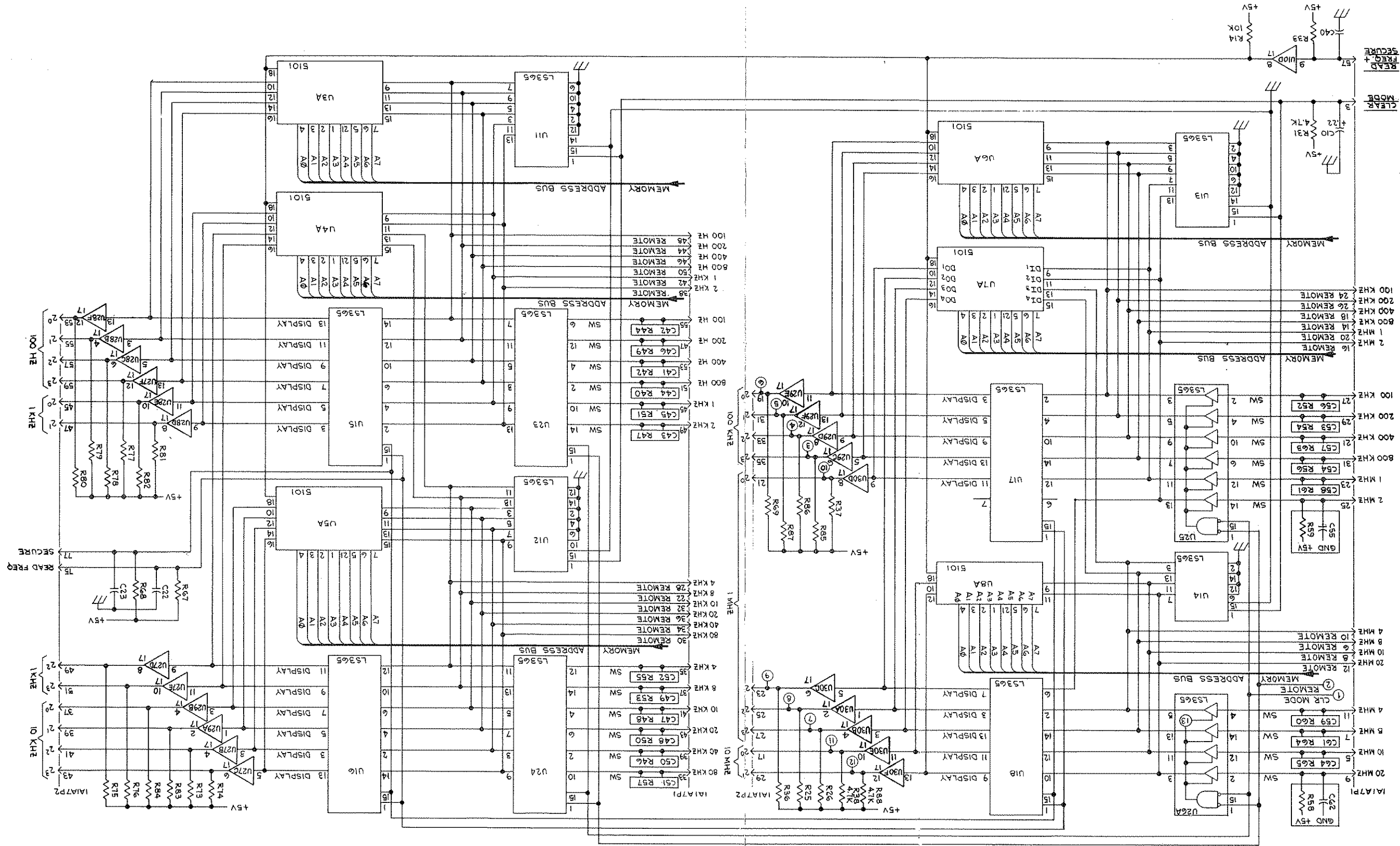
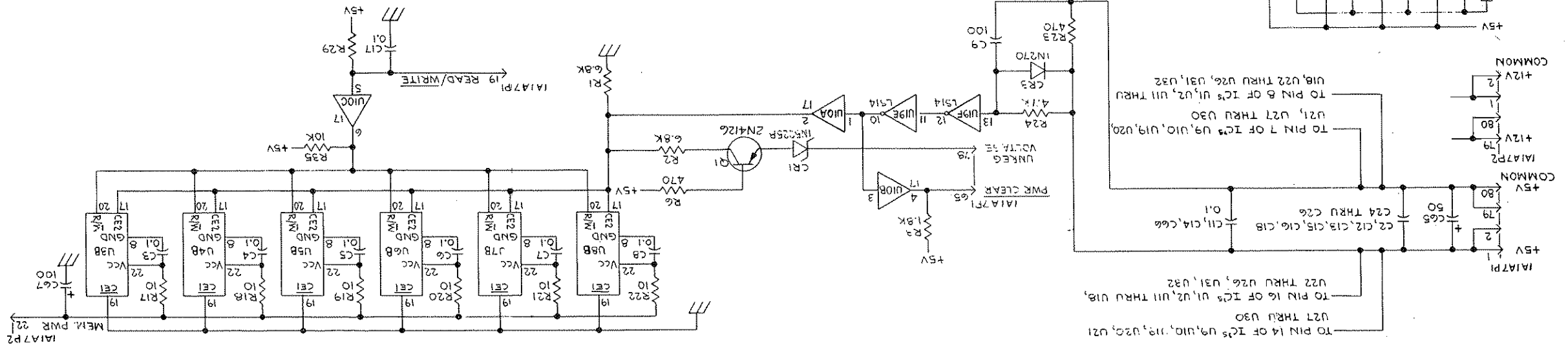


Figure 5.9C Band Steering Schematic (Cont)

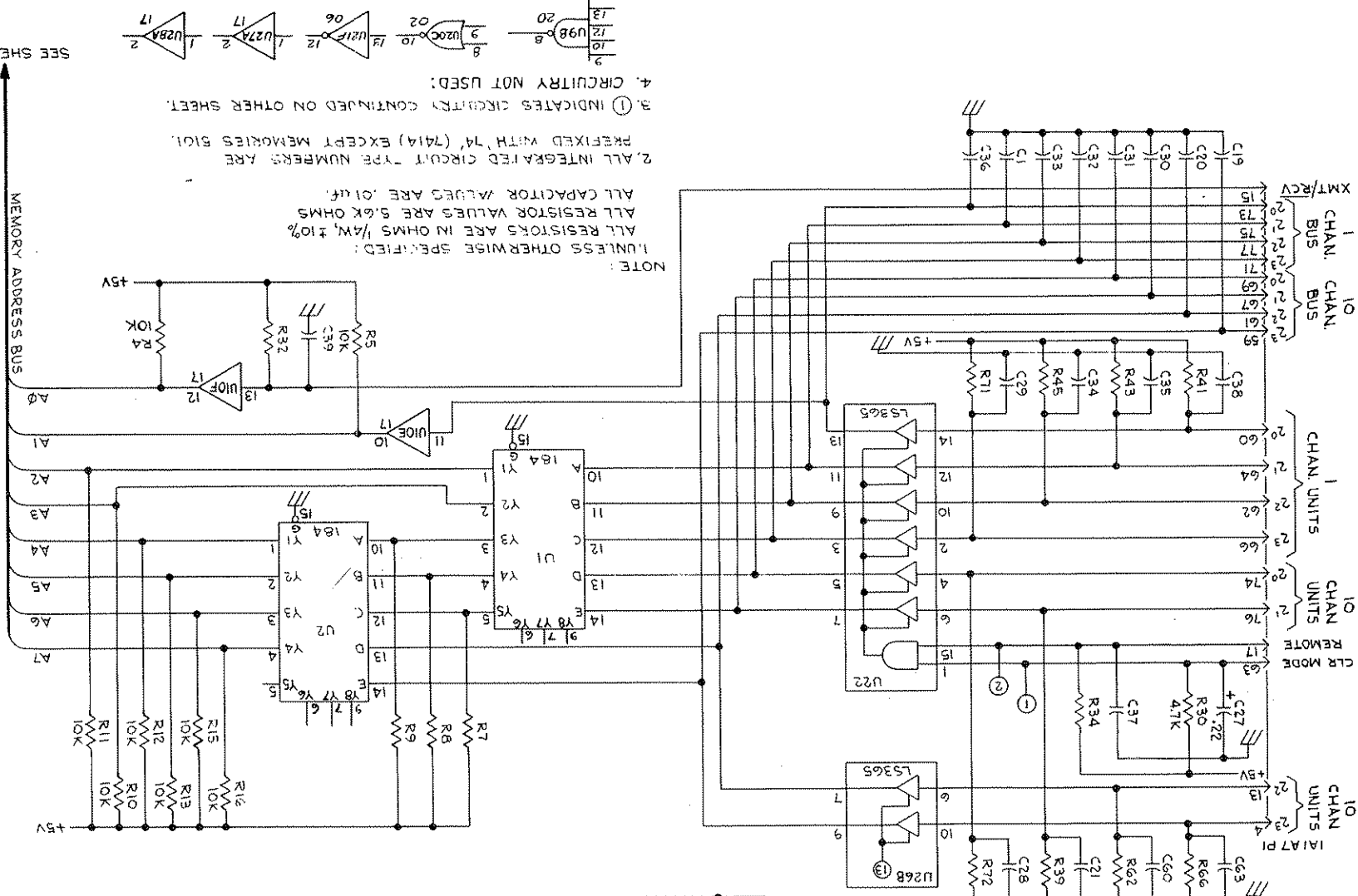


MEMORY BOARD SCHEMATIC

SI003620001A



TO PIN 14 OF IC^s U9, U10, U19, U20, U21
U27 THRU U30
TO PIN 16 OF IC^s U1, U2, U11 THRU U18,
U22 THRU U26, U31, U32
C24, C12, C13, C15, C16, C18
C11, C14, C16
IA17P2
COMMON
+5V
80
79
C65
50
+5V
IA17P1
PWR CLEAR
4
U10B
17
1.5K
R3
+5V
UNREG
VOLTAGE
78
R24
4.7K
R23
470
C9
100
R25
470
C8
1N270
R26
4.7K
R27
470
C7
100
R28
470
C6
1N270
R29
470
C5
100
R30
470
C4
100
R31
470
C3
100
R32
470
C2
100
R33
470
C1
100
R34
470
C0
100
R35
470
C0
100
R36
470
C1
100
R37
470
C2
100
R38
470
C3
100
R39
470
C4
100
R40
470
C5
100
R41
470
C6
100
R42
470
C7
100
R43
470
C8
100
R44
470
C9
100
R45
470
C10
100
R46
470
C11
100
R47
470
C12
100
R48
470
C13
100
R49
470
C14
100
R50
470
C15
100
R51
470
C16
100
R52
470
C17
100
R53
470
C18
100
R54
470
C19
100
R55
470
C20
100
R56
470
C21
100
R57
470
C22
100
R58
470
C23
100
R59
470
C24
100
R60
470
C25
100
R61
470
C26
100
R62
470
C27
100
R63
470
C28
100
R64
470
C29
100
R65
470
C30
100
R66
470
C31
100
R67
470
C32
100
R68
470
C33
100
R69
470
C34
100
R70
470
C35
100
R71
470
C36
100
R72
470
C37
100
R73
470
C38
100
R74
470
C39
100
R75
470
C40
100
R76
470
C41
100
R77
470
C42
100
R78
470
C43
100
R79
470
C44
100
R80
470
C45
100
R81
470
C46
100
R82
470
C47
100
R83
470
C48
100
R84
470
C49
100
R85
470
C50
100
R86
470
C51
100
R87
470
C52
100
R88
470
C53
100
R89
470
C54
100
R90
470
C55
100
R91
470
C56
100
R92
470
C57
100
R93
470
C58
100
R94
470
C59
100
R95
470
C60
100
R96
470
C61
100
R97
470
C62
100
R98
470
C63
100
R99
470
C64
100
R100
470



NOTE:
1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTOR VALUES ARE IN OHMS 1/4W, 10%
ALL CAPACITOR VALUES ARE .01μF.
2. ALL INTEGRATED CIRCUIT TYPE NUMBERS ARE
PREFIXED WITH '74' (7414) EXCEPT MEMORIES 5101.
3. ① INDICATES CIRCUITRY CONTINUED ON OTHER SHEET.
4. CIRCUITRY NOT USED:
SEE SHEET 2

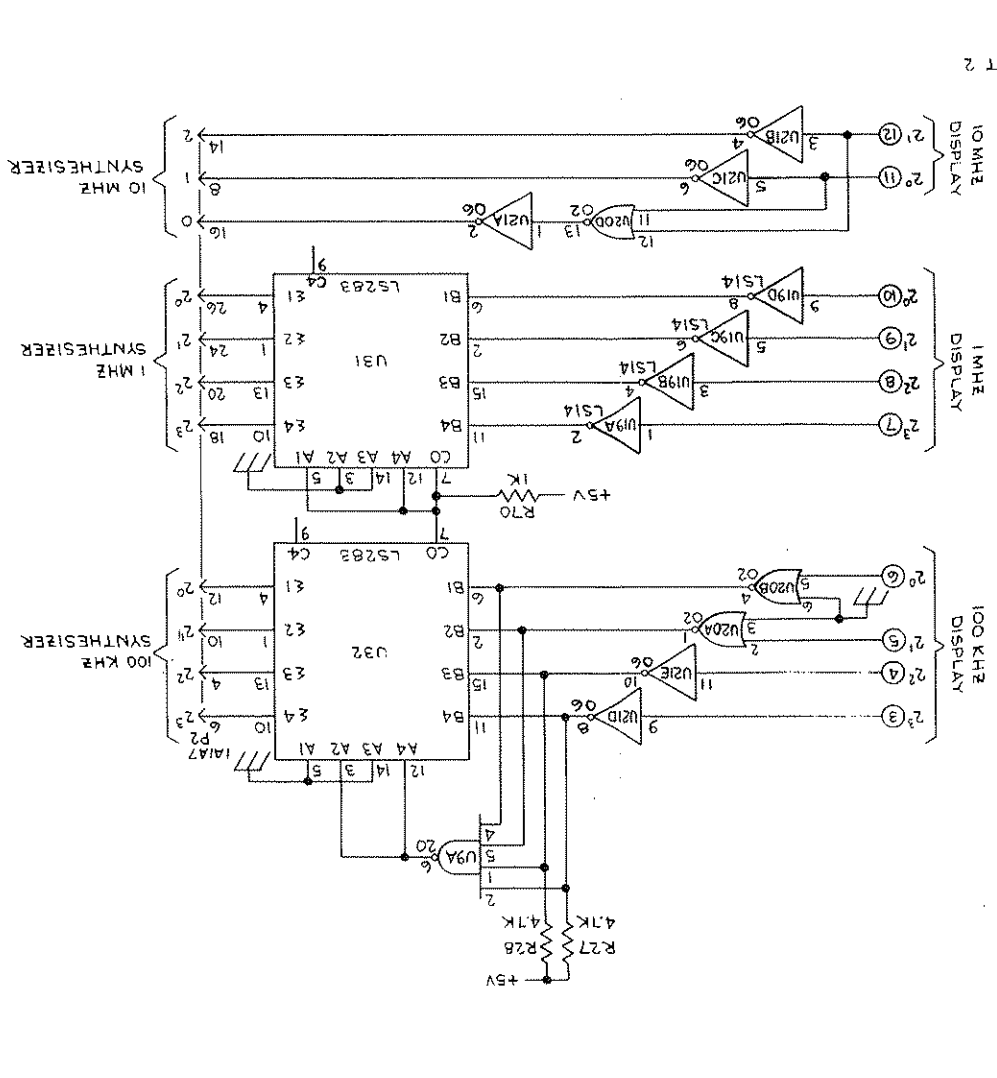


Figure 5.9D Memory Board Schematic

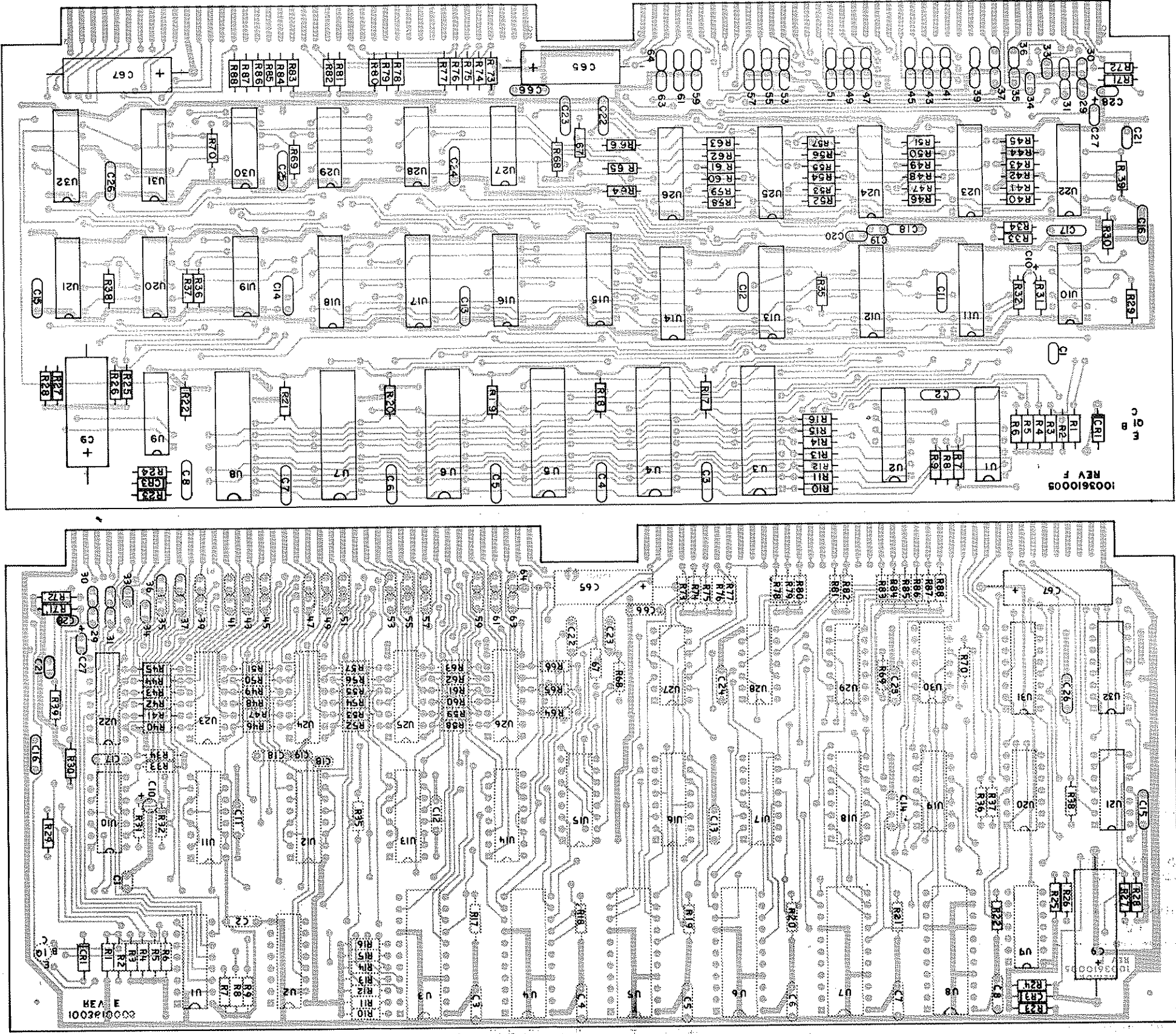
REF	SYMBOL	DESCRIPTION	PART NO.
C1		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C2		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C3		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C4		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C5		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C6		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C7		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C8		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C9		Capacitor, 100 uF, 16 V, NLW	0265970008
C10		Capacitor, 22 uF, 35 V, T368	0283510005
C11		Capacitor, 0.1 uF, 12 V, Y5 F, 20%	0270100008
C12		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C13		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C14		Capacitor, 0.1 uF, 12 V, Y5 F, 20%	0270100008
C15		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C16		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C17		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C18		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C19		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C20		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C21		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C22		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C23		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C24		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C25		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C26		Capacitor, 0.01 uF, 100 V, Z5 V	0273210009
C27		Capacitor, 22 uF, 35 V, T368	0283510005
C28		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C29		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C30		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C31		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C32		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C33		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C34		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C35		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C36		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C37		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C38		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C39		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C40		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C41		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C42		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C43		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C44		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C45		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C46		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C47		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C48		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C49		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C50		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C51		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C52		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C53		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C54		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C55		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C56		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C57		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C58		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C59		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C60		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C61		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C62		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C63		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C64		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C65		Capacitor, 50 uF, 50 V, 30 D	0247070009
C66		Capacitor, 0.1 uF, 12 V, Y5 F, 20%	0270100008
C67		Capacitor, 100 uF, 16 V, NLW	0265970008
CR1		Diode, Zener, 1 N5225 B	0405520000
CR2		Not used	
CR3		Diode, Signal, Germ. 1 N270	0405510004
Q1		Transistor, PNP, SI. 2 N4126	0448020009
R1		Resistor, 6.8K, 5%, 1/4W	0174810008
R2		Resistor, 6.8K, 5%, 1/4W	0174810008
R3		Resistor, 1.8K, 10%, 1/4W	0178190004

1003620001C PC ASSY MEMORY GSB900SC

SUNAIR GSB-900SC

REF	SYMBOL	DESCRIPTION	PART NO.
R4		Resistor, 10K, 10%, 1/4W	0170410005
R5		Resistor, 10K, 10%, 1/4W	0170410005
R6		Resistor, 470, 10%, 1/4W	0172610001
R7		Resistor, 5.6K, 10%, 1/4W	0183060008
R8		Resistor, 5.6K, 10%, 1/4W	0183060008
R9		Resistor, 5.6K, 10%, 1/4W	0183060008
R10		Resistor, 10K, 10%, 1/4W	0170410005
R11		Resistor, 10K, 10%, 1/4W	0170410005
R12		Resistor, 10K, 10%, 1/4W	0170410005
R13		Resistor, 10K, 10%, 1/4W	0170410005
R14		Resistor, 10K, 10%, 1/4W	0170410005
R15		Resistor, 10K, 10%, 1/4W	0170410005
R16		Resistor, 10K, 10%, 1/4W	0170410005
R17		Resistor, 10, 5%, 1/4W	0177160004
R18		Resistor, 10, 5%, 1/4W	0177160004
R19		Resistor, 10, 5%, 1/4W	0177160004
R20		Resistor, 10, 5%, 1/4W	0177160004
R21		Resistor, 10, 5%, 1/4W	0177160004
R22		Resistor, 10, 5%, 1/4W	0177160004
R23		Resistor, 470, 10%, 1/4W	0172610001
R24		Resistor, 47K, 5%, 1/4W	0170770001
R25		Resistor, 5.6K, 10%, 1/4W	0183060008
R26		Resistor, 5.6K, 10%, 1/4W	0183060008
R27		Resistor, 5.6K, 10%, 1/4W	0183060008
R28		Resistor, 47K, 5%, 1/4W	0170770001
R29		Resistor, 5.6K, 10%, 1/4W	0183060008
R30		Resistor, 47K, 5%, 1/4W	0170770001
R31		Resistor, 47K, 5%, 1/4W	0170770001
R32		Resistor, 5.6K, 10%, 1/4W	0183060008
R33		Resistor, 5.6K, 10%, 1/4W	0183060008
R34		Resistor, 5.6K, 10%, 1/4W	0183060008
R35		Resistor, 10K, 10%, 1/4W	0170410005
R36		Resistor, 5.6K, 10%, 1/4W	0183060008
R37		Resistor, 5.6K, 10%, 1/4W	0183060008
R38		Resistor, 47K, 5%, 1/4W	0170770001
R39		Resistor, 5.6K, 10%, 1/4W	0183060008
R40		Resistor, 5.6K, 10%, 1/4W	0183060008
R41		Resistor, 5.6K, 10%, 1/4W	0183060008
R42		Resistor, 5.6K, 10%, 1/4W	0183060008
R43		Resistor, 5.6K, 10%, 1/4W	0183060008
R44		Resistor, 5.6K, 10%, 1/4W	0183060008
R45		Resistor, 5.6K, 10%, 1/4W	0183060008
R46		Resistor, 5.6K, 10%, 1/4W	0183060008
R47		Resistor, 5.6K, 10%, 1/4W	0183060008
R48		Resistor, 5.6K, 10%, 1/4W	0183060008
R49		Resistor, 5.6K, 10%, 1/4W	0183060008
R50		Resistor, 5.6K, 10%, 1/4W	0183060008
R51		Resistor, 5.6K, 10%, 1/4W	0183060008
R52		Resistor, 5.6K, 10%, 1/4W	0183060008
R53		Resistor, 5.6K, 10%, 1/4W	0183060008
R54		Resistor, 5.6K, 10%, 1/4W	0183060008
R55		Resistor, 5.6K, 10%, 1/4W	0183060008
R56		Resistor, 5.6K, 10%, 1/4W	0183060008
R57		Resistor, 5.6K, 10%, 1/4W	0183060008
R58		Resistor, 5.6K, 10%, 1/4W	0183060008
R59		Resistor, 5.6K, 10%, 1/4W	0183060008
R60		Resistor, 5.6K, 10%, 1/4W	0183060008
R61		Resistor, 5.6K, 10%, 1/4W	0183060008
R62		Resistor, 5.6K, 10%, 1/4W	0183060008

REF	SYMBOL	DESCRIPTION	PART NO.
R63		Resistor, 5.6K, 10%, 1/4W	0183060008
R64		Resistor, 5.6K, 10%, 1/4W	0183060008
R65		Resistor, 5.6K, 10%, 1/4W	0183060008
R66		Resistor, 5.6K, 10%, 1/4W	0183060008
R67		Resistor, 5.6K, 10%, 1/4W	0183060008
R68		Resistor, 5.6K, 10%, 1/4W	0183060008
R69		Resistor, 5.6K, 10%, 1/4W	0183060008
R70		Resistor, 1K, 10%, 1/4W	0171560001
R71		Resistor, 5.6K, 10%, 1/4W	0183060008
R72		Resistor, 5.6K, 10%, 1/4W	0183060008
R73		Resistor, 5.6K, 10%, 1/4W	0183060008
R74		Resistor, 5.6K, 10%, 1/4W	0183060008
R75		Resistor, 5.6K, 10%, 1/4W	0183060008
R76		Resistor, 5.6K, 10%, 1/4W	0183060008
R77		Resistor, 5.6K, 10%, 1/4W	0183060008
R78		Resistor, 5.6K, 10%, 1/4W	0183060008
R79		Resistor, 5.6K, 10%, 1/4W	0183060008
R80		Resistor, 5.6K, 10%, 1/4W	0183060008
R81		Resistor, 5.6K, 10%, 1/4W	0183060008
R82		Resistor, 5.6K, 10%, 1/4W	0183060008
R83		Resistor, 5.6K, 10%, 1/4W	0183060008
R84		Resistor, 5.6K, 10%, 1/4W	0183060008
R85		Resistor, 5.6K, 10%, 1/4W	0183060008
R86		Resistor, 5.6K, 10%, 1/4W	0183060008
R87		Resistor, 5.6K, 10%, 1/4W	0183060008
R88		Resistor, 47K, 5%, 1/4W	0170770001
U1		IC Digital, Convert, SN74184N	1003930000
U2		IC Digital, Convert, SN74184N	1003930000
U3		IC Digital, 256 X4 RAM	1003860001
U4		IC Digital, 256 X4 RAM	1003860001
U5		IC Digital, 256 X4 RAM	1003860001
U6		IC Digital, 256 X4 RAM	1003860001
U7		IC Digital, 256 X4 RAM	1003860001
U8		IC Digital, 256 X4 RAM	1003860001
U9		IC Digital Dual 4 IN SN7420N	1003920004
U10		IC Digital, Hex Driv, SN7417N	1003870007
U11		IC Digital SN74 LS365 AN	1003880002
U12		IC Digital SN74 LS365 AN	1003880002
U13		IC Digital SN74 LS365 AN	1003880002
U14		IC Digital SN74 LS365 AN	1003880002
U15		IC Digital SN74 LS 365 AN	1003880002
U16		IC Digital SN74 LS 365 AN	1003880002
U17		IC Digital SN74 LS365 AN	1003880002
U18		IC Digital SN74 LS365 AN	1003880002
U19		IC Digital, Hex Inv, SN74 LS14 N	1003940005
U20		IC Digital, Quad, 2 IN SN7402 N	1003910009
U21		IC Digital Hex Inv, SN7406 N	1003880002
U22		IC Digital SN74 LS365 AN	1003880002
U23		IC Digital SN74 LS365 AN	1003880002
U24		IC Digital SN74 LS365 AN	1003880002
U25		IC Digital SN74 LS365 AN	1003880002
U26		IC Digital SN74 LS365 AN	1003880002
U27		IC Digital, Hex Driv, SN7417N	1003870007
U28		IC Digital, Hex Driv, SN7417N	1003870007
U29		IC Digital, Hex Driv, SN7417N	1003870007
U30		IC Digital, Hex Driv, SN7417N	1003870007
U31		IC Digital SN74 LS283 N	1003890008
U32		IC Digital SN74 LS283 N	1003890008



50240XXXXX CHASSIS ASSY

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
1A3P1		Connector, RF, Subminiature	0753700000
1A3P2		Connector, RF, Subminiature	0753720001
1A3P3		Connector, RF, Miniature	0753720001
1A3P4		Connector, RF, Miniature	0753720001
1A8P5		Connector, RF, BNC	0753710005
1A8U1		TCXO, 5MHz Ground Eght.	5024012704
C1		Capacitor, 0.01uF, 25V, X55	0281620008
C2		Capacitor, 0.01uF, 25V, X55	0281620008
C3		Capacitor, 2uF, 100V, Mylar	0272420000
C4		Not used	
C5		Capacitor, 0.01uF, 1000V, 25U, 20%	0243550006
C6		Capacitor, 0.01uF, 1000V, 25U, 10%	0243550006
C7		Capacitor, 0.01uF, 25V, X55	0281620008
C8		Capacitor, 0.01uF, 25V, X55	0281620008
C9		Capacitor, 0.01uF, 25V, X55	0281620008
C10		Capacitor, 0.01uF, 25V, X55	0281620008
C11		Capacitor, 0.01uF, 25V, X55	0281620008
C12		Capacitor, 15uF, 35V	0282240004
CR1		Diode, Rectifier 1N4004	0405180004
CR2		Diode, Rectifier 1N4004	0405180004
CR3		Diode, Signal, SII, 1N454	0405220003
CR4		Diode, Signal, SII, 1N454	0405220003
CR5		Diode, Rectifier 1N4004	0405180004
CR6		Diode, Rectifier 1N4004	0405180004
J1		Connector, RF, UHF	0753300001
J2		Connector, Power, 10 Pin Round	0753990008
J3		Connector, Power, 9 Pin Round	0753440008
J4		Connector, Power, 37 Pin Round	0753430002
J5		Connector, Power, 11 Pin Rect.	0753460009
J6		Connector, Power, 24 Pin Rect.	0753510006
J7		Connector, Power, 36 Pin Rect.	0753520001
K1		Relay, 4PDT, 12V, Sensitive	066640009
K2		Relay, 3PDT, 12V, Plug-In 10A	0666760004
L1		Inductor, Molded, 47uH, 5%	0652680003
P1		Connector, Power, 7 Pin Rect.	0753530007
P2		Connector, Power, 20 Pin Rect.	0753550008
Q1		Transistor, PNP, SII, T1P-32A	0448200007
Q101		Transistor, NPN, SII	0448210002
R1		Resistor, 3.9, 5%, 1/2W	0168270005
R2		Resistor, 2.2K, 10%, 1W	0164510001
S1		Socket, Tube 7 Pin	0764370006
		Connector, RF, COAX Feedthru	0753690004
		COAX Cable Assy.	5024003799

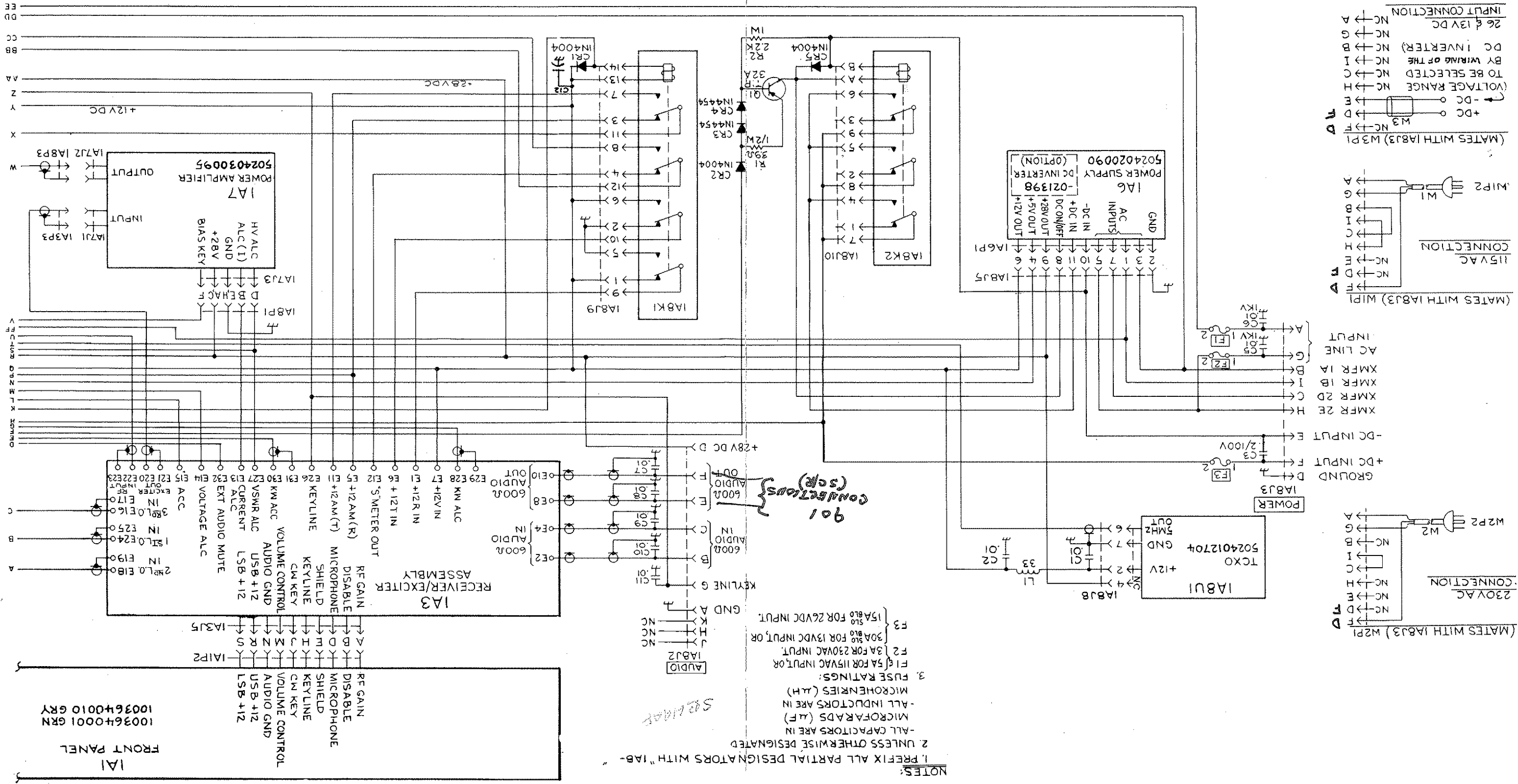


Figure 5.10 Main Frame Wiring

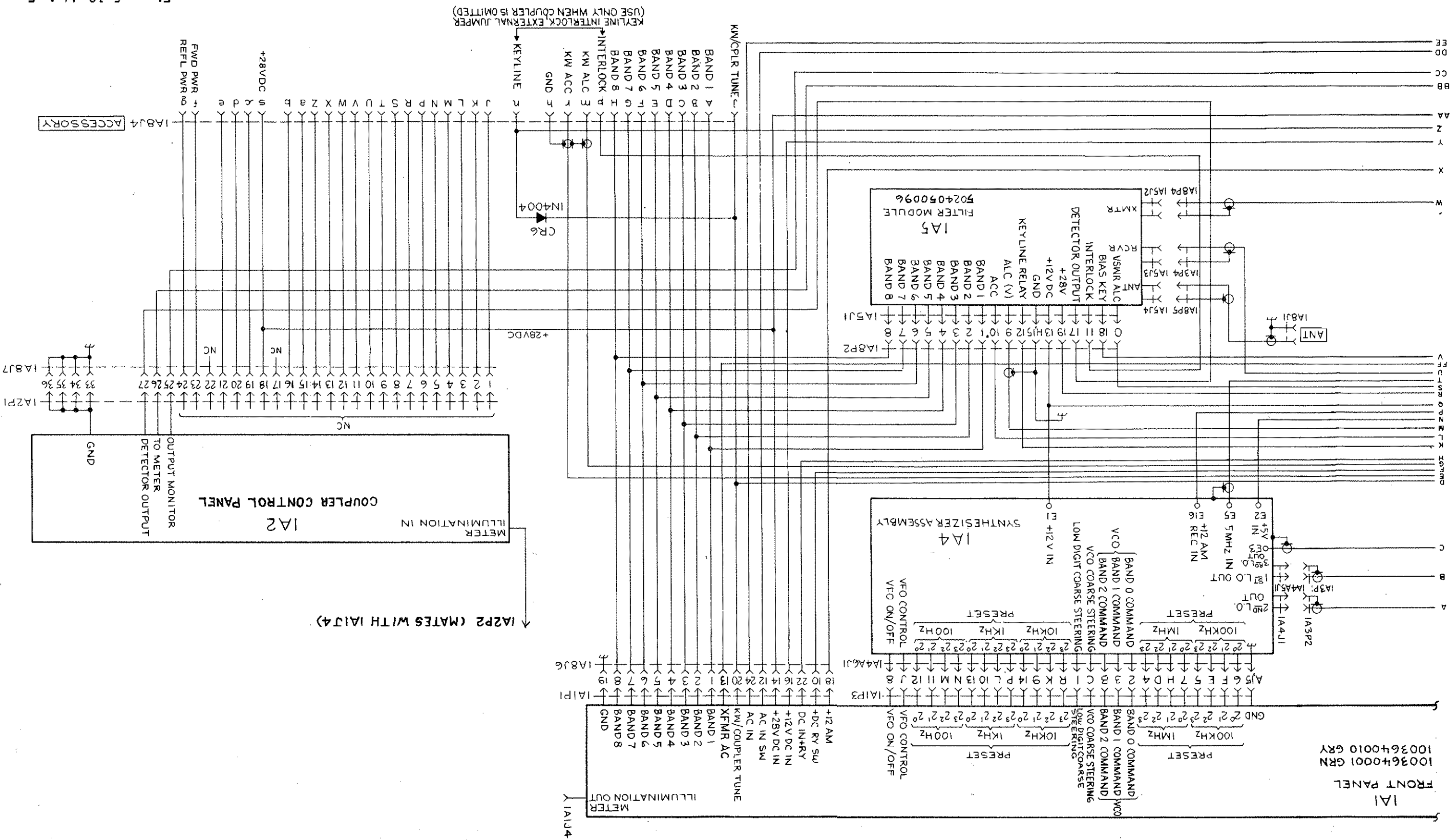
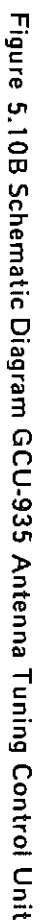
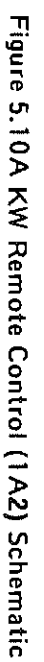


Figure 5.10 Main Frame Wiring



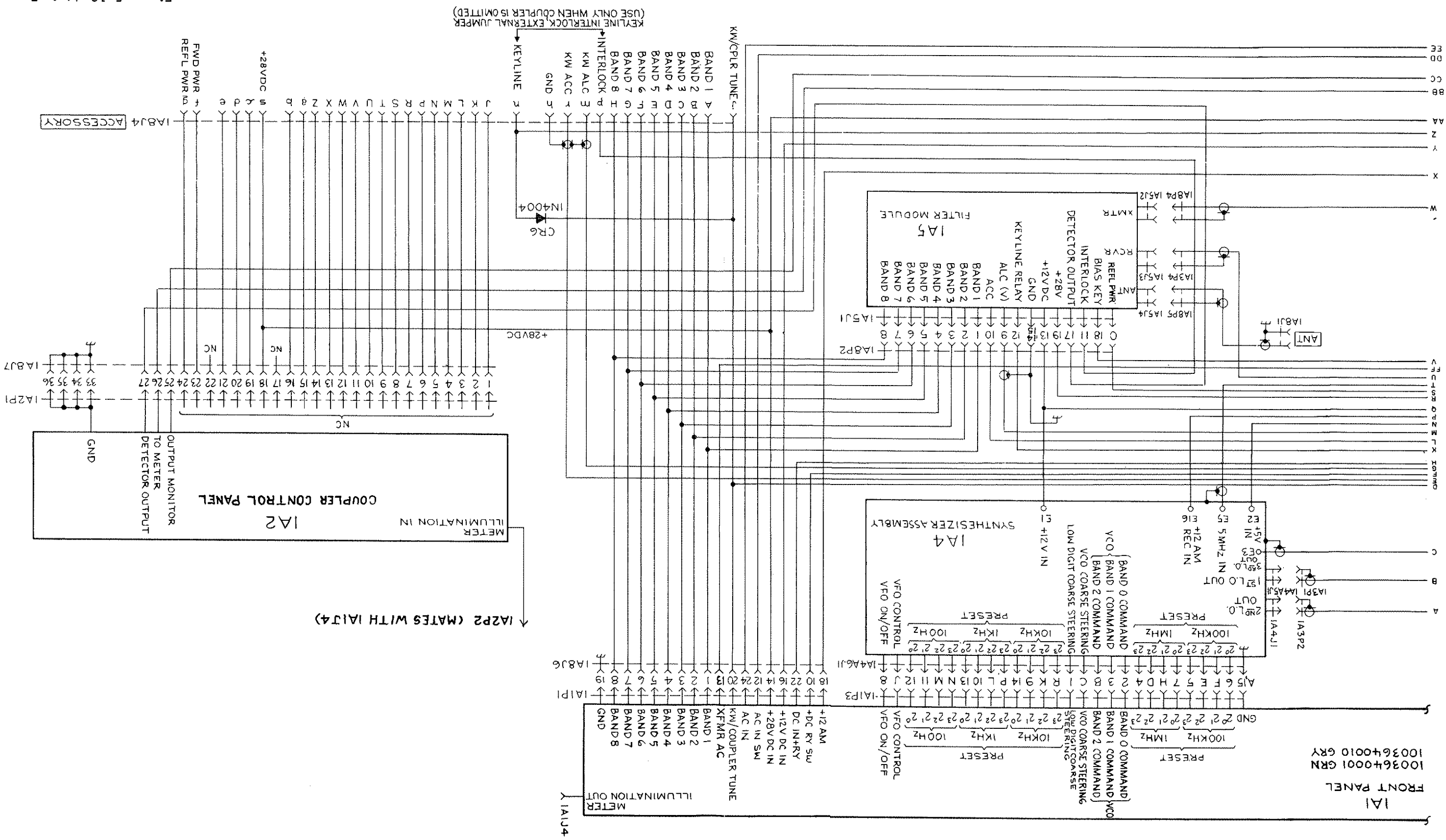


Figure 5.10 Main Frame Wiring

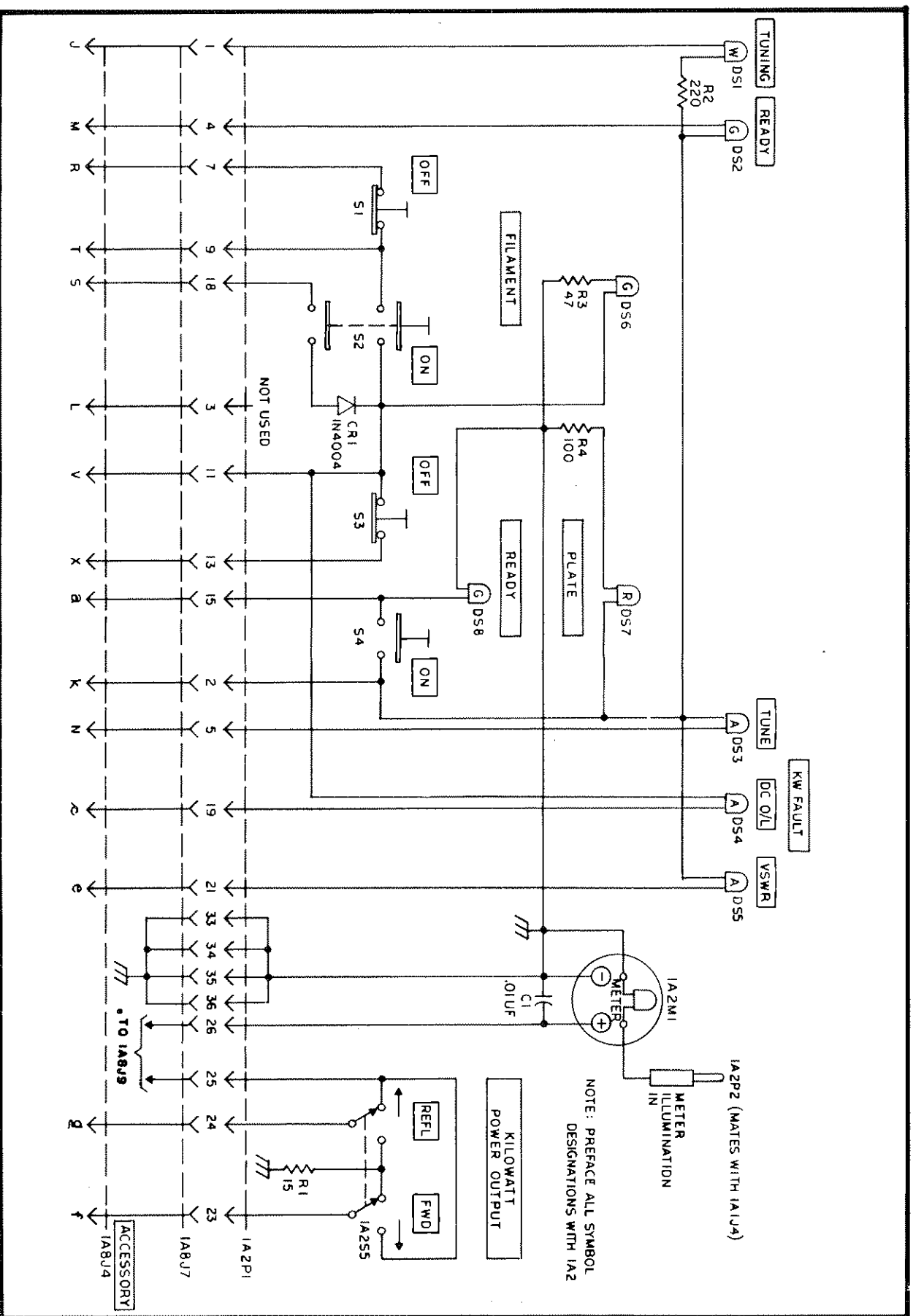
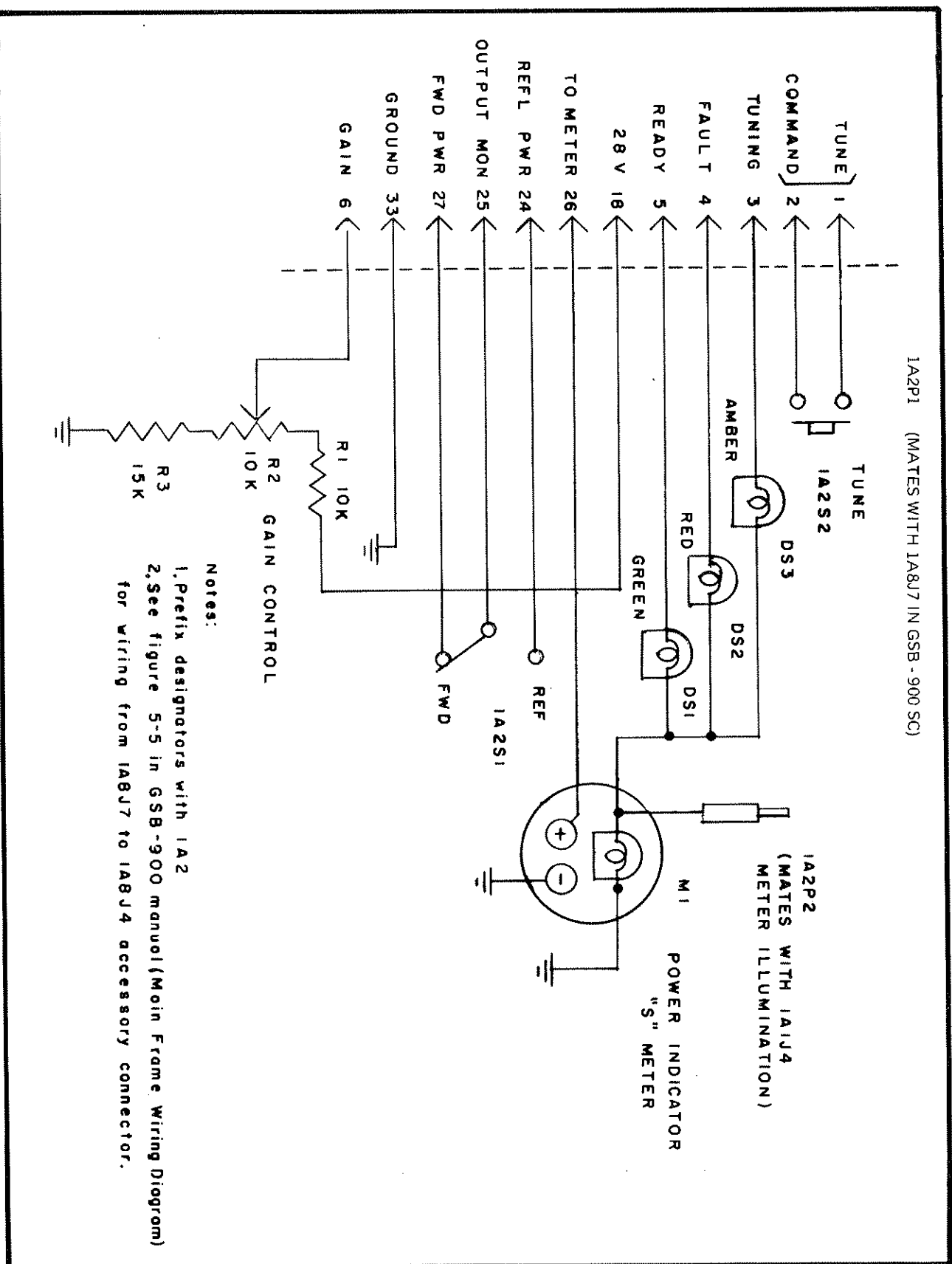


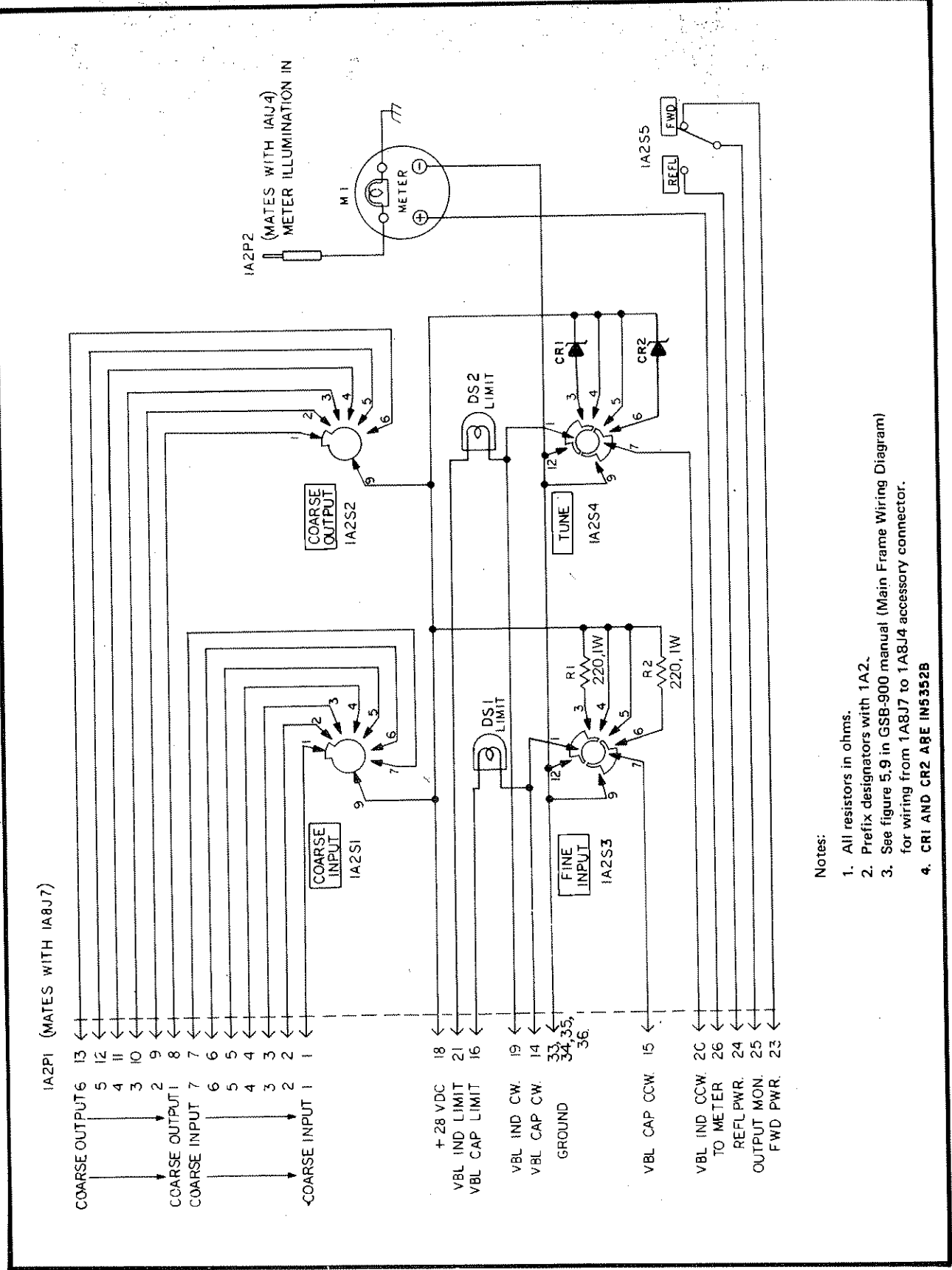
Figure 5.10A KW Remote Control (1A2) Schematic

5-72



SUNAIR GSB-900SC

Figure 5.10B Schematic Diagram GCU-935 Antenna Tuning Control Unit



- Notes:
- 1. All resistors in ohms.
 - 2. Prefix designators with 1A2.
 - 3. See figure 5.9 in GSB-900 manual (Main Frame Wiring Diagram) for wiring from 1A8J7 to 1A8J4 accessory connector.
 - 4. CR1 AND CR2 ARE IN5352B

Figure 5.10C Schematic : Antenna Tuning Control Unit

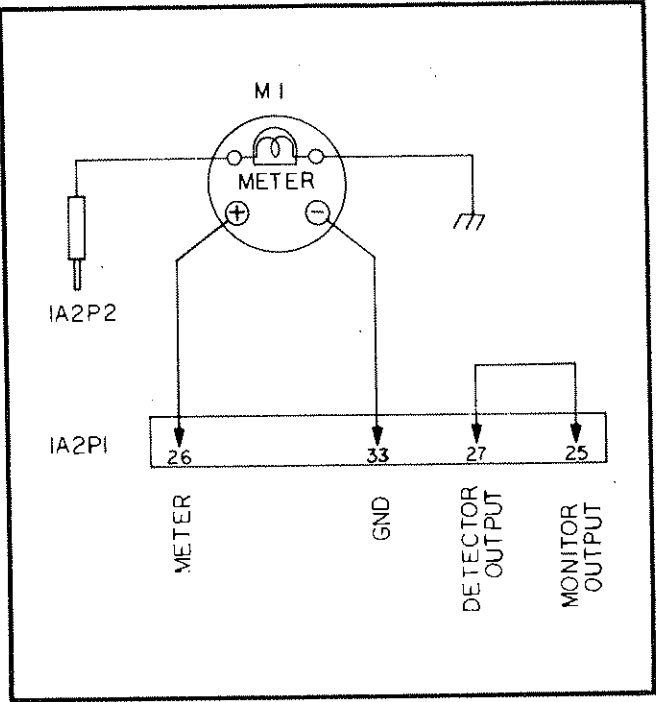
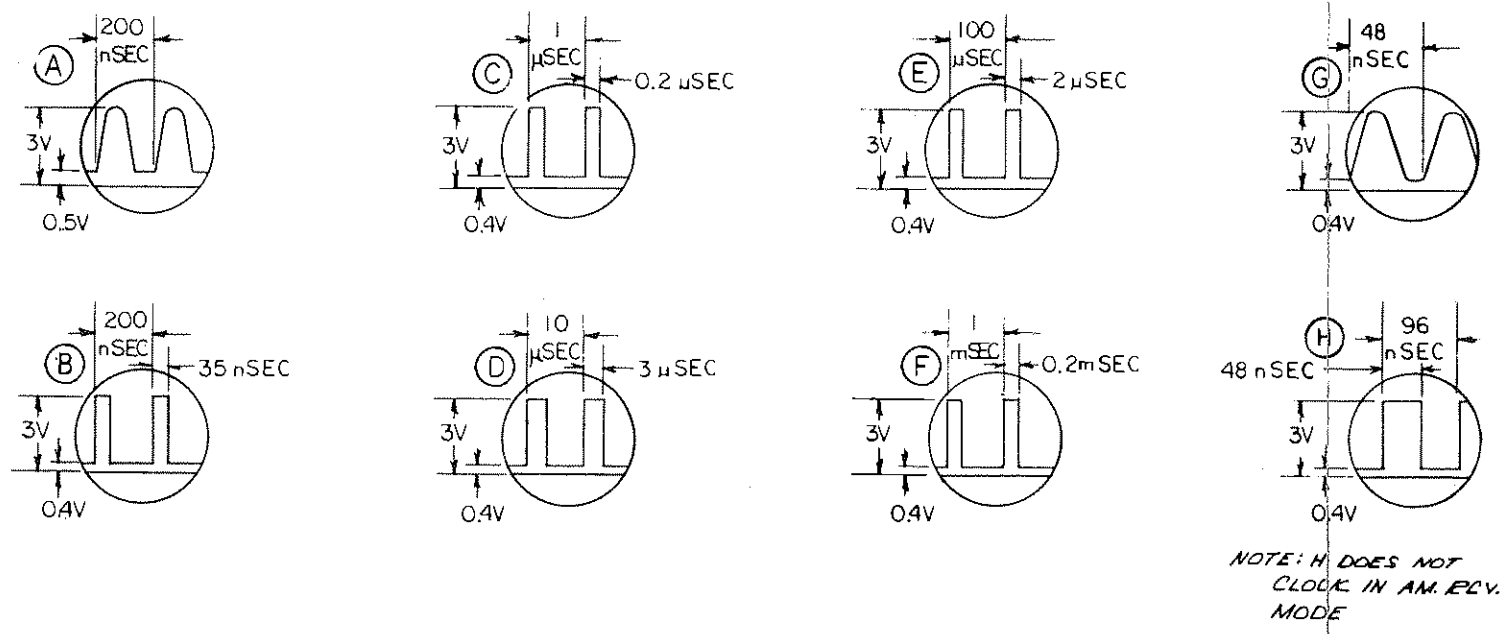


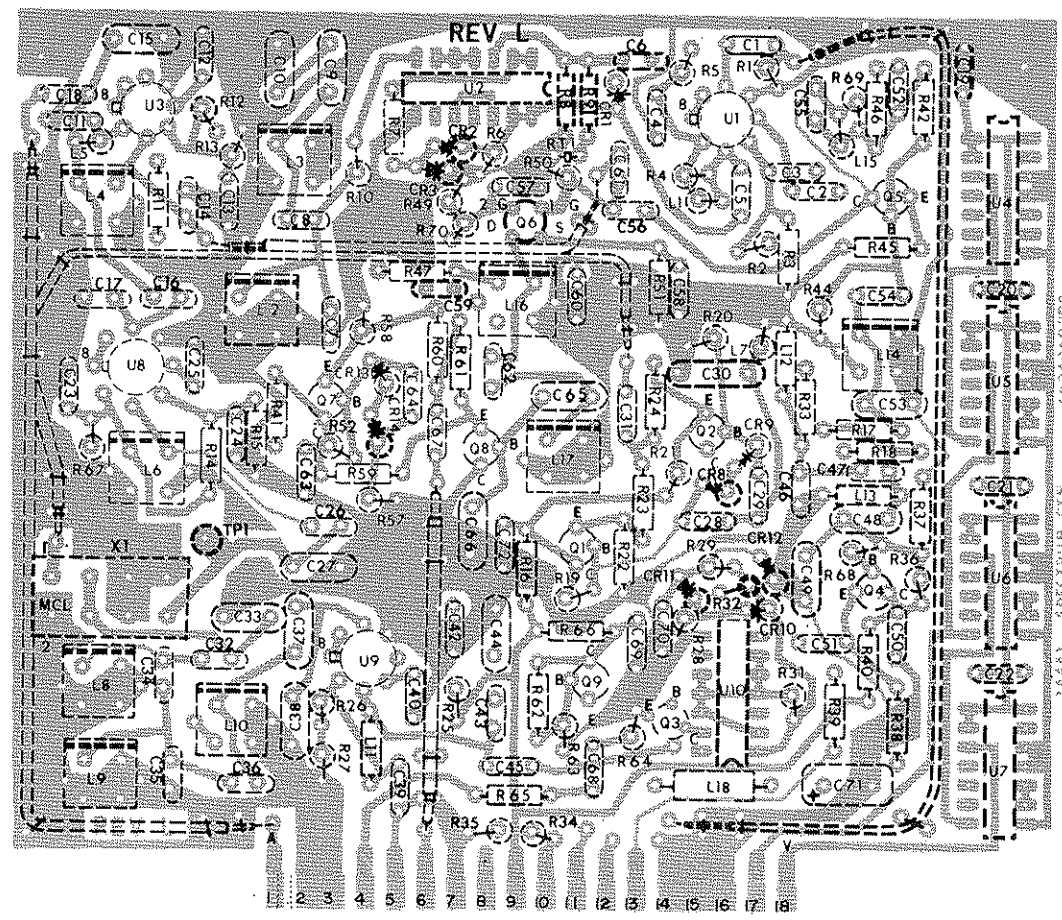
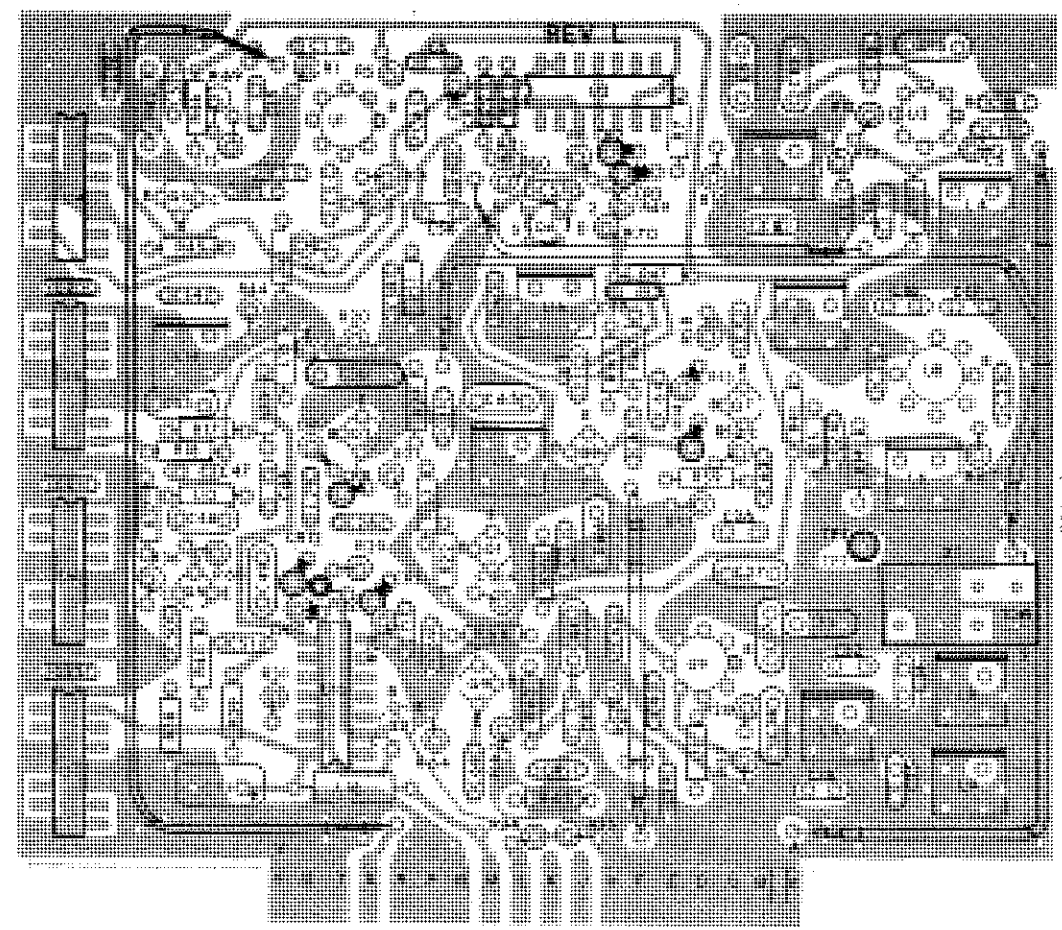
Figure 5.11 Meter Panel Schematic (1A2)

50240419XXE METER PANEL ASSY.

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
M1	Meter, Illuminated	5024042204
P1	Connector, 36 Pin	0754070000
.P2	Plug, Phone Tip, Red	0753680000



Spectrum Generator (1A4A1) Waveforms
(Frequency Dials at 00000.0 KHZ



502406009IL PC ASSY. SPECTRUM GENERATOR

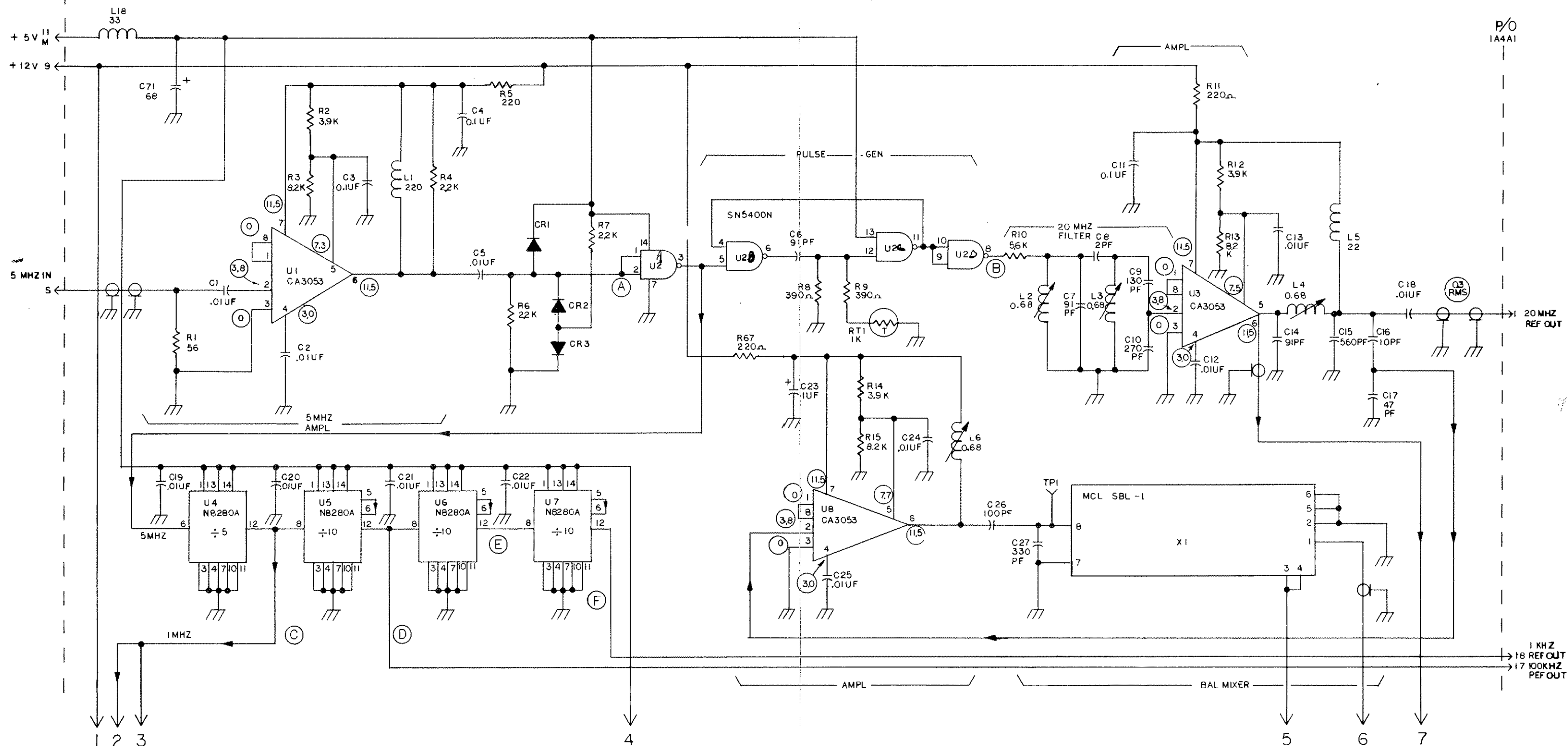
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY SPECTRUM GENERATOR	5024060091
C1	Capacitor, 0.01UF, 25V, X5S	0281620008
C2	Capacitor, 0.01UF, 25V, X5S	0281620008
C3	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C4	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C5	Capacitor, 0.01UF, 25V, X5S	0281620008
C6	Capacitor, 91PF, 500V, DM10, 5%	0284420000
C7	Capacitor, 91PF, 500V, DM10, 5%	0259710008
C8	Capacitor, 2PF, 500V, DM10	0274860007
C9	Capacitor, 130PF, 500V, DM15, 5%	0275030008
C10	Capacitor, 270PF, 500V, DM15, 5%	0281610002
C11	Capacitor, 0.01UF, 50V, X7R, 20%	0281620008
C12	Capacitor, 0.01UF, 25V, X5S	0281620008
C13	Capacitor, 0.01UF, 25V, X5S	0281620008
C14	Capacitor, 91PF, 500V, DM10, 5%	0284420000
C15	Capacitor, 560PF, 300V, DM15, 5%	0283750006
C16	Capacitor, 10PF, 500V, DM10	0259830003
C17	Capacitor, 47PF, 500V, DM10, 5%	0294960007
C18	Capacitor, 0.01UF, 25V, X5S	0281620008
C19	Capacitor, 0.01UF, 25V, X5S	0281620008
C20	Capacitor, 0.01UF, 25V, X5S	0281620008
C21	Capacitor, 0.01UF, 25V, X5S	0281620008
C22	Capacitor, 0.01UF, 25V, X5S	0281620008
C23	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C24	Capacitor, 0.01UF, 25V, X5S	0281620008
C25	Capacitor, 0.01UF, 25V, X5S	0281620008
C26	Capacitor, 100PF, 500V, DM10, 5%	0274740001
C27	Capacitor, 330PF, 500V, DM15, 5%	0299030008
C28	Capacitor, 0.01UF, 25V, X5S	0281620008
C29	Capacitor, 0.01UF, 25V, X5S	0281620008
C30	Capacitor, 2200PF, 500V, DM19, 2%	0281360006
C31	Capacitor, 0.01UF, 25V, X5S	0281620008
C32	Capacitor, 91PF, 500V, DM10, 5%	0284420000
C33	Capacitor, 750PF, 300V, DM15, 5%	0275410005
C34	Capacitor, 2PF, 500V, DM10	0259710008
C35	Capacitor, 91PF, 500V, DM10, 5%	0284420000
C36	Capacitor, 2PF, 500V, DM10	0259710008
C37	Capacitor, 120PF, 500V, DM15, 5%	0289850002
C38	Capacitor, 180PF, 500V, DM15, 5%	0258280000
C39	Capacitor, 0.01UF, 25V, X5S	0281620008
C40	Capacitor, 0.01UF, 25V, X5S	0281620008
C41	Not used	
C42	Capacitor, 0.01UF, 25V, X5S	0281620008
C43	Capacitor, 68PF, 500V, DM10, 5%	0261070002
C44	Capacitor, 270PF, 500V, DM15, 5%	0275030008
C45	Capacitor, 0.01UF, 25V, X5S	0281620008
C46	Capacitor, 100PF, 500V, DM10, 5%	0274740001
C47	Capacitor, 15PF, 500V, DM10, 5%	0259950009
C48	Capacitor, 150PF, 500V, DM15, 5%	0274980002
C49	Capacitor, 360PF, 500V, DM15, 5%	0275150003
C50	Capacitor, 0.01UF, 25V, X5S	0281620008
C51	Capacitor, 0.01UF, 25V, X5S	0281620008
C52	Capacitor, 0.01UF, 25V, X5S	0281620008
C53	Capacitor, 180PF, 500V, DM15, 5%	0258280000
C54	Capacitor, 0.01UF, 25V, X5S	0281620008
C55	Capacitor, 56PF, 500V, DM10, 5%	0293170002
C56	Capacitor, 10PF, 500V, DM10	0259830003
C57	Capacitor, 0.01UF, 25V, X5S	0281620008
C58	Capacitor, 0.01UF, 25V, X5S	0281620008
C59	Capacitor, 82PF, 500V, DM10, 5%	0262120003
C60	Capacitor, 0.01UF, 25V, X5S	0281620008
C61	Capacitor, 10PF, 500V, DM10	0259830003
C62	Capacitor, 2PF, 500V, DM10	0259710008
C63	Capacitor, 0.01UF, 25V, X5S	0281620008
C64	Capacitor, 0.01UF, 25V, X5S	0281620008
C65	Capacitor, 130PF, 500V, DM15, 5%	0274860007
C66	Capacitor, 270PF, 500V, DM15, 5%	0275030008
C67	Capacitor, 0.01UF, 25V, X5S	0281620008
C68	Capacitor, 0.01UF, 25V, X5S	0281620008
C69	Capacitor, 0.01UF, 25V, X5S	0281620008
C70	Capacitor, 0.01UF, 25V, X5S	0281620008
C71	Capacitor, 68UF, 15V, T368	0296540005
C72	Capacitor, 0.01UF, 25V, X5S	0281620008
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
CR3	Diode, Signal, Sil. 1N4454	0405270003
CR4	Not used	
CR5	Not used	
CR6	Not used	
CR7	Not used	
CR8	Diode, Signal, Sil. 1N4454	0405270003
CR9	Diode, Signal, Sil. 1N4454	0405270003
CR10	Diode, Signal, Sil. 1N4454	0405270003
CR11	Diode, Signal, Sil. 1N4454	0405270003
CR12	Diode, Signal, Sil. 1N4454	0405270003
CR13	Diode, Signal, Sil. 1N4454	0405270003
CR14	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 220UH, 5%	0650500008
L2	Inductor, Var. 0.68UH	0647900009
L3	Inductor, Var. 0.68UH	0647900009
L4	Inductor, Var. 0.68UH	0647900009
L5	Inductor, Molded, 22UH, 5%	0650000005
L6	Inductor, Var. 0.68UH	0647900009
L7	Inductor, Molded, 12UH, 5%	0652700004
L8	Inductor, Var. 0.68UH	0647900009
L9	Inductor, Var. 0.68UH	0647900009
L10	Inductor, Var. 0.68UH	0647900009
L11	Inductor, Molded, 1.0UH, 5%	0649150007
L12	Inductor, Molded, 2.2UH, 5%	0649890001
L13	Inductor, Molded, 2.2UH, 5%	0649890001
L14	Inductor, Var. 15.0UH	0629790001
L15	Inductor, Molded, 47UH, 5%	0652680003
L16	Inductor, Var. 1.00UH	0647910004
L17	Inductor, Var. 1.00UH	0647910004
L18	Inductor, Molded, 33UH, 5%	0646300008
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, PNP, Si. 2N4126	0448020009
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, NPN, Si. 2N4124	0448010003
Q6	Transistor, N-CH, Fet MFE122	0448030004
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, PNP, Si. 2N4126	0448020009
Q9	Transistor, NPN, Si. 2N4124	0448010003
R1	Resistor, 56, 10%, 1/4W	0174290004
R2	Resistor, 3.9K, 10%, 1/4W	0178830003
R3	Resistor, 8.2K, 10%, 1/4W	0181620006
R4	Resistor, 2.2K, 5%, 1/4W	0178070009
R5	Resistor, 220, 10%, 1/4W	0171320000
R6	Resistor, 2.2K, 5%, 1/4W	0178070009
R7	Resistor, 2.2K, 5%, 1/4W	0178070009
R8	Resistor, 390, 10%, 1/4W	0178330001
R9	Resistor, 390, 10%, 1/4W	0178330001
R10	Resistor, 5.6K, 10%, 1/4W	0183060008
R11	Resistor, 220, 10%, 1/4W	0171320000
R12	Resistor, 3.9K, 10%, 1/4W	0178830003
R13	Resistor, 8.2K, 10%, 1/4W	0181620006
R14	Resistor, 3.9K, 10%, 1/4W	0178830003
R15	Resistor, 8.2K, 10%, 1/4W	0181620006
R16	Resistor, 220, 10%, 1/4W	0171320000
R17	Resistor, 8.2K, 10%, 1/4W	0181620006
R18	Resistor, 680, 10%, 1/4W	0176630007
R19	Resistor, 4.7K, 5%, 1/4W	0170770001
R20	Resistor, 4.7K, 5%, 1/4W	0170770001
R21	Resistor, 1K, 10%, 1/4W	0171560001
R22	Resistor, 1K, 10%, 1/4W	0171560001
R23	Resistor, 22, 10%, 1/4W	0192690001
R24	Resistor, 22, 10%, 1/4W	0192690001
R25	Resistor, 220, 10%, 1/4W	0171320000
R26	Resistor, 3.9K, 10%, 1/4W	0178830003
R27	Resistor, 8.2K, 10%, 1/4W	0181620006
R28	Resistor, 1K, 10%, 1/4W	0171560001
R29	Resistor, 2.2K, 5%, 1/4W	0178070009
R30	Not used	
R31	Resistor, 1K, 10%, 1/4W	0171560001
R32	Resistor, 1K, 10%, 1/4W	0171560001
R33	Resistor, 1K, 10%, 1/4W	0171560001
R34	Resistor, 6.8K, 5%, 1/4W	0174810008
R35	Resistor, 2.2K, 5%, 1/4W	0178070009
R36	Resistor,, 12K, 10%, 1/4W	0183180003

SUNAIR GSB-900SC

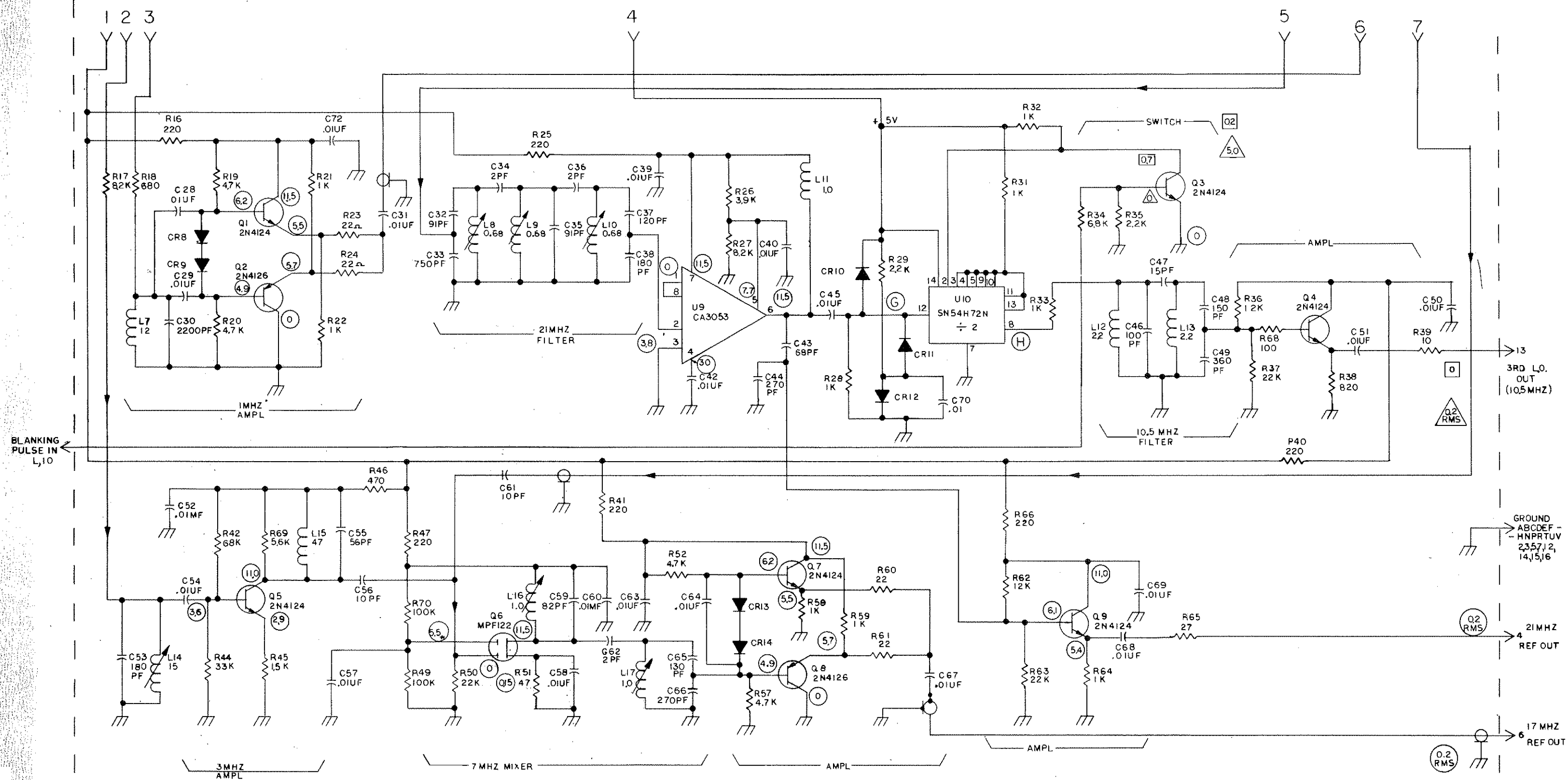
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R37	Resistor, 22K, 5%, 1/4W	0172230004
R38	Resistor, 820, 10%, 1/4W	0178210005
R39	Resistor, 10, 5%, 1/4W	0177160004
R40	Resistor, 220, 10%, 1/4W	0171320000
R41	Resistor, 220, 10%, 1/4W	0171320000
R42	Resistor, 68K, 10%, 1/4W	0173520006
R43	Not used	
R44	Resistor, 33K, 10%, 1/4W	0177920009
R45	Resistor, 1.5K, 10%, 1/4W	0172470005
R46	Resistor, 470, 10%, 1/4W	0172610001
R47	Resistor, 220, 10%, 1/4W	0171320000
R48	Not used	
R49	Resistor, 100K, 10%, 1/4W	0170390004
R50	Resistor, 22K, 5%, 1/4W	0172230004
R51	Resistor, 47K, 10%, 1/4W	0179360001
R52	Resistor, 4.7K, 5%, 1/4W	0170770001
R53	Not used	
R54	Not used	
R55	Not used	
R56	Not used	
R57	Resistor, 4.7K, 5%, 1/4W	0170770001
R58	Resistor, 1K, 10%, 1/4W	0171560001
R59	Resistor, 1K, 10%, 1/4W	0171560001
R60	Resistor, 22, 10%, 1/4W	0192690001
R61	Resistor, 22, 10%, 1/4W	0192690001

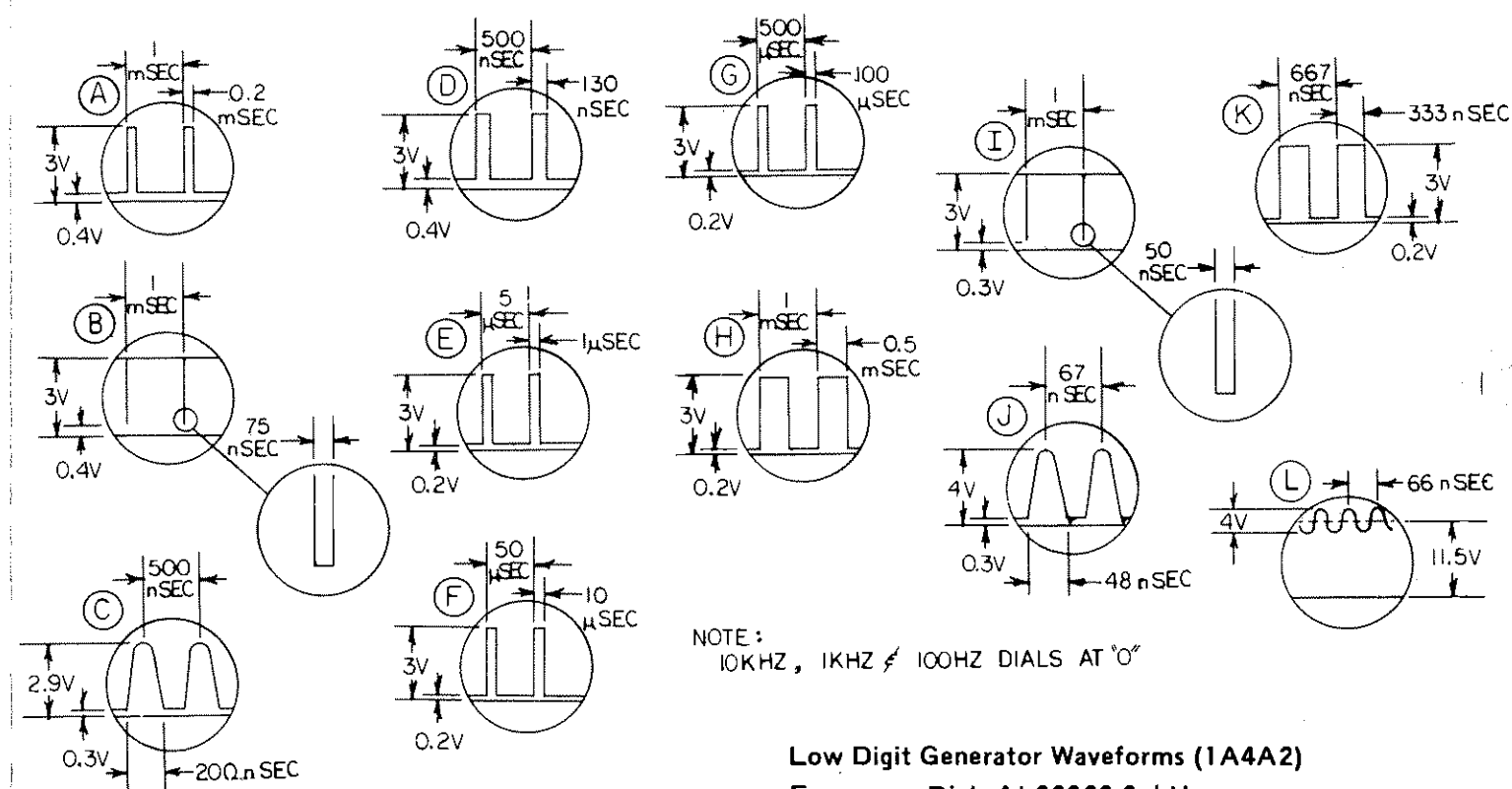
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R62	Resistor, 12K, 10%, 1/4W	0183180003
R63	Resistor, 22K, 5%, 1/4W	0172230004
R64	Resistor, 1K, 10%, 1/4W	0171560001
R65	Resistor, 27, 10%, 1/4W	0172590001
R66	Resistor, 220, 10%, 1/4W	0171320000
R67	Resistor, 220, 10%, 1/4W	0171320000
R68	Resistor, 100, 5%, 1/4W	0171180003
R69	Resistor, 5.6K, 10%, 1/4W	0183060008
R70	Resistor, 100K, 10%, 1/4W	0170390004
RT1	Resistor, 1K at 25C	0196110009
TP1		0525580000
U1	IC Linear CA3053	0448060001
U2	IC Digital SN5400N	0448400006
U3	IC Linear CA3053	0448060001
U4	IC Digital SN74176/N8280A	0448080001
U5	IC Digital SN74176/N8280A	0448080001
U6	IC Digital SN74176/N8280A	0448080001
U7	IC Digital SN74176/N8280A	0448080001
U8	IC Linear CA3053	0448060001
U9	IC Linear CA3053	0448060001
U10	IC Digital SN54H72N	0448410001
	Tubing, No. 22 Natural DNP	0579480003
	Wire Kit, Spectrum Gen. Assy.	5024060008
	PCB Spectrum Generator	5024060202
X1	Balanced Mixer	1003300006



7. (A) - REFERENCE WAVEFORMS WITH ALL FREQUENCY
DIALS SET AT "0"

5-76





5024070097C

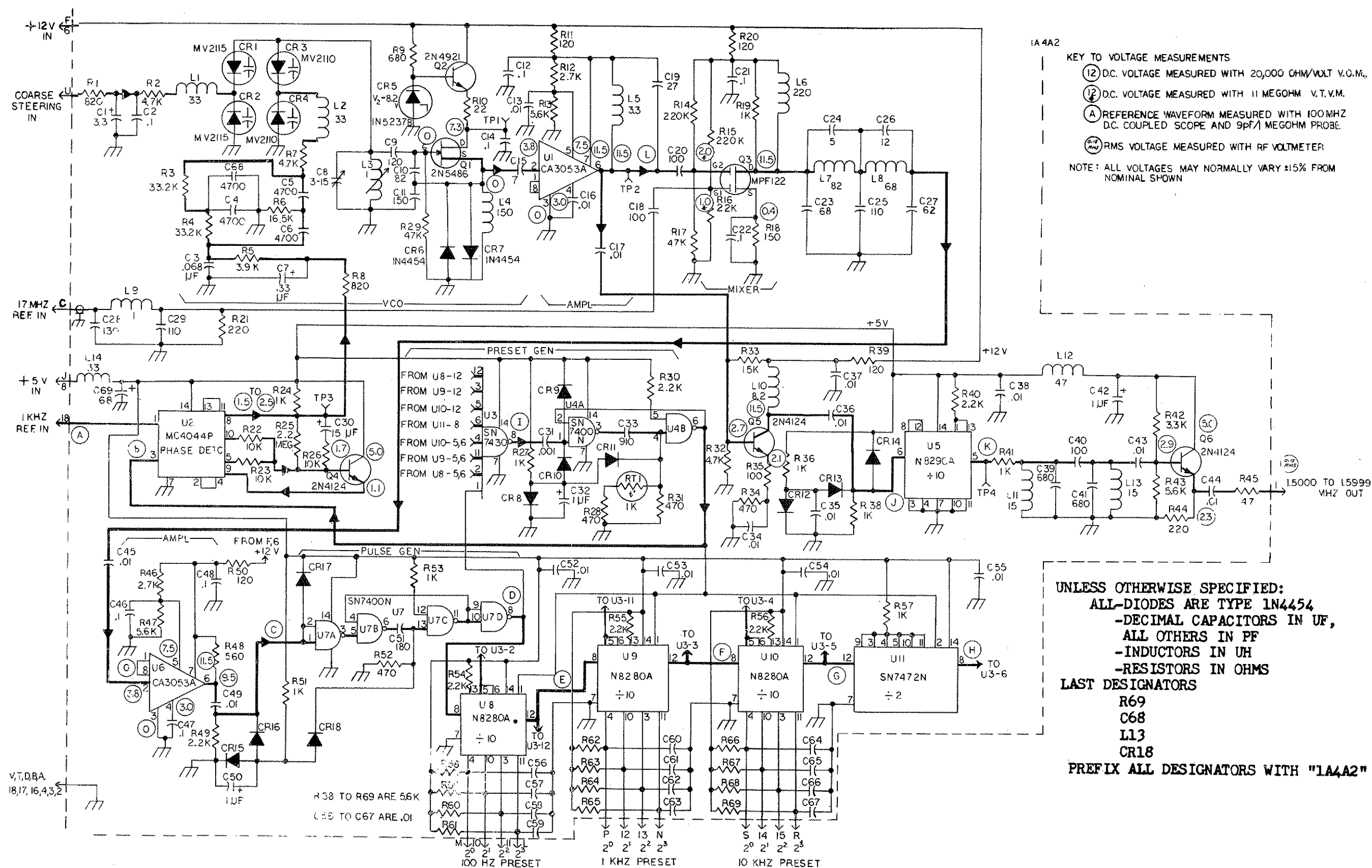


Figure 5.13 Low Digit Generator Schematic (1A4A2)

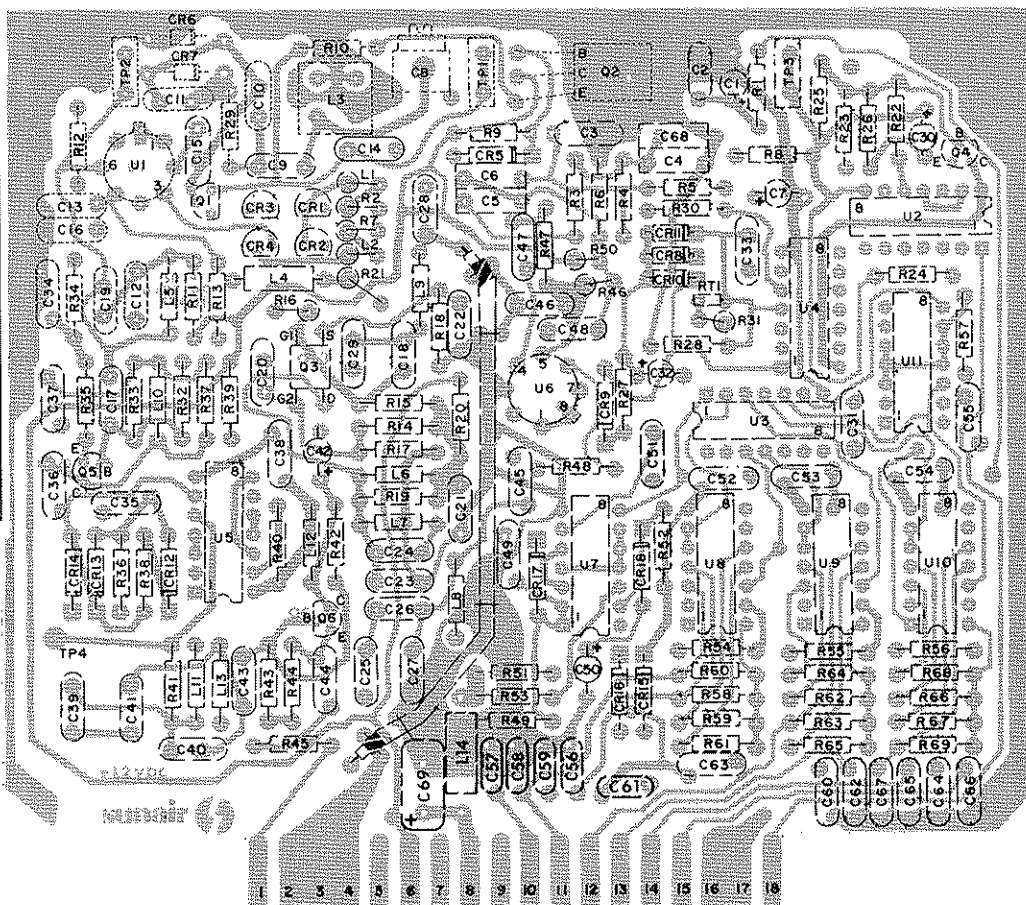
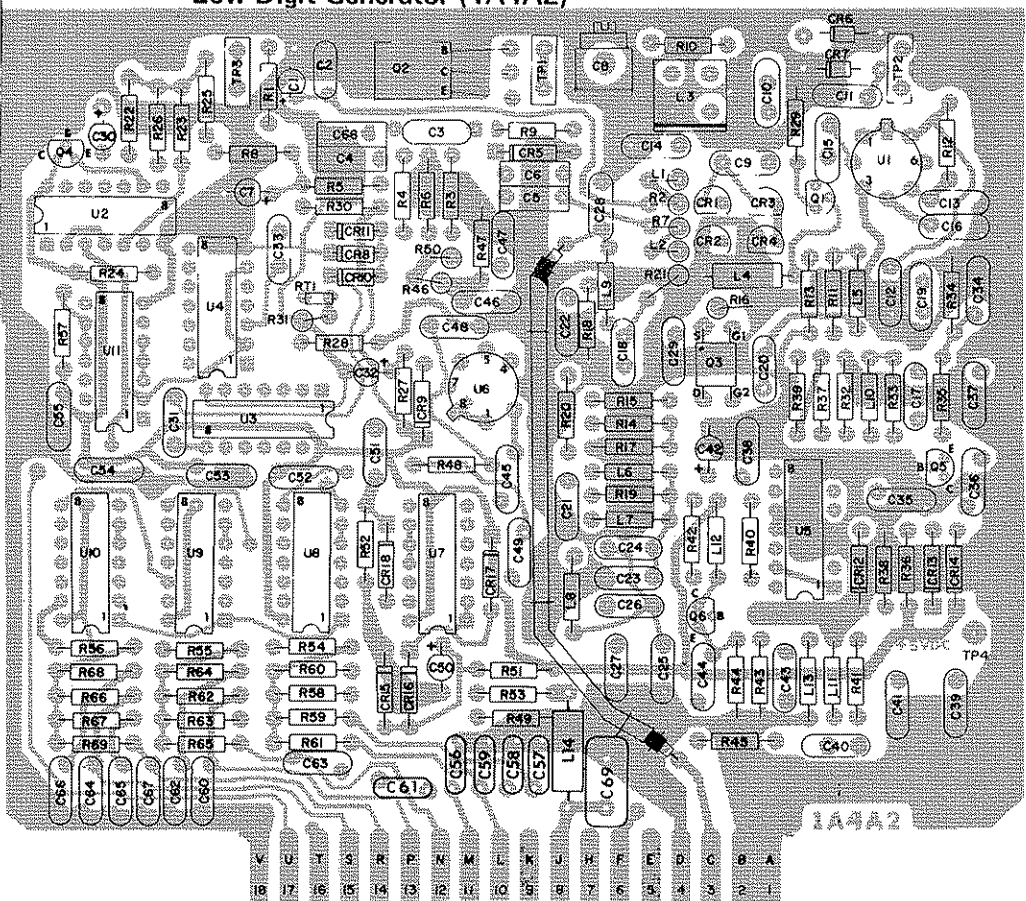
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY LOW DIGIT GENERATOR	5024070097
C1	Capacitor, 3.3UF, 35V, 196D	0281680001
C2	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C3	Capacitor, .068UF, 50V, Mylar	0281640009
C4	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C5	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C6	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C7	Capacitor, 0.33UF, 35V, 196D	0281650004
C8	Capacitor, 3-15PF, 200V, N650	0285710001
C9	Capacitor, 120PF, 500V, DM15, 5%	0289850002
C10	Capacitor, 82PF, 500V, DM10, 5%	0262120003
C11	Capacitor, 150PF, 500V, DM10, 5%	0293430004
C12	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C13	Capacitor, 0.01UF, 25V, X5S	0281620008
C14	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C15	Capacitor, 7PF, 500V, DM10	0292400004
C16	Capacitor, 0.01UF, 25V, X5S	0281620008
C17	Capacitor, 0.01UF, 25V, X5S	0281620008
C18	Capacitor, 100PF, 500V, DM10, 5%	0274740001
C19	Capacitor, 27PF, 500V, DM10, 5%	0260660001
C20	Capacitor, 100PF, 500V, DM10, 5%	0274740001
C21	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C22	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C23	Capacitor, 68PF, 500V, DM10, 5%	0261070002
C24	Capacitor, 5PF, 500V, DM10	0261190008
C25	Capacitor, 110PF, 500V, DM10, 5%	0257750002
C26	Capacitor, 12PF, 500V, DM10, 5%	0260280003
C27	Capacitor, 62PF, 500V, DM10, 5%	0283010002
C28	Capacitor, 130PF, 500V, DM15, 5%	0274860007
C29	Capacitor, 110PF, 500V, DM10, 5%	0257750002
C30	Capacitor, 15UF, 15V, 196D	0281720002
C31	Capacitor, 0.001UF, 100V, X7R, 20%	0281630003
C32	Capacitor, 1UF, 35V, 196D	0281660000
C33	Capacitor, 910PF, 100V, CD7, 5%	0288660005
C34	Capacitor, 0.01UF, 25V, X5S	0281620008
C35	Capacitor, 0.01UF, 25V, X5S	0281620008
C36	Capacitor, 0.01UF, 25V, X5S	0281620008
C37	Capacitor, 0.01UF, 25V, X5S	0281620008
C38	Capacitor, 0.01UF, 25V, X5S	0281620008
C39	Capacitor, 680PF, 300V, DM15, 5%	0286240009
C40	Capacitor, 100PF, 500V, DM10, 5%	0274740001
C41	Capacitor, 680PF, 300V, DM15, 5%	0286240009
C42	Capacitor, 1UF, 35V, 196D	0281660000
C43	Capacitor, 0.01UF, 25V, X5S	0281620008
C44	Capacitor, 0.01UF, 25V, X5S	0281620008
C45	Capacitor, 0.01UF, 25V, X5S	0281620008
C46	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C47	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C48	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C49	Capacitor, 0.01UF, 25V, X5S	0281620008
C50	Capacitor, 1UF, 35V, 196D	0281660000
C51	Capacitor, 180PF, 500V, DM15, 5%	0258280000
C52	Capacitor, 0.01UF, 25V, X5S	0281620008
C53	Capacitor, 0.01UF, 25V, X5S	0281620008
C54	Capacitor, 0.01UF, 25V, X5S	0281620008
C55	Capacitor, 0.01UF, 25V, X5S	0281620008
C56	Capacitor, 0.01UF, 25V, X5S	0281620008
C57	Capacitor, 0.01UF, 25V, X5S	0281620008
C58	Capacitor, 0.01UF, 25V, X5S	0281620008
C59	Capacitor, 0.01UF, 25V, X5S	0281620008
C60	Capacitor, 0.01UF, 25V, X5S	0281620008
C61	Capacitor, 0.01UF, 25V, X5S	0281620008
C62	Capacitor, 0.01UF, 25V, X5S	0281620008
C63	Capacitor, 0.01UF, 25V, X5S	0281620008
C64	Capacitor, 0.01UF, 25V, X5S	0281620008
C65	Capacitor, 0.01UF, 25V, X5S	0281620008
C66	Capacitor, 0.01UF, 25V, X5S	0281620008
C67	Capacitor, 0.01UF, 25V, X5S	0281620008
C68	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C69	Capacitor, 68UF, 15V, T368	0296540005
CR1	Diode, Varicap MV2115	0405300000
CR2	Diode, Varicap MV2115	0405300000
CR3	Diode, Varicap MV2110	0405290004
CR4	Diode, Varicap MV2110	0405290004
CR5	Diode, Zener 1N5237B	0405240007

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
CR6	Diode, Signal, Sil. 1N4454	0405270003
CR7	Diode, Signal, Sil. 1N4454	0405270003
CR8	Diode, Signal, Sil. 1N4454	0405270003
CR9	Diode, Signal, Sil. 1N4454	0405270003
CR10	Diode, Signal, Sil. 1N4454	0405270003
CR11	Diode, Signal, Sil. 1N4454	0405270003
CR12	Diode, Signal, Sil. 1N4454	0405270003
CR13	Diode, Signal, Sil. 1N4454	0405270003
CR14	Diode, Signal, Sil. 1N4454	0405270003
CR15	Diode, Signal, Sil. 1N4454	0405270003
CR16	Diode, Signal, Sil. 1N4454	0405270003
CR17	Diode, Signal, Sil. 1N4454	0405270003
CR18	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 33UH, 5%	0659690004
L2	Inductor, Molded, 33UH, 5%	0659690004
L3	Inductor, Var, 1.00UH	0647910004
L4	Inductor, Molded, 150UH, 5%	0646780000
L5	Inductor, Molded, 3.3UH, 5%	0658920006
L6	Inductor, Molded, 220UH, 5%	0650500008
L7	Inductor, Molded, 82UH, 5%	0659450003
L8	Inductor, Molded, 68UH, 5%	0651650003
L9	Inductor, Molded, 1.0UH, 5%	0649150007
L10	Inductor, Molded, 8.2UH, 5%	0652060005
L11	Inductor, Molded, 15UH, 5%	0659070006
L12	Inductor, Molded, 47UH, 5%	0652680003
L13	Inductor, Molded, 15UH, 5%	0659070006
L14	Inductor, Molded, 33UH, 5%	0646300008
Q1	Transistor, N-CH, Fet 2N5486	0448050005
Q2	Transistor, NPN, Si. 2N4921	0448040000
Q3	Transistor, N-CH, Fet MFE122	0448030004
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, NPN, Si. 2N4124	0448010003
Q6	Transistor, NPN, Si. 2N4124	0448010003
R1	Resistor, 820, 10%, 1/4W	0178210005
R2	Resistor, 4.7K, 5%, 1/4W	0170770001
R3	Resistor, 33.2K, 1%, 1/8W	0196470005
R4	Resistor, 33.2K, 1%, 1/8W	0196470005
R5	Resistor, 3.9K, 10%, 1/4W	0178830003
R6	Resistor, 16.5K, 1%, 1/8W	0196590001
R7	Resistor, 4.7K, 5%, 1/4W	0170770001
R8	Resistor, 820, 10%, 1/4W	0178210005
R9	Resistor, 680, 10%, 1/4W	0176630007
R10	Resistor, 22, 10%, 1/4W	0192690001
R11	Resistor, 120, 10%, 1/4W	0186550006
R12	Resistor, 2.7K, 10%, 1/4W	0186670001
R13	Resistor, 5.6K, 10%, 1/4W	0183060008
R14	Resistor, 220K, 10%, 1/4W	0177780002
R15	Resistor, 220K, 10%, 1/4W	0177780002
R16	Resistor, 22K, 5%, 1/4W	0172230004
R17	Resistor, 47K, 10%, 1/4W	0171060008
R18	Resistor, 150, 10%, 1/4W	0172730007
R19	Resistor, 1K, 10%, 1/4W	0171560001
R20	Resistor, 120, 10%, 1/4W	0186550006
R21	Resistor, 220, 10%, 1/4W	0171320000
R22	Resistor, 10K, 10%, 1/4W	0170410005
R23	Resistor, 10K, 10%, 1/4W	0170410005
R24	Resistor, 1K, 10%, 1/4W	0171560001
R25	Resistor, 2.2M, 10%, 1/4W	0176870008
R26	Resistor, 10K, 10%, 1/4W	0170410005
R27	Resistor, 1K, 10%, 1/4W	0171560001
R28	Resistor, 470, 10%, 1/4W	0172610001
R29	Resistor, 4.7K, 10%, 1/4W	0171060008
R30	Resistor, 2.2K, 5%, 1/4W	0178070009
R31	Resistor, 470, 10%, 1/4W	0172610001
R32	Resistor, 4.7K, 5%, 1/4W	0170770001
R33	Resistor, 15K, 10%, 1/4W	0172350000
R34	Resistor, 470, 10%, 1/4W	0172610001
R35	Resistor, 100, 5%, 1/4W	0171180003
R36	Resistor, 1K, 10%, 1/4W	0171560001
R37	Not used	
R38	Resistor, 1K, 10%, 1/4W	0171560001
R39	Resistor, 120, 10%, 1/4W	0186550006
R40	Resistor, 2.2K, 5%, 1/4W	0178070009
R41	Resistor, 1K, 10%, 1/4W	0171560001
R42	Resistor, 3.3K, 10%, 1/4W	0170890007

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R43	Resistor, 5.6K, 10%, 1/4W	0183060008
R44	Resistor, 220, 10%, 1/4W	0171320000
R45	Resistor, 47, 10%, 1/4W	0179360001
R46	Resistor, 2.7K, 10%, 1/4W	0186670001
R47	Resistor, 5.6K, 10%, 1/4W	0183060008
R48	Resistor, 560, 5%, 1/4W	0183200004
R49	Resistor, 2.2K, 5%, 1/4W	0178070009
R50	Resistor, 120, 10%, 1/4W	0186550006
R51	Resistor, 1K, 10%, 1/4W	0171560001
R52	Resistor, 470, 10%, 1/4W	0172610001
R53	Resistor, 1K, 10%, 1/4W	0171560001
R54	Resistor, 2.2K, 5%, 1/4W	0178070009
R55	Resistor, 2.2K, 5%, 1/4W	0178070009
R56	Resistor, 2.2K, 5%, 1/4W	0178070009
R57	Resistor, 1K, 10%, 1/4W	0171560001
R58	Resistor, 5.6K, 10%, 1/4W	0183060008
R59	Resistor, 5.6K, 10%, 1/4W	0183060008
R60	Resistor, 5.6K, 10%, 1/4W	0183060008
R61	Resistor, 5.6K, 10%, 1/4W	0183060008
R62	Resistor, 5.6K, 10%, 1/4W	0183060008
R63	Resistor, 5.6K, 10%, 1/4W	0183060008
R64	Resistor, 5.6K, 10%, 1/4W	0183060008
R65	Resistor, 5.6K, 10%, 1/4W	0183060008
R66	Resistor, 5.6K, 10%, 1/4W	0183060008
R67	Resistor, 5.6K, 10%, 1/4W	0183060008
R68	Resistor, 5.6K, 10%, 1/4W	0183060008
R69	Resistor, 5.6K, 10%, 1/4W	0183060008
RT1	Resistor, 1K at 25C	0196110009
TP1	Test Point, White	0753640007
TP2	Test Point, White	0753640007
TP3	Test Point, White	0753640007
U1	IC Linear CA3053	0448060001
U2	IC Digital MC4044P	0448100002
U3	IC Digital SN7430N	0448110008
U4	IC Digital SN7400N	0448070006
U5	IC Digital 74LS196N Selected	0448250004
U6	IC Linear CA3053	0448060001
U7	IC Digital SN7400N	0448070006
U8	IC Digital SN74176/N8280A	0448080001
U9	IC Digital SN74176/N8280A	0448080001
U10	IC Digital SN74176/N8280A	0448080001
U11	IC Digital SN7472N	0448120003
	Terminal, Turret SWGD .071 Mtg	0525580000

SUNAIR GSB-900SC

Low Digit Generator (1A4A2)



5024080092M PC ASSY TRANSLATOR

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY TRANSLATOR	5024080092
C1	Capacitor, 120PF, 300V, CD6, 5%	0280880006
C2	Capacitor, 820PF, 100 V, CD7, 5%	0283990007
C3	Capacitor, 2PF, 500 V, DM10	0259710008
C4	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C5	Capacitor, 2PF, 500 V, DM10	0259710008
C6	Capacitor, 200PF, 500 V, DM10, 5%	0293050007
C7	Capacitor, 200PF, 300 V, CD7, 5%	0287150003
C8	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C9	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C10	Capacitor, 680PF, 100 V, CD7, 5%	0284280003
C11	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C12	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C13	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C14	Capacitor, 1PF, 500 V, DM10	0260160008
C15	Capacitor, 20PF, 500 V, DM10, 5%	0260420000
C16	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C17	Capacitor, 47PF, 500 V, DM10, 5%	0294960007
C18	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C19	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C20	Capacitor, 18PF, 500 V, DM10, 5%	0260300004
C21	Capacitor, 1PF, 500 V, DM10	0260160008
C22	Capacitor, 33PF, 300 V, CD6, 5%	0286860007
C23	Capacitor, 39PF, 500 V, DM10, 5%	0293290008
C24	Capacitor, 150PF, 500 V, DM10, 5%	0293430004
C25	Not used	
C26	Not used	
C27	Not used	
C28	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C29	Capacitor, 24PF, 500 V, DM10, 5%	0290060001
C30	Not used	
C31	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C32	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C33	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C34	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C35	Capacitor, 33PF, 500 V, DM10, 5%	0260780006
C36	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
CR37	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
CR38	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
CR39	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
CR40	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
CR41	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C42	Capacitor, 62PF, 500 V, DM10, 5%	0283010002
C43	Capacitor, 560PF, 100 V, CD7, 5%	0285690001
C44	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C45	Capacitor, 680PF, 100 V, CD7, 5%	0284280003
C46	Capacitor, 24PF, 500 V, DM10, 5%	0290060001
C47	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C48	Capacitor, 200PF, 500 V, DM10, 5%	0293050007
C49	Capacitor, 120PF, 500 V, DM10, 2%	0292880006
C50	Capacitor, 470PF, 100 V, CD7, 5%	0285570005
C51	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C52	Capacitor, 0.5PF, 500 V, NPO	0281740003
C53	Capacitor, 7PF, 500V, DM10	0292400004
C54	Capacitor, 0.5PF, 500 V, NPO	0281740003
C55	Capacitor, 5PF, 500V, DM10	0261190000
C56	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C57	Capacitor, 56PF, 500 V, DM10, 5%	0293170002
C58	Capacitor, 180PF, 500 V, DM10, 5%	0294100008
C59	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C60	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C61	Capacitor, 5PF, 500 V, DM10, 5%	0261190008
C62	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C63	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C64	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C65	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C66	Capacitor, 270PF, 300 V, DM10, 5%	0294600001
C67	Capacitor, 18PF, 500 V, DM10, 5%	0260300004
C68	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C69	Capacitor, 680PF, 100 V, CD7, 5%	0284280003
C70	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C71	Capacitor, 20PF, 500 V, DM10, 5%	0260420000
C72	Capacitor, 20PF, 500 V, DM10, 5%	0260420000
C73	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C74	Capacitor, 15PF, 500 V, DM10, 5%	0259950009

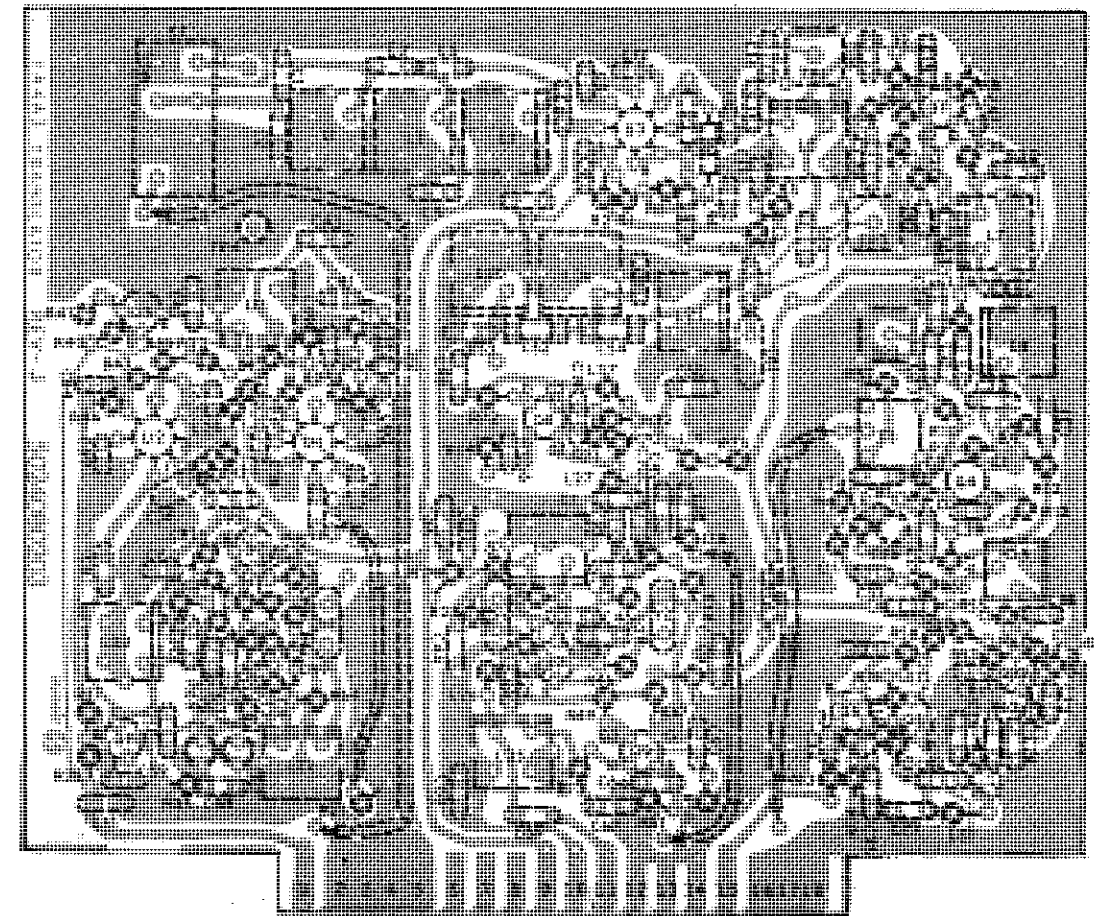
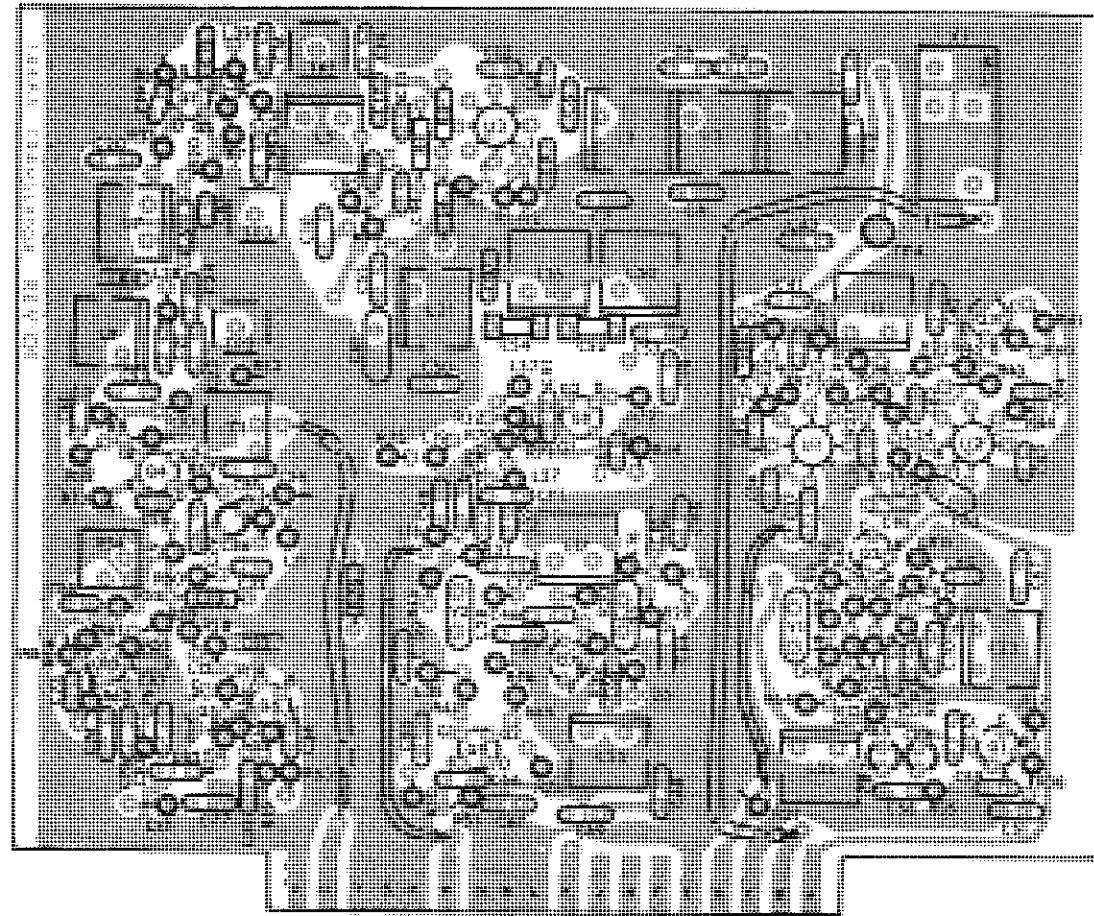
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
C75	Capacitor, 1PF, 500 V, DM10	0260160008
C76	Capacitor, 24PF, 500 V, DM10, 5%	0290060001
C77	Capacitor, 12PF, 500 V, DM10, 5%	0260280003
C78	Capacitor, 15 UF, 15 V, 196 D	0281720002
C79	Capacitor, 12PF, 500 V, DM10, 5%	0260280003
C80	Capacitor, 12PF, 500V, DM10, 5%	0260280003
C81	Capacitor, 82PF, 300 V, CD6, 5%	0266520006
C82	Capacitor, 2PF, 500 V, DM10	0259710008
C83	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C84	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C85	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C86	Capacitor, 2PF, 500V, DM10	0259710008
C87	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C88	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C89	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C90	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C91	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C92	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C93	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C94	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C95	Capacitor, 150PF, 500 V, DM10, 5%	0293430004
C96	Capacitor, 120PF, 500 V, DM10, 2%	0292880006
C97	Not used	
C98	Capacitor, 100PF, 500 V, DM10, 5%	0274740001
C99	Capacitor, 200PF, 500 V, DM10, 5%	0293050007
C100	Not used	
C101	Capacitor, 18PF, 500 V, DM10, 5%	0260300004
CR1	Not used	
CR2	Not used	
CR3	Not used	
CR4	Not used	
CR5	Diode, Signal, Sil. 1N4454	0405270003
CR6	Diode, Varicap MV2106	0405310005
CR7	Diode, Varicap MV2106	0405310005
CR8	Diode, Signal, Sil. 1N4454	0405270003
CR9	Diode, Signal, Sil. 1N4454	0405270003
CR10	Diode, Signal, Sil. 1N4454	0405270003
CR11	Diode, Signal, Sil. 1N4454	0405270003
CR12	Diode, Signal, Sil. 1N4454	0405270003
CR13	Diode, Signal, Sil. 1N4454	0405270003
CR14	Diode, Signal, Sil. 1N4454	0405270003
CR15	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Var, 0.68UH	0647900009
L2	Inductor, Var, 0.68UH	0647900009
L3	Inductor, Var, 0.68UH	0647900009
L4	Inductor, Molded, 22UH, 5%	0650000005
L5	Inductor, Var, 1.00UH	0647910004
L6	Inductor, Molded, 4.7UH, 5%	0651910005
L7	Inductor, Var, 0.18UH	0647890003
L8	Inductor, Var, 0.18UH	0647890003
L9	Inductor, Molded, 6.8UH, 5%	0659210002
L10	Inductor, Molded, 1.2UH, 10%	0663910005
L11	Inductor, Molded, 8.2UH, 5%	0652060005
L12	Inductor, Molded, 22UH, 5%	0650000005
L13	Inductor, Var, 1.00UH	0647910004
L14	Inductor, Molded, 22UH, 5%	0650000005
L15	Inductor, Molded, 22UH, 5%	0650000005
L16	Inductor, Molded, 4.7UH, 5%	0651910005
L17	Inductor, Var, 0.18UH	0647890003
L18	Inductor, Molded, 0.68UH, 5%	0649030001
L19	Inductor, Molded, 4.7UH, 5%	0651910005
L20	Inductor, Var, 0.18UH	0647890003
L21	Inductor, Var, 0.18UH	0647890003
L22	Inductor, Var, 5.60UH	0647880008
L23	Inductor, Var, 1.00UH	0647910004
L24	Inductor, Molded, 22UH, 5%	0650000005
L25	Inductor, Var, 0.18UH	0647890003
L26	Inductor, Molded, 4.7UH, 5%	0651910005
L27	Inductor, Molded, 0.18UH, 10%	0651890004
L28	Inductor, Molded, 3.3UH, 5%	0658920006
L29	Inductor, Molded, 0.18UH, 10%	0651890004
L30	Inductor, Molded, 0.68UH, 5%	0659030001
L31	Inductor, Molded, 0.56UH, 5%	0649530004
L32	Inductor, Molded, 3.3UH, 5%	0659820006
L33	Inductor, Molded, 4.7UH, 5%	0651910005

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
L34	Inductor, Molded, 0.22UH, 5%	0650620003
L35	Inductor, Molded, 4.7UH, 5%	0651910005
L36	Inductor, Var, 0.18UH	0647890003
L37	Inductor, Molded, 2.7UH, 5%	0652180001
L38	Inductor, Molded, 4.7UH, 5%	0651910005
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, N-CH, Fet MFE122	0448030004
Q5	Transistor, NPN, Si. 2N5179	0445130008
Q6	Transistor, NPN, Si. 2N5179	0445130008
Q7	Transistor, NPN, Si. 2N5179	0445130008
Q8	Transistor, N-CH, Fet MFE122	0448030004
Q9	Transistor, N-CH, Fet MFE120	0448000008
Q10	Transistor, NPN, Si. 2N5179	0445130008
Q11	Transistor, N-CH, Fet MFE122	0448030004
R1	Resistor, 33K, 10%, 1/4W	0177920009
R2	Resistor, 10K, 10%, 1/4W	0170410005
R3	Resistor, 1K, 10%, 1/4W	0171560001
R4	Resistor, 150, 10%, 1/4W	0172730007
R5	Resistor, 2.2K, 5%, 1/4W	0178070009
R6	Resistor, 3.3K, 10%, 1/4W	0170890007
R7	Resistor, 100K, 10%, 1/4W	0170390004
R8	Resistor, 150, 10%, 1/4W	0172730007
R9	Resistor, 120K, 10%, 1/4W	0175100004
R10	Resistor, 47K, 10%, 1/4W	0171060008
R11	Resistor, 22K, 5%, 1/4W	0172230004
R12	Resistor, 220K, 10%, 1/4W	0177780002
R13	Resistor, 100, 5%, 1/4W	0171180003
R14	Resistor, 22K, 5%, 1/4W	0172230004
R15	Resistor, 220, 10%, 1/4W	0171320000
R16	Resistor, 560, 5%, 1/4W	0183200004
R17	Resistor, 470, 5%, 1/4W	0184110009
R18	Resistor, 820, 10%, 1/4W	0178210005
R19	Resistor, 82, 10%, 1/4W	0184610001
R20	Resistor, 220K, 10%, 1/4W	0177780002
R21	Resistor, 56, 10%, 1/4W	0174290004
R22	Resistor, 22, 10%, 1/4W	0192690001
R23	Resistor, 8.2K, 10%, 1/4W	0181620006
R24	Resistor, 3.9K, 10%, 1/4W	0178830003
R25	Resistor, 10K, 10%, 1/4W	0170410005
R26	Resistor, 4.7K, 5%, 1/4W	0170770001
R27	Resistor, 10K, 10%, 1/4W	0170410005
R28	Resistor, 6.8K, 5%, 1/4W	0174810008
R29	Resistor, 1.2K, 10%, 1/4W	0181860007
R30	Resistor, 4.7K, 5%, 1/4W	0170770001
R31	Resistor, 220, 10%, 1/4W	0171320000
R32	Resistor, 220K, 10%, 1/4W	0177780002
R33	Resistor, 22, 10%, 1/4W	0192690001
R34	Resistor, 150, 10%, 1/4W	0172730007
R35	Resistor, 12K, 10%, 1/4W	0183180003
R36	Resistor, 4.7K, 5%, 1/4W	0170770001
R37	Resistor, 1K, 10%, 1/4W	0171560001
R38	Resistor, 6.8K, 5%, 1/4W	0174810008
R39	Resistor, 220, 10%, 1/4W	0171320000
R40	Resistor, 10K, 10%, 1/4W	0170410005
R41	Resistor, 6.8K, 5%, 1/4W	0174810008
R42	Resistor, 6.8K, 5%, 1/4W	0174810008
R43	Resistor, 3.9K, 10%, 1/4W	0178830003
R44	Resistor, 8.2K, 10%, 1/4W	0181620006
R45	Resistor, 22, 10%, 1/4W	0192690001
R46	Resistor, 220, 10%, 1/4W	0171320000
R47	Resistor, 220K, 10%, 1/4W	0177780002
R48	Resistor, 22K, 5%, 1/4W	0172230004
R49	Resistor, 220K, 10%, 1/4W	0177780002
R50	Resistor, 47K, 10%, 1/4W	0171060008
R51	Resistor, 150, 10%, 1/4W	0172730007
R52	Resistor, 220, 10%, 1/4W	0171320000
R53	Resistor, 10K, 10%, 1/4W	0170410005
R54	Pot., 500, 20%, 1/2W, PC Mount	0345980000
R55	Resistor, 10K, 10%, 1/4W	0170410005
R56	Resistor, 1K, 10%, 1/4W	0171560001
R57	Resistor, 22, 10%, 1/4W	0192690001
R58	Resistor, 470, 5%, 1/4W	0184110009
R59	Resistor, 220, 10%, 1/4W	0171320000

SUNAIR GSB-900SC

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R60	Resistor, 68, 10%, 1/4W	0187960003
R61	Resistor, 100, 5%, 1/4W	0171180003
R62	Resistor, 180, 10%, 1/4W	0175220000
R63	Resistor, 22, 10%, 1/4W	0192690001
R64	Resistor, 12K, 10%, 1/4W	0183180003
R65	Resistor, 220, 10%, 1/4W	0171320000
R66	Resistor, 22, 10%, 1/4W	0192690001
R67	Resistor, 3.3K, 10%, 1/4W	0170890007
R68	Resistor, 1.5K, 10%, 1/4W	0172470005
R69	Resistor, 1.8K, 10%, 1/4W	0178190004
R70	Resistor, 22K, 5%, 1/4W	0172230004
R71	Resistor, 100K, 10%, 1/4W	0170390004
R72	Resistor, 22, 10%, 1/4W	0192690001
R73	Resistor, 22, 10%, 1/4W	0192690001
R74	Resistor, 100, 5%, 1/4W	0171180003
R75	Resistor, 100, 5%, 1/4W	0171180003
R76	Resistor, 100, 5%, 1/4W	0171180003
T1	Transformer	5024110307
T2	Transformer	5024110307
T3	Transformer	5024111401
TP1	Connector, RF, JCM	0753600005
TP2	Connector, RF, JCM	0753600005
TP3	Connector, RF, JCM	0753600005
U1	IC Linear CA3053	0448060001
U2	IC Linear CA3053	0448060001
U3	IC Linear CA3053	0448060001
Y1	Crystal, 21.0000 MHz, HC-18U	5024080301
Y2	Crystal, 80.7500 MHz, HC-18U	5024080408
	Terminal, Turret	0525580000
	Wire Kit, Translator Assy.	5024080009

Translator (1A4A3)



5024080076L

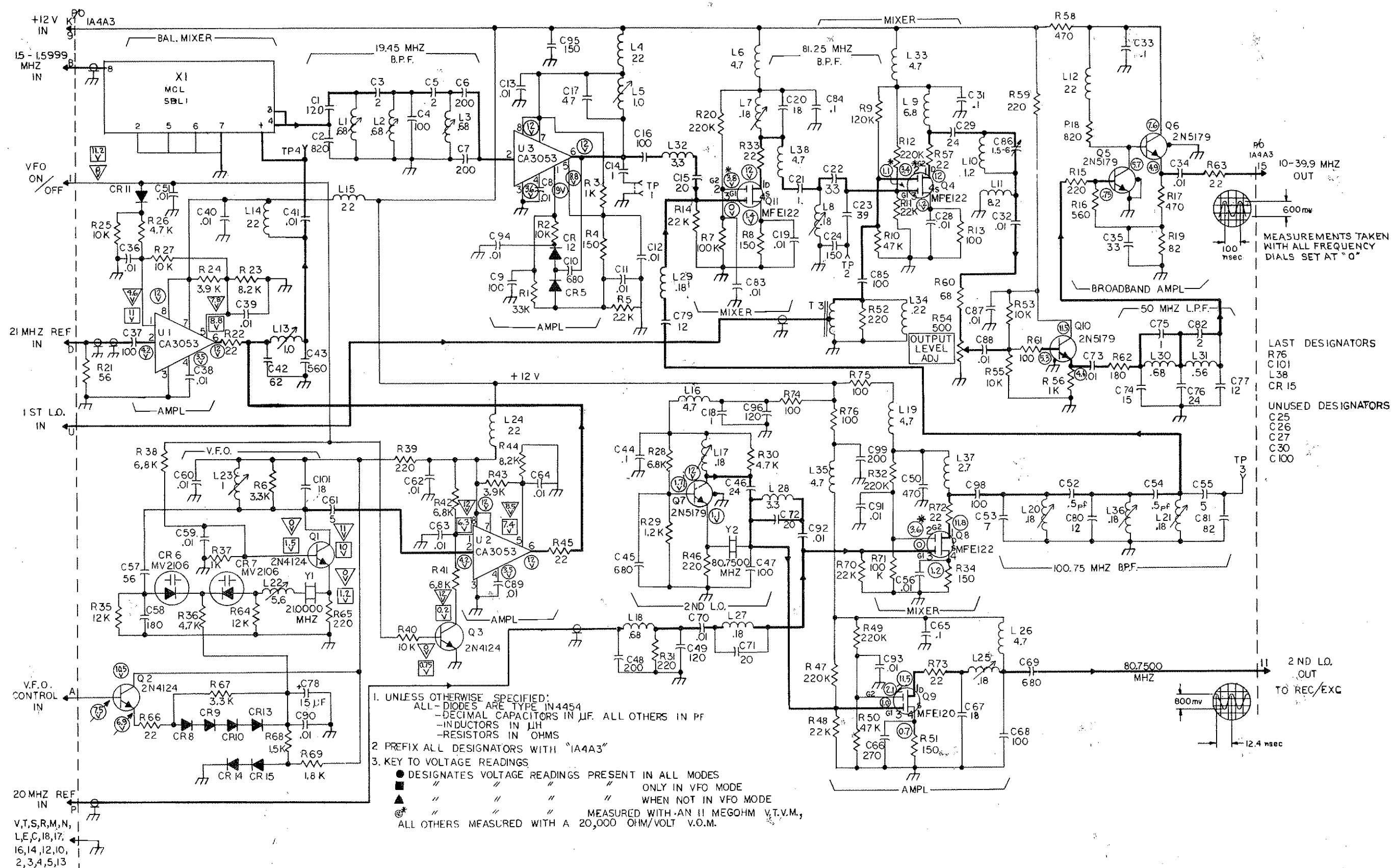
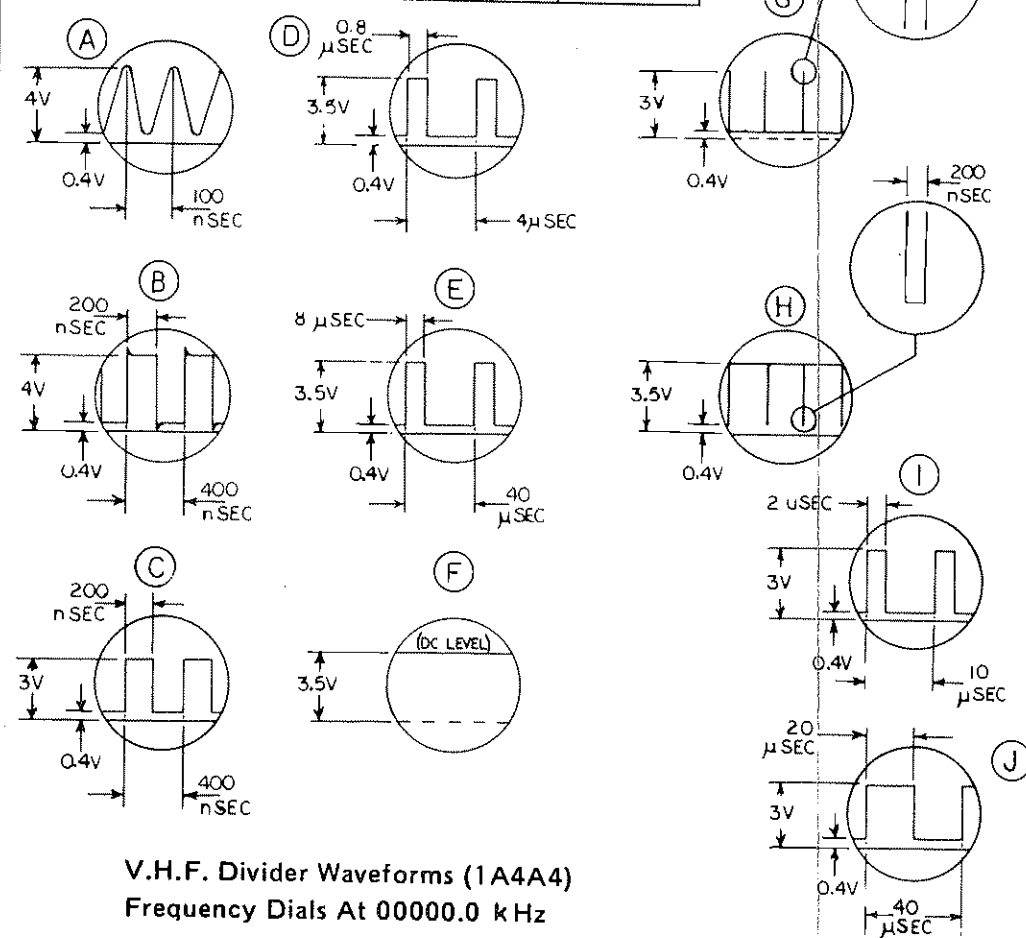


Figure 5.14 Translator Schematic (1A4A3)

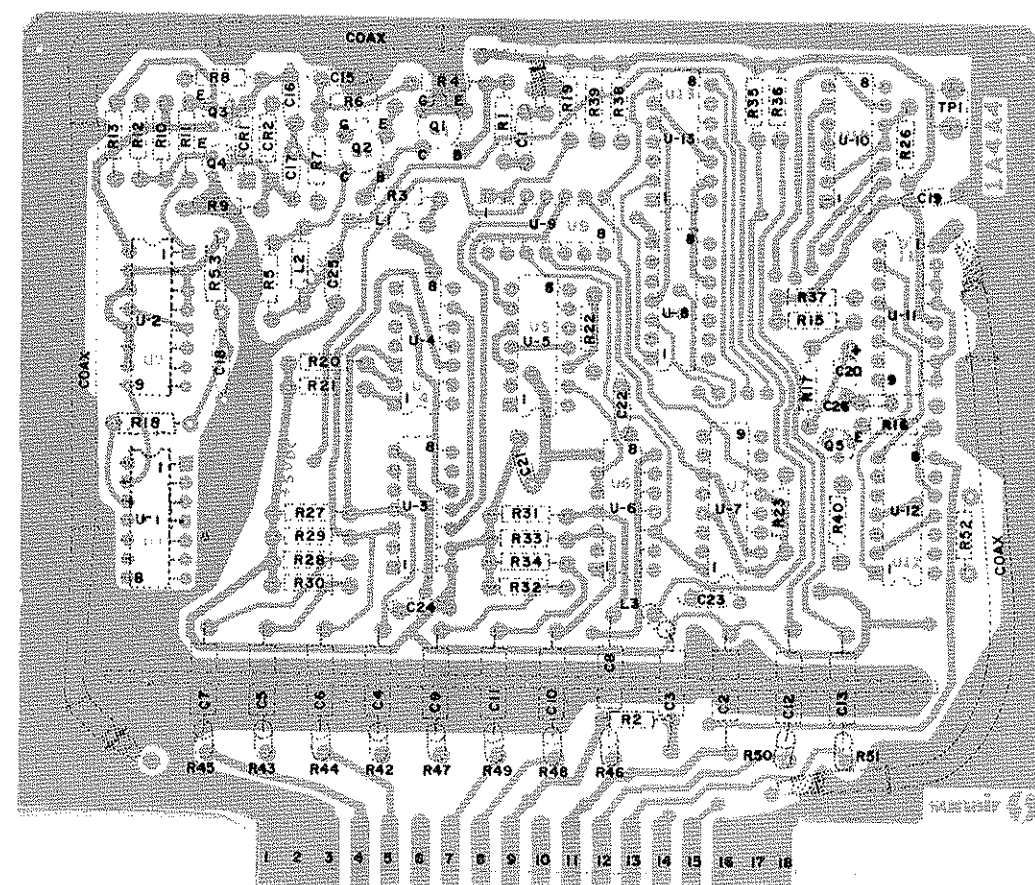
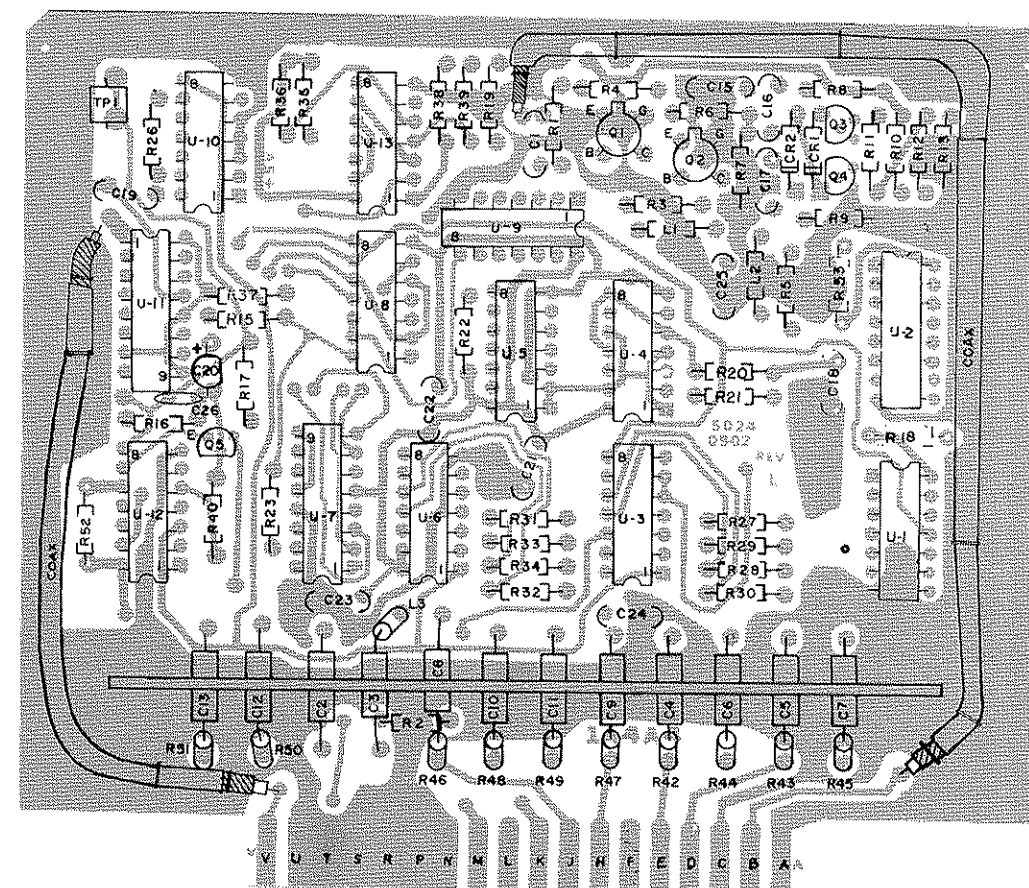
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY VHF DIVIDER	5024090098
C1	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C2	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C3	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C4	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C5	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C6	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C7	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C8	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C9	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C10	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C11	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C12	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C13	Capacitor, Feed Thru, 1500 PF, 500 V	0281760004
C14	Not used	
C15	Capacitor, 47 PF, 500 V, DM10, 5%	0294960007
C16	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C17	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C18	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C19	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C20	Capacitor, 3.3 UF, 35 V, 196 D	0281680001
C21	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C22	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C23	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C24	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C25	Capacitor, 0.1 UF, 50 V, X7R, 20%	0281610002
C26	Capacitor, 100 PF, 500 V, DM10, 5%	0274740001
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 22 UH, 5%	0650000005
L2	Inductor, Molded, 22 UH, 5%	0650000005
L3	Inductor, Molded, 15 UH, 5%	0659070006
Q1	Transistor, NPN, Si 2N5179	0445130008
Q2	Transistor, NPN, Si 2N5179	0445130008
Q3	Transistor, NPN, Si 2N4124	0448010003
Q4	Transistor, PNP, Si 2N4126	0448010003
Q5	Transistor, NPN, Si 2N4124	0448010003
R1	Resistor, 56, 10%, 1/4W	0174290004
R2	Resistor, 100, 5%, 1/4W	0171180003
R3	Resistor, 820, 10%, 1/4W	0178210005
R4	Resistor, 470, 10%, 1/4W	0172610001
R5	Resistor, 1K, 10%, 1/4W	0171560001
R6	Resistor, 330, 5%, 1/4W	0170910008
R7	Resistor, 100, 5%, 1/4W	0171180003
R8	Resistor, 2.7K, 10%, 1/4W	01866670001
R9	Resistor, 1K, 10%, 1/4W	0171560001
R10	Resistor, 1K, 10%, 1/4W	0171560001
R11	Resistor, 22, 10%, 1/4W	0192690001
R12	Resistor, 22, 10%, 1/4W	0192690001
R13	Resistor, 1K, 10%, 1/4W	0171560001
R14	Not used	
R15	Resistor, 1K, 10%, 1/4W	0171560001
R16	Resistor, 1K, 10%, 1/4W	0171560001
R17	Resistor, 2.2K, 5%, 1/4W	0178070009
R18	Resistor, 1K, 10%, 1/4W	0171560001
R19	Resistor, 1K, 10%, 1/4W	0171560001
R20	Resistor, 1K, 10%, 1/4W	0171560001
R21	Resistor, 1K, 10%, 1/4W	0171560001
R22	Resistor, 1K, 10%, 1/4W	0171560001
R23	Resistor, 1K, 10%, 1/4W	0171560001
R24	Not used	
R25	Not used	
R26	Resistor, 1K, 10%, 1/4W	0171560001
R27	Resistor, 2.2K, 5%, 1/4W	0178070009
R28	Resistor, 2.2K, 5%, 1/4W	0178070009
R29	Resistor, 2.2K, 5%, 1/4W	0178070009
R30	Resistor, 2.2K, 5%, 1/4W	0178070009
R31	Resistor, 2.2K, 5%, 1/4W	0178070009
R32	Resistor, 2.2K, 5%, 1/4W	0178070009
R33	Resistor, 2.2K, 5%, 1/4W	0178070009
R34	Resistor, 2.2K, 5%, 1/4W	0178070009
R35	Resistor, 2.2K, 5%, 1/4W	0178070009
R36	Resistor, 2.2K, 5%, 1/4W	0178070009
R37	Resistor, 1K, 10%, 1/4W	0171560001

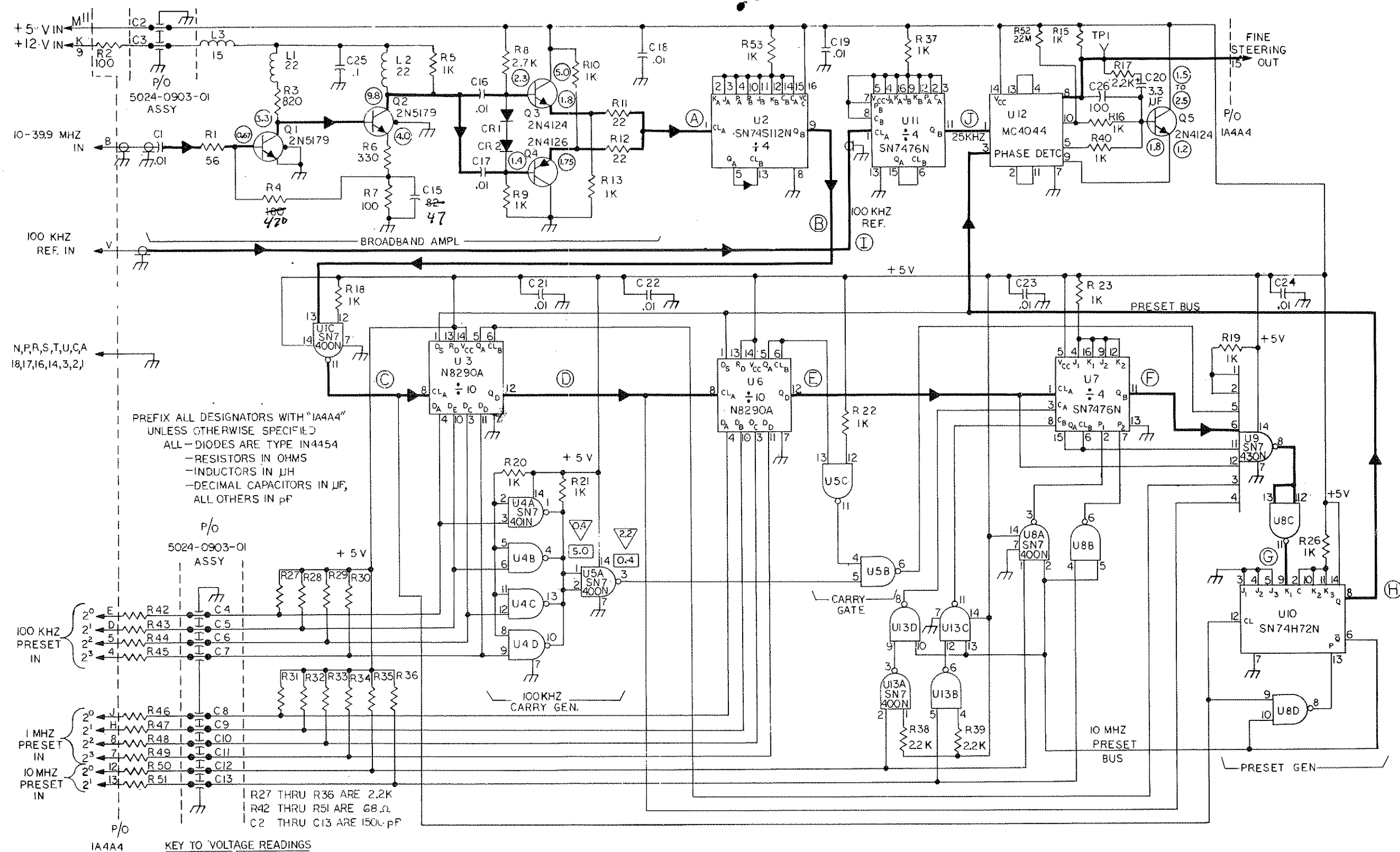
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R38	Resistor, 2.2K, 5%, 1/4W	0178070009
R39	Resistor, 2.2K, 5%, 1/4W	0178070009
R40	Resistor, 1K, 10%, 1/4W	0171560001
R41	Not used	
R42	Resistor, 68, 10%, 1/4W	0187960003
R43	Resistor, 68, 10%, 1/4W	0187960003
R44	Resistor, 68, 10%, 1/4W	0187960003
R45	Resistor, 68, 10%, 1/4W	0187960003
R46	Resistor, 68, 10%, 1/4W	0187960003
R47	Resistor, 68, 10%, 1/4W	0187960003
R48	Resistor, 68, 10%, 1/4W	0187960003
R49	Resistor, 68, 10%, 1/4W	0187960003
R50	Resistor, 68, 10%, 1/4W	0187960003
R51	Resistor, 68, 10%, 1/4W	0187960003
R52	Resistor, 22M, 10%, 1/4W	0180950002
R53	Resistor, 1K, 10%, 1/4W	0171560001
TP1	Test Point, White	0753640007
U1	IC Digital SN7400N	0448070006
U2	IC Digital SN74S112N	0448450003
U3	IC Digital 74LS196N Selected	0448250004
U4	IC Digital SN7401N	0448230003
U5	IC Digital SN7400N	0448070006
U6	IC Digital 74LS196N Selected	0448250004
U7	IC Digital SN7476N	0448240009
U8	IC Digital SN7400N	0448070006
U9	IC Digital SN7430N	0448110008
U10	IC Digital SN74H72N	0448090007
U11	IC Digital SN7476N	0448240009
U12	IC Digital MC4044P	0448100002
U13	IC Digital SN7400N	0448070006
	Wire Kit, VHF Divider Assy.	5024090004
	Bracket, Feedthru	5024090009
	PCB Wire Divider	5024090403



V.H.F. Divider Waveforms (1A4A4)
Frequency Dials At 00000.0 kHz

SUNAIR GSB-900SC





PREFIX ALL DESIGNATORS WITH "IA4A4"
UNLESS OTHERWISE SPECIFIED
ALL—DIODES ARE TYPE IN4454
—RESISTORS IN OHMS
—INDUCTORS IN μ H
—DECIMAL CAPACITORS IN μ F,
ALL OTHERS IN pF

KEY TO VOLTAGE READINGS

⑫ DESIGNATES — VOLTAGE PRESENT IN ALL MODES

 (B) — REFERENCE WAVEFORM WITH ALL FREQUENCY
 DIALS SET AT "0"

 5 — VOLTAGE PRESENT WITH ALL 100 KHZ PRESET
 INPUTS IN "0" STATE (100 KHZ DIAL = 0)

 5 — VOLTAGE PRESENT IF ANY 100 KHZ PRESET INPUT
 IS IN A "1" STATE (100 KHZ DIAL ≠ 0)

ALL D.C. VOLTAGES MEASURED WITH 20,000 OHM/VOLT V.O.M. AND MAY VARY $\pm 15\%$

ALL WAVEFORMS MEASURED WITH 100MHZ OSCILLOSCOPE AND 9pF/1 MEGOHM PROBE

Figure 5.15 V.H.F. Divider Schematic (1A4A4)

C24	Capacitor, 0.01 uF, 25 V, X55	0281620008
C25	Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C26	Capacitor, 0.001 uF, X5E, 10%	0282080007
C27	Capacitor, 0.01 uF, 25 V, X55	0281620008
C28	Capacitor, 47 uF, 20 V, 196 D	0281700001
C29	Capacitor, 47 uF, 20 V, 196 D	0281700001
C30	Capacitor, 0.01 uF, 25 V, X55	0281620008
C31	Capacitor, 0.33 uF, 35 V, 196 D	0281620008
C32	Capacitor, 0.01 uF, 25 V, X55	0281620008
C33	Capacitor, 1 uF, 35 V, 196 D	0281660000
C34	Capacitor, 0.01 uF, 25 V, X55	0281620008
C35	Capacitor, 0.001 uF, 100 V, X7 R, 20%	0281620008
C36	Capacitor, 1 uF, 50 V, 198 D	0280910002
C37	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C38	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C39	Capacitor, 0.01 uF, 25 V, X55	0281620008
C40	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C41	Capacitor, 2.8 pF, 350 V, NPO	0268220000
C42	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C43	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C44	Capacitor, 2.8 pF, 350 V, NPO	0268220000
C45	Not used	
C46	Capacitor, 10 pF, 500 V, DM10	0259830003
C47	Capacitor, 47 pF, 500 V, DM10, 5%	0294960007
C48	Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C49	Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C50	Capacitor, 33 pF, 500 V, DM10, 5%	0260780006
C51	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C52	Capacitor, 0.01 uF, 50 V, X7 R, 20%	0281610002
C53	Capacitor, 0.01 uF, 50 V, X7 R, 20%	0281610002
C54	Capacitor, 0.01 uF, 50 V, X7 R, 20%	0281610002
C55	Capacitor, 10 pF, 500 V, DM10	0281610002
C56	Capacitor, 47 pF, 500 V, DM10, 5%	0294960007
C57	Capacitor, 33 pF, 500 V, DM10, 5%	0260780006
C58	Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C59	Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C60	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C61	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C62	Capacitor, 43 pF, 500 V, DM15, 2%	0281100004
C63	Capacitor, 43 pF, 500 V, DM15, 2%	0281100004
C64	Capacitor, 430 pF, 500 V, DM15, 5%	0289590001
C65	Capacitor, 130 pF, 500 V, DM15, 2%	0281010005
C66	Capacitor, 200 pF, 500 V, DM15, 5%	0258040009
C67	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C68	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
C69	Capacitor, 220 pF, 500 V, DM15, 5%	0285950002
CR1	Diode, Signal, SIL, 1N4454	0405270003
CR2	Diode, Zener 1N5227 B	0405250002
CR3	Diode, Signal, SIL, 1N4454	0405270003
CR4	Not used	
CR5	Not used	

L14	Inductor, Molded, 0.82 uH, 5%	
L15	Inductor, Molded, 0.56 uH, 5%	
L16	Inductor, Molded, 3.9 uH, 5%	
L17	Inductor, Molded, 3.9 uH, 5%	
L18	Inductor, Molded, 3.9 uH, 5%	
L19	Inductor, Molded, 3.9 uH, 5%	
L20	Inductor, Molded, 3.9 uH, 5%	
L21	Inductor, Molded, 3.9 uH, 5%	
L22	Inductor, Molded, 3.9 uH, 5%	
Q1	Transistor, NPN, SI, 2N3866	0448140004
Q2	Transistor, N-CH, FET 40673	0447450000
Q3	Transistor, NPN, SI, 2N5179	0445130008
Q4	Transistor, NPN, SI, 2N4124	0448010003
Q5	Transistor, NPN, SI, 2N5179	0445130008
Q6	Transistor, N-CH, FET 40673	0447450000
Q7	Transistor, N-CH, FET 40673	0447450000
Q8	Transistor, NPN, SI, 2N5179	0445130008
R1	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R2	Resistor, 1.5 K, 10%, 1/4 W	0172470005
R3	Resistor, 27, 10%, 1/4 W	0172590001
R4	Resistor, 10%, 1/4 W	0177160004
R5	Resistor, 120, 10%, 1/4 W	0186550006
R6	Resistor, 10 K, 10%, 1/4 W	0170410005
R7	Resistor, 47, 10%, 1/4 W	0179360001
R8	Resistor, 100 K, 10%, 1/4 W	0170390004
R9	Resistor, 820, 10%, 1/4 W	0178210005
R10	Resistor, 820, 10%, 1/4 W	0178210005
R11	Resistor, 1.5 K, 10%, 1/4 W	0172470005
R12	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R13	Resistor, 560, 5%, 1/4 W	0183200004
R14	Resistor, 560, 5%, 1/4 W	0183200004
R15	Resistor, 220, 10%, 1/4 W	0171320000
R16	Pot., 500, 20%, 1/2 W, PC Mount	0345980000
R17	Resistor, 560, 5%, 1/4 W	0183200004
R18	Resistor, 1.2 K, 10%, 1/4 W	0181860007
R19	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R20	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R21	Resistor, 1 K, 10%, 1/4 W	0171560001
R22	Not used	
R23	Not used	
R24	Not used	
R25	Resistor, 470, 10%, 1/4 W	0172610001
R26	Not used	
R27	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R28	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R29	Resistor, 56, 10%, 1/4 W	0174290004
R30	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R31	Resistor, 10 K, 10%, 1/4 W	0170410005
R32	Resistor, 100 K, 10%, 1/4 W	0170390004
R33	Resistor, 10, 5%, 1/4 W	0177160004
R34	Resistor, 27, 10%, 1/4 W	0172590001
R35	Resistor, 820, 10%, 1/4 W	0178210005

R40	Resistor, 100 K, 10%, 1/4 W	0170330004
R41	Resistor, 10 K, 10%, 1/4 W	0170410005
R42	Not used	
R43	Not used	
R44	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R45	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R47	Resistor, 470, 10%, 1/4 W	0172610001
R48	Resistor, 10 K, 10%, 1/4 W	0170410005
R49	Resistor, 68, 10%, 1/4 W	0187990004
R50	Resistor, 22, 10%, 1/4 W	0192660004
R51	Resistor, 22, 10%, 1/4 W	0192660004
T1	Transformer, Input	5024110001
T2	Transformer	5024110001
T3	Transformer, RF Amp	5024110001
T4	Not used	
T5	Not used	
T6	Transformer	5024110001
T7	Inductor	5024110001
T8	Inductor	5024110001
T9	Not used	
T10	Transformer	5024110001
T11	Not used	
X1	Mixer, Broadband, Balanced	1003300001
X2	Mixer, Broadband, Balanced	1003300001
Wirekit	VHF Mixer Assy.	5024110001
Shield Can		5024110001
Shield Can		5024110001
Shield Can		5024110001

5024110072L

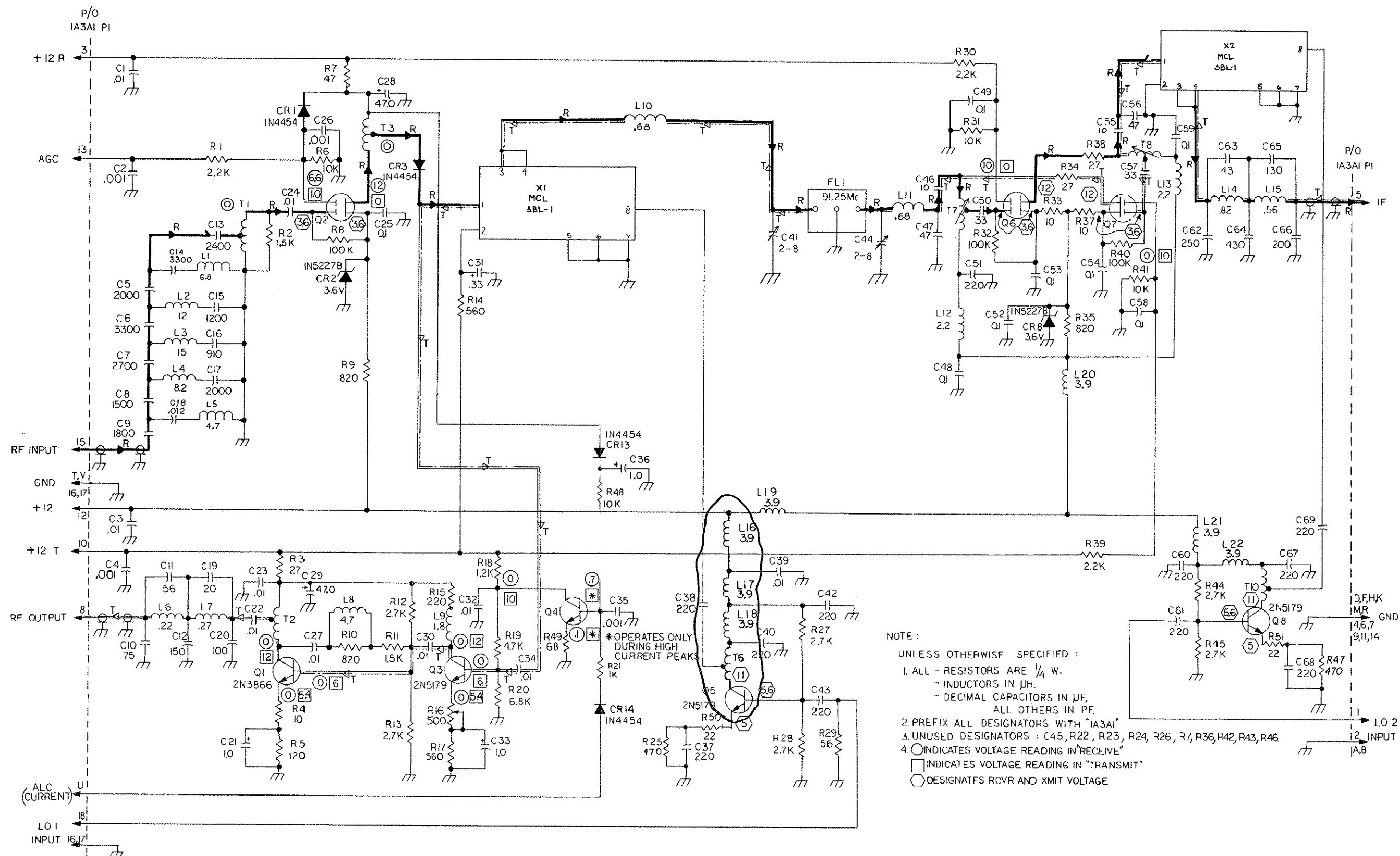
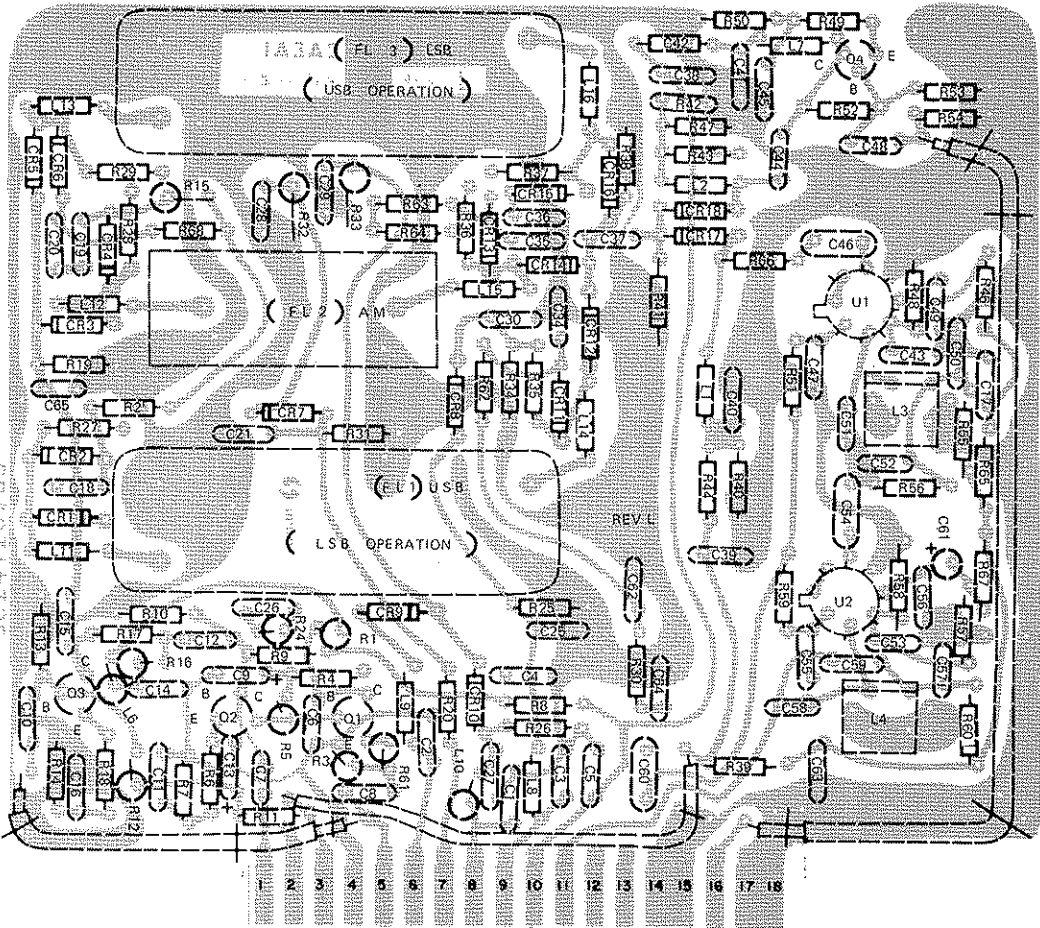
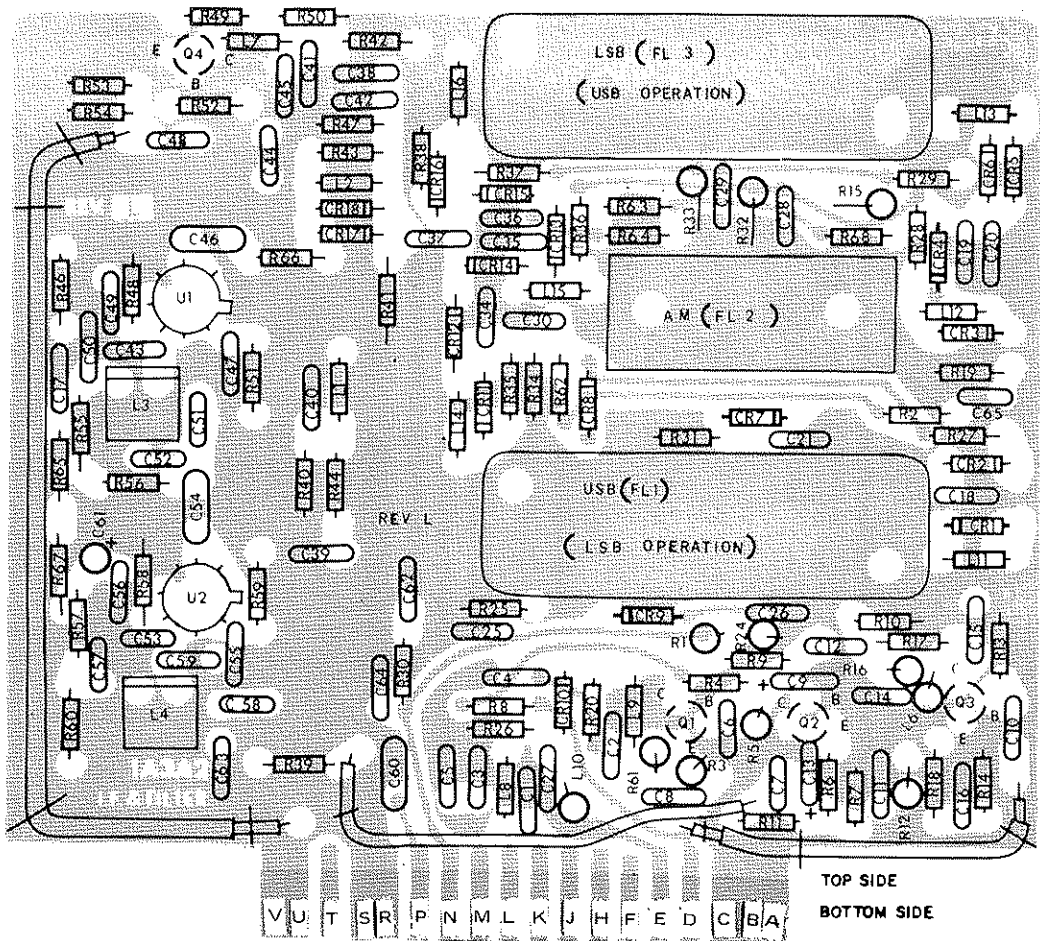


Figure 5.18 VHF Mixer Schematic (1A3A1)

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.	REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY IF FILTER W/O FILTERS	5024120191			
C1	Capacitor, 0.01UF, 25V, X5S	0281620008	CR10	Diode, Signal, Sil. 1N4454	0405270003
C2	Capacitor, 0.01UF, 25V, X5S	0281620008	CR11	Diode, Signal, Sil. 1N4454	0405270003
C3	Capacitor, 0.01UF, 25V, X5S	0281620008	CR12	Diode, Signal, Sil. 1N4454	0405270003
C4	Capacitor, 0.01UF, 25V, X5S	0281620008	CR13	Diode, Signal, Sil. 1N4454	0405270003
C5	Capacitor, 0.01UF, 25V, X5S	0281620008	CR14	Diode, Signal, Sil. 1N4454	0405270003
C6	Capacitor, 0.01UF, 25V, X5S	0281620008	CR15	Diode, Signal, Sil. 1N4454	0405270003
C7	Capacitor, 10PF, 500V, DM10	0259830003	CR16	Diode, Signal, Sil. 1N4454	0405270003
C8	Capacitor, 0.01UF, 25V, X5S	0281620008	CR17	Diode, Signal, Sil. 1N4454	0405270003
C9	Capacitor, 68UF, 15V, T368	0296540005	CR18	Diode, Signal, Sil. 1N4454	0405270003
C10	Capacitor, 0.01UF, 25V, X5S	0281620008	FL1	Filter, Crystal, LSB, 10.5 MHz	0818250003
C11	Capacitor, 0.01UF, 25V, X5S	0281620008	FL2	Filter, Crystal, AM, 10.5 MHz	0818270004
C12	Capacitor, 0.01UF, 25V, X5S	0281620008	FL3	Filter, Crystal, USB, 10.5 MHz	0818260009
C13	Capacitor, 15UF, 15V, 196D	0281720002	L1	Inductor, Molded, 150UH, 5%	0659190001
C14	Capacitor, 0.01UF, 25V, X5S	0281620008	L2	Inductor, Molded, 150UH, 5%	0659190001
C15	Capacitor, 0.01UF, 25V, X5S	0281620008	L3	Inductor, Var, 3.30UH	0647930005
C16	Capacitor, 0.01UF, 25V, X5S	0281620008	L4	Inductor, Var, 3.30UH	0674930005
C17	Capacitor, 0.01UF, 25V, X5S	0281620008	L5	Not used	
C19	Capacitor, 0.01UF, 25V, X5S	0281620008	L6	Inductor, Molded, 150UH, 5%	0659190001
C20	Capacitor, 0.01UF, 25V, X5S	0281620008	L7	Inductor, Molded, 150UH, 5%	0650000005
C21	Capacitor, 0.01UF, 25V, X5S	0281620008	L8	Inductor, Molded, 22UH, 5%	0650000005
C22	Not used		L9	Inductor, Molded, 22UH, 5%	0650000005
C23	Not used		L10	Inductor, Molded, 22UH, 5%	0650000005
C24	Not used		L11	Inductor, Molded, 1.5UH, 5%	0649270002
C25	Capacitor, 0.01UF, 25V, X5S	0281620008	L12	Inductor, Molded, 1.5UH, 5%	0649270002
C25	Capacitor, 0.01UF, 25V, X5S	0281620008	L13	Inductor, Molded, 1.5UH, 5%	0649270002
C26	Capacitor, 0.01UF, 25V, X5S	0281620008	L14	Inductor, Molded, 1.5UH, 5%	0649270002
C27	Capacitor, 0.01UF, 25V, X5S	0281620008	L15	Inductor, Molded, 1.5UH, 5%	0649270002
C28	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002	L16	Inductor, Molded, 1.5UH, 5%	0649270002
C29	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002	Q1	Transistor, NPN, Si. 2N4124	0448010003
C30	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002	Q2	Transistor, NPN, Si. 2N4124	0448010003
C31	Not used		Q3	Transistor, NPN, Si. 2N4124	0448010003
C32	Not used		Q4	Transistor, NPN, Si. 2N4124	0448010003
C33	Not used		R1	Resistor, 100, 5%, 1/4W	0171180003
C34	Capacitor, 0.01UF, 25V, X5S	0281620008	R2	Resistor, 27, 10%, 1/4W	0172590001
C35	Capacitor, 0.01UF, 25V, X5S	0281620008	R3	Resistor, 470, 5%, 1/4W	0184110009
C36	Capacitor, 0.01UF, 25V, X5S	0281620008	R4	Resistor, 100, 5%, 1/4W	0171180003
C37	Capacitor, 0.01UF, 25V, X5S	0281620008	R5	Resistor, 1K, 10%, 1/4W	0171560001
C38	Capacitor, 0.01UF, 25V, X5S	0281620008	R6	Resistor, 18, 10%, 1/4W	0184590001
C39	Capacitor, 0.01UF, 25V, X5S	0281620008	R7	Resistor, 1K, 10%, 1/4W	0171560001
C40	Capacitor, 0.01UF, 25V, X5S	0281620008	R8	Resistor, 1.5K, 10%, 1/4W	0172470005
C41	Capacitor, 0.01UF, 25V, X5S	0281620008	R9	Resistor, 8.2K, 10%, 1/4W	0181620006
C42	Capacitor, 0.01UF, 25V, X5S	0281620008	R10	Resistor, 4.7K, 5%, 1/4W	0170770001
C43	Capacitor, 0.01UF, 25V, X5S	0281620008	R11	Resistor, 220, 10%, 1/4W	0171320000
C44	Capacitor, 0.01UF, 25V, X5S	0281620008	R12	Resistor, 8.2K, 10%, 1/4W	0181620006
C45	Capacitor, 0.01UF, 25V, X5S	0281620008	R13	Resistor, 4.7K, 5%, 1/4W	0170770001
C46	Capacitor, 220PF, 500V, DM15, 5%	0285950002	R14	Resistor, 820, 10%, 1/4W	0178210005
C47	Capacitor, 0.01UF, 25V, X5S	0281620008	R15	Resistor, 27, 10%, 1/4W	0172590001
C48	Capacitor, 0.01UF, 25V, X5S	0281620008	R16	Resistor, 330, 5%, 1/4W	0170910008
C49	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002	R17	Resistor, 330, 5%, 1/4W	0170910008
C50	Capacitor, 0.01UF, 25V, X5S	0281620008	R18	Resistor, 22, 10%, 1/4W	0192690001
C51	Capacitor, 82PF, 500V, DM10, 5%	0262120003	R19	Resistor, 1K, 10%, 1/4W	0171560001
C52	Capacitor, 360PF, 500V, DM15, 5%	0275150003	R20	Resistor, 56, 10%, 1/4W	0174290004
C53	Capacitor, 0.01UF, 25V, X5S	0281620008	R21	Not used	
C54	Capacitor, 220PF, 500V, DM15, 5%	0285950002	R22	Not used	
C55	Capacitor, 0.01UF, 25V, X5S	0281620008	R23	Not used	
C56	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002	R24	Resistor, 10K, 10%, 1/4W	0170410005
C57	Capacitor, 0.01UF, 25V, X5S	0281620008	R25	Resistor, 10K, 10%, 1/4W	0170410005
C58	Capacitor, 82PF, 500V, DM10, 5%	0262120003	R26	Resistor, 10K, 10%, 1/4W	0170410005
C59	Capacitor, 360PF, 500V, DM15, 5%	0275150003	R27	Resistor, 1K, 10%, 1/4W	0171560001
C60	Capacitor, 0.001UF, 100V, X5E, 10%	0282080007	R28	Resistor, 1K, 10%, 1/4W	0171560001
C61	Capacitor, 68UF, 15V, T368	0296540005	R29	Resistor, 1K, 10%, 1/4W	0171560001
C62	Capacitor, 0.01UF, 25V, X5S	0281620008	R30	Resistor, 1.5K, 10%, 1/4W	0172470005
C63	Capacitor, 0.01UF, 25V, X5S	0281620008	R31	Resistor, 10K, 10%, 1/4W	0170410005
C64	Capacitor, 68UF, 25V, X5S	0282150005	R32	Resistor, 1K, 10%, 1/4W	0171560001
C65	Capacitor, 75PF, 500V	0294340009	R33	Resistor, 1K, 10%, 1/4W	0171560001
CR1	Diode, Signal, Sil. 1N4454	0405270003	R34	Resistor, 1K, 10%, 1/4W	0171560001
CR2	Diode, Signal, Sil. 1N4454	0405270003	R35	Resistor, 1K, 10%, 1/4W	0171560001
CR3	Diode, Signal, Sil. 1N4454	0405270003	R36	Resistor, 1K, 10%, 1/4W	0171560001
CR4	Diode, Signal, Sil. 1N4454	0405270003	R37	Resistor, 1K, 10%, 1/4W	0171560001
CR5	Diode, Signal, Sil. 1N4454	0405270003	R38	Resistor, 1K, 10%, 1/4W	0171560001
CR6	Diode, Signal, Sil. 1N4454	0405270003	R39	Resistor, 10, 5%, 1/4W	0177160004
CR7	Diode, Signal, Sil. 1N4454	0405270003	R40	Resistor, 10K, 10%, 1/4W	0170410005
CR8	Diode, Signal, Sil. 1N4454	0405270003	R41	Resistor, 1K, 10%, 1/4W	0171560001
CR9	Diode, Signal, Sil. 1N4454	0405270003	R42	Resistor, 100, 5%, 1/4W	0171180003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R43	Resistor, 100, 5%, 1/4W	0171180003
R44	Resistor, 100, 5%, 1/4W	0171180003
R45	Not used	
R46	Resistor, 2.7K, 10%, 1/4W	0186670001
R47	Resistor, 10K, 10%, 1/4W	0170410005
R48	Resistor, 5.6K, 10%, 1/4W	0183060008
R49	Resistor, 10, 5%, 1/4W	0177160004
R50	Resistor, 560, 5%, 1/4W	0183200004
R51	Resistor, 100, 5%, 1/4W	0171180003
R52	Resistor, 4.7K, 5%, 1/4W	0170770001
R53	Resistor, 3.9K, 10%, 1/4W	0178830003
R54	Resistor, 56, 10%, 1/4W	0174290004
R55	Resistor, 100, 5%, 1/4W	0171180003
R56	Resistor, 56, 10%, 1/4W	0172490004
R57	Resistor, 2.7K, 10%, 1/4W	0186670001
R58	Resistor, 5.6K, 10%, 1/4W	0183060008
R59	Resistor, 100, 5%, 1/4W	0171180003
R60	Resistor, 100, 5%, 1/4W	0171180003
R61	Resistor, 10, 5%, 1/4W	0177160004
R62	Resistor, 27, 10%, 1/4W	0172590001
R63	Resistor, 27, 10%, 1/4W	0175290001
R64	Resistor, 27, 10%, 1/4W	0175290001
R65	Resistor, 150, 10%, 1/4W	0172730007
R66	Resistor, 470, 5%, 1/4W	0184110009
R67	Resistor, 150, 10%, 1/4W	0172730007
R68	Resistor, 27, 10%, 1/4W	0172590001
U1	IC Linear CA3053	0448060001
U2	IC Linear CA3053	0448060001



502412Q078L

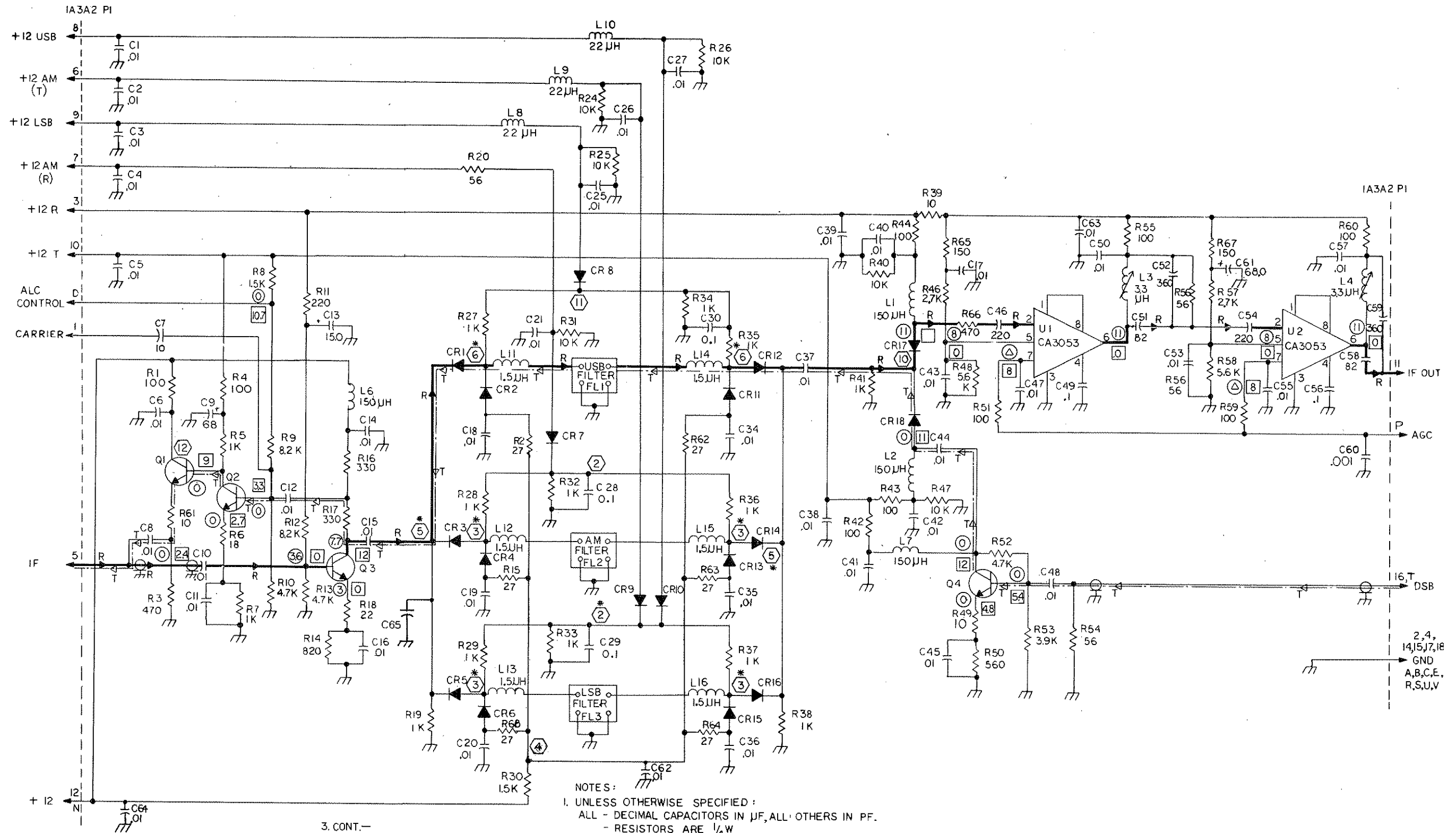
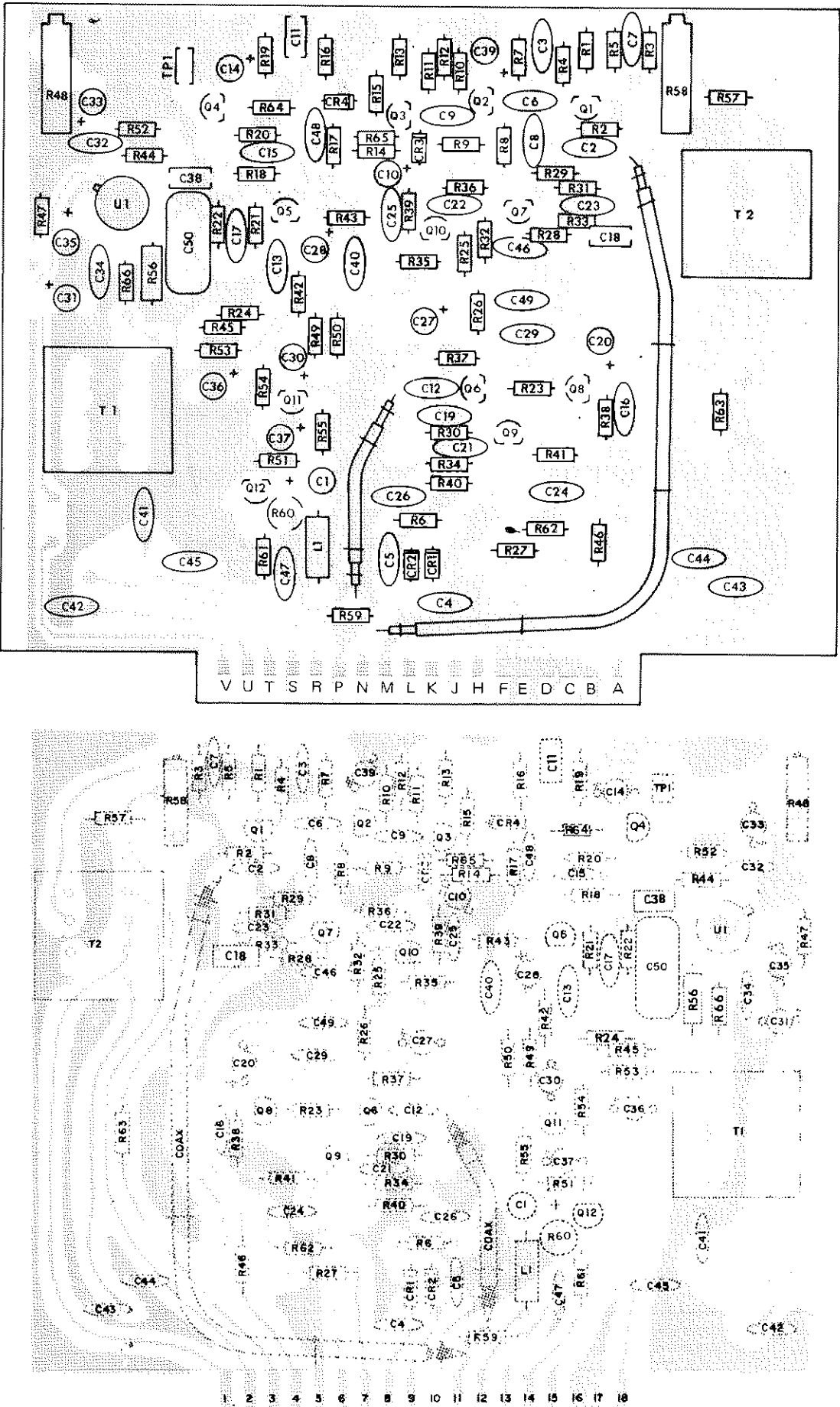


Figure 5.19 IF/Filter Schematic (1A3A2)

5024140095M PC ASSY AUDIO

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY AUDIO	5024140095
C1	Capacitor, 47 UF, 20 V, 196 D	0281700001
C2	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C3	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C4	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C5	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C6	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C7	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C8	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C9	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C10	Capacitor, 15 UF, 20 V, 198 D	0280920008
C11	Capacitor, 68 UF, 25 V, T368	0282150005
C12	Capacitor, 220 PF, 500 V, DM15, 5%	0285950002
C13	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C14	Capacitor, 15 UF, 20 V, 198 D	0280920008
C15	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C16	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C17	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C18	Capacitor, 68 UF, 25 V, T368	0282150005
C19	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C20	Capacitor, 15 UF, 20 V, 198 D	0280920008
C21	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C22	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C23	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C24	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C25	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C26	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C27	Capacitor, 1 UF, 50 V, 198 D	0280910002
C28	Capacitor, 1 UF, 50 V, 198 D	0280910002
C29	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C30	Capacitor, 1 UF, 50 V, 198 D	0280910002
C31	Capacitor, 3.3 UF, 35 V, 196 D	0281680001
C32	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C33	Capacitor, 1 UF, 50 V, 198 D	0280910002
C34	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C35	Capacitor, 3.3 UF, 35 V, 196 D	0281680001
C36	Capacitor, 1 UF, 50 V, 198 D	0280910002
C37	Capacitor, 47 UF, 20 V, 196 D	0281700001
C38	Capacitor, 68 UF, 25 V, T368	0282150005
C39	Capacitor, 15 UF, 20 V, 198 D	0280920008
C40	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C41	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C42	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C43	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C44	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C45	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C46	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C47	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C48	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C49	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C50	Capacitor, 910 PF, 500 V, DM19, 5%	0297570005
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Signal, Sil. 1N4454	0405270003
CR4	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 150 UH, 5%	0646780000
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q6	Transistor, NPN, Si. 2N4124	0448010003
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, NPN, Si. 2N4124	0448010003
Q9	Transistor, NPN, Si. 2N4124	0448010003
Q10	Transistor, NPN, Si. 2N4124	0448010003
Q11	Transistor, NPN, Si. 2N4124	0448010003
Q12	Transistor, NPN, Si. 2N4124	0448010003
R1	Resistor, 12 K, 10%, 1/4 W	0183180003
R2	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R3	Resistor, 220, 10%, 1/4 W	0171320000
R4	Resistor, 560, 5%, 1/4 W	0183200004
R5	Resistor, 18, 10%, 1/4 W	0184590001
R6	Resistor, 56, 10%, 1/4 W	0174290004
R7	Resistor, 1.8 K, 10%, 1/4 W	0178190004

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R8	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R9	Resistor, 18, 10%, 1/4 W	0184590001
R10	Resistor, 680, 10%, 1/4 W	0176630007
R11	Resistor, 22 K, 5%, 1/4 W	0172230004
R12	Resistor, 3 K, 5%, 1/4 W	0197180001
R13	Resistor, 1.5 K, 10%, 1/4 W	0172470005
R14	Resistor, 120, 10%, 1/4 W	0186550006
R15	Resistor, 1.8 K, 10%, 1/4 W	0178190004
R16	Resistor, 33 K, 10%, 1/4 W	0177920009
R17	Resistor, 120 K, 10%, 1/4 W	0175100004
R18	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R19	Resistor, 100, 5%, 1/4 W	0171180003
R20	Resistor, 1 K, 10%, 1/4 W	0171560001
R21	Resistor, 3.9 K, 10%, 1/4 W	0178830003
R22	Resistor, 1.2 K, 10%, 1/4 W	0181860007
R23	Resistor, 120, 10%, 1/4 W	0186550006
R24	Resistor, 560, 5%, 1/4 W	0183200004
R25	Resistor, 56, 10%, 1/4 W	0174290004
R26	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R27	Resistor, 220, 10%, 1/4 W	0171320000
R28	Resistor, 18 K, 10%, 1/4 W	0171520002
R29	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R30	Resistor, 2.7 K, 10%, 1/4 W	0188670001
R31	Resistor, 270, 10%, 1/4 W	0178450006
R32	Resistor, 680, 10%, 1/4 W	0176630007
R33	Resistor, 82, 10%, 1/4 W	0184610001
R34	Resistor, 680, 10%, 1/4 W	0176630007
R35	Resistor, 33 K, 10%, 1/4 W	0177920009
R36	Resistor, 5.6 K, 10%, 1/4 W	0183060008
R37	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R38	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R39	Resistor, 1.2 K, 10%, 1/4 W	0181860007
R40	Resistor, 5.6 K, 10%, 1/4 W	0183060008
R41	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R42	Resistor, 680, 10%, 1/4 W	0176630007
R43	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R44	Resistor, 100 K, 10%, 1/4 W	0170390004
R45	Resistor, 10, 5%, 1/4 W	0177160004
R46	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R47	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R48	Pot., 2 K, 10%, 3/4 W, 15 Turns	0338490060
R49	Resistor, 18 K, 10%, 1/4 W	0175720002
R50	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R51	Resistor, 560, 5%, 1/4 W	0183200004
R52	Resistor, 470 K, 10%, 1/4 W	0180570005
R53	Resistor, 10, 5%, 1/4 W	0177160004
R54	Resistor, 1 K, 10%, 1/4 W	0171560001
R55	Resistor, 56, 10%, 1/4 W	0174290004
R56	Resistor, 4.7 K, 10%, 1/2 W	0195680006
R57	Resistor, 10, 5%, 1/4 W	0177160004
R58	Pot., 500, 10%, 3/4 W, 15 Turns	0338490078
R59	Resistor, 120, 10%, 1/4 W	0186550006
R60	Pot., 20, 10%, 1/2 W, 1 Turn	1000080030
R61	Resistor, 1 K, 10%, 1/4 W	0171560001
R62	Resistor, 560, 5%, 1/4 W	0183200004
R63	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R64	Resistor, 100, 5%, 1/4 W	0171180003
R65	Resistor, 10, 5%, 1/4 W	0177160004
R66	Resistor, 330, 5%, 1/4 W	0170910008
T1	Transformer, Audio, PC Mount	0491660006
T2	Transformer, Audio, PC Mount	0491650001
U1	IC Linear CA3020	0444600001
	Test Point, White	0753640007
	Heatsink, Transistor	0871870002
	Wire Kit, Audio Board Assy.	5024140001
	PCB, Audio	5024140206



5024120078M

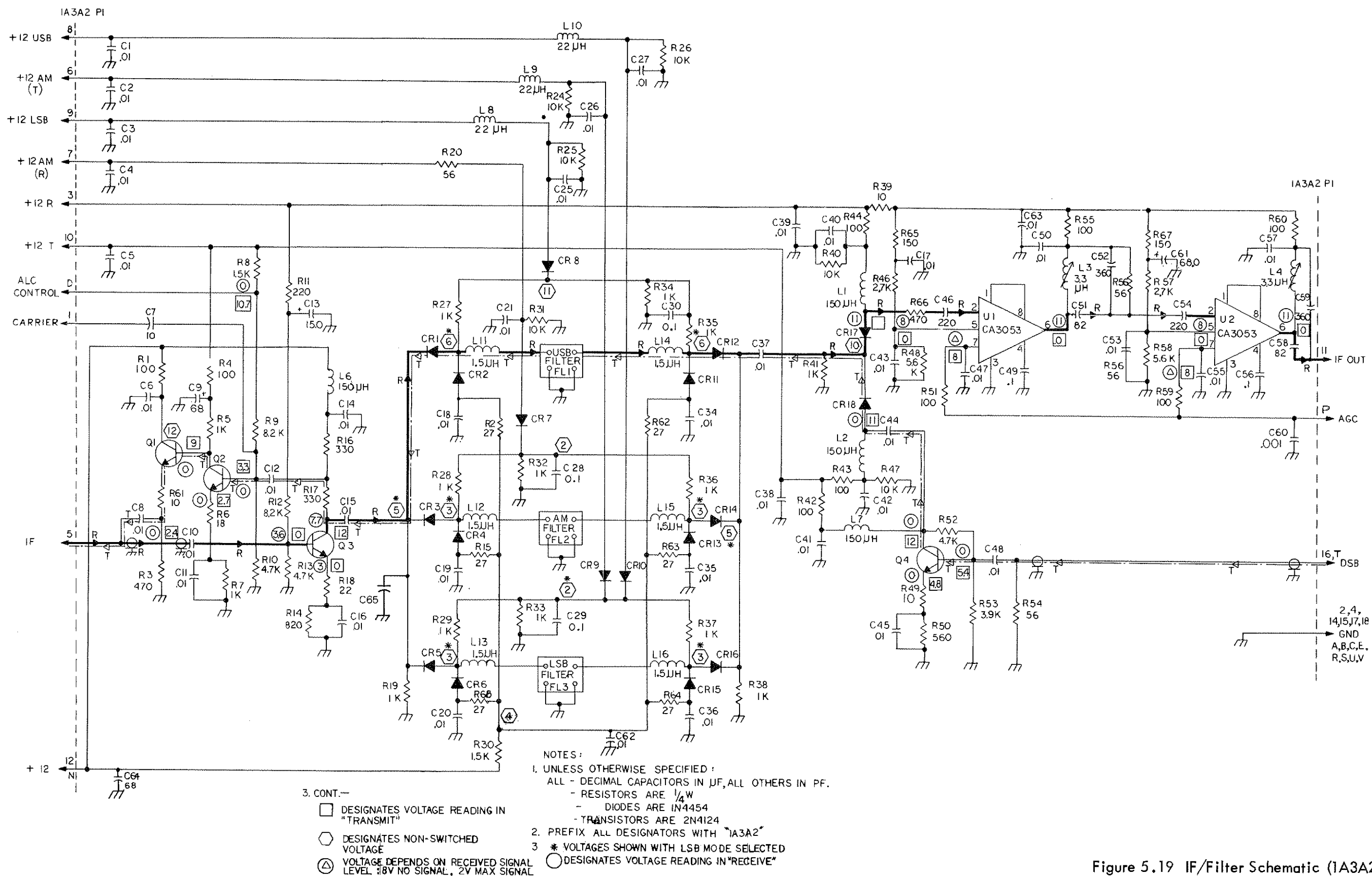
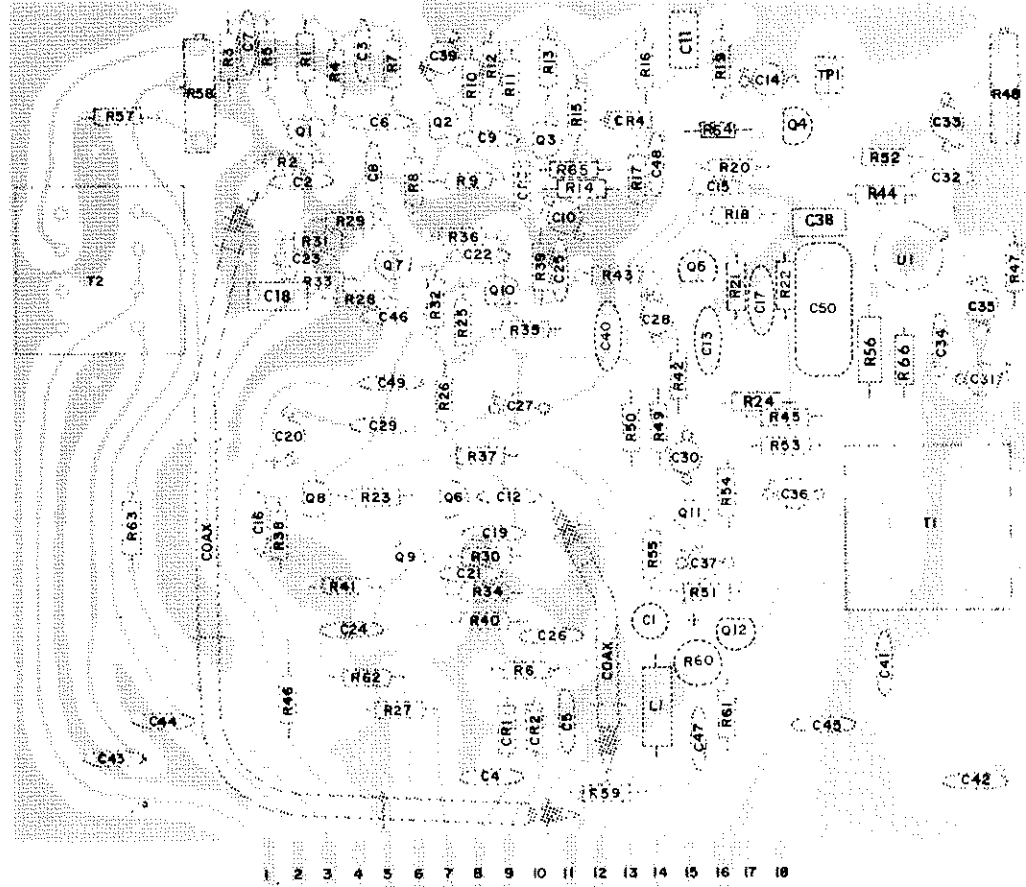
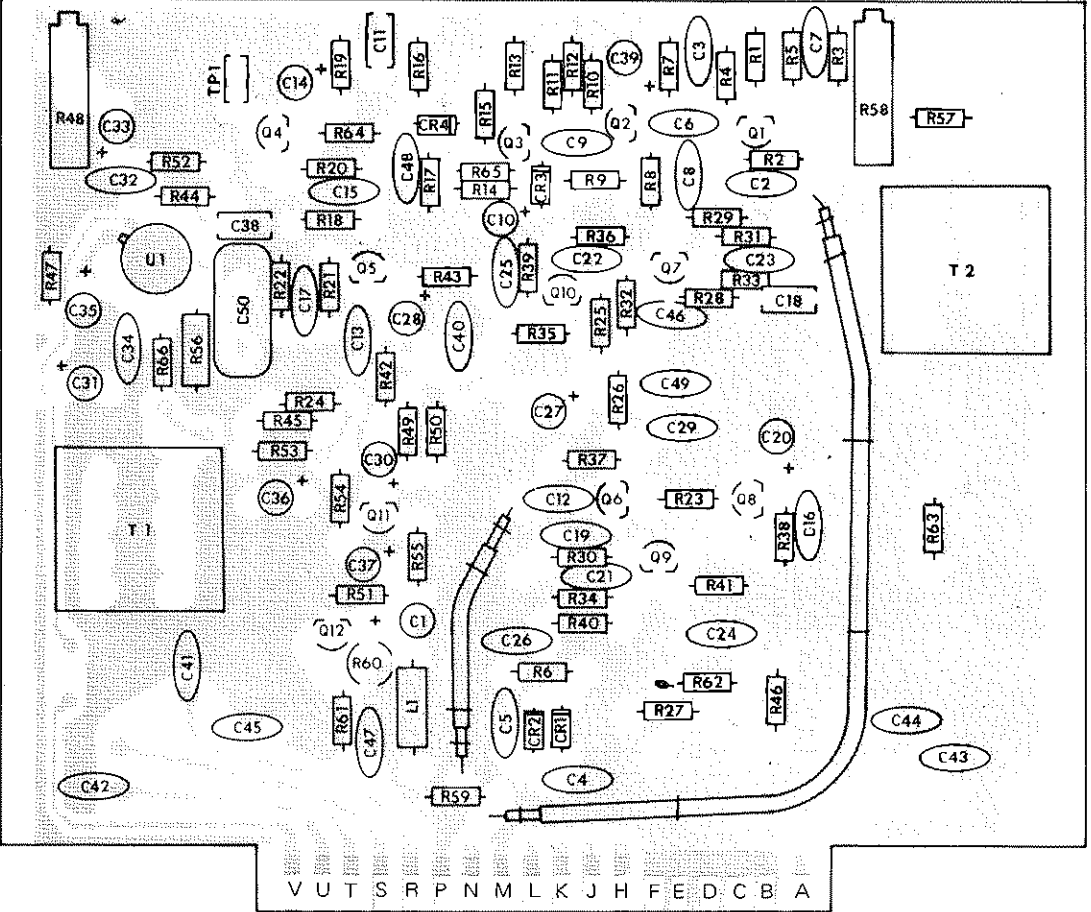


Figure 5.19 IF/Filter Schematic (1A3A2)

5024140095M PC ASSY AUDIO

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY AUDIO	5024140095
C1	Capacitor, 47 UF, 20 V, 196 D	0281700001
C2	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C3	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C4	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C5	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C6	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C7	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C8	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C9	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C10	Capacitor, 15 UF, 20 V, 198 D	0280920008
C11	Capacitor, 68 UF, 25 V, T368	0282150005
C12	Capacitor, 220 PF, 500 V, DM15, 5%	0285950002
C13	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C14	Capacitor, 15 UF, 20 V, 198 D	0280920008
C15	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C16	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C17	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C18	Capacitor, 68 UF, 25 V, T368	0282150005
C19	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C20	Capacitor, 15 UF, 20 V, 198 D	0280920008
C21	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C22	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C23	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C24	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C25	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C26	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C27	Capacitor, 1 UF, 50 V, 198 D	0280910002
C28	Capacitor, 1 UF, 50 V, 198 D	0280910002
C29	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C30	Capacitor, 1 UF, 50 V, 198 D	0280910002
C31	Capacitor, 3.3 UF, 35 V, 196 O	0281680001
C32	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C33	Capacitor, 1 UF, 50 V, 198 D	0280910002
C34	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C35	Capacitor, 3.3 UF, 35 V, 196 D	0281680001
C36	Capacitor, 1 UF, 50 V, 198 D	0280910002
C37	Capacitor, 47 UF, 20 V, 196 D	0281700001
C38	Capacitor, 68 UF, 25 V, T368	0282150005
C39	Capacitor, 15 UF, 20 V, 198 D	0280920008
C40	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C41	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C42	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C43	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C44	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C45	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C46	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C47	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C48	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C49	Capacitor, 0.01 UF, 25 V, X5S	0281620008
C50	Capacitor, 910 PF, 500 V, DM19, 5%	0297570005
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Signal, Sil. 1N4454	0405270003
CR4	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 150 UH, 5%	0646780000
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q6	Transistor, NPN, Si. 2N4124	0448010003
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, NPN, Si. 2N4124	0448010003
Q9	Transistor, NPN, Si. 2N4124	0448010003
Q10	Transistor, NPN, Si. 2N4124	0448010003
Q11	Transistor, NPN, Si. 2N4124	0448010003
Q12	Transistor, NPN, Si. 2N4124	0448010003
R1	Resistor, 12 K, 10%, 1/4 W	0183180003
R2	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R3	Resistor, 220, 10%, 1/4 W	0171320000
R4	Resistor, 560, 5%, 1/4 W	0183200004
R5	Resistor, 18, 10%, 1/4 W	0184590001
R6	Resistor, 56, 10%, 1/4 W	0174290004
R7	Resistor, 1.8 K, 10%, 1/4 W	0178190004

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R8	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R9	Resistor, 18, 10%, 1/4 W	0184590001
R10	Resistor, 680, 10%, 1/4 W	0176630007
R11	Resistor, 22 K, 5%, 1/4 W	0172230004
R12	Resistor, 3 K, 5%, 1/4 W	0197180001
R13	Resistor, 1.5 K, 10%, 1/4 W	0172470005
R14	Resistor, 120, 10%, 1/4 W	0186550006
R15	Resistor, 1.8 K, 10%, 1/4 W	0178190004
R16	Resistor, 33 K, 10%, 1/4 W	0177920009
R17	Resistor, 120 K, 10%, 1/4 W	0175100004
R18	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R19	Resistor, 100, 5%, 1/4 W	0171180003
R20	Resistor, 1 K, 10%, 1/4 W	0171560001
R21	Resistor, 3.9 K, 10%, 1/4 W	0178830003
R22	Resistor, 1.2 K, 10%, 1/4 W	0181860007
R23	Resistor, 120, 10%, 1/4 W	0186550006
R24	Resistor, 560, 5%, 1/4 W	0183200004
R25	Resistor, 56, 10%, 1/4 W	0174290004
R26	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R27	Resistor, 220, 10%, 1/4 W	0171320000
R28	Resistor, 18 K, 10%, 1/4 W	0171520002
R29	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R30	Resistor, 2.7 K, 10%, 1/4 W	0188670001
R31	Resistor, 270, 10%, 1/4 W	0178450006
R32	Resistor, 680, 10%, 1/4 W	0176630007
R33	Resistor, 82, 10%, 1/4 W	0184610001
R34	Resistor, 680, 10%, 1/4 W	0176630007
R35	Resistor, 33 K, 10%, 1/4 W	0177920009
R36	Resistor, 5.6 K, 10%, 1/4 W	0183060008
R37	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R38	Resistor, 6.8 K, 5%, 1/4 W	0174810008
R39	Resistor, 1.2 K, 10%, 1/4 W	0181860007
R40	Resistor, 5.6 K, 10%, 1/4 W	0183060008
R41	Resistor, 3.3 K, 10%, 1/4 W	0170890007
R42	Resistor, 680, 10%, 1/4 W	0176630007
R43	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R44	Resistor, 100 K, 10%, 1/4 W	0170390004
R45	Resistor, 10, 5%, 1/4 W	0177160004
R46	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R47	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R48	Pot., 2 K, 10%, 3/4 W, 15 Turns	0338490006
R49	Resistor, 18 K, 10%, 1/4 W	0175720002
R50	Resistor, 8.2 K, 10%, 1/4 W	0181620006
R51	Resistor, 560, 5%, 1/4 W	0183200004
R52	Resistor, 470 K, 10%, 1/4 W	0180570005
R53	Resistor, 10, 5%, 1/4 W	0177160004
R54	Resistor, 1 K, 10%, 1/4 W	0171560001
R55	Resistor, 56, 10%, 1/4 W	0174290004
R56	Resistor, 4.7 K, 10%, 1/2 W	0195680006
R57	Resistor, 10, 5%, 1/4 W	0177160004
R58	Pot., 500, 10%, 3/4 W, 15 Turns	0338490007
R59	Resistor, 120, 10%, 1/4 W	0186550006
R60	Pot., 20, 10%, 1/2 W, 1 Turn	1000080030
R61	Resistor, 1 K, 10%, 1/4 W	0171560001
R62	Resistor, 560, 5%, 1/4 W	0183200004
R63	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R64	Resistor, 100, 5%, 1/4 W	0171180003
R65	Resistor, 10, 5%, 1/4 W	0177160004
R66	Resistor, 330, 5%, 1/4 W	0170910008
T1	Transformer, Audio, PC Mount	0491650006
T2	Transformer, Audio, PC Mount	0491650001
U1	IC Linear CA3020	0444600001
	Test Point, White	0753640007
	Heatsink, Transistor	0871870002
	Wire Kit, Audio Board Assy.	5024140001
	PCB, Audio	5024140206



SS024 140095L

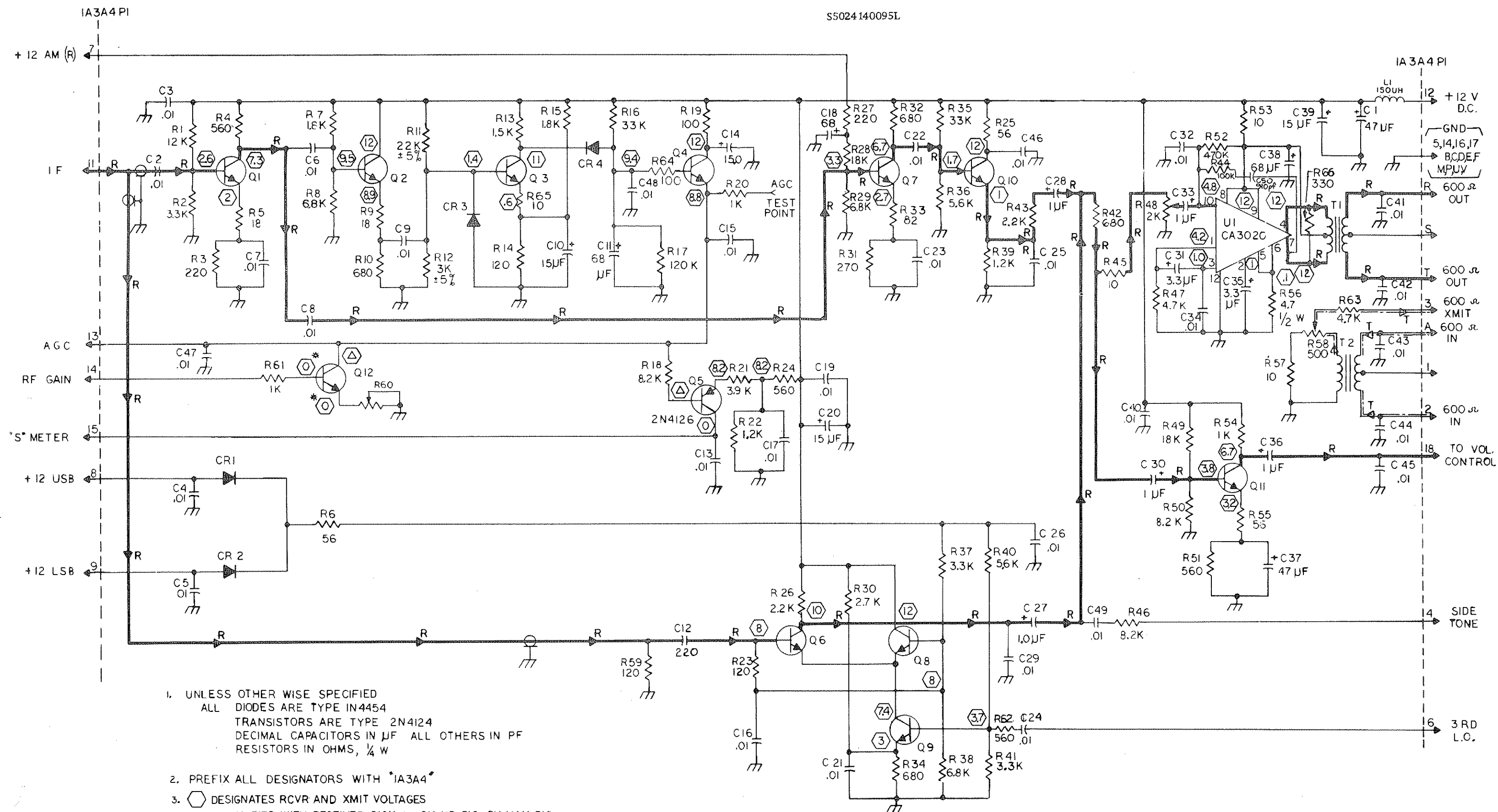
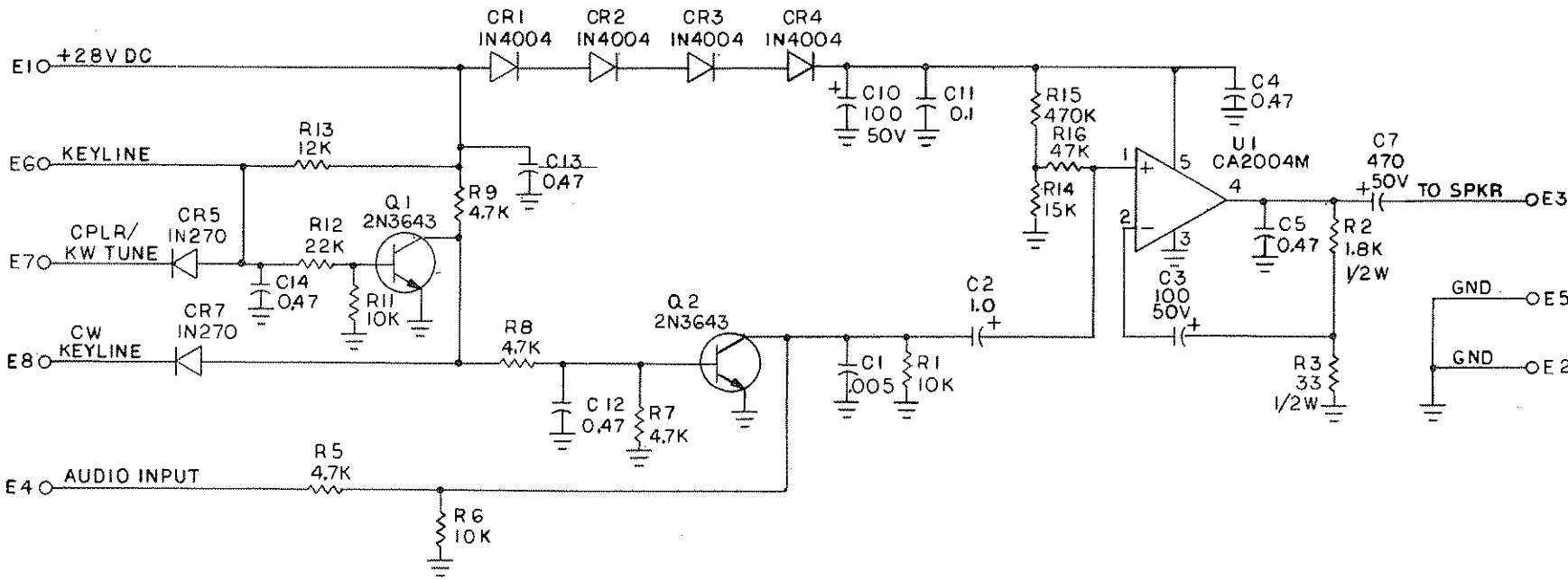


Figure 5.20 Audio Board Schematic (1A3A4)

5024047079A

5024047095B PC ASSY. SPEAKER DRIVER

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY, SPEAKER DRIVER	5024047095
C1	Capacitor, 0.005 UF, 100V, Z5V	0273330004
C2	Capacitor, 1 UF, 35 V, T368	0283630001
C3	Capacitor, 100 UF, 50 V	1004260016
C4	Capacitor, 0.47 UF, 50 V, X5 V, 20%	0283370009
C5	Capacitor, 0.47 UF, 50 V, X5 V, 20%	
C6	Not used	
C7	Capacitor, 470 UF, 50 V, TAL	0280890001
C8	Not used	
C9	Not used	
C10	Capacitor, 100 UF, 50 V	1004260016
C11	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C12	Capacitor, 0.47 UF, 50 V, X5 V, 20%	0283370009
C13	Capacitor, 0.47 UF, 50 V, X5 V, 20%	0283370009
C14	Capacitor, 0.47 UF, 50 V, X5 V, 20%	0283370009
CR1	Diode, Rectifier 1N4004	0405180004
CR2	Diode, Rectifier 1N4004	0405180004
CR3	Diode, Rectifier 1N4004	0405180004
CR4	Diode, Rectifier 1N4004	0405180004
CR5	Diode, Signal, Germ. 1N270	0405510004
CR6	Not used	
CR7	Diode, Signal, Germ. 1N270	0405510004
Q1	Transistor, NPN, Si. 2N3643	0443310009
Q2	Transistor, NPN, Si. 2N3643	0443310009
R1	Resistor, 10 K, 10%, 1/4 W	0170410005
R2	Resistor, 1.8 K, 5%, 1/2 W	0184970008
R3	Resistor, 33, 10%, 1/2 W	0171700007
R4	Not used	
R5	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R6	Resistor, 10 K, 10%, 1/4 W	0170410005
R7	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R8	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R9	Resistor, 4.7 K, 5%, 1/4 W	0170770001
R10	Not used	
R11	Resistor, 10 K, 10%, 1/4 W	0170410005
R12	Resistor, 22 K, 5%, 1/4 W	0172230004
R13	Resistor, 12 K, 10%, 1/4 W	0183180003
R14	Resistor, 15 K, 10%, 1/4 W	0172350000
R15	Resistor, 470 K, 10%, 1/4 W	0180570005
R16	Resistor, 47 K, 10%, 1/4 W	0171060008
U1	IC, Linear	1003140025



NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL CAPACITORS ARE IN MICROFARADS.
2. ALL RESISTORS ARE IN OHMS AND ARE 1/4 WATT.

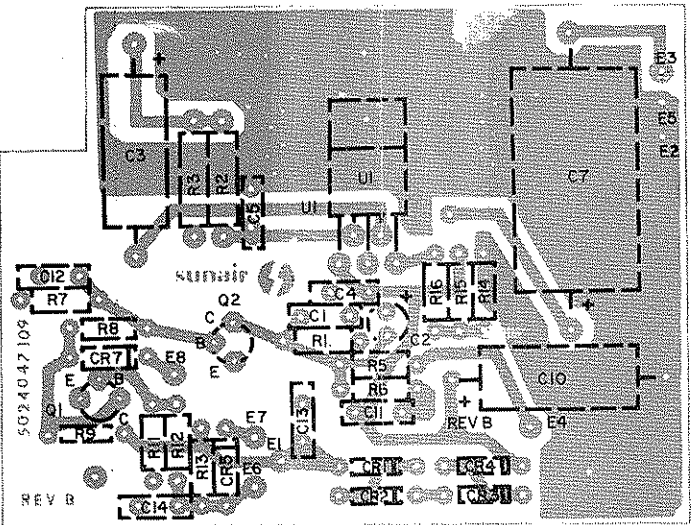
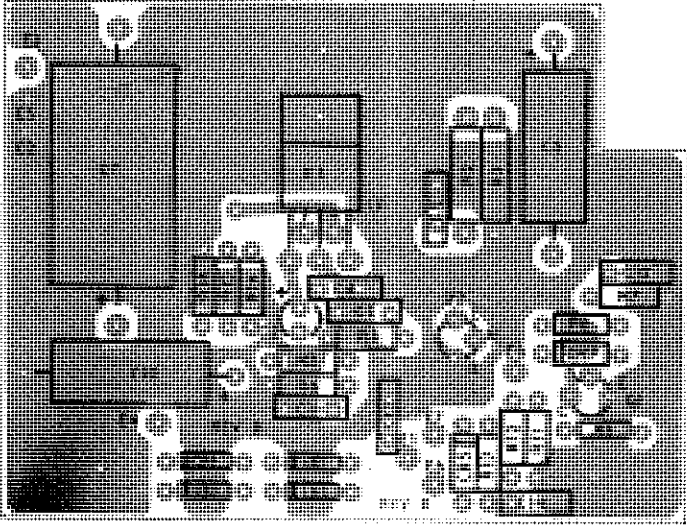


Figure 5.21 Speaker Driver Schematic (1A1A1)

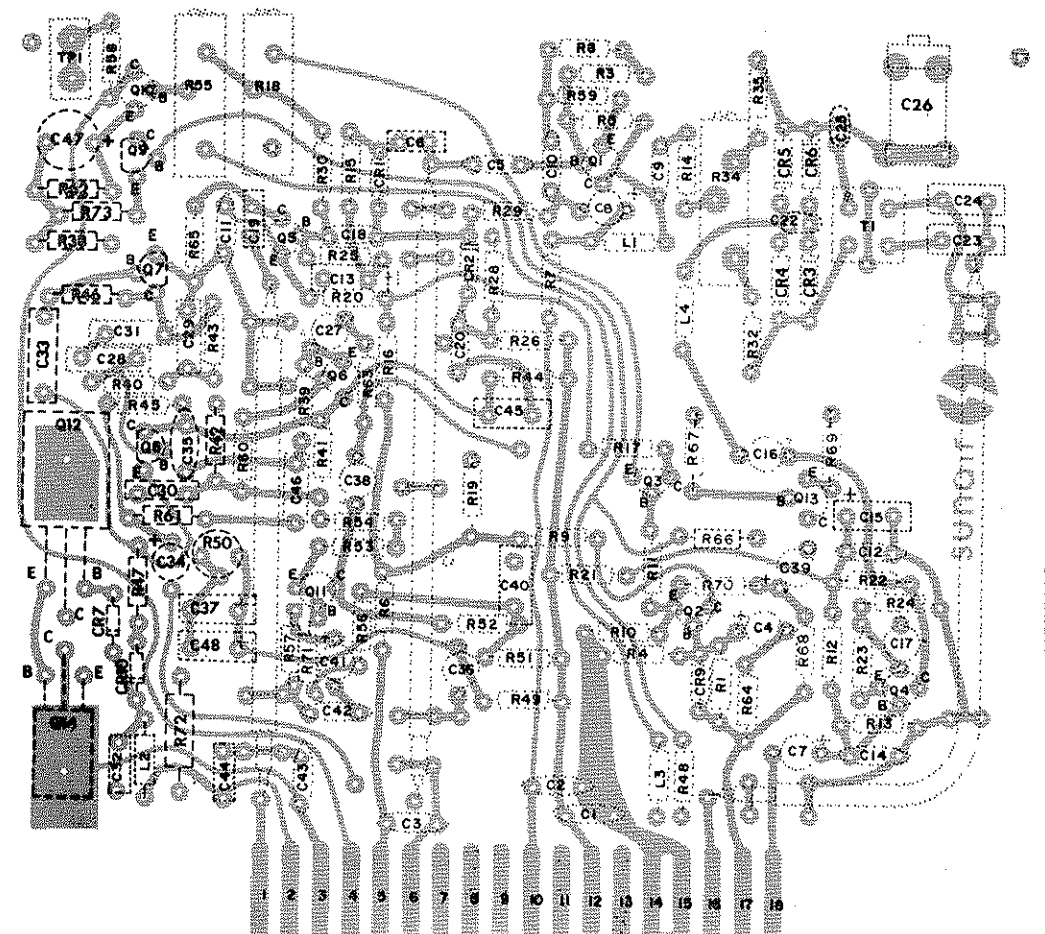
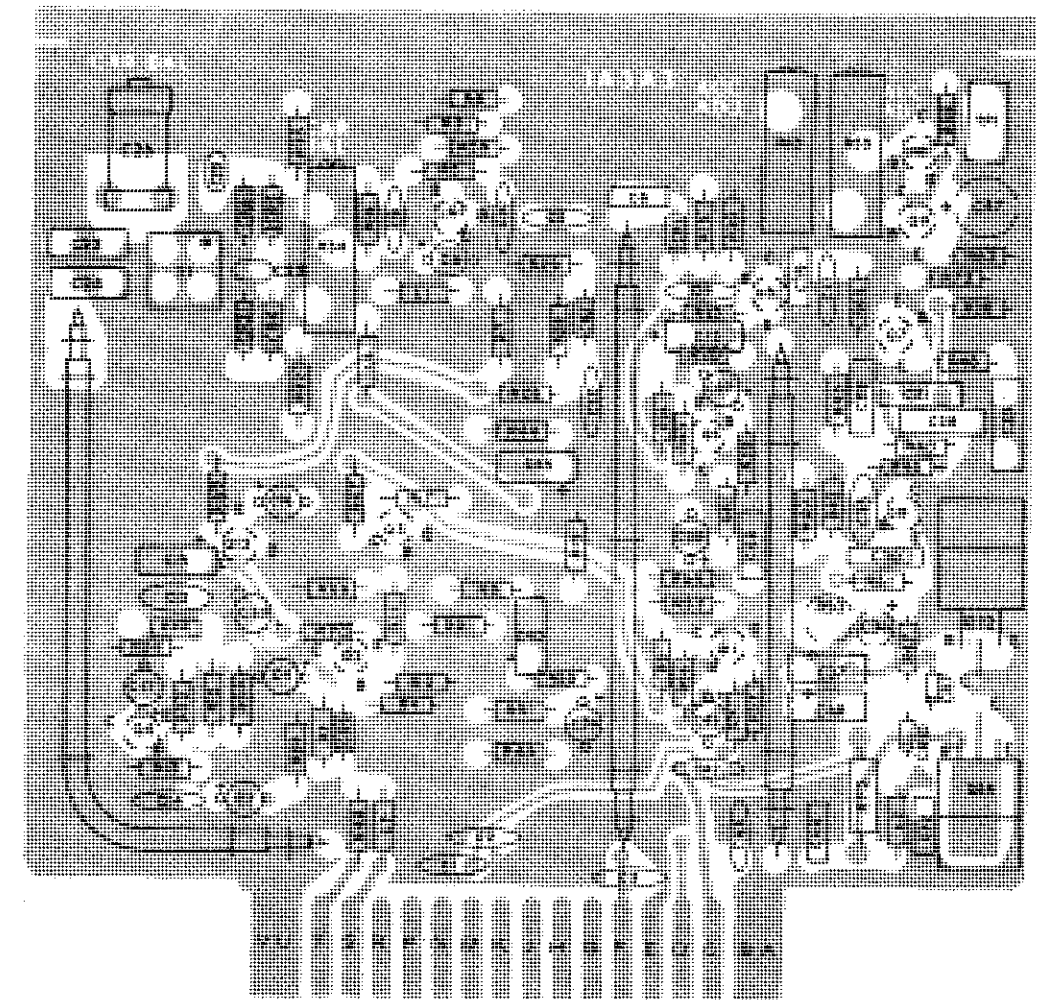
CHANGE DATE AUGUST 1, 1982

(Schematic shown on page 5-97)

5024130090W PC ASSY SIDEBAND GENERATOR

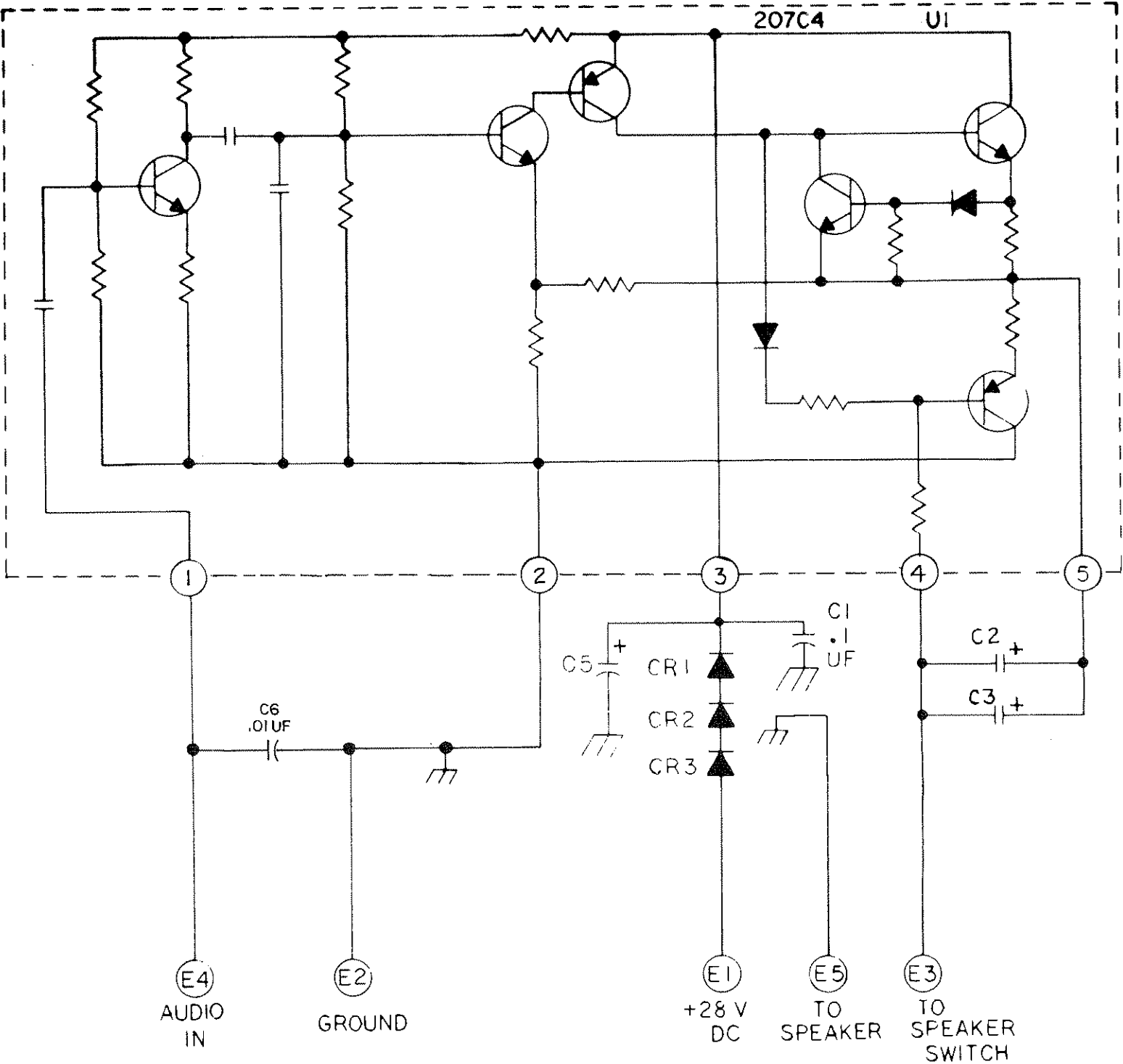
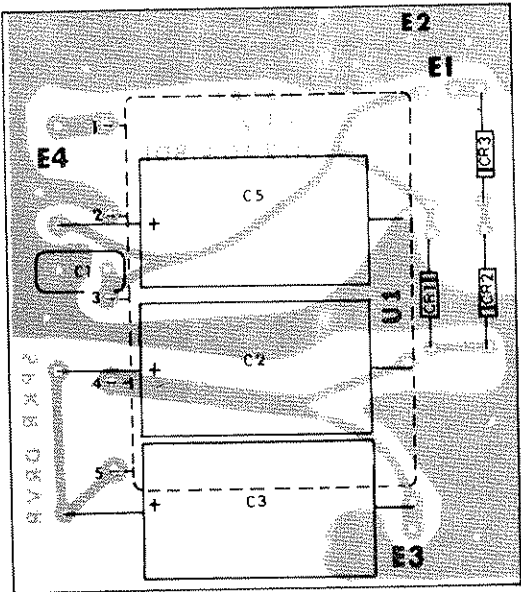
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1	PC ASSY SIDEBAND GENERATOR	5024130090
C2	Capacitor, 0.01UF, 25V, X5S	0281620008
C3	Capacitor, 0.01UF, 25V, X5S	1281620008
C4	Capacitor, 0.01UF, 25V, X5S	0281620008
C5	Capacitor, 15UF, 20V, 198D	0280920008
C6	Capacitor, 0.01UF, 25V, X5S	0281620008
C7	Capacitor, 47PF, 500V, DM10, 5%	0294960007
C8	Capacitor, 1UF, 50V, 198D	0280910002
C9	Capacitor, 15UF, 20V, 198D	0280920008
C10	Capacitor, 0.01UF, 25V, X5S	0281620008
C11	Capacitor, 0.01UF, 25V, X5S	0281620008
C12	Capacitor, 0.01UF, 25V, X5S	0281620008
C13	Capacitor, 68UF, 15V, T368	0296540005
C14	Capacitor, 0.01UF, 25V, X5S	0281620008
C15	Capacitor, 68UF, 15V, T368	0296540005
C16	Capacitor, 1UF, 50V, 198D	0280910002
C17	Capacitor, 15UF, 20V, 198D	0280920008
C18	Capacitor, 0.01UF, 25V, X5S	0281620008
C19	Capacitor, 10PF, 500V, DM10	0259830003
C20	Capacitor, 0.01UF, 25V, X5S	0281620008
C21	Not used	
C22	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C23	Capacitor, 360PF, 500V, DM15, 5%	0275150003
C24	Capacitor, 82PF, 300V, DM15, 5%	0289970008
C25	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C26	Capacitor, 8-8PF, PC Mt. Glass	1000060012
C27	Capacitor, 1UF, 50V, 198D	0280910002
C28	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C29	Capacitor, 0.01UF, 50V, Mylar	0281560005
C30	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C31	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C32	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C33	Capacitor, 0.1UF, 50V, Mylar	0281580006
C34	Capacitor, 1UF, 50V, 198D	0280910002
C35	Capacitor, 0.01UF, 25V, X5S	0281620008
C36	Capacitor, 15UF, 20V, 198D	0280920008
C37	Capacitor, 68UF, 15V, T368	0296540005
C38	Capacitor, 1UF, 50V, 198D	0280910002
C39	Capacitor, 47UF, 20V, 196D	0281700001
C40	Capacitor, 68UF, 15V, T368	0296540005
C41	Capacitor, 1UF, 50V, 198D	0280910002
C42	Capacitor, 0.01UF, 25V, X5S	0281620008
C43	Capacitor, 0.01UF, 25V, X5S	0281620008
C44	Capacitor, 0.01UF, 50V, X7R, 20%	0281610002
C45	Capacitor, 68UF, 15V, T368	0296540005
C46	Capacitor, 0.033UF, 50V, Mylar	0281770000
C47	Capacitor, 47UF, 20V, 196D	0281700000
C48	Capacitor, 68UF, 15V, T368	0296540005
C49	Capacitor, 1UF, 50V, X7R, 20%	0281610002
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Hot Carrier MBD102	1000210022
CR4	Diode, Hot Carrier MBD102	1000210022
CR5	Diode, Hot Carrier MBD102	1000210022
CR6	Diode, Hot Carrier MBD102	1000210022
CR7	Diode, Signal, Sil. 1N4454	0405270003
CR8	Not used	
CR9	Diode, Signal, Sil. 1N4454	0405270003
CR10	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 22UH, 5%	0650000005
L2	Inductor, Molded, 150UH, 5%	0659190001
L3	Inductor, Molded, 150UH, 5%	0659190001
L4	Inductor, Molded, 22UH, 5%	0650000005
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q6	Transistor, NPN, Si. 2N4124	0448010003
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, NPN, Si. 2N4124	0448010003
Q9	Transistor, NPN, Si. 2N4124	0448010003
Q10	Transistor, NPN, Si. 2N4124	0448010003
Q11	Transistor, NPN, Si. 2N4124	0448010003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
Q12	Transistor, PNP, Sil. TIP-32A	0448200007
Q13	Transistor, PNP, Si. 2N4126	0448020009
Q14	Transistor, NPN, Si. 2N4921	0448040000
R1	Resistor, 47K, 10%, 1/4W	0171060008
R2	Not used	
R3	Resistor, 1K, 10%, 1/4W	0171560001
R4	Resistor, 68K, 10%, 1/4W	0173520006
R5	Resistor, 3.3K, 10%, 1/4W	0170890007
R6	Resistor, 100, 5%, 1/4W	0171180003
R7	Resistor, 120, 10%, 1/4W	0186550006
R8	Resistor, 120, 10%, 1/4W	0186550006
R9	Resistor, 220, 10%, 1/4W	0171320000
R10	Resistor, 10K, 10%, 1/4W	0170410005
R11	Resistor, 1K, 10%, 1/4W	0171560001
R12	Resistor, 18K, 10%, 1/4W	0175720002
R13	Resistor, 8.2K, 10%, 1/4W	0181620006
R14	Resistor, 100, 5%, 1/4W	0171180003
R15	Resistor, 1K, 10%, 1/4W	0171560001
R16	Resistor, 1.2K, 10%, 1/4W	0181860007
R17	Resistor, 1.5K, 10%, 1/4W	0172470005
R18	Pot, 500, 10%, 3/4W, 15 Turns	0338490078
R19	Resistor, 2.2K, 5%, 1/4W	0178070009
R20	Resistor, 100, 5%, 1/4W	0171180003
R21	Resistor, 220, 10%, 1/4W	0171320000
R22	Resistor, 820, 10%, 1/4W	0178210005
R23	Resistor, 10, 5%, 1/4W	0177160004
R24	Resistor, 560, 5%, 1/4W	0183200004
R25	Resistor, 4.7K, 5%, 1/4W	0170770001
R26	Resistor, 2.2K, 5%, 1/4W	0178070009
R27	Not used	
R28	Resistor, 2.2K, 5%, 1/4W	0178070009
R29	Resistor, 2.2K, 5%, 1/4W	0178070009
R30	Resistor, 6.8K, 5%, 1/4W	0174810008
R31	Not used	
R32	Resistor, 100, 5%, 1/4W	0171180003
R33	Not used	
R34	Pot., 20, 10%, 3/4W, 20 Turns	0346770009
R35	Resistor, 100, 5%, 1/4W	0171180003
R36	Not used	
R37	Not used	
R38	Resistor, 15K, 5%, 1/4W	0195700007
R39	Resistor, 560, 5%, 1/4W	0183200004
R40	Resistor, 33K, 5%, 1/4W	0195820002
R41	Resistor, 27K, 10%, 1/4W	0171200004
R42	Resistor, 47K, 10%, 1/4W	0171060008
R43	Resistor, 33K, 5%, 1/4W	0195820002
R44	Resistor, 220, 10%, 1/4W	0171320000
R45	Resistor, 3.3K, 10%, 1/4W	0170890007
R46	Resistor, 180K, 10%, 1/4W	0177280000
R47	Resistor, 4.7K, 5%, 1/4W	0170770001
R48	Resistor, 2.2K, 5%, 1/4W	0178070009
R49	Resistor, 1K, 10%, 1/4W	0171560001
R50	Pot. 10K, 10%, 1/2W, PC Mount	0346630002
R51	Resistor, 220, 10%, 1/4W	0171320000
R52	Resistor, 820, 10%, 1/4W	0178210005
R53	Resistor, 39, 10%, 1/4W	0182890007
R54	Resistor, 390, 10%, 1/4W	0178330001
R55	Pot., 5K, 10%, 3/4W, 15 Turns	0338490078
R56	Resistor, 18K, 10%, 1/4W	0175720002
R57	Resistor, 8.2K, 10%, 1/4W	0181620006
R58	Resistor, 1K, 10%, 1/4W	0171560001
R59	Resistor, 47, 10%, 1/4W	0179360001
R60	Resistor, 180, 10%, 1/4W	0175220000
R61	Resistor, 22K, 5%, 1/4W	0172230004
R62	Resistor, 10, 5%, 1/4W	0177160004
R63	Resistor, 680, 10%, 1/4W	0176630007
R64	Resistor, 1K, 10%, 1/4W	0171560001
R65	Resistor, 1K, 10%, 1/4W	0171560001
R66	Resistor, 10K, 10%, 1/4W	0170410005
R67	Resistor, 4.7K, 5%, 1/4W	0170770001
R68	Resistor, 2.7K, 10%, 1/4W	0186670001
R69	Resistor, 100, 5%, 1/4W	0171180003
R70	Resistor, 10K, 10%, 1/4W	0170410005
R71	Resistor, 100, 5%, 1/4W	0171180003
R72	Resistor, 470, 10%, 1/2W	0173900003
R73	Resistor, 33, 10%, 1/4W	0182530001
	Wire Kit, Sideband Generator	5024130006



50240417
09 D

SPEAKER DRIVER BOARD		
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PCB SPEAKER DRIVER	5024041801
C1	Capacitor, 0.1 UF, 50 V, X7R, 20%	0281610002
C2	Capacitor, 470 UF, 50 V, TAL	0280890001
C3	Capacitor, 470 UF, 50 V, TAL	0280890001
C4	Not used	
C5	Capacitor, 470 UF, 50 V, TAL	0280890001
C6	Capacitor, 0.01 UF, 25 V	0281620008
CR1	Diode, Rectifier, 1N4004	0405180004
CR2	Diode, Rectifier, 1N4004	0405180004
CR3	Diode, Rectifier, 1N4004	0405180004
U1	IC Linear, 207 C4 SC	0448260000



- NOTES :
- 1. C1,C2,C3,C5ARE 470 UF, 50V DCW
 - 2. ALL DIODES ARE IN4004

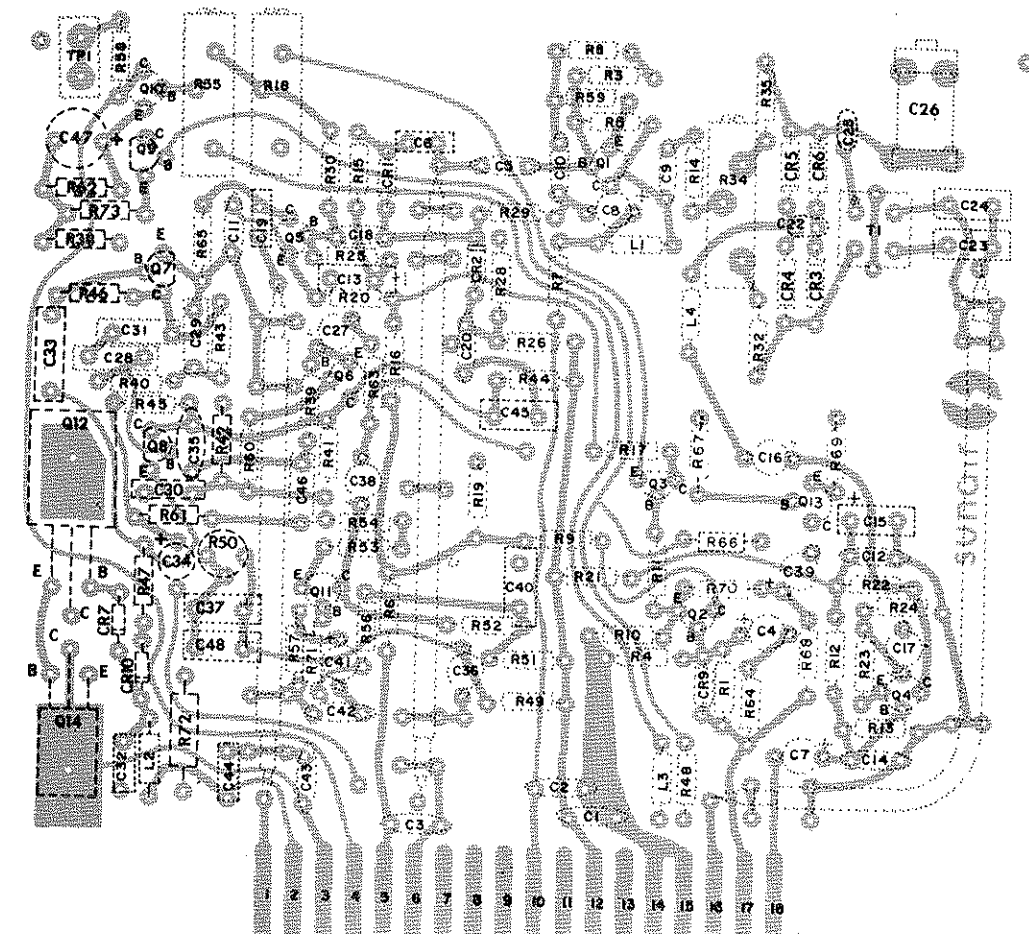
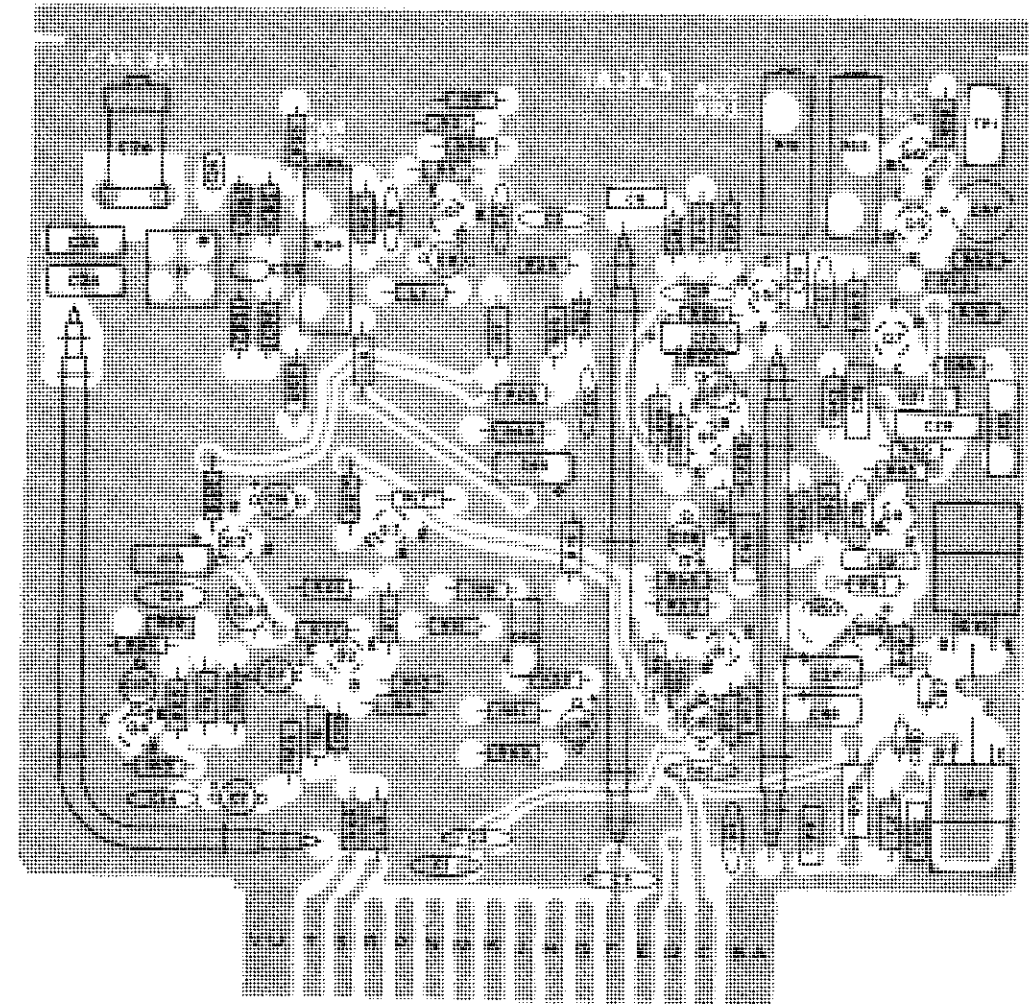
Figure 5.21B Speaker Driver Schematic (1A1A1)

(Schematic shown on page 5-97)

5024130090W PC ASSY SIDEBAND GENERATOR

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1	PC ASSY SIDEBAND GENERATOR	5024130090
C2	Capacitor, 0.01UF, 25V, X5S	0281620008
C3	Capacitor, 0.01UF, 25V, X5S	1281620008
C4	Capacitor, 0.01UF, 25V, X5S	0281620008
C5	Capacitor, 15UF, 20V, 198D	0280920008
C6	Capacitor, 0.01UF, 25V, X5S	0281620008
C7	Capacitor, 47PF, 500V, DM10, 5%	0294960007
C8	Capacitor, 1UF, 50V, 198D	0280910002
C9	Capacitor, 15UF, 20V, 198D	0280920008
C10	Capacitor, 0.01UF, 25V, X5S	0281620008
C11	Capacitor, 0.01UF, 25V, X5S	0281620008
C12	Capacitor, 0.01UF, 25V, X5S	0281620008
C13	Capacitor, 68UF, 15V, T368	0296540005
C14	Capacitor, 0.01UF, 25V, X5S	0281620008
C15	Capacitor, 68UF, 15V, T368	0296540005
C16	Capacitor, 1UF, 50V, 198D	0280910002
C17	Capacitor, 15UF, 20V, 198D	0280920008
C18	Capacitor, 0.01UF, 25V, X5S	0281620008
C19	Capacitor, 10PF, 500V, DM10	0259830003
C20	Capacitor, 0.01UF, 25V, X5S	0281620008
C21	Not used	
C22	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C23	Capacitor, 360PF, 500V, DM15, 5%	0275150003
C24	Capacitor, 82PF, 300V, DM15, 5%	0289970008
C25	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C26	Capacitor, .8-8PF, PC Mt. Glass	100060012
C27	Capacitor, 1UF, 50V, 198D	0280910002
C28	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C29	Capacitor, 0.01UF, 50V, Mylar	0281560005
C30	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C31	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C32	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C33	Capacitor, 0.1UF, 50V, Mylar	0281580006
C34	Capacitor, 1UF, 50V, 198D	0280910002
C35	Capacitor, 0.01UF, 25V, X5S	0281620008
C36	Capacitor, 15UF, 20V, 198D	0280920008
C37	Capacitor, 68UF, 15V, T368	0296540005
C38	Capacitor, 1UF, 50V, 198D	0280910002
C39	Capacitor, 47UF, 20V, 196D	0281700001
C40	Capacitor, 68UF, 15V, T368	0296540005
C41	Capacitor, 1UF, 50V, 198D	0280910002
C42	Capacitor, 0.01UF, 25V, X5S	0281620008
C43	Capacitor, 0.01UF, 25V, X5S	0281620008
C44	Capacitor, 0.01UF, 50V, X7R, 20%	0281610002
C45	Capacitor, 68UF, 15V, T368	0296540005
C46	Capacitor, .033UF, 50V, Mylar	0281770000
C47	Capacitor, 47UF, 20V, 196D	0281700000
C48	Capacitor, 68UF, 15V, T368	0296540005
C49	Capacitor, .1UF, 50V, X7R, 20%	0281610002
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Hot Carrier MBD102	1000210022
CR4	Diode, Hot Carrier MBD102	1000210022
CR5	Diode, Hot Carrier MBD102	1000210022
CR6	Diode, Hot Carrier MBD102	1000210022
CR7	Diode, Signal, Sil. 1N4454	0405270003
CR8	Not used	
CR9	Diode, Signal, Sil. 1N4454	0405270003
CR10	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 22UH, 5%	0650000005
L2	Inductor, Molded, 150UH, 5%	0659190001
L3	Inductor, Molded, 150UH, 5%	0659190001
L4	Inductor, Molded, 22UH, 5%	0650000005
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
Q3	Transistor, NPN, Si. 2N4124	0448010003
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q6	Transistor, NPN, Si. 2N4124	0448010003
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, NPN, Si. 2N4124	0448010003
Q9	Transistor, NPN, Si. 2N4124	0448010003
Q10	Transistor, NPN, Si. 2N4124	0448010003
Q11	Transistor, NPN, Si. 2N4124	0448010003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
Q12	Transistor, PNP, Sil. TIP-32A	0448200007
Q13	Transistor, PNP, Si. 2N4126	0448020009
Q14	Transistor, NPN, Si. 2N4921	0448040000
R1	Resistor, 47K, 10%, 1/4W	0171060008
R2	Not used	
R3	Resistor, 1K, 10%, 1/4W	0171560001
R4	Resistor, 68K, 10%, 1/4W	0173520006
R5	Resistor, 3.3K, 10%, 1/4W	0170890007
R6	Resistor, 100, 5%, 1/4W	0171180003
R7	Resistor, 120, 10%, 1/4W	0186550006
R8	Resistor, 120, 10%, 1/4W	0186550006
R9	Resistor, 220, 10%, 1/4W	0171320000
R10	Resistor, 10K, 10%, 1/4W	0170410005
R11	Resistor, 1K, 10%, 1/4W	0171560001
R12	Resistor, 18K, 10%, 1/4W	0175720002
R13	Resistor, 8.2K, 10%, 1/4W	0181620006
R14	Resistor, 100, 5%, 1/4W	0171180003
R15	Resistor, 1K, 10%, 1/4W	0171560001
R16	Resistor, 1.2K, 10%, 1/4W	0181860007
R17	Resistor, 1.5K, 10%, 1/4W	0172470005
R18	Pot, 500, 10%, 3/4W, 15 Turns	0338490078
R19	Resistor, 2.2K, 5%, 1/4W	0178070009
R20	Resistor, 100, 5%, 1/4W	0171180003
R21	Resistor, 220, 10%, 1/4W	0171320000
R22	Resistor, 820, 10%, 1/4W	0178210005
R23	Resistor, 10, 5%, 1/4W	0177160004
R24	Resistor, 560, 5%, 1/4W	0183200004
R25	Resistor, 4.7K, 5%, 1/4W	0170770001
R26	Resistor, 2.2K, 5%, 1/4W	0178070009
R27	Not used	
R28	Resistor, 2.2K, 5%, 1/4W	0178070009
R29	Resistor, 2.2K, 5%, 1/4W	0178070009
R30	Resistor, 6.8K, 5%, 1/4W	0174810008
R31	Not used	
R32	Resistor, 100, 5%, 1/4W	0171180003
R33	Not used	
R34	Pot., 20, 10%, 3/4W, 20 Turns	0346770009
R35	Resistor, 100, 5%, 1/4W	0171180003
R36	Not used	
R37	Not used	
R38	Resistor, 15K, 5%, 1/4W	0195700007
R39	Resistor, 560, 5%, 1/4W	0183200004
R40	Resistor, 33K, 5%, 1/4W	0195820002
R41	Resistor, 27K, 10%, 1/4W	0171200004
R42	Resistor, 47K, 10%, 1/4W	0171060008
R43	Resistor, 33K, 5%, 1/4W	0195820002
R44	Resistor, 220, 10%, 1/4W	0171320000
R45	Resistor, 3.3K, 10%, 1/4W	0170890007
R46	Resistor, 180K, 10%, 1/4W	0177280000
R47	Resistor, 4.7K, 5%, 1/4W	0170770001
R48	Resistor, 2.2K, 5%, 1/4W	0178070009
R49	Resistor, 1K, 10%, 1/4W	0171560001
R50	Pot. 10K, 10%, 1/2W, PC Mount	0346630002
R51	Resistor, 220, 10%, 1/4W	0171320000
R52	Resistor, 820, 10%, 1/4W	0178210005
R53	Resistor, 39, 10%, 1/4W	0182890007
R54	Resistor, 390, 10%, 1/4W	0178330001
R55	Pot., 5K, 10%, 3/4W, 15 Turns	0338490078
R56	Resistor, 18K, 10%, 1/4W	0175720002
R57	Resistor, 8.2K, 10%, 1/4W	0181620006
R58	Resistor, 1K, 10%, 1/4W	0171560001
R59	Resistor, 47, 10%, 1/4W	0179360001
R60	Resistor, 180, 10%, 1/4W	0175220000
R61	Resistor, 22K, 5%, 1/4W	0172230004
R62	Resistor, 10, 5%, 1/4W	0177160004
R63	Resistor, 680, 10%, 1/4W	0176630007
R64	Resistor, 1K, 10%, 1/4W	0171560001
R65	Resistor, 1K, 10%, 1/4W	0171560001
R66	Resistor, 10K, 10%, 1/4W	0170410005
R67	Resistor, 4.7K, 5%, 1/4W	0170770001
R68	Resistor, 2.7K, 10%, 1/4W	0186670001
R69	Resistor, 100, 5%, 1/4W	0171180003
R70	Resistor, 10K, 10%, 1/4W	0170410005
R71	Resistor, 100, 5%, 1/4W	0171180003
R72	Resistor, 470, 10%, 1/2W	0173900003
R73	Resistor, 33, 10%, 1/4W	0182530001
	Wire Kit, Sideband Generator	5024130006



5024130073S

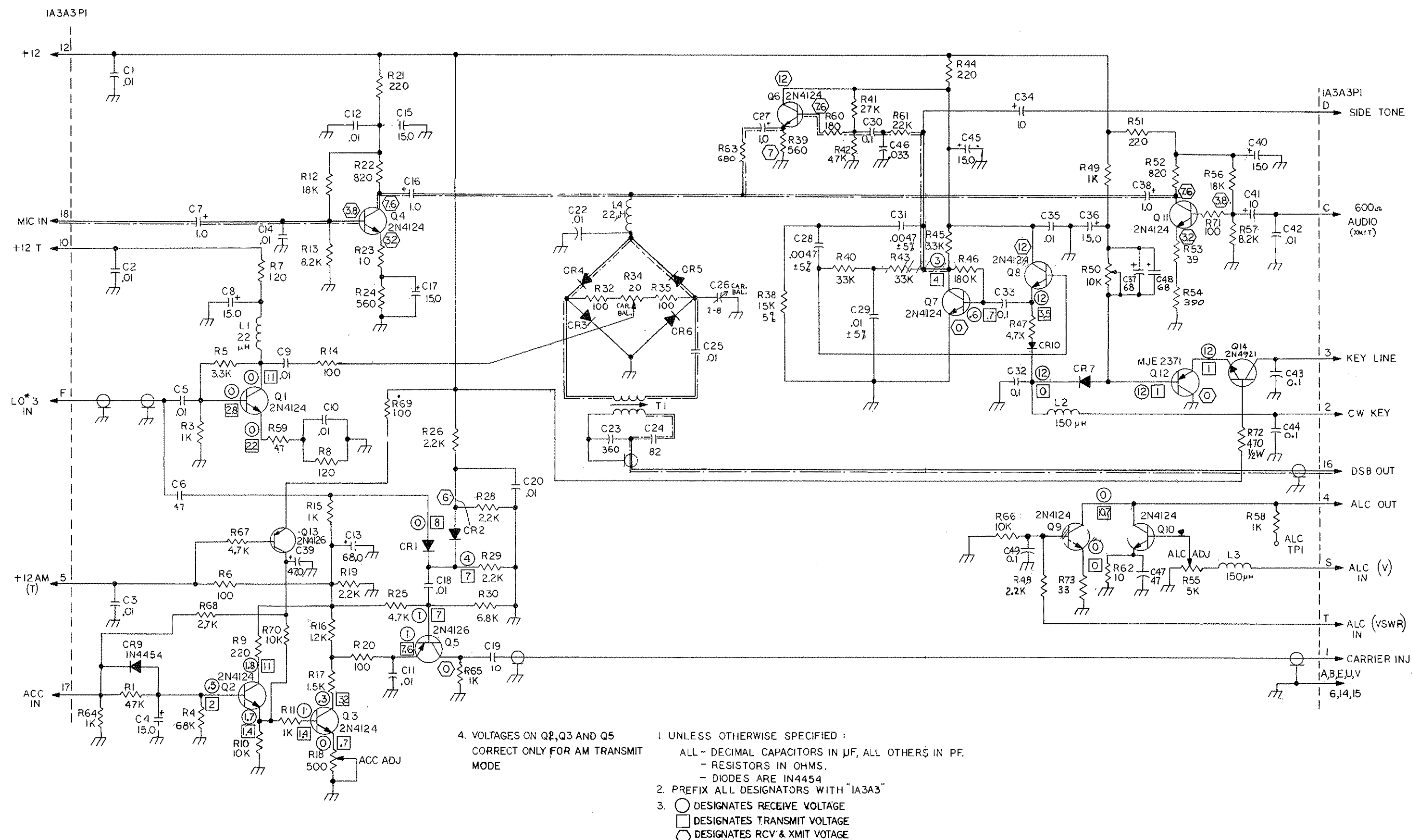
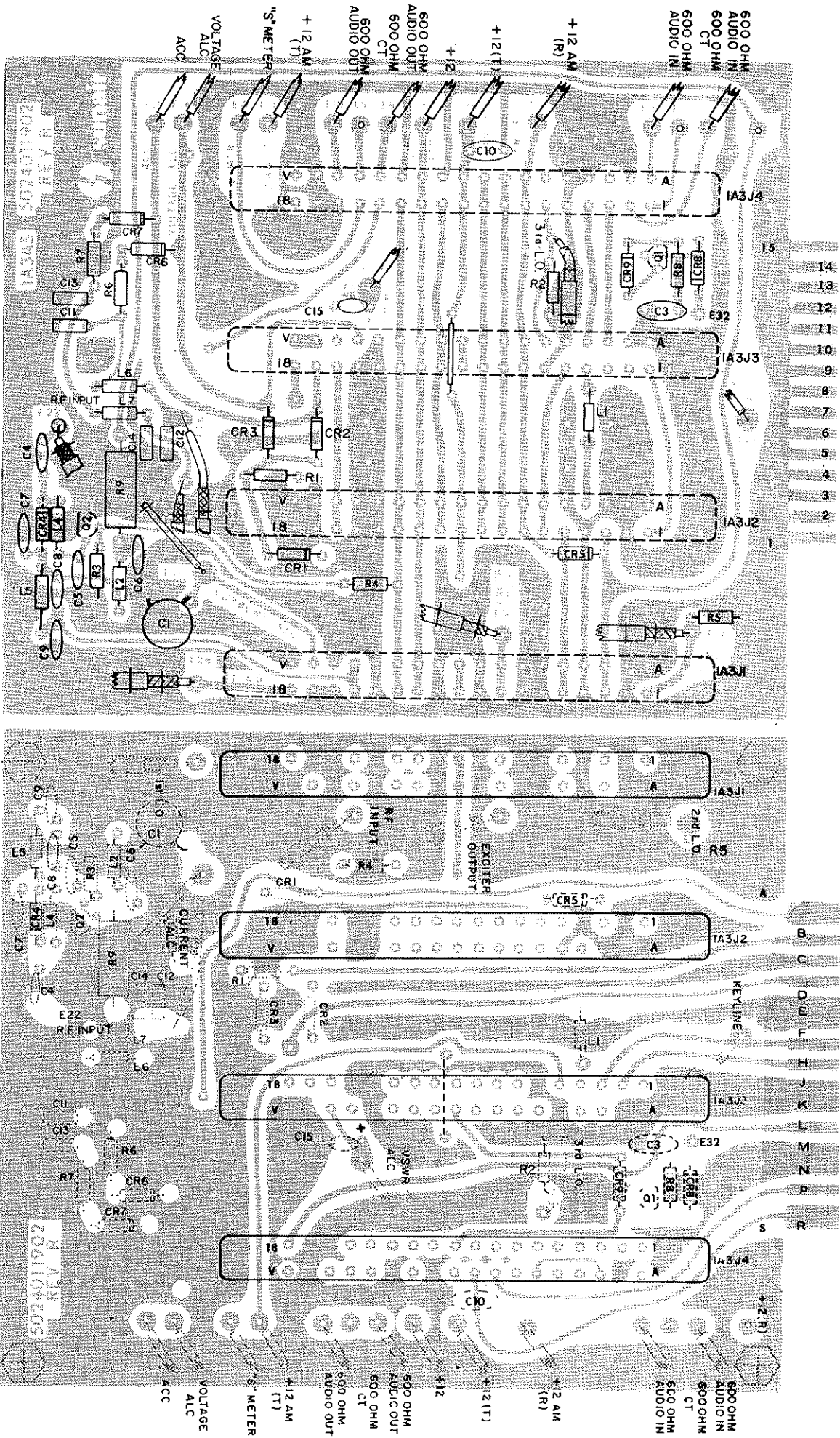


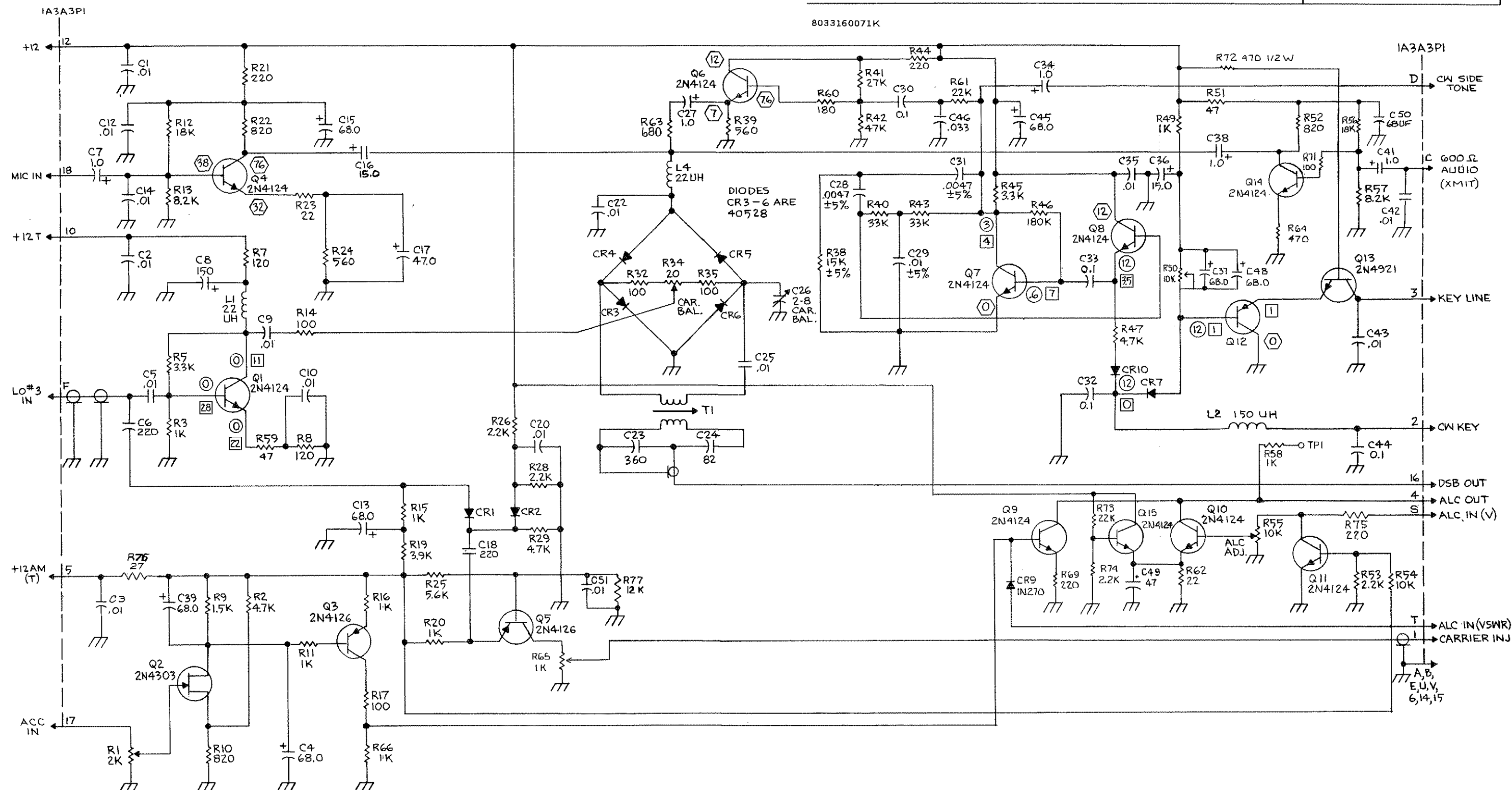
Figure 5.22 Sideband Generator Schematic (1A3A3)

5024011899L PC ASSY MOTHER BD. REC/EXC

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY MOTHER BD. REC/EXC	5024011899
C1	Capacitor, 2700 PF, 500 V, DM19, 2%	0281240001
C2	Not used	
C3	Capacitor, 0.01 UF, 100 V, Z5 V	0273210009
C4	Capacitor, 0.01 UF, 50 V, X7 R, 20%	0281610002
C5	Capacitor, 0.01 UF, 50 V, X7 R, 20%	0281610002
C6	Capacitor, 0.01 UF, 50 V, X7 R, 20%	0281610002
C7	Capacitor, 51 PF, 500 V, DM15, 2%	0281350001
C8	Capacitor, 18 PF, 500 V, DM15	0281330000
C9	Capacitor, 51 PF, 500 V, DM15, 2%	0281350001
C10	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C11	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C12	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C13	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C14	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C15	Capacitor, 1 UF, 35 V, 196 D	0281660000
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Signal, Sil. 1N4454	0405270003
CR4	Diode, Pin 50823080	0405570007
CR5	Diode, Signal, Sil. 1N4454	0405270003
CR6	Diode, Signal, Sil. 1N4454	0405270003
CR7	Diode, Signal, Sil. 1N4454	0405270003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
CR8	Diode, Signal, Sil. 1N4454	0405270003
CR9	Diode, Resistor, 1N4004	0405180004
J1	Connector, PC, 18 Pin, Female	0753610001
J2	Connector, PC, 18 Pin, Female	0753610001
J3	Connector, PC, 18 Pin, Female	0753610001
J4	Connector, PC, 18 Pin, Female	0753610001
L1	Inductor, Molded, 220 UH, 5%	0650500008
L2	Inductor, Molded, 220 UH, 5%	0650500008
L3	Not used	
L4	Inductor, Molded, 220 UH, 5%	0650500008
L5	Inductor, Molded, 0.15 UH, 5%	0648620000
L6	Inductor, Molded, 220 UH, 5%	0650500008
L7	Inductor, Molded, 220 UH, 5%	0650500008
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, NPN, Si. 2N4124	0448010003
R1	Resistor, 100, 5%, 1/4 W	0171180003
R2	Resistor, 56, 10%, 1/4 W	0174290004
R3	Resistor, 390, 10%, 1/4 W	0178390001
R4	Resistor, 1.8 K, 10%, 1/4 W	0178190004
R5	Resistor, 56, 10%, 1/4 W	0174290004
R6	Resistor, 100 K, 10%, 1/4 W	0170390004
R7	Resistor, 2.2 K, 5%, 1/4 W	0178070009
R8	Resistor, 10 K, 10%, 1/4 W	0170410005
R9	Resistor, 180, 10%, 1W	1000850030
	Key, Polarizing Connector	0753620006





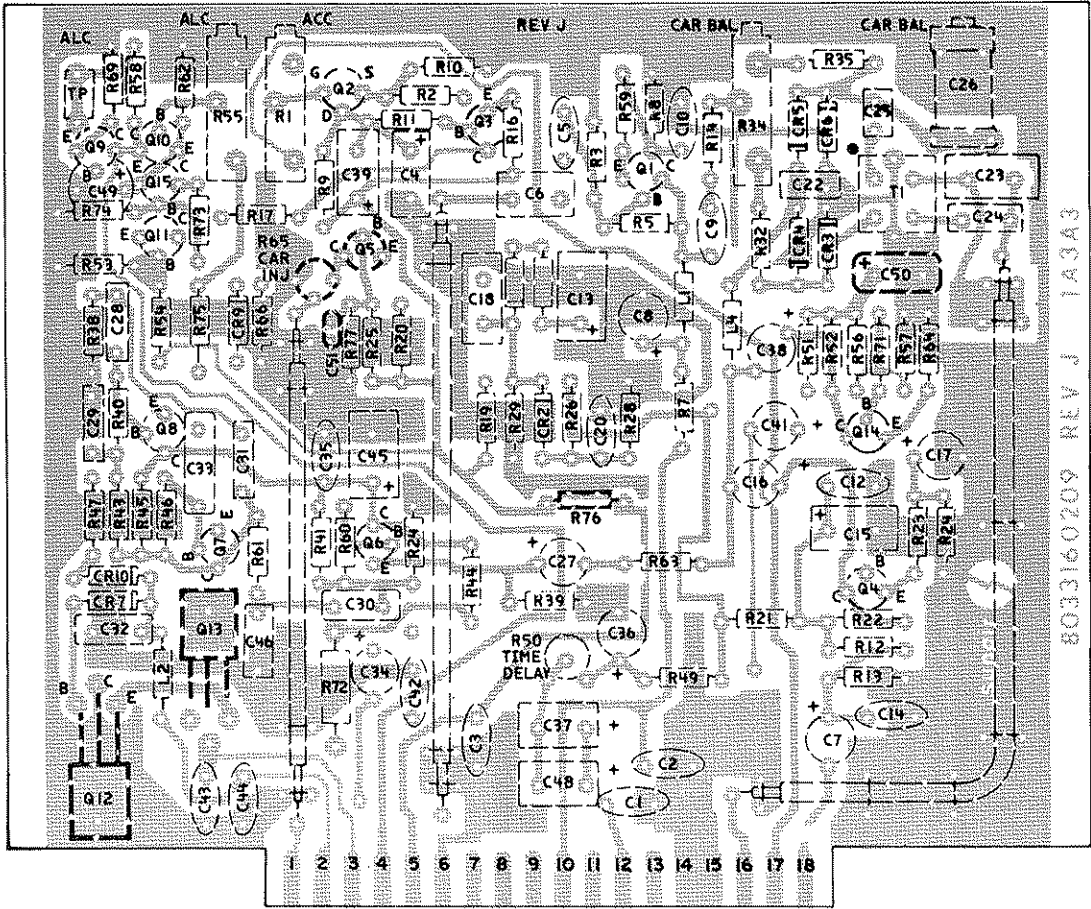
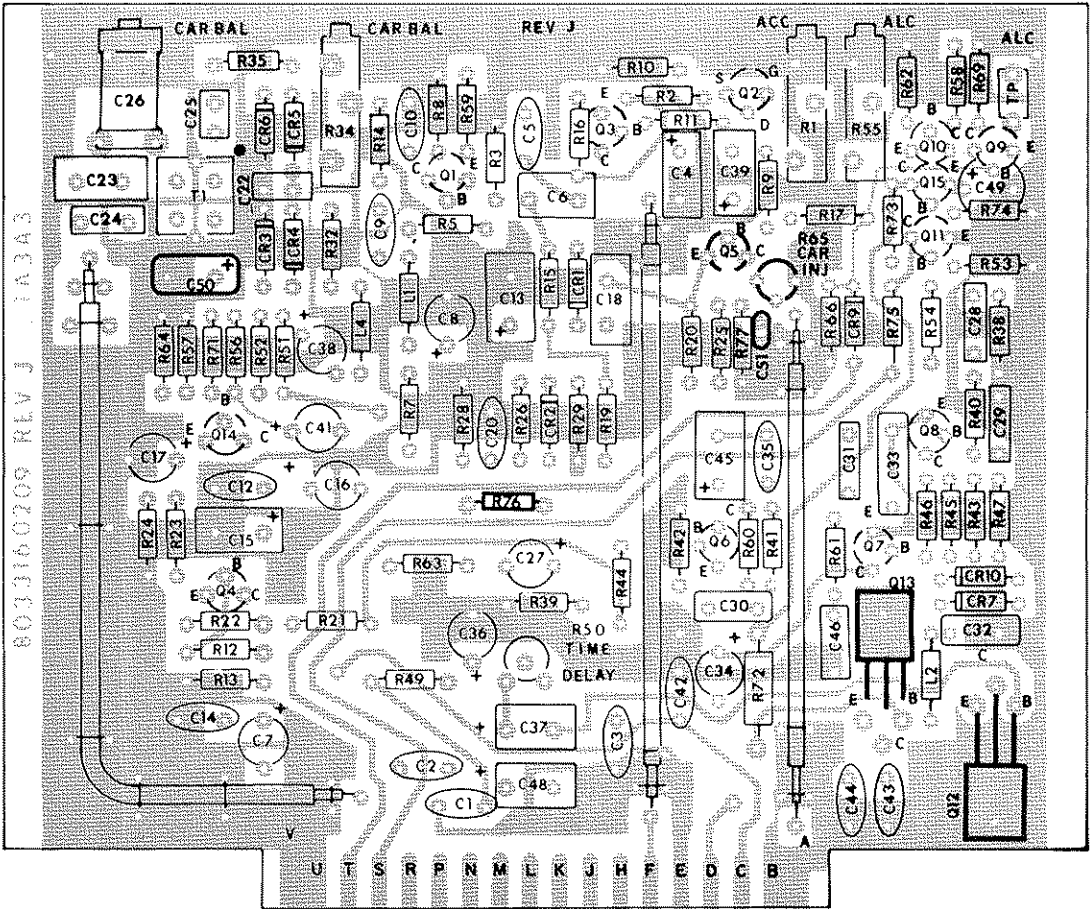
- NOTES, UNLESS OTHERWISE SPECIFIED
1. ALL DECIMAL CAPACITORS IN UF, ALL OTHERS IN PF
ALL RESISTORS IN OHMS
ALL DIODES ARE IN4454
 2. PREFIX ALL DESIGNATORS WITH '13A3A3'
 3.  DESIGNATES RECEIVE VOLTAGE
 DESIGNATES TRANSMIT VOLTAGE
 DESIGNATES RCV & XMIT VOLTAGE
 4. VOLTAGES ON Q2, Q3 & Q5 CORRECT ONLY
FOR A M TRANSIT MODE.

Figure 5.22A Sideband Generator (1A3A3)

8033160098R SIDEBAND GEN. (1A3A3)

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	PC ASSY SIDEBAND GEN.	8033160098
C1	Capacitor, 0.01UF, 25V, X5S	0281620008
C2	Capacitor, 0.01UF, 25V, X5S	0281620008
C3	Capacitor, 0.01UF, 25K, 25V, X5S	0281620008
C4	Capacitor, 68UF, 15V, T36B	0296540005
C5	Capacitor, 0.01UF, 25V, X5S	0281620008
C6	Capacitor, 220PF, 500V, DM15, 2%	0281420009
C7	Capacitor, 1UF, 50V, 198D	0280910002
C8	Capacitor, 15UF, 20V, 198D	0280920008
C9	Capacitor, 0.01UF, 25V, X5S	0281620008
C10	Capacitor, 0.01UF, 25V, X5S	0281620008
C11	Not used	
C12	Capacitor, 0.01UF, 25V, X5S	0281620008
C13	Capacitor, 68UF, 15V, T36B	0296540005
C14	Capacitor, 0.01UF, 25V, X5S	0281620008
C15	Capacitor, 68 UF, 15V, T36B	0296540005
C16	Capacitor, 15UF, 20V, 198D	0280920008
C17	Capacitor, 47UF, 20V, 196D	0281700001
C18	Capacitor, 220PF, 500V, DM15, 2%	0281420009
C19	Not used	
C20	Capacitor, 0.01UF, 25V, X5S	0281620008
C21	Not used	
C22	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C23	Capacitor, 360PF, 500V, DM15, 5%	0275150003
C24	Capacitor, 82PF, 300V, DM15, 5%	0289970008
C25	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
C26	Capacitor, .8-8PF, PC Mt. Glass	1000060012
C27	Capacitor, 1UF, 50V, 198D	0280910002
C28	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C29	Capacitor, 0.01UF, 50V, Mylar	0281560005
C30	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C31	Capacitor, 0.0047UF, 50V, Mylar	0281540004
C32	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C33	Capacitor, 0.1UF, 50V, Mylar	0281580006
C34	Capacitor, 1UF, 50V, 198D	0280910002
C35	Capacitor, 0.01UF, 25V, X5S	0281620008
C36	Capacitor, 15UF, 20V, 198D	0280920008
C37	Capacitor, 68UF, 15V, T36B	0296540005
C38	Capacitor, 1UF, 50V, 198D	0280910002
C39	Capacitor, 68UF, 15V, T36B	0296540005
C40	Not used	
C41	Capacitor, 1UF, 50V, 198D	0280910002
C42	Capacitor, 0.01UF, 25V, X5S	0281620008
C43	Capacitor, 0.01UF, 25V, X5S	0281620008
C44	Capacitor, 0.1UF, 50V, X7R, 20%	0281610002
C45	Capacitor, 68UF, 15V, T36B	0296540005
C46	Capacitor, .033UF, 50V, Mylar	0281770000
C47	Not used	
C48	Capacitor, 68UF, 15V, T36B	0296540005
C49	Capacitor, 47UF, 20V, 196D	0281700001
C50	Capacitor, 68UF, 15V, T36B	0296540005
C51	Capacitor, 0.01UF, 50V, W5R, 20%	0281730008
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Signal, Sil. 1N4454	0405270003
CR3	Diode, Hot Carrier	0405280009
CR4	Diode, Hot Carrier	0405280009
CR5	Diode, Hot Carrier	0405280009
CR6	Diode, Hot Carrier	0405280009
CR7	Diode, Signal, Sil. 1N4454	0405270003
CR8	Not used	
CR9	Diode, Signal, Germ. 1N270	0405510004
CR10	Diode, Signal, Sil. 1N4454	0405270003
L1	Inductor, Molded, 22UH, 5%	0650000005
L2	Inductor, Molded, 150UH, 5%	0659190001
L3	Not used	
L4	Inductor, Molded, 22UH, 5%	0650000005
Q1	Transistor, NPN, Si. 2N4124	0448010003
Q2	Transistor, N-CH, FET 2N4303	0443930007
Q3	Transistor, PNP, Si. 2N4126	0448020009
Q4	Transistor, NPN, Si. 2N4124	0448010003
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q5	Transistor, PNP, Si. 2N4126	0448020009
Q6	Transistor, NPN, Si. 2N4124	0448010003
Q7	Transistor, NPN, Si. 2N4124	0448010003
Q8	Transistor, NPN, Si. 2N4124	0448010003
Q9	Transistor, NPN, Si. 2N4124	0448010003
Q10	Transistor, NPN, Si. 2N4124	0448010003
Q11	Transistor, NPN, Si. 2N4124	0448010003
Q12	Transistor, PNP, Sil. TIP-32A	0448200007
Q13	Transistor, NPN, Si. 2N4921	0448040000
Q14	Transistor, NPN, Si. 2N4124	0448010003

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
Q15	Transistor, NPN, Si. 2N4124	0448010003
R1	Pot., 2K, 10%, 3/4W, 15 Turns	0338490060
R2	Resistor, 4.7K, 5%, 1/4W	0170770001
R3	Resistor, 1K, 10%, 1/4W	0171560001
R4	Not used	
R5	Resistor, 3.3K, 10%, 1/4W	0170890007
R6	Not used	
R7	Resistor, 120, 10%, 1/4W	0186550006
R8	Resistor, 120, 10%, 1/4W	0186550006
R9	Resistor, 1.5K, 10%, 1/4W	0172470005
R10	Resistor, 820, 10%, 1/4W	0178210005
R11	Resistor, 1K, 10%, 1/4W	0171560001
R12	Resistor, 18K, 10%, 1/4W	0175720002
R13	Resistor, 8.2K, 10%, 1/4W	0181620006
R14	Resistor, 100, 5%, 1/4W	0171180003
R15	Resistor, 1K, 10%, 1/4W	0171560001
R16	Resistor, 1K, 10%, 1/4W	0171560001
R17	Resistor, 100, 5%, 1/4W	0171180003
R18	Not used	
R19	Resistor, 3.9K, 10%, 1/4W	0178830003
R20	Resistor, 1K, 10%, 1/4W	0171560001
R21	Resistor, 220, 10%, 1/4W	0171320000
R22	Resistor, 820, 10%, 1/4W	0178210005
R23	Resistor, 22, 10%, 1/4W	0192690001
R24	Resistor, 560, 5%, 1/4W	0183200004
R25	Resistor, 5.6K, 10%, 1/4W	0183060008
R26	Resistor, 2.2K, 5%, 1/4W	0178070009
R27	Not used	
R28	Resistor, 2.2K, 5%, 1/4W	0178070009
R29	Resistor, 4.7K, 5%, 1/4W	0170770001
R30	Not used	
R31	Not used	
R32	Resistor, 100, 5%, 1/4W	0171180003
R33	Not used	
R34	Pot. 20, 10%, 3/4W, 15 Turns	0347700009
R35	Resistor, 100, 5%, 1/4W	0171180003
R36	Not used	
R37	Not used	
R38	Resistor, 15K, 5%, 1/4W	0195700007
R39	Resistor, 560, 5%, 1/4W	0183200007
R40	Resistor, 33K, 5%, 1/4W	0195820002
R41	Resistor, 27K, 10%, 1/4W	0171200004
R42	Resistor, 47K, 10%, 1/4W	0171060008
R43	Resistor, 33K, 5%, 1/4W	0195820002
R44	Resistor, 220, 10%, 1/4W	0171320000
R45	Resistor, 3.3K, 10%, 1/4W	0170890007
R46	Resistor, 180K, 10%, 1/4W	0177280000
R47	Resistor, 4.7K, 5%, 1/4W	0170770001
R48	Not used	
R49	Resistor, 1K, 10%, 1/4W	0171560001
R50	Pot., 10K, 10%, 1/2W PC Mount	0346630002
R51	Resistor, 47, 10%, 1/4W	0179360001
R52	Resistor, 820, 10%, 1/4W	0178210005
R53	Resistor, 2.2K, 5%, 1/4W	0178070009
R54	Resistor, 10K, 10%, 1/4W	0170410005
R55	Pot., 10K, 10%, 3/4W, 15 Turns	0338490043
R56	Resistor, 18K, 10%, 1/4W	0175720002
R57	Resistor, 8.2K, 10%, 1/4W	0181620006
R58	Resistor, 1K, 10%, 1/4W	0171560001
R59	Resistor, 47, 10%, 1/4W	0179360001
R60	Resistor, 180, 10%, 1/4W	0175220000
R61	Resistor, 22K, 5%, 1/4W	0172230004
R62	Resistor, 22, 10%, 1/4W	0192690001
R63	Resistor, 680, 10%, 1/4W	0176630007
R64	Resistor, 470, 5%, 1/4W	0184110009
R65	Pot., 1K, 10%, 1/2, 4 Turns	1000850021
R66	Resistor, 1K, 10%, 1/4W	0171560001
R67	Not used	
R68	Not used	
R69	Resistor, 220, 10%, 1/4W	0171320000
R70	Not used	
R71	Resistor, 100 5%, 1/4W	0173900003
R72	Resistor, 470, 10%, 1/2W	0172230004
R73	Resistor, 22K, 5%, 1/4W	0178070009
R74	Resistor, 2.2K, 5%, 1/4W	0171320000
R75	Resistor, 220, 10%, 1/4W	0172590001
R76	Resistor, 27, 10%, 1/4W	0183180003
R77	Resistor, 12K, 10%, 1/4W	5024130308
T1	Transformer, Balanced Mod	0508700001
	Mica Insulator Mot Case 199	0753640007
	Test Point, White	



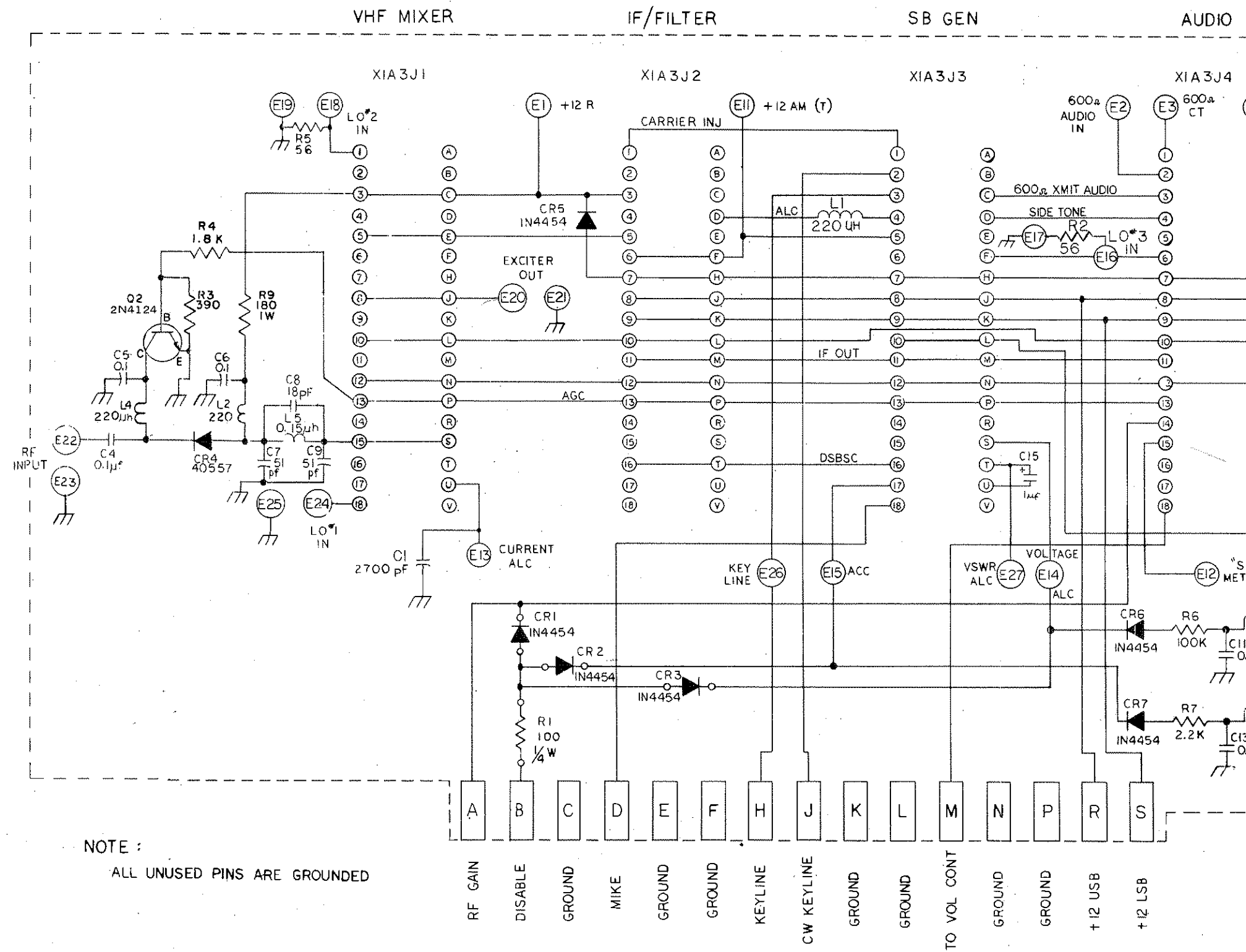
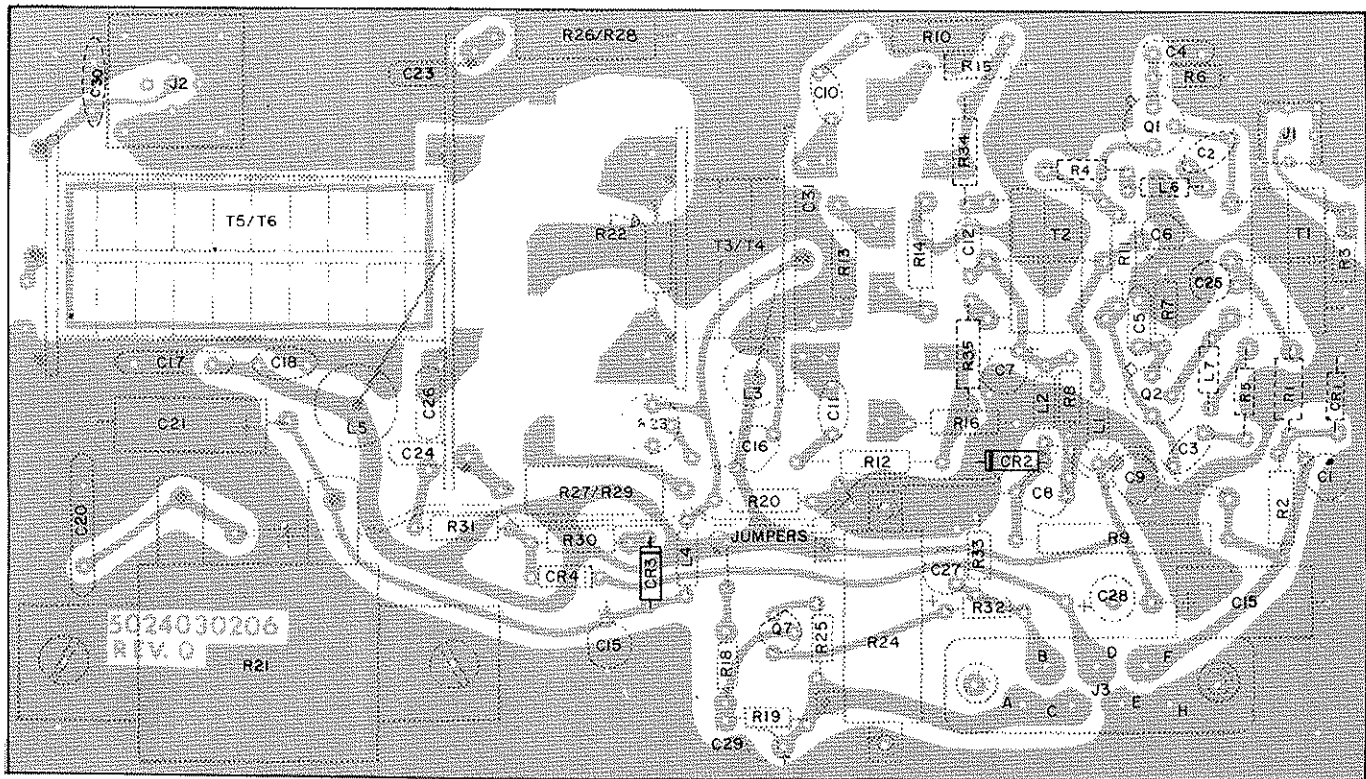
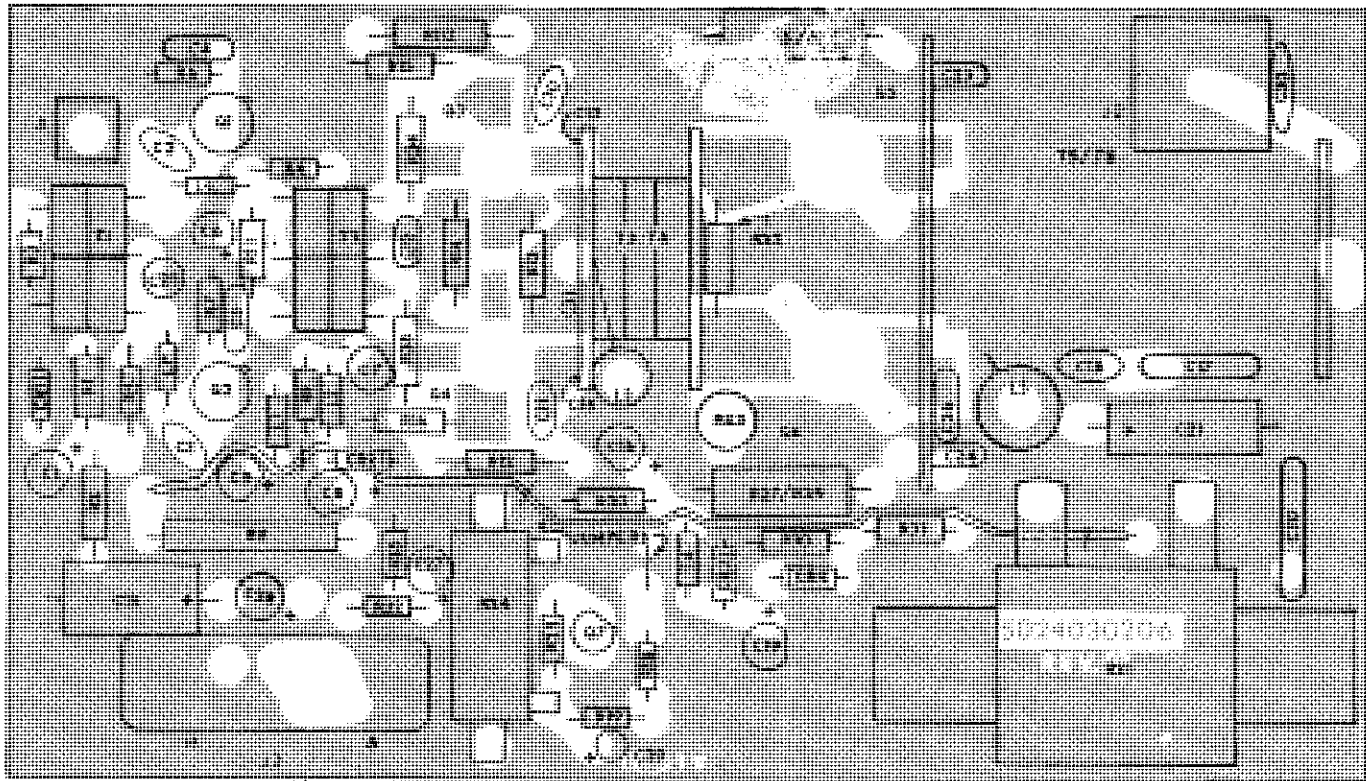


Figure 5.23 Receiver/Exciter Mother

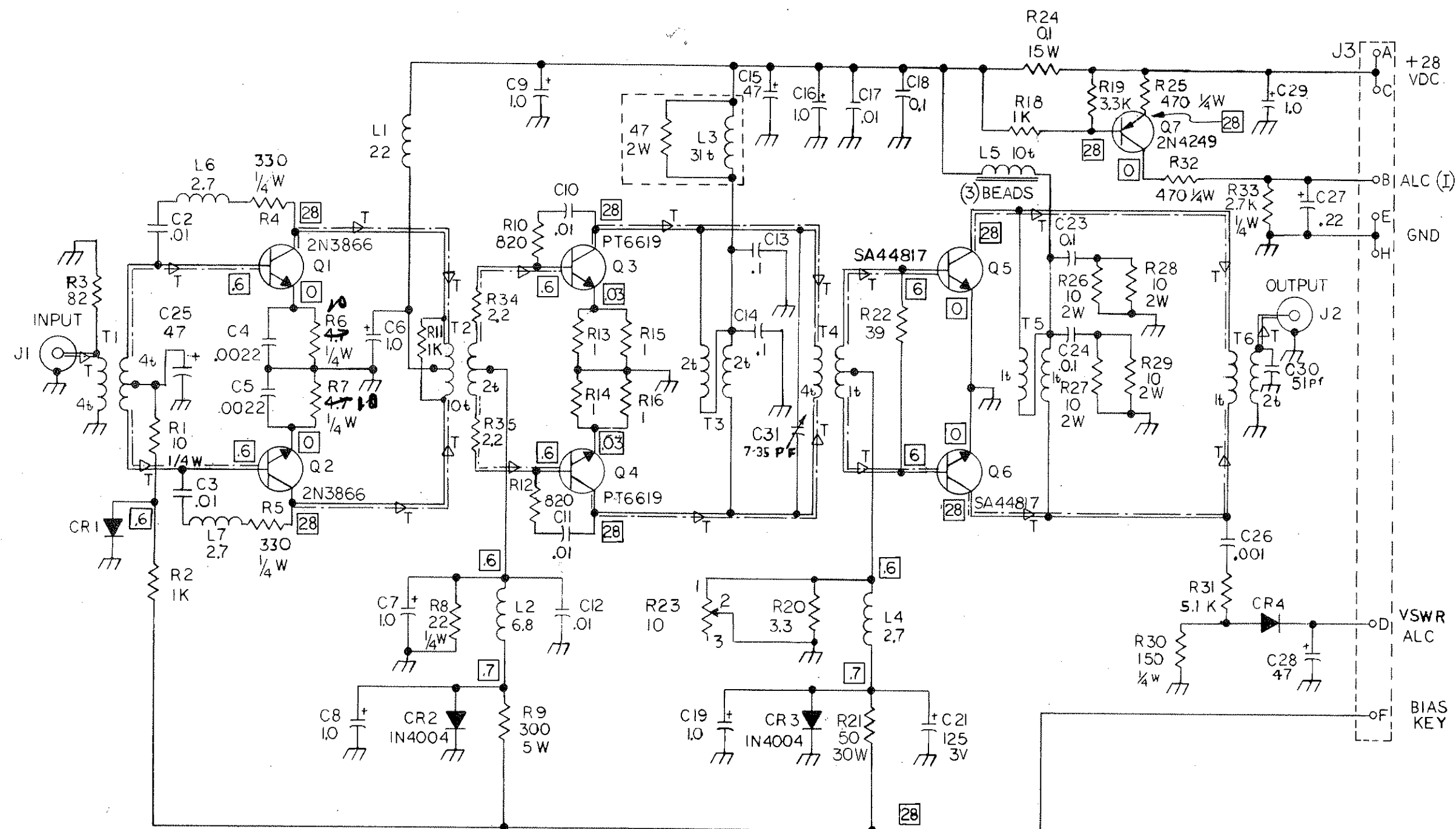
REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
	POWER AMPLIFIER ASSY	5024030095
C1	Not used	
C2	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C3	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C4	Capacitor, 0.0022 UF, 200 V, Z5 F, 10%	0272780006
C5	Capacitor, 0.0022 UF, 200 V, Z5 F, 10%	0272780006
C6	Capacitor, 1 UF, 50 V, 198 D	0280910002
C7	Capacitor, 1 UF, 50 V, 198 D	0280910002
C8	Capacitor, 1 UF, 50 V, 198 D	0280910002
C9	Capacitor, 1 UF, 50 V, 198 D	0280910002
C10	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C11	Capacitor, 0.01 UF, 50 V, W5 R, 20%	0281730008
C12	Capacitor, 0.01 UF, 25 V, X55	0281620008
C13	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C14	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C15	Capacitor, 47 UF, 50 V, CL65 B	0245750002
C16	Capacitor, 1 UF, 50 V, 198 D	0280910002
C17	Capacitor, 0.01 UF, 250 V, Z5 R, 10%	0280950004
C18	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C19	Capacitor, 1 UF, 50 V, 198 D	0280910002
C20	Not used	
C21	Capacitor, 125 UF, 3 V	0266020003
C22	Not used	
C23	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C24	Capacitor, 0.1 UF, 50 V, X7 R, 20%	0281610002
C25	Capacitor, 47 UF, 20 V, 196 D	0281700001
C26	Capacitor, 0.001 UF, 250 V, X5 R, 10%	0286260000
C27	Capacitor, .22 UF, 35 V, T368	0283510005
C28	Capacitor, 47 UF, 20 V, 196 D	0281700001
C29	Capacitor, 1 UF, 50 V, 198 D	0280910002
C30	Capacitor, 51 PF, 500 V, DM15, 2%	0281350001
C31	Capacitor, 7-35 PF, 160 V, N1500	0287390004
CR1	Diode, Signal, Sil. 1N4454	0405270003
CR2	Diode, Rectifier, 1N4004	0405180004
CR3	Diode, Rectifier, 1N4004	0405180004
CR4	Diode, Signal, Sil. 1N4454	0405270003
J1	Connector, RF, JCM	0753600005
J2	Connector, RF, BNC	0753490005
J3	Connector, Power, 7 Pin Rect.	0753590000
L1	Inductor, Molded, 22 UH, 5%	0650000005
L2	Inductor, Molded, 6.8 UH, 5%	0659210002
L3	Choke, RF	5024030605
L4	Inductor, Molded, 2.7 UH, 5%	0652180001
L5	Choke, RF	5024030702
L6	Inductor, Molded, 2.7 UH, 5%	0652180001
L7	Inductor, Molded, 2.7 UH, 5%	0652180001
Q1	Transistor, NPN, Si. 2N3866	0448140004
Q2	Transistor, NPN, Si. 2N3866	0448140004
Q3	Transistor, NPN, Si PT6619	0448150000
Q4	Transistor, NPN Si PT6619	0448150000
Q5	Transistor, NPN Si	0448170001
Q6	Transistor, NPN Si	0448170001
Q7	Transistor, PNP, Si. 2N4249	0446780006
R1	Resistor, 10, 5%, 1/4 W	0177160004
R2	Resistor, 1 K, 10%, 1/2 W	0167480006
R3	Resistor, 82, 10%, 1/4 W	0184610001
R4	Resistor, 330, 5%, 1/4 W	0170910008
R5	Resistor, 330, 5%, 1/4 W	0170910008
R6	Resistor, 4.7, 5%, 1/4 W	01003060024
R7	Resistor, 4.7, 5%, 1/4 W	01003060024
R8	Resistor, 22, 10%, 1/4 W	0192690001
R9	Resistor, 300, 5%, 5 W	0161140009
R10	Resistor, 820, 10%, 1/2 W	0175600007
R11	Resistor, 1 K, 10%, 1/2 W	0167480006
R12	Resistor, 820, 10%, 1/2 W	0175600007
R13	Resistor, 1, 10%, 1/2 W	0194770001
R14	Resistor, 1, 10%, 1/2 W	0194770001
R15	Resistor, 1, 10%, 1/2 W	0194770001
R16	Resistor, 1, 10%, 1/2 W	0194770001
R17	Not used	
R18	Resistor, 1 K, 10%, 1/2 W	0167480006
R19	Resistor, 3.3 K, 5%, 1/2 W	0184090008
R20	Resistor, 3.3, 10%, 1/2 W	0186050003
R21	Resistor, 50, 10%, 30 W	0193240009
R22	Resistor, 39, 10%, 1/2 W	0165920009

REF SYMBOL	DESCRIPTION	SUNAIR PART NO.
R23	Pot., 10, 5%, 1/2 W, PC Mount	0346380006
R24	Resistor, 0.1, 10%, 15 W	0193360004
R25	Resistor, 470, 10%, 1/4 W	0172610001
R26	Resistor, 10, 10%, 2 W	0163840008
R27	Resistor, 10, 10%, 2 W	0163840008
R28	Resistor, 10, 10%, 2 W	0163840008
R29	Resistor, 10, 10%, 2 W	0163840008
R30	Resistor, 150, 10%, 1/4 W	0172730007
R31	Resistor, 5.1 K, 5%, 1/2 W	0183700007
R32	Resistor, 470, 10%, 1/4 W	0172610001
R33	Resistor, 2.7 K, 10%, 1/4 W	0186670001
R34	Resistor, 2.2, 10%, 1/2 W	0178690007
R35	Resistor, 2.2, 10%, 1/2 W	0178690007
T1	Transformer Input	5024030401
T2	Transformer Interstage	5024030508
T3	Driver, Transformer Assy	5024030893
T4	Driver, Transformer Assy	5024030893
T5	Output, Transformer Assy	5024031199
T6	Output, Transformer Assy	5024031199

SUNAIR GSB-900SC



5024030079K



UNLESS OTHERWISE SPECIFIED:

1. ALL-RESISTORS IN OHMS, $\frac{1}{2}$ W
- CAPACITORS IN μ F
- INDUCTORS IN μ H
- DIODES ARE IN4454

2. PREFIX ALL DESIGNATORS WITH "1A7A1"

3. UNUSED DESIGNATORS:

R17, C1, C20

4. VOLTAGES ARE GIVEN WITH XMTR KEYED IN
SSB AND NO
MODULATION

Figure 5.24 RF Power Amplifier Schematic (1A7A1)

Handwritten notes on the right margin, including the word "C" and other illegible markings.

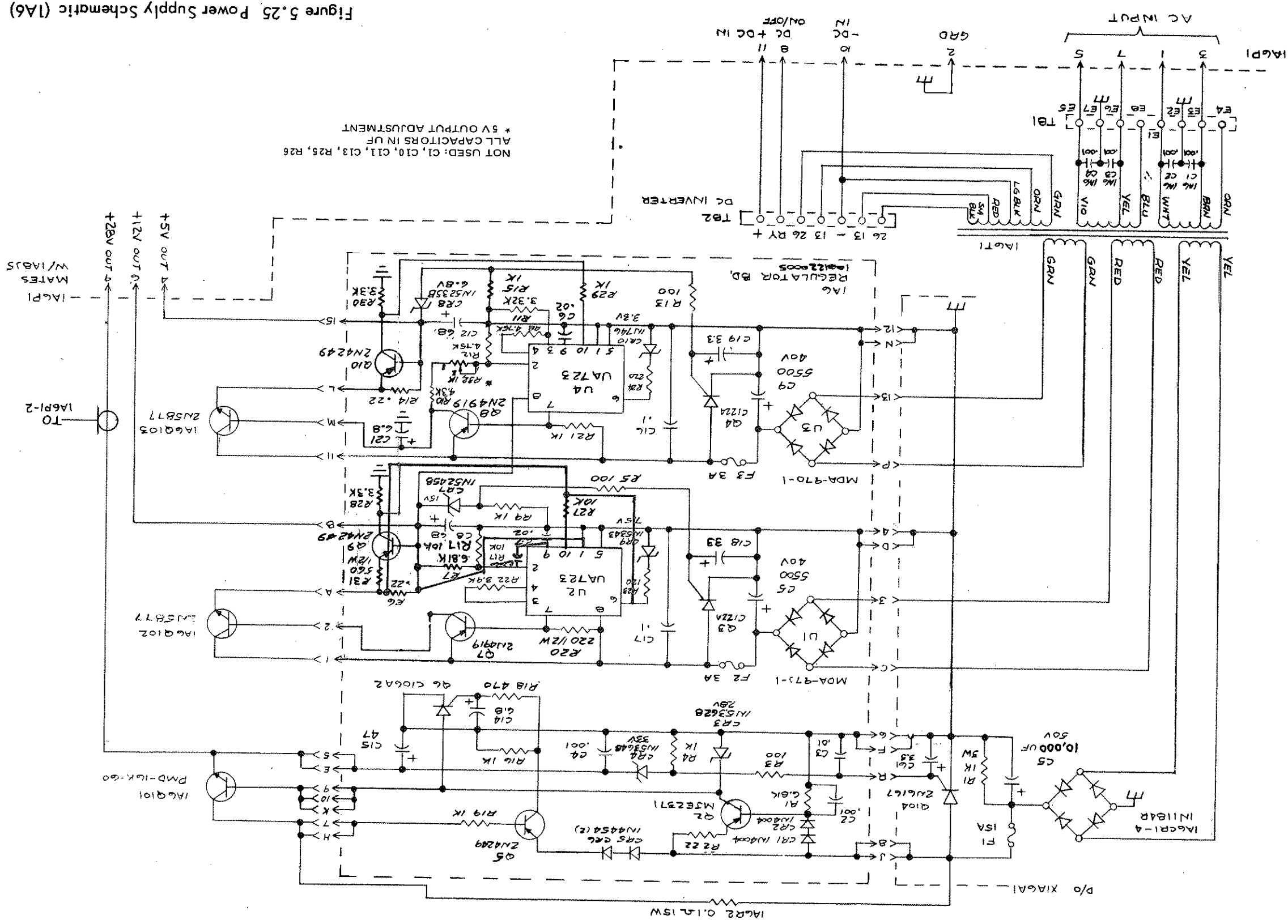
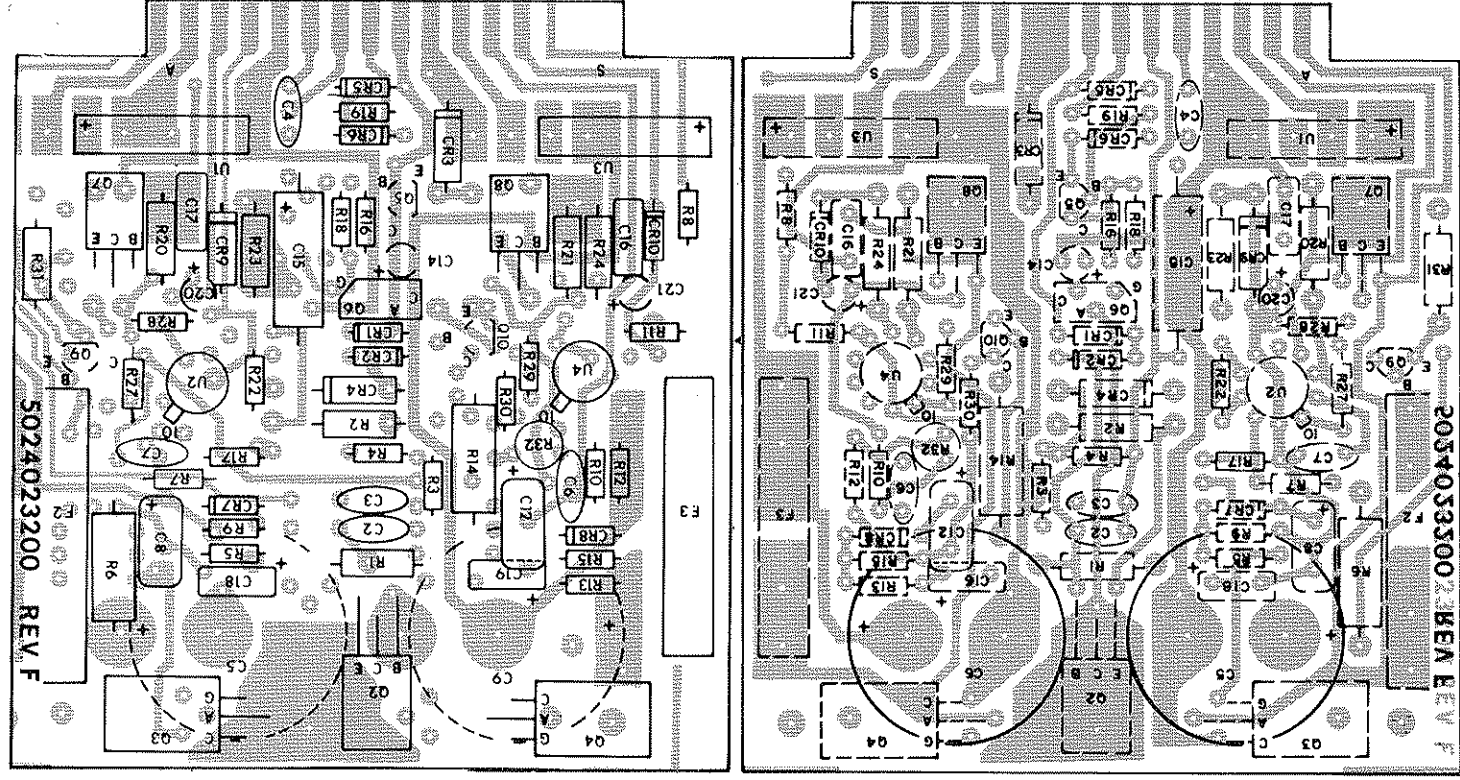
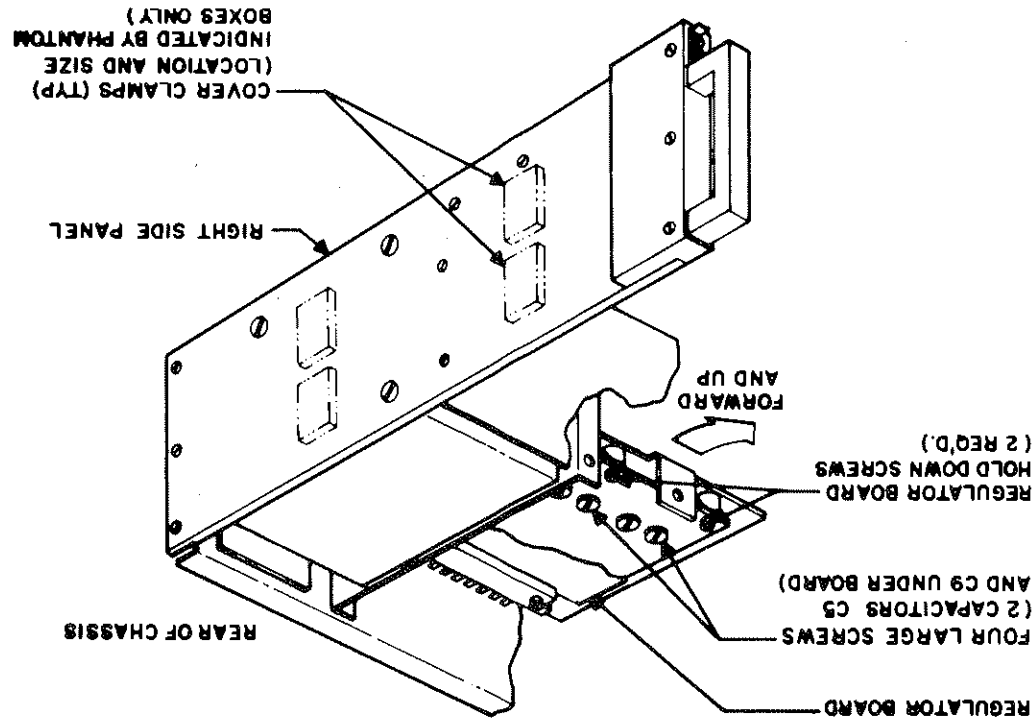


Figure 5.25 Power Supply Schematic (1A6)

SUNAIR GSB-900SC



REF	SYMBOL	DESCRIPTION	SUNAIR	PART NO.
1A6C1	1A6C2	Capacitor, 0.001UF, 500V, 10%	0289350000	5024020090
1A6C2	1A6C3	Capacitor, 0.001UF, 500V, 10%	0289350000	5024020090
1A6C3	1A6C4	Capacitor, 0.001UF, 500V, 10%	0289350000	5024020090
1A6C4	1A6C5	Capacitor, 0.001UF, 500V, 10%	0289350000	5024020090
1A6C5	1A6C6	Capacitor, 10000UF, 50V	1001120027	5024020090
1A6C6	1A6C7	Barrier Jumper, 140 Series	0508340004	5024020090
1A6C7	1A6C8	Barrier Jumper, 140 Series	0508340004	5024020090
1A6C8	1A6C9	Barrier Jumper, 140 Series	0508340004	5024020090
1A6C9	1A6CA	Barrier Jumper, 140 Series	0508340004	5024020090
1A6CA	1A6CB	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CB	1A6CC	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CC	1A6CD	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CD	1A6CE	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CE	1A6CF	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CF	1A6CG	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CG	1A6CH	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CH	1A6CI	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CI	1A6CJ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CJ	1A6CK	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CK	1A6CL	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CL	1A6CM	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CM	1A6CN	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CN	1A6CO	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CO	1A6CP	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CP	1A6CQ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CQ	1A6CR	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CR	1A6CS	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CS	1A6CT	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CT	1A6CU	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CU	1A6CV	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CV	1A6CW	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CW	1A6CX	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CX	1A6CY	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CY	1A6CZ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6CZ	1A6D1	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D1	1A6D2	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D2	1A6D3	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D3	1A6D4	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D4	1A6D5	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D5	1A6D6	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D6	1A6D7	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D7	1A6D8	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D8	1A6D9	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6D9	1A6DA	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DA	1A6DB	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DB	1A6DC	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DC	1A6DD	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DD	1A6DE	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DE	1A6DF	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DF	1A6DG	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DG	1A6DH	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DH	1A6DI	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DI	1A6DJ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DJ	1A6DK	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DK	1A6DL	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DL	1A6DM	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DM	1A6DN	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DN	1A6DO	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DO	1A6DP	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DP	1A6DQ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DQ	1A6DR	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DR	1A6DS	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DS	1A6DT	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DT	1A6DU	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DU	1A6DV	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DV	1A6DW	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DW	1A6DX	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DX	1A6DY	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DY	1A6DZ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6DZ	1A6E1	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E1	1A6E2	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E2	1A6E3	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E3	1A6E4	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E4	1A6E5	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E5	1A6E6	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E6	1A6E7	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E7	1A6E8	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E8	1A6E9	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6E9	1A6EA	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EA	1A6EB	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EB	1A6EC	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EC	1A6ED	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6ED	1A6EE	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EE	1A6EF	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EF	1A6EG	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EG	1A6EH	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EH	1A6EI	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EI	1A6EJ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EJ	1A6EK	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EK	1A6EL	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EL	1A6EM	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EM	1A6EN	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EN	1A6EO	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EO	1A6EP	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EP	1A6EQ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EQ	1A6ER	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6ER	1A6ES	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6ES	1A6ET	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6ET	1A6EU	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EU	1A6EV	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EV	1A6EW	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EW	1A6EX	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EX	1A6EY	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EY	1A6EZ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6EZ	1A6F1	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F1	1A6F2	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F2	1A6F3	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F3	1A6F4	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F4	1A6F5	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F5	1A6F6	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F6	1A6F7	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F7	1A6F8	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F8	1A6F9	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6F9	1A6FA	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FA	1A6FB	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FB	1A6FC	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FC	1A6FD	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FD	1A6FE	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FE	1A6FF	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FF	1A6FG	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FG	1A6FH	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FH	1A6FI	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FI	1A6FJ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FJ	1A6FK	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FK	1A6FL	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FL	1A6FM	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FM	1A6FN	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FN	1A6FO	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FO	1A6FP	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FP	1A6FQ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FQ	1A6FR	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FR	1A6FS	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FS	1A6FT	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FT	1A6FU	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FU	1A6FV	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FV	1A6FW	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FW	1A6FX	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FX	1A6FY	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FY	1A6FZ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6FZ	1A6G1	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G1	1A6G2	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G2	1A6G3	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G3	1A6G4	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G4	1A6G5	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G5	1A6G6	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G6	1A6G7	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G7	1A6G8	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G8	1A6G9	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6G9	1A6GA	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GA	1A6GB	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GB	1A6GC	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GC	1A6GD	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GD	1A6GE	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GE	1A6GF	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GF	1A6GG	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GG	1A6GH	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GH	1A6GI	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GI	1A6GJ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GJ	1A6GK	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GK	1A6GL	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GL	1A6GM	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GM	1A6GN	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GN	1A6GO	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GO	1A6GP	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GP	1A6GQ	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GQ	1A6GR	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GR	1A6GS	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GS	1A6GT	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GT	1A6GU	Capacitor, 5500UF, 40V	0289350000	5024020090
1A6GU	1A6GV	Capacitor, 5500UF, 40V	0289350000	50

REF	SYMBOL	DESCRIPTION	SUNAIR	PART NO.
PC ASSY REGULATOR				
C1		Capacitor, Disc, Cer., .001uF, 250V	0286260000	
C2		Capacitor, Disc, Cer., .001uF, 250V	0281620000	
C3		Capacitor, Disc, Cer., .01uF, 25V	0281620000	
C4		Capacitor, Disc, Cer., .001uF, 250V	0286260000	
C5		Not used		
C6		Capacitor, .02uF, 25V, Y5U	02691330004	
C7		Capacitor, .02uF, 25V, Y5U	02691330004	
C8		Capacitor, .02uF, 25V, Y5U	02691330004	
C9		Not used		
C10		Not used		
C11		Not used		
C12		Capacitor, Tantalum, 68uF, 25V	02821550005	
C13		Not used		
C14		Capacitor, Tantalum, 6.8uF, 50V	02967800006	
C15		Capacitor, Tantalum, 47uF, 50V	02967800006	
C16		Capacitor, Monolithic, 0.1uF, 50V	02816100002	
C17		Capacitor, Monolithic, 0.1uF, 50V	02816100002	
C18		Capacitor, Tantalum, 3.3uF, 35V	02816800001	
C19		Capacitor, Tantalum, 3.3uF, 35V	02816800001	
C20		Not used		
C21		Capacitor, Tantalum, 68uF, 20V	02967800006	
CR1		Diode, 1N4004	04051800004	
CR2		Diode, 1N4004	04051800004	
CR3		Diode, Zener	04051800004	
CR4		Diode, Zener, 1N5364B	04052300001	
CR5		Diode, Signal, 1N4454	04052700003	
CR6		Diode, Signal, 1N4454	04052700003	
CR7		Diode, Zener, 1N5245B	04052100001	
CR8		Diode, 1N5235B	04052000005	
CR9		Diode, Zener, 1N5343B	10030600005	
CR10		Diode, Zener, 1N746	04023200000	
F2		Fuse, 3 amp, 250V	10025500009	
F3		Fuse, 3 amp, 250V	10025500009	
Q2		Transistor, PNP, Siliccone	04482000007	
Q3		Diode, SCR	04469200002	
Q4		Diode, SCR	04469200002	
Q5		Transistor, PNP, Siliccone, 2N4249	04467800006	
Q6		Diode, SCR	04470700002	
Q7		Transistor, PNP, Si, 2N4919	04453700009	
Q8		Transistor, PNP, Si, 2N4919	04453700009	
Q9		Transistor, PNP, Si, 2N4249	04467800006	
Q10		Transistor, PNP, Si, 2N4249	04467800006	
R1		Resistor, Carbon, 6.8K, 10%, 1/2W	01622900004	
R2		Resistor, Carbon, 22 ohm, 10%, 1/2W	01869300003	
R3		Resistor, Carbon, 100 ohm, 5%, 1/4W	01718000003	
R4		Resistor, Carbon, 100 ohm, 5%, 1/4W	01718000003	
R5		Resistor, Carbon, 100 ohm, 5%, 1/4W	01718000003	
R6		Resistor, Carbon, 100 ohm, 5%, 1/4W	01718000003	
R7		Resistor, 6.18K, 1%, 1/8W	01963600000	
R8		Resistor, 4750, 1%, 1/8W	10030500018	
R9		Resistor, 1K, 10%, 1/4W	01715600001	
R10		Resistor, 4.3K, 5%, 1/4W	10050900025	
R11		Resistor, 33320, 1%, 1/8W	10030500000	
R12		Resistor, Carbon, 4750 ohm, 1%, 1/8W	10030500018	
R13		Resistor, Carbon, 100 ohm, 5%, 1/4W	01718000003	
R14		Resistor, 0.22 ohm, 5%, 2W	01936200006	
R15		Resistor, Carbon, 1K, 10%, 1/4W	01715600001	
R16		Resistor, Carbon, 1K, 10%, 1/4W	01715600001	
R17		Resistor, 10K, 1%, 1/8W	10030500026	
R18		Resistor, Carbon, 470 ohm, 5%, 1/4W	01841100009	
R19		Resistor, Carbon, 1K, 10%, 1/4W	01715600001	
R20		Resistor, 220, 10%, 1/2W	01728000002	
R21		Resistor, 1K, 10%, 1/2W	01674600006	
R22		Resistor, 3.9K, 10%, 1/4W	01788300003	
R23		Resistor, 120, 10%, 1/2W	01864300001	
R24		Resistor, 220, 10%, 1/2W	01728000002	
R25		Not used		
R26		Not used		
R27		Resistor, 10K, 10%, 1/4W	01704100005	
R28		Resistor, 3.3K, 10%, 1/4W	01708900007	
R29		Resistor, 1K, 10%, 1/4W	01715600001	
R30		Resistor, 3.3K, 10%, 1/4W	01708900007	
R31		Resistor, 560, 10%, 1/2W	01708900007	
R32		Pot., 1K, 10%, 1/2W, PC Mount	10046800007	
U1		Diode Bridge, MDA970-1	04052600008	
U2		Integrated Circuit, Linear, UAZ23	04481290001	
U3		Diode, Bridge, MDA970-1	04052600008	
U5		Integrated Circuit, LI near, UAZ23	04481900001	

Car. CAP. 470pf, 500V, 0.28144000

1000618710 27 147 743017 21 47

NOTES :

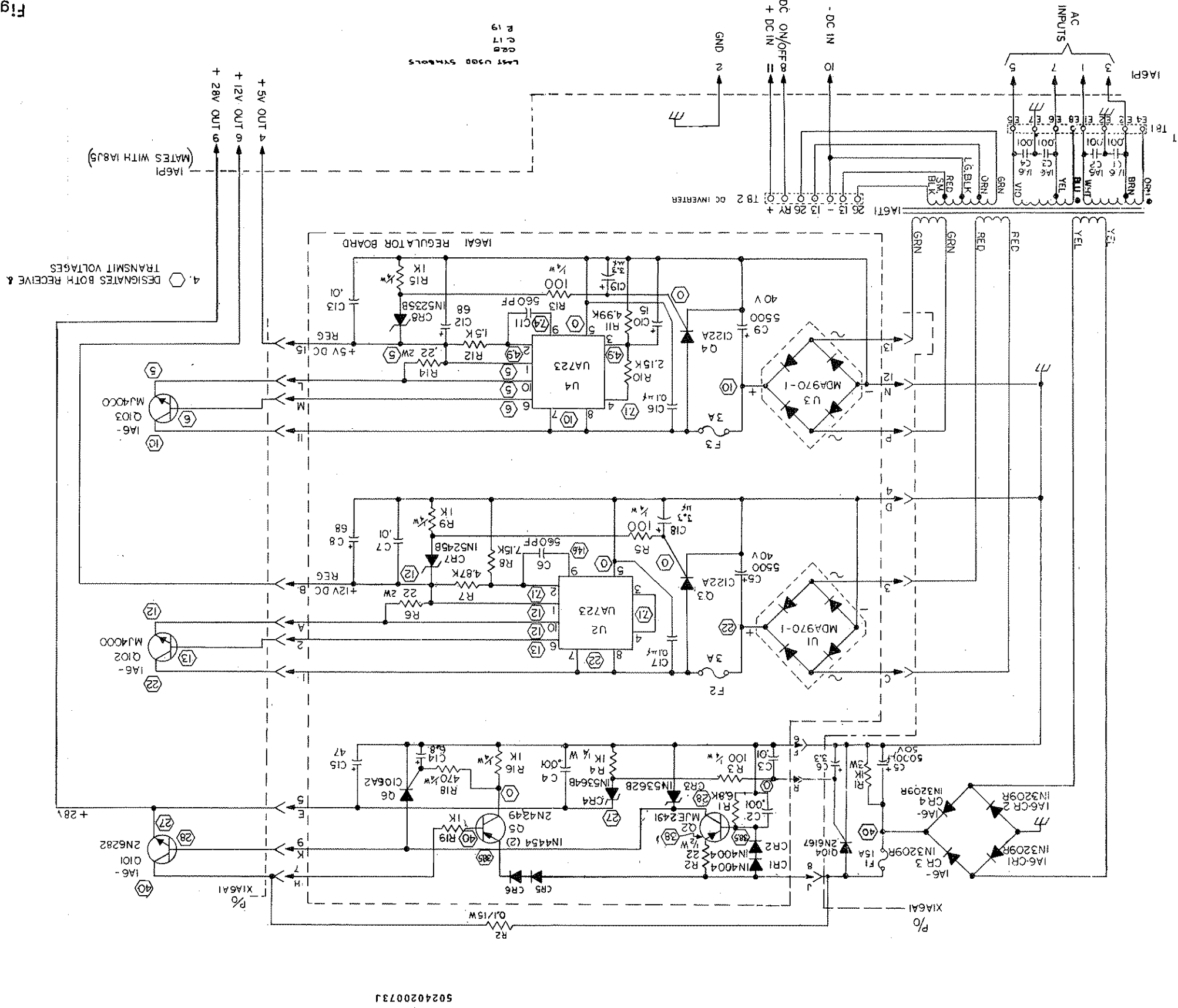
1. UNLESS OTHERWISE SPECIFIED
- ALL - RESISTORS IN OHMS
- CAPACITORS ARE IN μF

2. PREFIX ALL DESIGNATORS WITH "1A6"

3. WIRING SHOWN FOR OPERATION AT NORMAL LINE VOLTAGE. FOR CONTINUOUS OPERATION AT +15% HIGH LINE VOLTAGE CONNECT AS FOLLOWS :

Diagram illustrating the wiring for the 1A6PI vacuum tube socket. The pins are connected as follows:

- Pin 1: VLD
- Pin 2: YEL
- Pin 3: BLU
- Pin 4: WHT
- Pin 5: BRN
- Pin 6: ORN
- Pin 7: 1A6PI
- Pin 8: 1A6PI
- Pin 9: 1A6PI



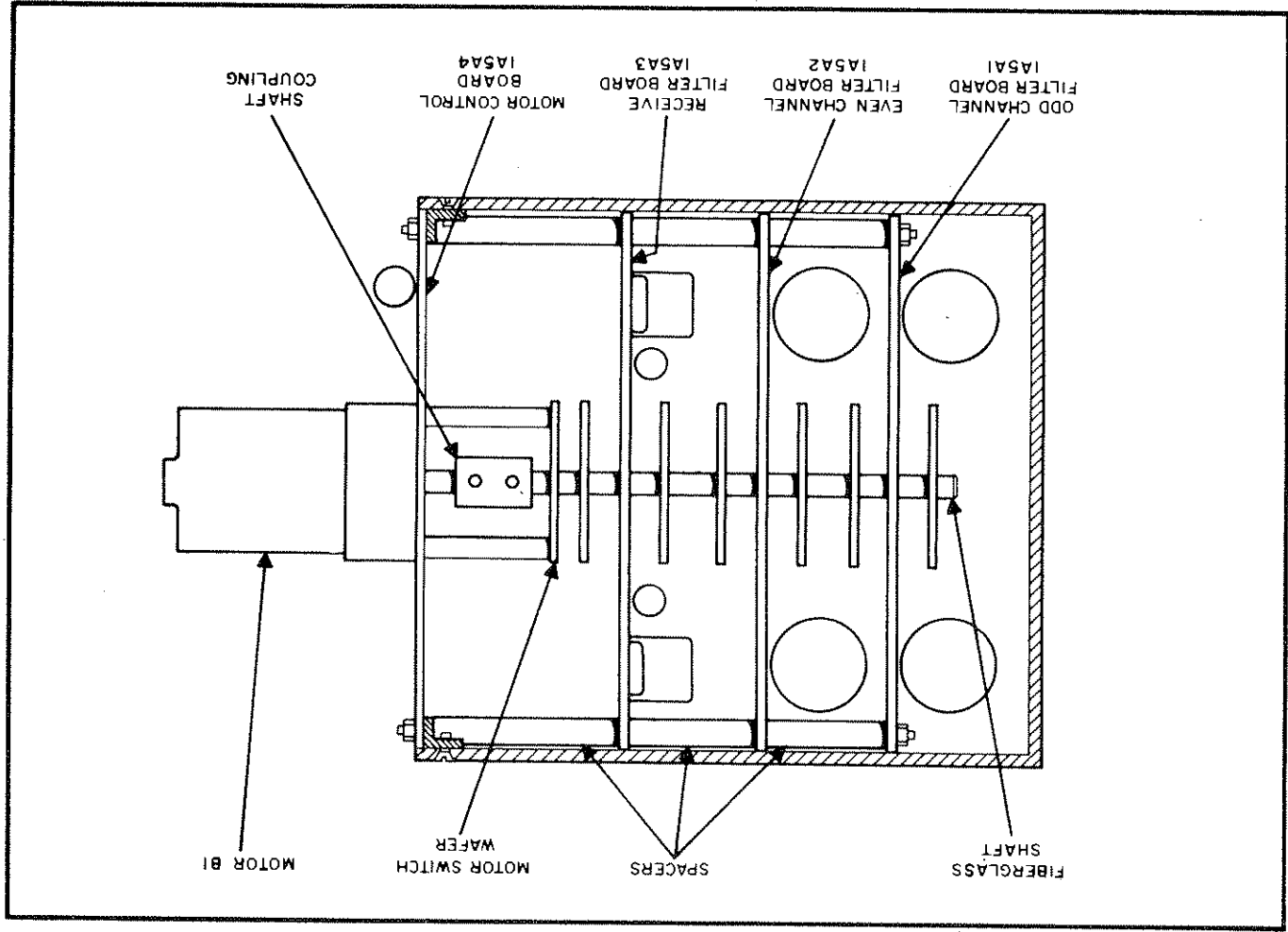
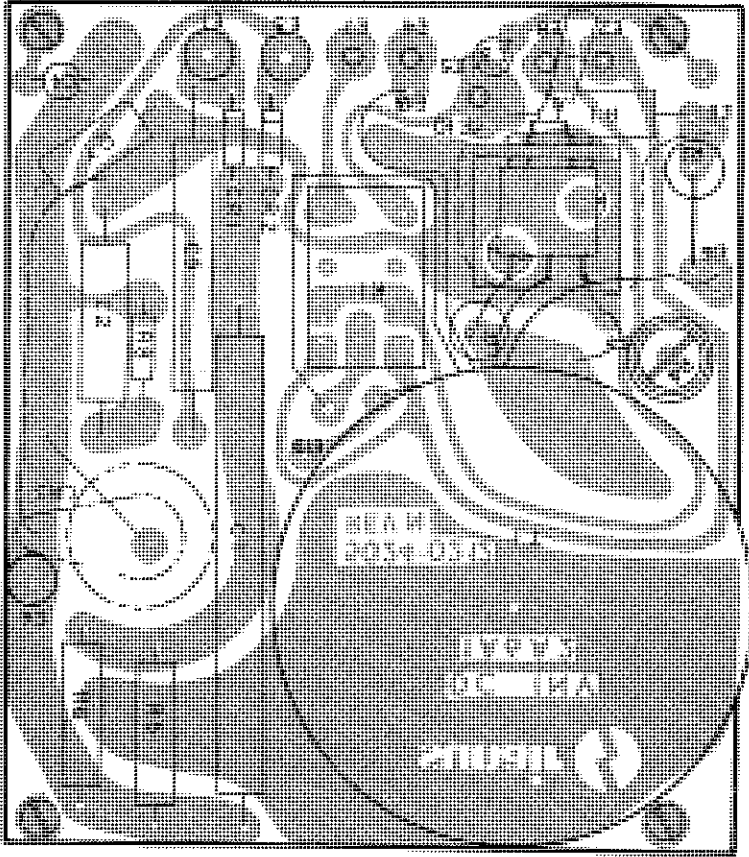


Figure 5.27 Filter Module Assembly



REF	SYMBOL	DESCRIPTION	PART NO.
C1		PC ASSY DC INV./W/HEAT SINK OP	5024021495
C2		Capacitor, 12 U.F., 100 V, Mylar	0228202004
C3		Capacitor, 0.1 U.F., 50 V, X7 R, 20%	0281610002
C4		Capacitor, 0.1 U.F., 50 V, X7 R, 20%	0281610002
C5		Capacitor, 1 U.F., 200 V, Mylar	0245250000
CR1		Diode, Rectifier 1N4004	0405180004
CR2		Diode, Rectifier 1N4004	0405180004
CR3		Diode, Rectifier 1N3209 R	0405190000
K1		Relay, DPDT, 12 V	1000190030
Q1		Transistor, PNP, GE, 2N5439	04483320002
Q2		Transistor, PNP, GE, 2N5439	04483320002
R1		Resistor, 470, 10%, 2W	0163580006
R2		Resistor, 470, 10%, 2W	0163580006
R3		Resistor, 0.47, 5%, 2W	0197350003
R4		Resistor, 0.1, 10%, 12W	0197490000
R5		Resistor, 3.3 K, 10%, 2W	01972220002
R6		Resistor, 3.3 K, 10%, 2W	01972220002
R7		Resistor, 27, 10%, 1W	0197150004
R8		Resistor, 1.2, 10%, 1/2W	0188490001
SI		Switch, Toggle, DPDT	0346370001
TI		Transformer, Saturable	5024021509
		Mount, Transistor	0502740001
		Thermal Compound	0840810008
		Standoff, M-F, 4-40, .250 L	1003170005
		Heat Sink, DC Inverter	5024021100

5024021495S PC ASSY DC INV./W/HEAT SINK OP

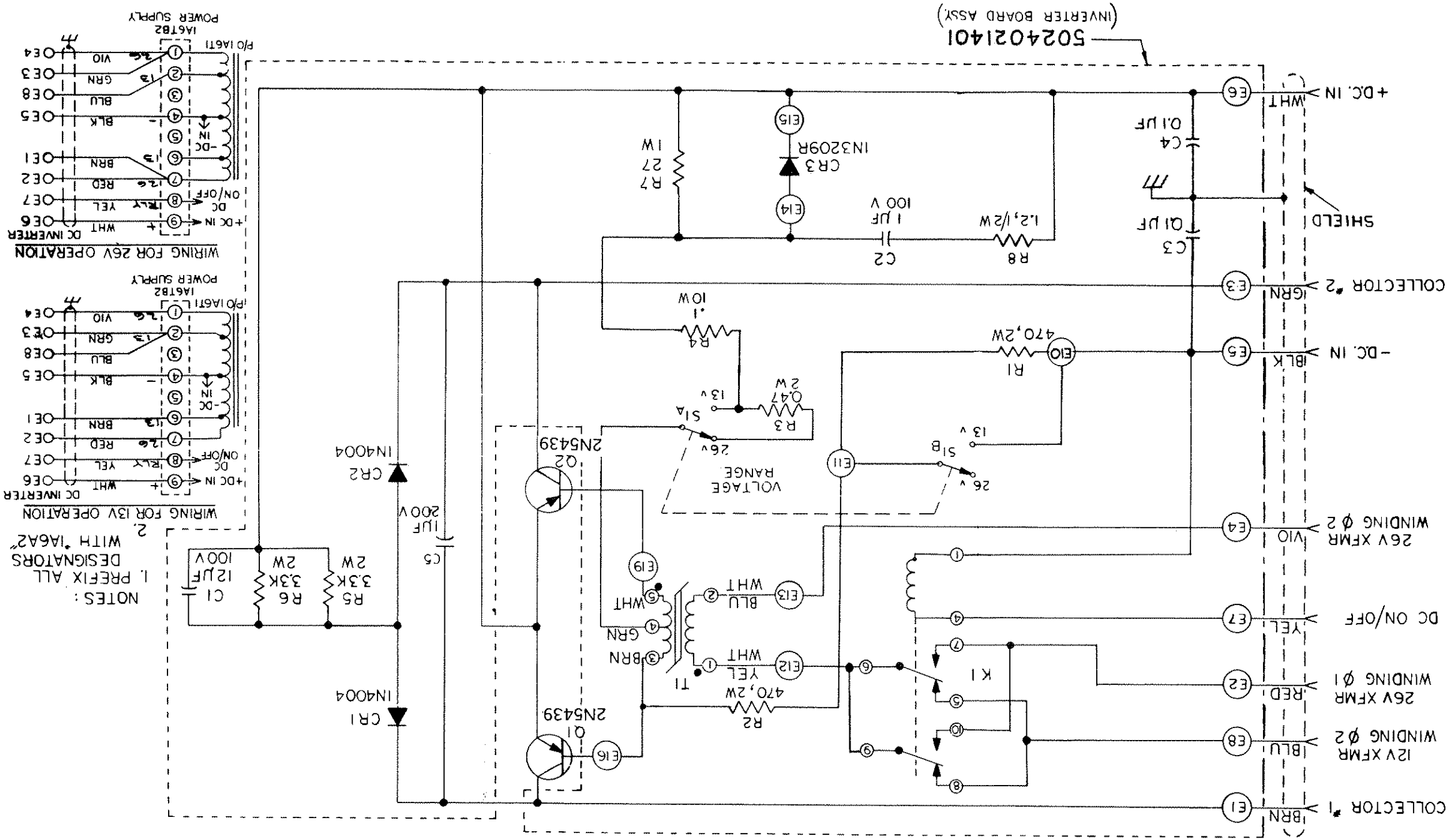


Figure 5.26 D.C. Inverter Schematic (1A6A2)

5024050061A

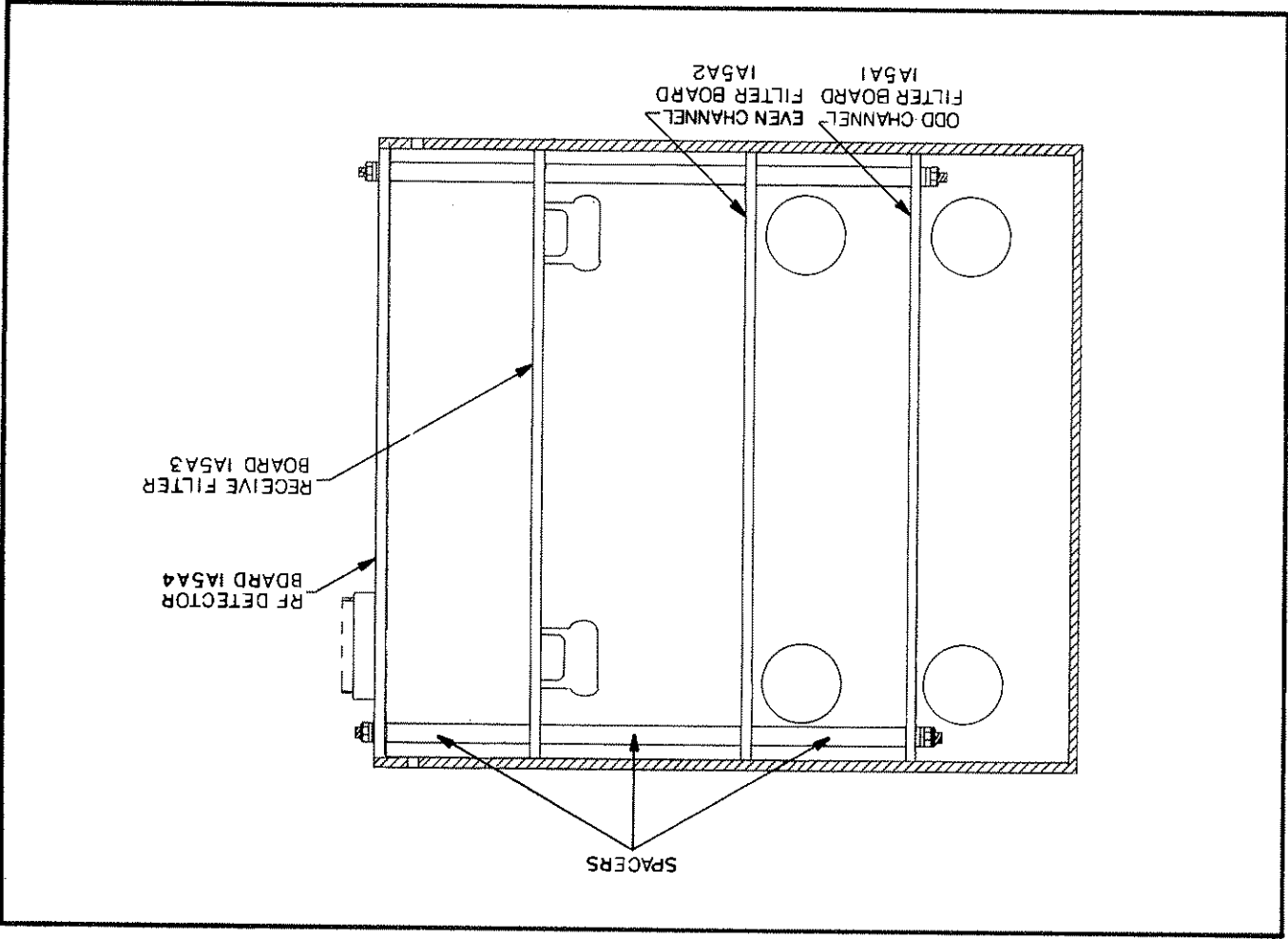
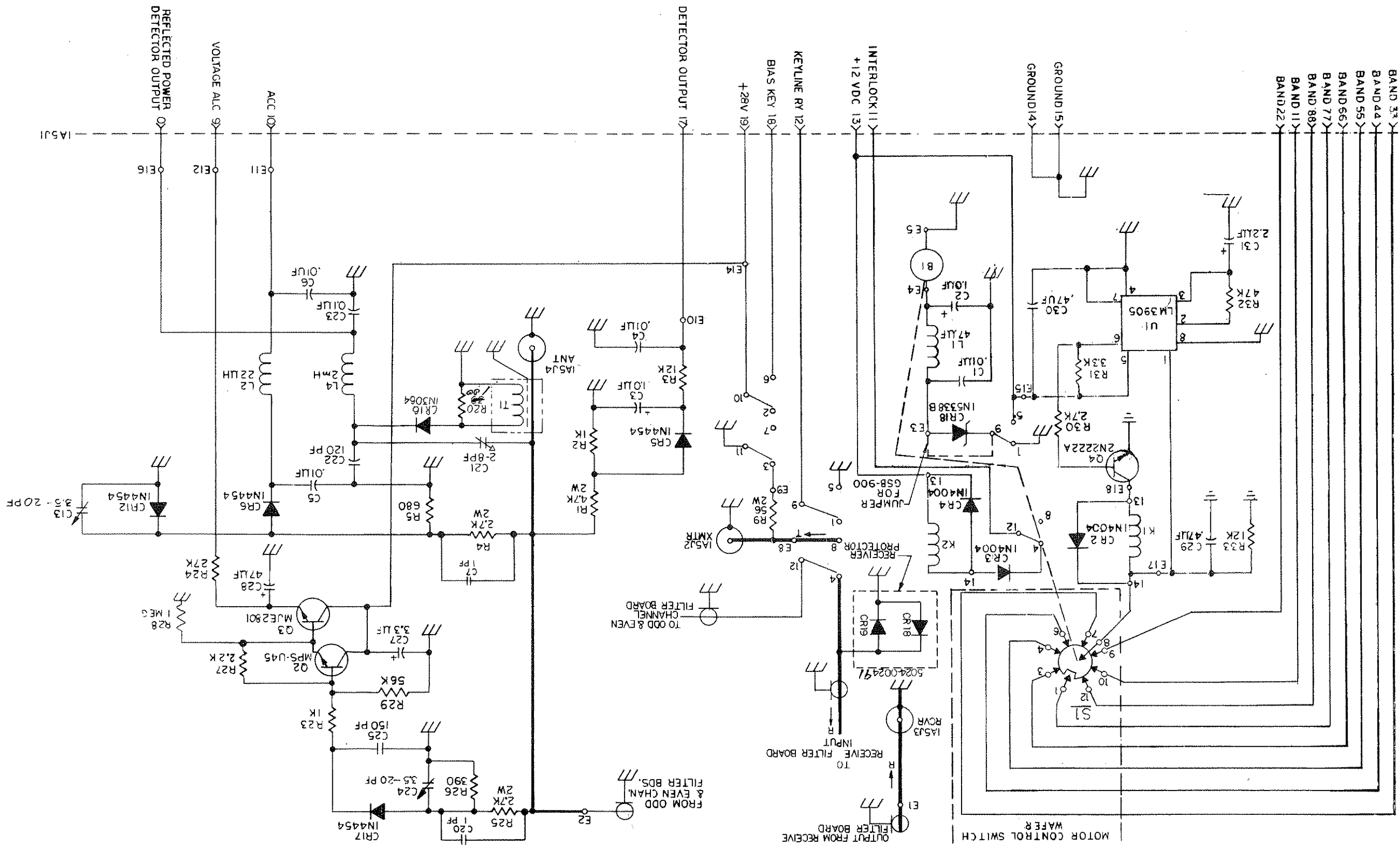
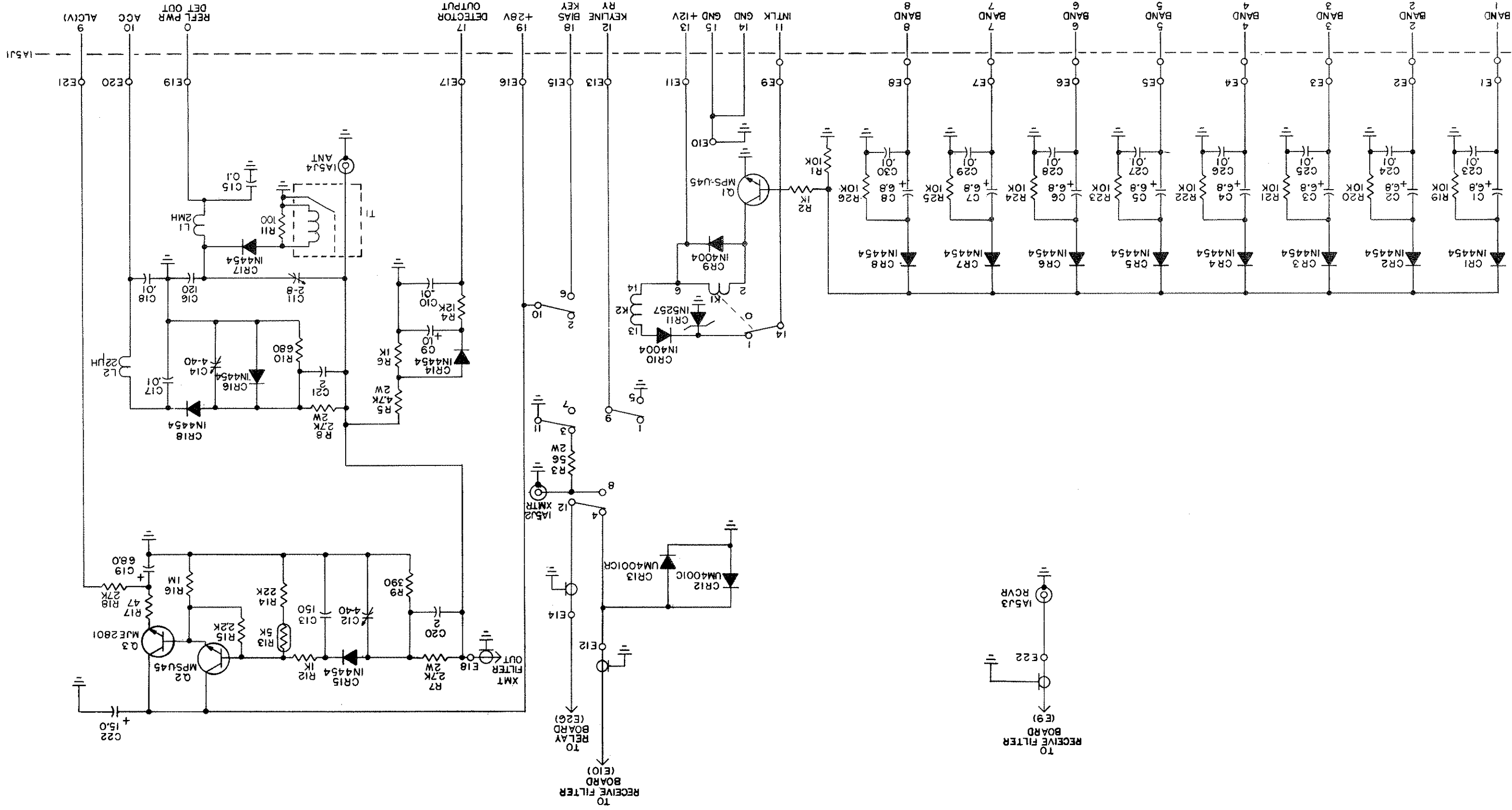


Figure 5.27 Filter Module Assembly



NOTES:
1) UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS AND 1/4 WATT.
INDUCTANCE VALUES ARE IN MICROHENRIES.
PREFIX ALL ITEMS WITH 1A5A4.
* CR18 USED ONLY IN GSE 924

Figure 5.28 Motor Control Board Schematic (1A5A4)



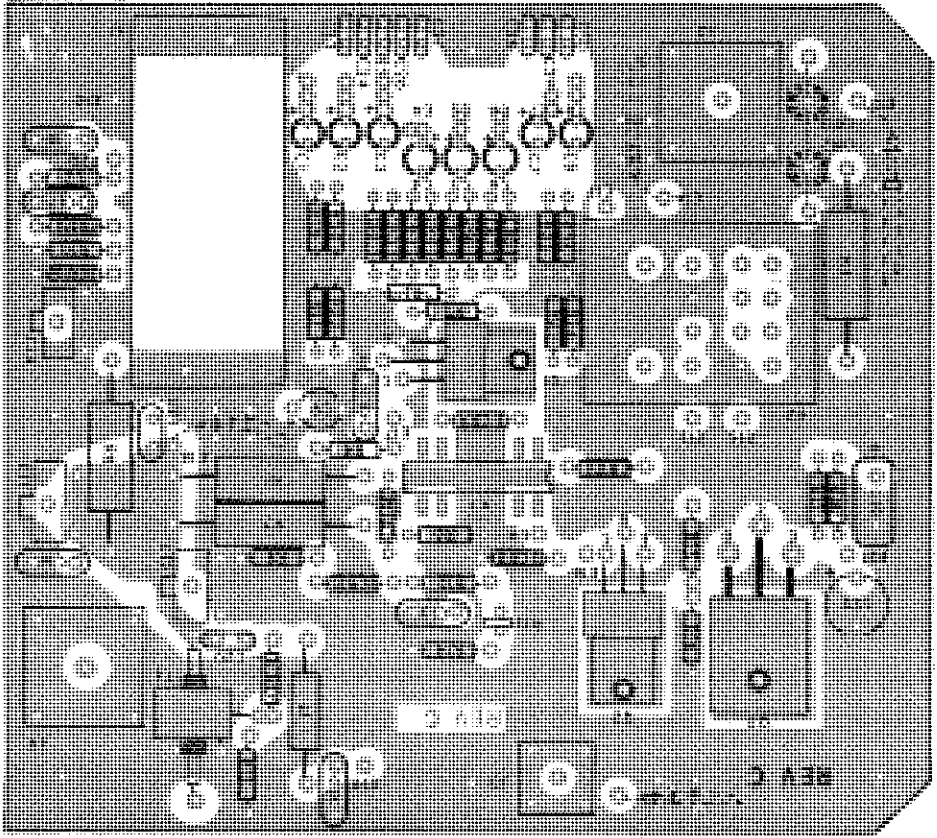
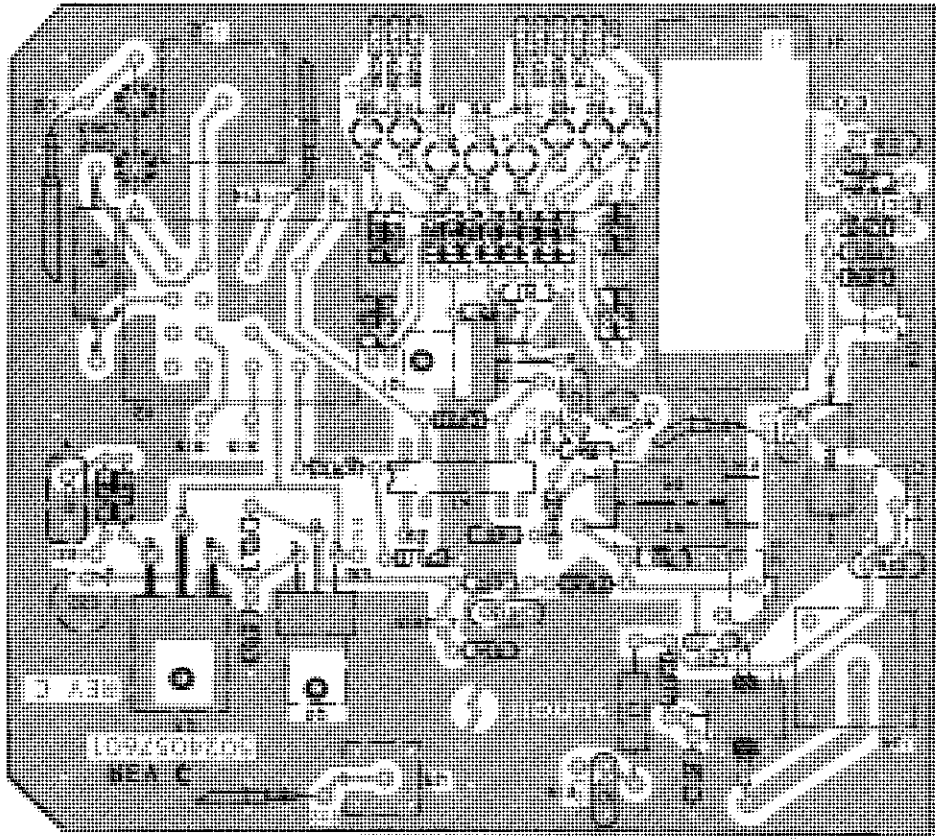
NOTES:
UNLESS OTHERWISE SPECIFIED:
1.DECIMAL CAPACITORS ARE IN MICROFARADS, ALL OTHER PICOFARADS.
2.RESISTORS ARE IN OHMS AND 1/4 WATT.

Figure 5.28 RF Detector Board Schematic (1A5A4)

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		Capacitor, 6.8 uF, 20 V, T368	0296780006
C2		Capacitor, 6.8 uF, 20 V, T368	0296780006
C3		Capacitor, 6.8 uF, 20 V, T368	0296780006
C4		Capacitor, 6.8 uF, 20 V, T368	0296780006
C5		Capacitor, 6.8 uF, 20 V, T368	0296780006
C6		Capacitor, 6.8 uF, 20 V, T368	0296780006
C7		Capacitor, 6.8 uF, 20 V, T368	0296780006
C8		Capacitor, 6.8 uF, 20 V, T368	0296780006
C9		Capacitor, 1 uF, 50 V, 198 D	0280910002
C10		Capacitor, 0.01 uF, 25 V, X55	0281620008
C11		Capacitor, 2.8 pF, 200 V, NPO	0284300004
C12		Capacitor, 4.40 pF, 25 V	0295490004
C13		Capacitor, 150 pF, 500 V, DM15, 5%	0274980002
C14		Capacitor, 4.40 pF, 25 V	0295490004
C15		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C16		Capacitor, 120 pF, 500 V, DM15, 5%	0289850002
C17		Capacitor, 0.01 uF, 25 V, X55	0281620008
C18		Capacitor, 0.01 uF, 25 V, X55	0281620008
C19		Capacitor, 68 uF, 25 V, T368	0282150005
C20		Capacitor, 2 pF, 500 V, DM10	0259710008
C21		Capacitor, 2 pF, 500 V, DM10	0259710008
C22		Capacitor, 15 uF, 50 V, 196 D	0274000008
C23		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C24		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C25		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C26		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C27		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C28		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C29		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
C30		Capacitor, 0.01 uF, 50 V, W5 R, 20%	0281730008
CR1		Diode, Signal, SiL, 1N4454	0405270003
CR2		Diode, Signal, SiL, 1N4454	0405270003
CR3		Diode, Signal, SiL, 1N4454	0405270003
CR4		Diode, Signal, SiL, 1N4454	0405270003
CR5		Diode, Signal, SiL, 1N4454	0405270003
CR6		Diode, Signal, SiL, 1N4454	0405270003
CR7		Diode, Signal, SiL, 1N4454	0405270003
CR8		Diode, Signal, SiL, 1N4454	0405270003
CR9		Diode, Rectifier 1N4004	0405180004
CR10		Diode, Rectifier 1N4004	0405180004
CR11		Diode, Zener 1N5257 A	1005320012
CR12		Diode, Pin UM4001 C	0405430001
CR13		Diode, Pin UM4001 CR	0405440006
CR14		Diode, Signal, SiL, 1N4454	0405270003
CR15		Diode, Signal, SiL, 1N4454	0405270003
CR16		Diode, Signal, SiL, 1N4454	0405270003
CR17		Diode, Signal, SiL, 1N4454	0405270003
CR18		Diode, Signal, SiL, 1N4454	0405270003
J1		Connector, Power, 20 Pin Rect.	0753470004
J2		Connector, RF, BNC	0753490005
J3		Connector, RF, JCM	0753600005
J4		Connector, RF, BNC	0753490005
K1		Relay, SPDT, 12 V, Reed	1004630026
K2		Relay, 4 PDT, 12 V, Sensitive	0666440009
L1		Inductor, Molded, 2000 uH, 5%	0653590008
L2		Inductor, Molded, 22 uH, 5%	0650000005
Q1		Transistor, NPN, Si MPSU45	0448570009
Q2		Transistor, NPN, Si MPSU45	0448570009
Q3		Transistor, NPN, Si MJ2801	0448530007
R1		Resistor, 10 K, 10%, 1/4 W	0170410005
R2		Resistor, 1 K, 10%, 1/4 W	0171560001
R3		Resistor, 56, 10%, 2 W	0197210007
R4		Resistor, 12 K, 10%, 1/4 W	0183180003
R5		Resistor, 4.7 K, 10%, 2 W	0164130004
R6		Resistor, 1 K, 10%, 1/4 W	0171560001
R7		Resistor, 2.7 K, 5%, 2 W	0195940008
R8		Resistor, 2.7 K, 5%, 2 W	0195940008
R9		Resistor, 390, 10%, 1/2 W	0173260004
R10		Resistor, 680, 10%, 1/2 W	0167500007
R11		Resistor, 100, 5%, 1/4 W	0171180003
R12		Resistor, 1 K, 10%, 1/4 W	0171560001
R13		Resistor, 5 K at 25 C	1001340001

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R14		Resistor, 22 K, 5%, 1/4 W	0172230004
R15		Resistor, 2.2 K, 5%, 1/4 W	0178070009
R16		Resistor, 1 M, 10%, 1/4 W	0170650006
R17		Resistor, 47, 10%, 1/4 W	0179360001
R18		Resistor, 27 K, 10%, 1/4 W	0171200004
R19		Resistor, 10 K, 10%, 1/4 W	0170410005
R20		Resistor, 10 K, 10%, 1/4 W	0170410005
R21		Resistor, 10 K, 10%, 1/4 W	0170410005
R22		Resistor, 10 K, 10%, 1/4 W	0170410005
R23		Resistor, 10 K, 10%, 1/4 W	0170410005
R24		Resistor, 10 K, 10%, 1/4 W	0170410005
R25		Resistor, 10 K, 10%, 1/4 W	0170410005
R26		Resistor, 10 K, 10%, 1/4 W	0170410005
T1		Transformer, Current	5024055608

SUNAIR GSB-900SC

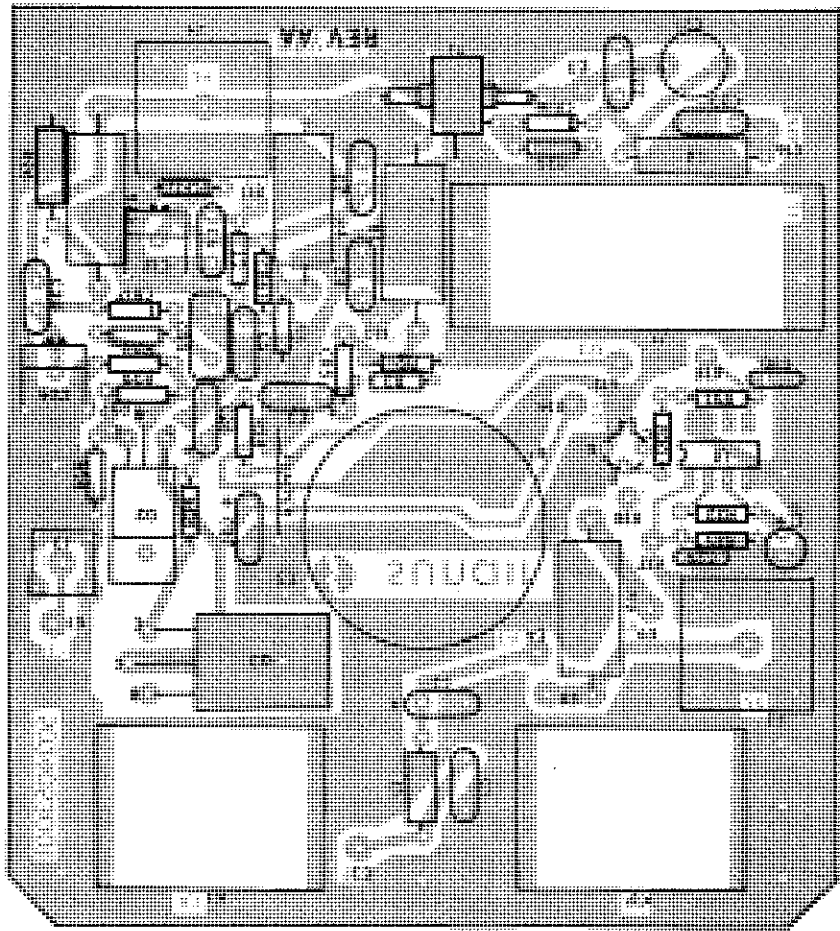


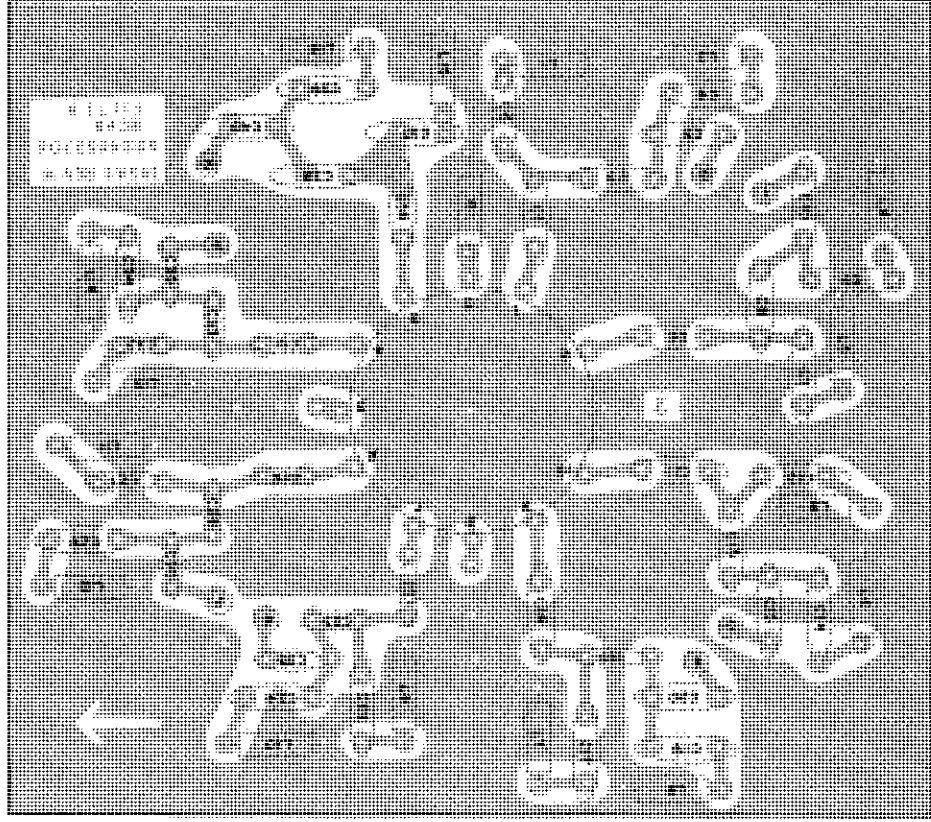
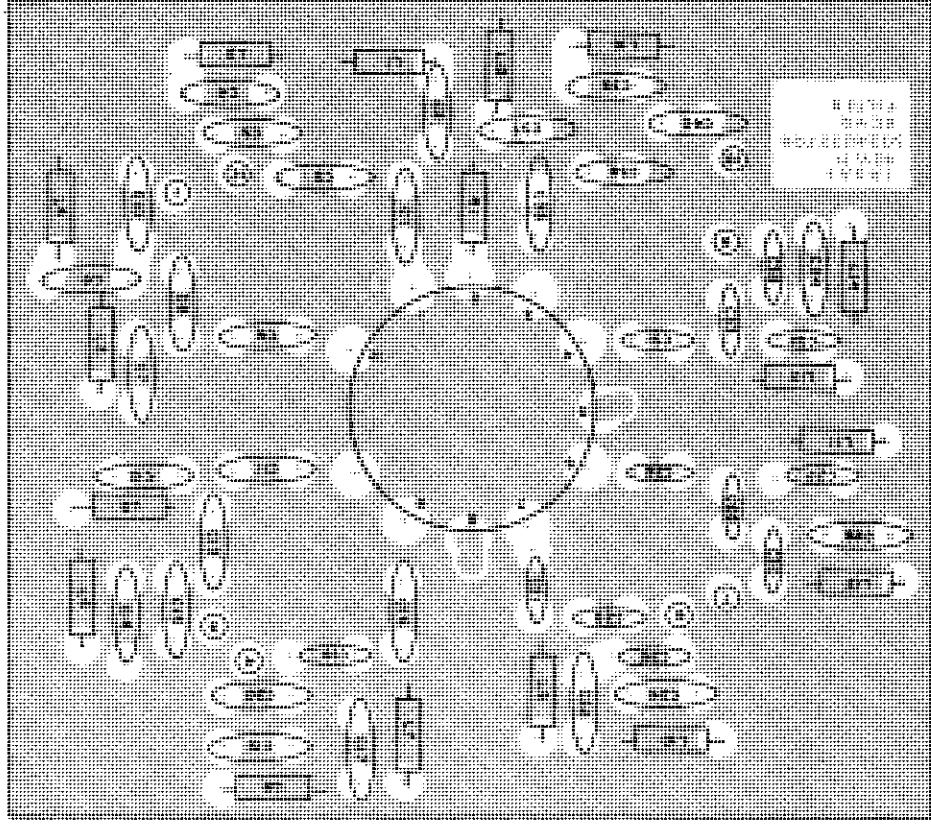
REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
B1		PC ASSY MOTOR CONTROL	5024052994
C1		Motor, 12 VDC, 96.7/1 Gear/Red	5024053508
C2		Capacitor, 1 uF, 50 V, 198 D	0280910002
C3		Capacitor, 1 uF, 50 V, 198 D	0280910002
C4		Capacitor, 0.01 uF, 25 V, X55	0281620008
C5		Capacitor, 0.01 uF, 25 V, X55	0281620008
C6		Capacitor, 0.01 uF, 25 V, X55	0281620008
C7		Capacitor, 1 pF, 500 V, DM10	0260160008
C8		Not used	
C9		Not used	
C10		Not used	
C11		Not used	
C12		Not used	
C13		Capacitor, 2.5-20 PF	1005140031
C14		Not used	
C15		Not used	
C16		Not used	
C17		Not used	
C18		Not used	
C19		Not used	
C20		Capacitor, 1 pF, 500 V, DM10	0260160008
C21		Capacitor, 2.8 PF, 350 V, NPO	0268220000
C22		Capacitor, 120 PF, 500 V, DM15, 5%	0289850002
C23		Capacitor, 0.01 uF, 50 V, X7 R, 20%	0281610002
C24		Capacitor, 2.5-20 PF	1005140031
C25		Capacitor, 150 PF, 500 V, DM15, 5%	0274980002
C26		Not used	
C27		Capacitor, 3.3 uF, 35 V, 196 D	0281680001
C28		Capacitor, 47 uF, 20 V, 196 D	0281700001
C29		Capacitor, 0.47 uF, 50 V, X5 V, 20%	0283370009
C30		Capacitor, 0.47 uF, 50 V, X5 V, 20%	0283370009
C31		Capacitor, 2.2 uF, 35 V, T368	0273950002
CR1		Not used	
CR2		Diode, Rectifier 1 N4004	0405180004
CR3		Diode, Rectifier 1 N4004	0405180004
CR4		Diode, Rectifier 1 N4004	0405180004
CR5		Diode, Signal, SIL 1 N4454	0405270003
CR6		Diode, Signal, SIL 1 N4454	0405270003
CR7		Not used	
CR8		Not used	
CR9		Not used	
CR10		Not used	
CR11		Not used	
CR12		Diode, Signal, SIL 1 N4454	0405270003
CR13		Not used	
CR14		Not used	
CR15		Not used	
CR16		Diode, Signal, SIL 1 N3064	0405460007
CR17		Diode, Signal, SIL 1 N4454	0405270003
CR18		Not used	
J1		Connector, Power, 20 Pin Rect.	0753470004
J2		Connector, RF, BNC	0753490005
J3		Connector, RF, JCM	0753600005
J4		Connector, RF, BNC	0753490005
L1		Inductor, Molded, 47 uH, 5%	0646420003
L2		Inductor, Molded, 22 uH, 5%	0650000005
L3		Not used	
L4		Inductor, Molded, 2000 uH, 5%	0653590008
Q1		Not used	
Q2		Transistor, NPN, SIL MPSU45	0448570009
Q3		Transistor, NPN, SIL MJE2801	0448530007
Q4		Transistor, NPN, SIL 2 N222 A	0448580004
R1		Resistor, 4.7 K, 10%, 2 W	0164130004
R2		Resistor, 1 K, 10%, 1/4 W	0171560001
R3		Resistor, 12 K, 10%, 1/4 W	0183180003
R4		Resistor, 2.7 K, 5%, 2 W	0195940008
R5		Resistor, 680, 10%, 1/4 W	0176630007
R6		Not used	
R7		Not used	
R8		Not used	
R9		Resistor, 56, 10%, 2 W	0197210007
R10		Not used	
R11		Not used	
R12		Not used	
R13		Not used	

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R14		Not used	
R15		Not used	
R16		Not used	
R17		Not used	
R18		Not used	
R19		Not used	
R20		Resistor, 39, 10%, 1/4 W	0183090007
R21		Not used	
R22		Not used	
R23		Resistor, 1 K, 10%, 1/4 W	0171560001
R24		Resistor, 27 K, 10%, 1/4 W	0171200004
R25		Resistor, 2.7 K, 5%, 2 W	0195940008
R26		Resistor, 390, 10%, 1/2 W	0173260004
R27		Resistor, 2.2 K, 5%, 1/4 W	0178070009
R28		Resistor, 1 M, 10%, 1/4 W	0170650006
R29		Resistor, 56 K, 10%, 1/4 W	0171440005
R30		Resistor, 2.7 K, 10%, 1/4 W	0186670001
R31		Resistor, 3.3 K, 10%, 1/4 W	0170890007
R32		Resistor, 47 K, 10%, 1/4 W	0171060008
R33		Resistor, 12 K, 10%, 1/4 W	0183180003
R34		Resistor, 47, 10%, 1/2 W	0167980009
T1		Transformer, Current	5024055608
U1		IC Linear LM3905N	04484470004
K1		Socket, Relay, 4 PDT Contacts	0767000005
K2		Socket, Relay, 4PDT Contacts	0767000005
		Switch, Water, Motor Control	5024053109
		Retainer, Relay Socket	0767500008

71180003

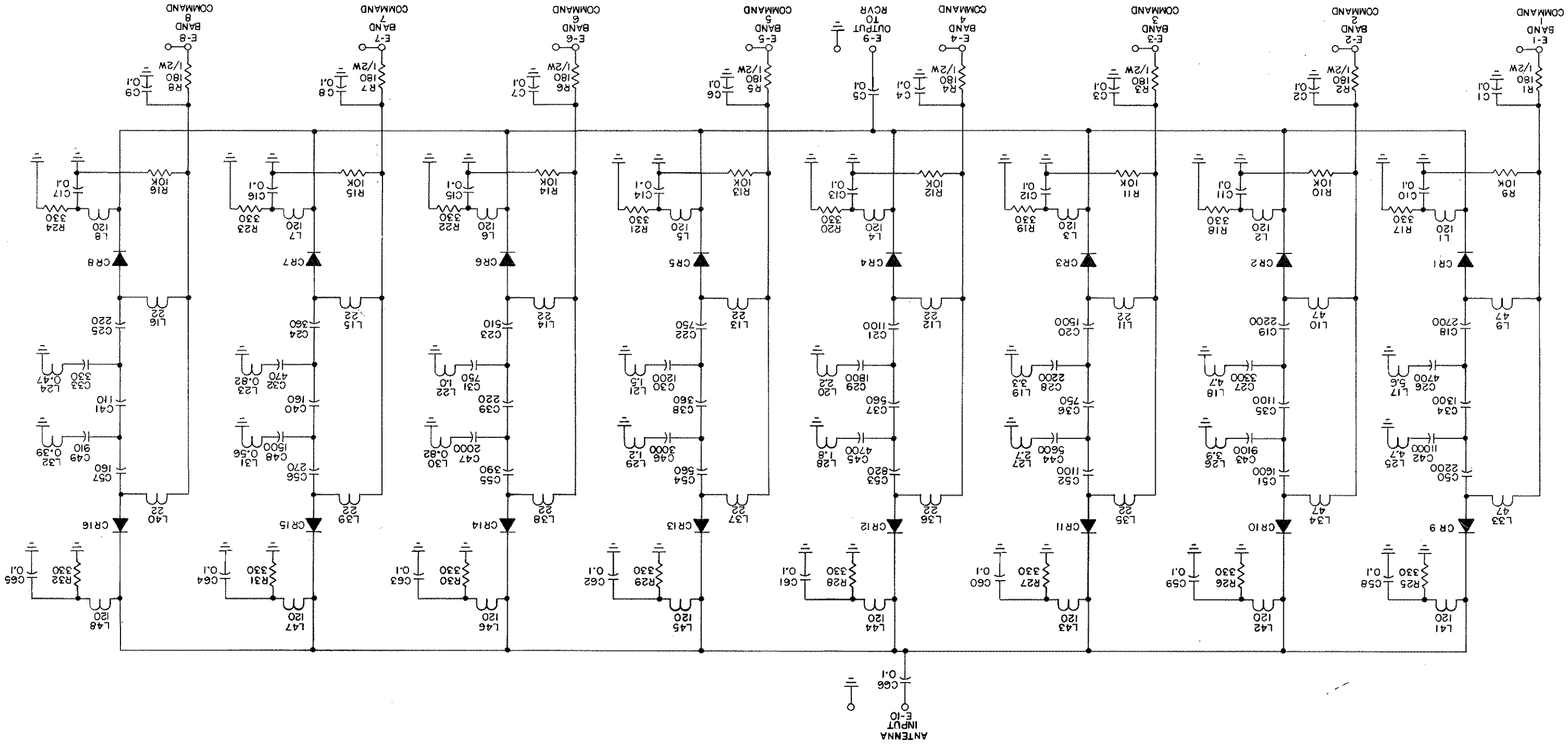
SUNAIR GSB-900SC





REF	DESCRIPTION	SUNAIR PART NO.
C1	PC ASSY RECEIVE FLTR, GSB-900	5024052692
C2	Capacitor, 4700 PF, 500 V, DM19, 2%	0281390002
C3	Capacitor, 1300 PF, 500 V, DM19, 2%	0281380007
C4	Capacitor, 1100 PF, 500 V, DM30, 2%	0281370001
C5	Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C6	Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C7	Capacitor, 3300 PF, 500 V, DM19, 2%	0281250006
C8	Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C9	Capacitor, 9100 PF, 500 V, DM30, 2%	0280960000
C10	Capacitor, 1600 PF, 500 V, DM19, 2%	0281220000
C11	Capacitor, 1500 PF, 500 V, DM19, 2%	0281270007
C12	Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C13	Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C14	Capacitor, 5600 PF, 500 V, DM20, 2%	0281260001
C15	Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C16	Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C17	Capacitor, 1800 PF, 500 V, DM19, 2%	0281300003
C18	Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C19	Capacitor, 4700 PF, 500 V, DM19, 2%	0281390002
C20	Capacitor, 820 PF, 500 V, DM19, 2%	0281280002
C21	Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C22	Capacitor, 1200 PF, 500 V, DM19, 2%	0281030006
C23	Capacitor, 360 PF, 500 V, DM15, 2%	0281160007
C24	Capacitor, 3000 PF, 500 V, DM19, 2%	02813320004
C25	Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C26	Capacitor, 510 PF, 500 V, DM15, 2%	02812330005
C27	Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C28	Capacitor, 220 PF, 500 V, DM15, 2%	02814420009
C29	Capacitor, 2000 PF, 500 V, DM19, 2%	0281410003
C30	Capacitor, 390 PF, 500 V, DM15, 2%	0281040001
C31	Capacitor, 360 PF, 500 V, DM15, 2%	0281160007
C32	Capacitor, 470 PF, 500 V, DM15, 2%	0281440000
C33	Capacitor, 160 PF, 500 V, DM15, 2%	02813340005
C34	Capacitor, 1500 PF, 500 V, DM19, 2%	0281270007
C35	Capacitor, 270 PF, 500 V, DM15, 2%	0280970005
C36	Capacitor, 220 PF, 500 V, DM15, 2%	0281420009
C37	Capacitor, 330 PF, 500 V, DM15, 2%	0281070008
C38	Capacitor, 110 PF, 500 V, DM15, 2%	0281460001
C39	Capacitor, 910 PF, 500 V, DM19, 2%	0281450005
C40	Capacitor, 160 PF, 500 V, DM15, 2%	02813340005
L1	Inductor, Molded, 5.6 UH, 5%	0650360001
L2	Inductor, Molded, 4.7 UH, 5%	0651910005
L3	Inductor, Molded, 4.7 UH, 5%	0651910005
L4	Inductor, Molded, 3.9 UH, 5%	0650480007
L5	Inductor, Molded, 3.3 UH, 5%	0658920006
L6	Inductor, Molded, 2.7 UH, 5%	0652180001
L7	Inductor, Molded, 2.2 UH, 5%	0649890001
L8	Inductor, Molded, 1.8 UH, 5%	0652440002
L9	Inductor, Molded, 1.5 UH, 5%	0649270002
L10	Inductor, Molded, 1.2 UH, 5%	0649910001
L11	Inductor, Molded, 1.0 UH, 5%	0649150007
L12	Inductor, Molded, 0.82 UH, 5%	0652320007
L13	Inductor, Molded, 0.82 UH, 5%	0649530004
L14	Inductor, Molded, 0.56 UH, 5%	0649410009
L15	Inductor, Molded, 0.47 UH, 5%	0649770005
L16	Inductor, Molded, 0.39 UH, 5%	0185380000
R1	Resistor, 10, 10%, 1/2W	0185380000
S1	Switch, Water, Rec. Filt. Top	5024052803
S2	Switch	5024053401

5024052692 PC ASSY RECEIVE FLTR, GSB-900



NOTES:
1. ALL DECIMAL CAPACITORS ARE IN MICROFARADS, ALL OTHERS PICOFARADS.
2. ALL RESISTORS ARE $\pm 10\%$, 1/4 WATT.
3. INDUCTANCE VALUES ARE IN MICROHENRIES.
4. ALL DIODES ARE 40557.

UNLESS OTHERWISE SPECIFIED:

CAPACITORS ARE IN μF .

INDUCTORS ARE IN μH .

PREFIX ALL DESIGNATORS WITH

Figure 5.29 Receiver Filter Board Schematic (1A5A3)

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C2		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C3		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C4		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C5		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C6		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C7		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C8		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C9		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C10		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C11		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C12		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C13		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C14		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C15		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C16		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C17		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281240001
C18		Capacitor, 2700 PF, 500 V, DM19, 2%	0281240001
C19		Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C20		Capacitor, 1500 PF, 500 V, DM19, 2%	0281270007
C21		Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C22		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C23		Capacitor, 510 PF, 500 V, DM15, 2%	0281230005
C24		Capacitor, 360 PF, 500 V, DM15, 2%	0281420009
C25		Capacitor, 220 PF, 500 V, DM15, 2%	0281420009
C26		Capacitor, 4700 PF, 500 V, DM19, 2%	0281390002
C27		Capacitor, 3300 PF, 500 V, DM19, 2%	0281250006
C28		Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C29		Capacitor, 1800 PF, 500 V, DM19, 2%	0281300003
C30		Capacitor, 1200 PF, 500 V, DM19, 2%	0281030006
C31		Capacitor, 470 PF, 500 V, DM19, 2%	0280990006
C32		Capacitor, 470 PF, 500 V, DM15, 2%	0281440000
C33		Capacitor, 330 PF, 500 V, DM15, 2%	0281070008
C34		Capacitor, 1300 PF, 500 V, DM19, 2%	0281380007
C35		Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C36		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C37		Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C38		Capacitor, 360 PF, 500 V, DM15, 2%	0281160007
C39		Capacitor, 220 PF, 500 V, DM15, 2%	0281420009
C40		Capacitor, 160 PF, 500 V, DM15, 2%	0281340005
C41		Capacitor, 1100 PF, 500 V, DM15, 2%	0281460001
C42		Capacitor, 1100 PF, 500 V, DM30, 2%	0281370001
C43		Capacitor, 9100 PF, 500 V, DM30, 2%	0280960000
C44		Capacitor, 5600 PF, 500 V, DM20, 2%	0281260001
C45		Capacitor, 4700 PF, 500 V, DM19, 2%	0281390002
C46		Capacitor, 3000 PF, 500 V, DM19, 2%	0281320004
C47		Capacitor, 2000 PF, 500 V, DM19, 2%	0281410003
C48		Capacitor, 1500 PF, 500 V, DM19, 2%	0281270007
C49		Capacitor, 910 PF, 500 V, DM19, 2%	0281450005
C50		Capacitor, 2200 PF, 500 V, DM19, 2%	0281360006
C51		Capacitor, 1600 PF, 500 V, DM19, 2%	0281220000
C52		Capacitor, 1100 PF, 500 V, DM19, 2%	0281000000
C53		Capacitor, 820 PF, 500 V, DM19, 2%	0281280002
C54		Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C55		Capacitor, 390 PF, 500 V, DM15, 2%	0281040001
C56		Capacitor, 270 PF, 500 V, DM15, 2%	0280970005
C57		Capacitor, 160 PF, 500 V, DM15, 2%	0281340005
C58		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C59		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C60		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C61		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C62		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C63		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C64		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C65		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
C66		Capacitor, 0.1 uF, 50 V, X7 R, 20%	0281610002
CR1		Diode, Pin MPN3500	1005260001
CR2		Diode, Pin MPN3500	1005260001
CR3		Diode, Pin MPN3500	1005260001
PC ASSY RECEIVE FILTER BOARD			5024057295
REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
CR4		Diode, Pin MPN3500	1005260001
CR5		Diode, Pin MPN3500	1005260001
CR6		Diode, Pin MPN3500	1005260001
CR7		Diode, Pin MPN3500	1005260001
CR8		Diode, Pin MPN3500	1005260001
CR9		Diode, Pin MPN3500	1005260001
CR10		Diode, Pin MPN3500	1005260001
CR11		Diode, Pin MPN3500	1005260001
CR12		Diode, Pin MPN3500	1005260001
CR13		Diode, Pin MPN3500	1005260001
CR14		Diode, Pin MPN3500	1005260001
CR15		Diode, Pin MPN3500	1005260001
CR16		Diode, Pin MPN3500	1005260001
L1		Inductor, Molded, 120 uH, 10%	06599330008
L2		Inductor, Molded, 120 uH, 10%	06599330008
L3		Inductor, Molded, 120 uH, 10%	06599330008
L4		Inductor, Molded, 120 uH, 10%	06599330008
L5		Inductor, Molded, 120 uH, 10%	06599330008
L6		Inductor, Molded, 120 uH, 10%	06599330008
L7		Inductor, Molded, 120 uH, 10%	06599330008
L8		Inductor, Molded, 120 uH, 10%	06599330008
L9		Inductor, Molded, 47 uH, 5%	0652680003
L10		Inductor, Molded, 47 uH, 5%	0652680003
L11		Inductor, Molded, 22 uH, 5%	0650000005
L12		Inductor, Molded, 22 uH, 5%	0650000005
L13		Inductor, Molded, 22 uH, 5%	0650000005
L14		Inductor, Molded, 22 uH, 5%	0650000005
L15		Inductor, Molded, 22 uH, 5%	0650000005
L16		Inductor, Molded, 22 uH, 5%	0650000005
L17		Inductor, Molded, 5.6 uH, 5%	0650360001
L18		Inductor, Molded, 4.7 uH, 5%	0651910005
L19		Inductor, Molded, 3.3 uH, 5%	0658920006
L20		Inductor, Molded, 2.2 uH, 5%	0649890001
L21		Inductor, Molded, 1.5 uH, 5%	0649270002
L22		Inductor, Molded, 1.0 uH, 5%	0649150007
L23		Inductor, Molded, 0.82 uH, 5%	0652320007
L24		Inductor, Molded, 0.47 uH, 5%	0649410009
L25		Inductor, Molded, 4.7 uH, 5%	0651910005
L26		Inductor, Molded, 3.9 uH, 5%	0650480007
L27		Inductor, Molded, 2.7 uH, 5%	0652180001
L28		Inductor, Molded, 1.8 uH, 5%	0652440002
L29		Inductor, Molded, 1.2 uH, 5%	0649910001
L30		Inductor, Molded, 0.82 uH, 5%	0652320007
L31		Inductor, Molded, 0.56 uH, 5%	0649530004
L32		Inductor, Molded, 0.39 uH, 5%	0649770005
L33		Inductor, Molded, 47 uH, 5%	0652680003
L34		Inductor, Molded, 47 uH, 5%	0652680003
L35		Inductor, Molded, 22 uH, 5%	0650000005
L36		Inductor, Molded, 22 uH, 5%	0650000005
L37		Inductor, Molded, 22 uH, 5%	0650000005
L38		Inductor, Molded, 22 uH, 5%	0650000005
L39		Inductor, Molded, 22 uH, 5%	0650000005
L40		Inductor, Molded, 22 uH, 5%	0650000005
L41		Inductor, Molded, 120 uH, 10%	06599330008
L42		Inductor, Molded, 120 uH, 10%	06599330008
L43		Inductor, Molded, 120 uH, 10%	06599330008
L44		Inductor, Molded, 120 uH, 10%	06599330008
L45		Inductor, Molded, 120 uH, 10%	06599330008
L46		Inductor, Molded, 120 uH, 10%	06599330008
L47		Inductor, Molded, 120 uH, 10%	06599330008
L48		Inductor, Molded, 120 uH, 10%	06599330008
R1		Resistor, 180, 10%, 1/2 W	0173640001
R2		Resistor, 180, 10%, 1/2 W	0173640001
R3		Resistor, 180, 10%, 1/2 W	0173640001
R4		Resistor, 180, 10%, 1/2 W	0173640001
R5		Resistor, 180, 10%, 1/2 W	0173640001
R6		Resistor, 180, 10%, 1/2 W	0173640001
R7		Resistor, 180, 10%, 1/2 W	0173640001
R8		Resistor, 180, 10%, 1/2 W	0173640001
REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R9		Resistor, 10K, 10%, 1/4 W	0170410005
R10		Resistor, 10K, 10%, 1/4 W	0170410005
R11		Resistor, 10K, 10%, 1/4 W	0170410005
R12		Resistor, 10K, 10%, 1/4 W	0170410005
R13		Resistor, 10K, 10%, 1/4 W	0170410005
R14		Resistor, 10K, 10%, 1/4 W	0170410005
R15		Resistor, 10K, 10%, 1/4 W	0170410005
R16		Resistor, 10K, 10%, 1/4 W	0170410005
R17		Resistor, 330, 5%, 1/4 W	0170910008
R18		Resistor, 330, 5%, 1/4 W	0170910008
R19		Resistor, 330, 5%, 1/4 W	0170910008
R20		Resistor, 330, 5%, 1/4 W	0170910008
R21		Resistor, 330, 5%, 1/4 W	0170910008
R22		Resistor, 330, 5%, 1/4 W	0170910008
R23		Resistor, 330, 5%, 1/4 W	0170910008
R24		Resistor, 330, 5%, 1/4 W	0170910008
R25		Resistor, 330, 5%, 1/4 W	0170910008
R26		Resistor, 330, 5%, 1/4 W	0170910008
R27		Resistor, 330, 5%, 1/4 W	0170910008
R28		Resistor, 330, 5%, 1/4 W	0170910008
R29		Resistor, 330, 5%, 1/4 W	0170910008
R30		Resistor, 330, 5%, 1/4 W	0170910008
R31		Resistor, 330, 5%, 1/4 W	0170910008
R32		Resistor, 330, 5%, 1/4 W	0170910008

SUNAIR GSB-900SC

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
R9		Resistor, 10K, 10%, 1/4 W	0170410005
R10		Resistor, 10K, 10%, 1/4 W	0170410005
R11		Resistor, 10K, 10%, 1/4 W	0170410005
R12		Resistor, 10K, 10%, 1/4 W	0170410005
R13		Resistor, 10K, 10%, 1/4 W	0170410005
R14		Resistor, 10K, 10%, 1/4 W	0170410005
R15		Resistor, 10K, 10%, 1/4 W	0170410005
R16		Resistor, 10K, 10%, 1/4 W	0170410005
R17		Resistor, 330, 5%, 1/4 W	0170910008
R18		Resistor, 330, 5%, 1/4 W	0170910008
R19		Resistor, 330, 5%, 1/4 W	0170910008
R20		Resistor, 330, 5%, 1/4 W	0170910008
R21		Resistor, 330, 5%, 1/4 W	0170910008
R22		Resistor, 330, 5%, 1/4 W	0170910008
R23		Resistor, 330, 5%, 1/4 W	0170910008
R24		Resistor, 330, 5%, 1/4 W	0170910008
R25		Resistor, 330, 5%, 1/4 W	0170910008
R26		Resistor, 330, 5%, 1/4 W	0170910008
R27		Resistor, 330, 5%, 1/4 W	0170910008
R28		Resistor, 330, 5%, 1/4 W	0170910008
R29		Resistor, 330, 5%, 1/4 W	0170910008
R30		Resistor, 330, 5%, 1/4 W	0170910008
R31		Resistor, 330, 5%, 1/4 W	0170910008
R32		Resistor, 330, 5%, 1/4 W	0170910008

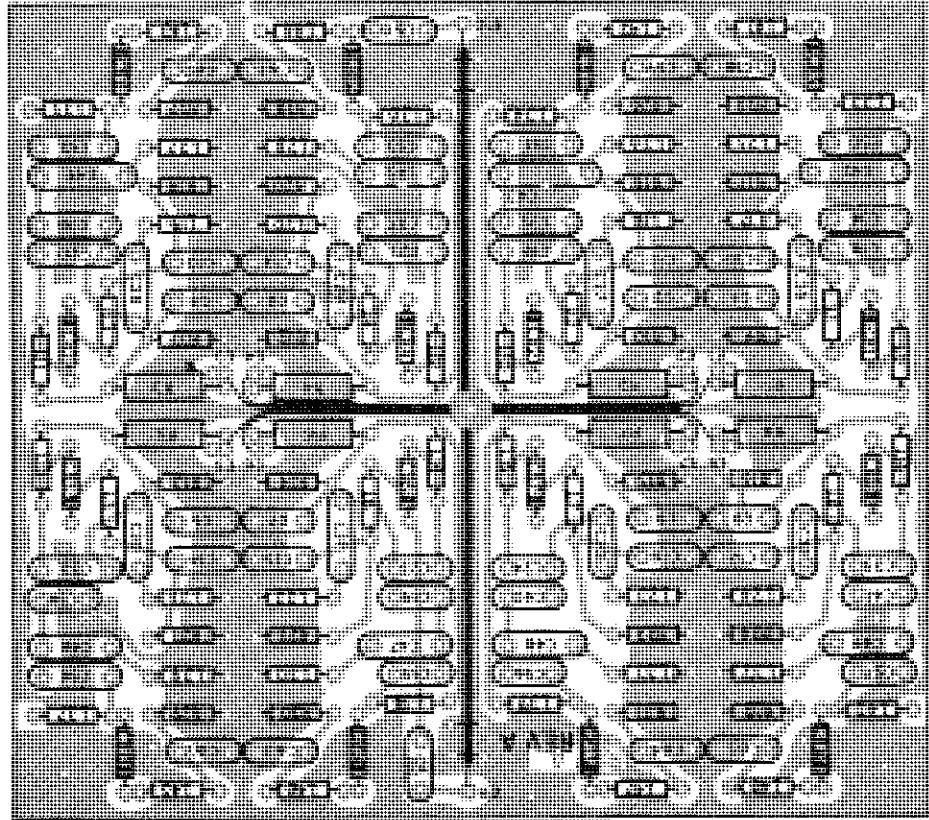
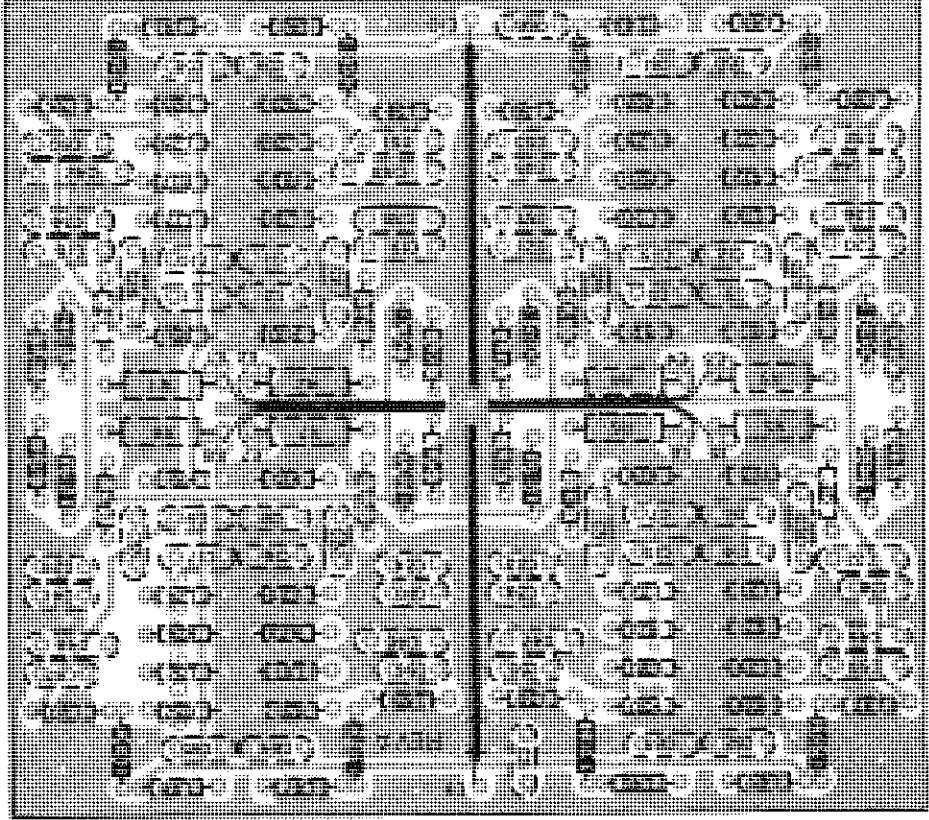
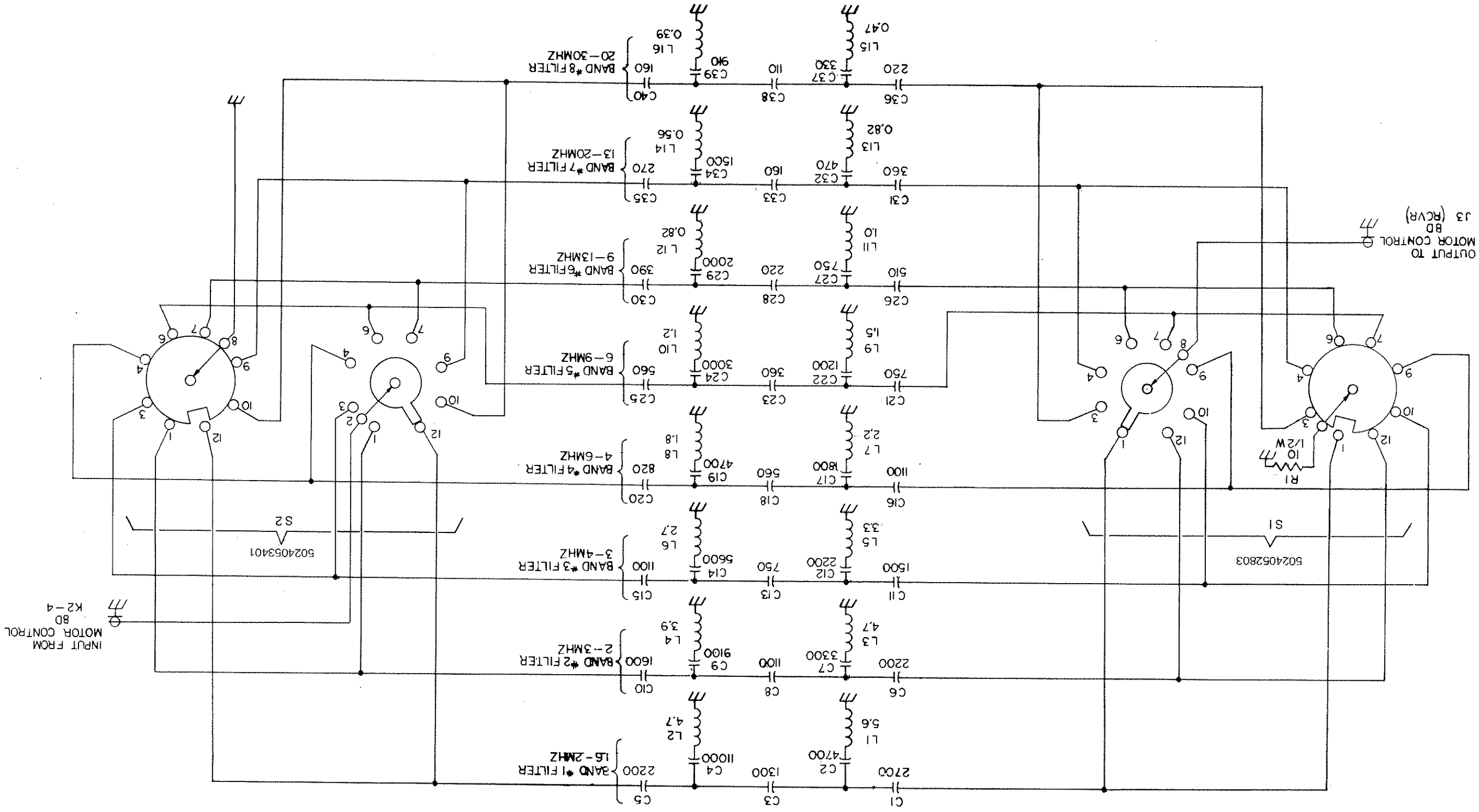


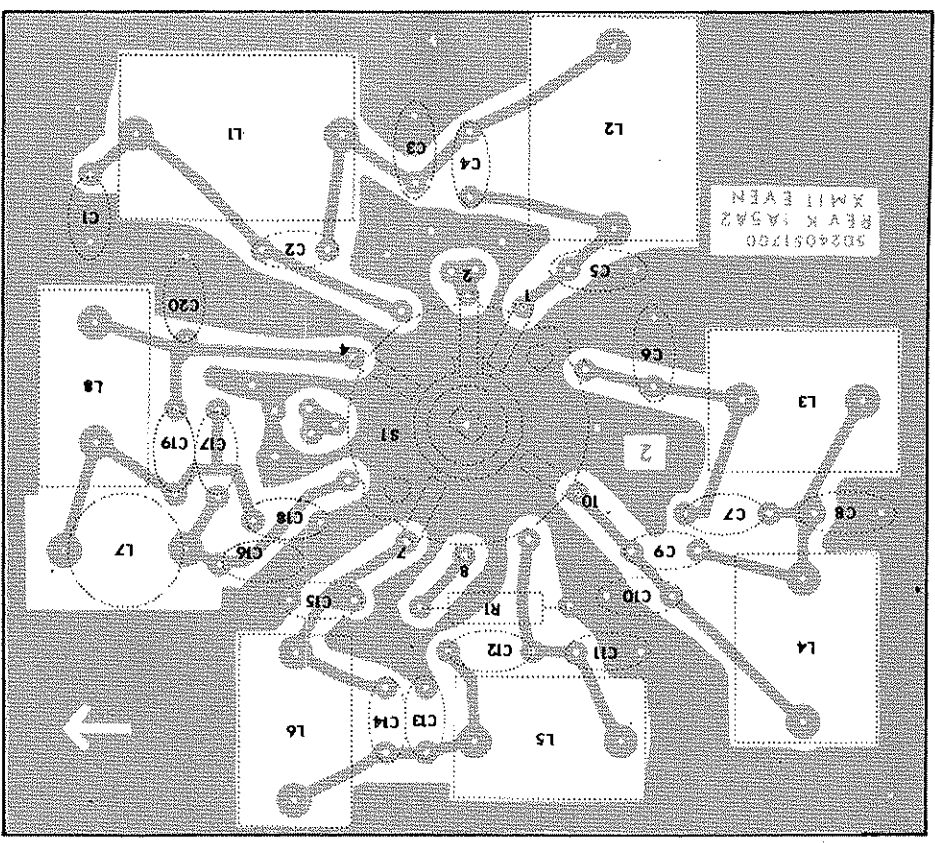
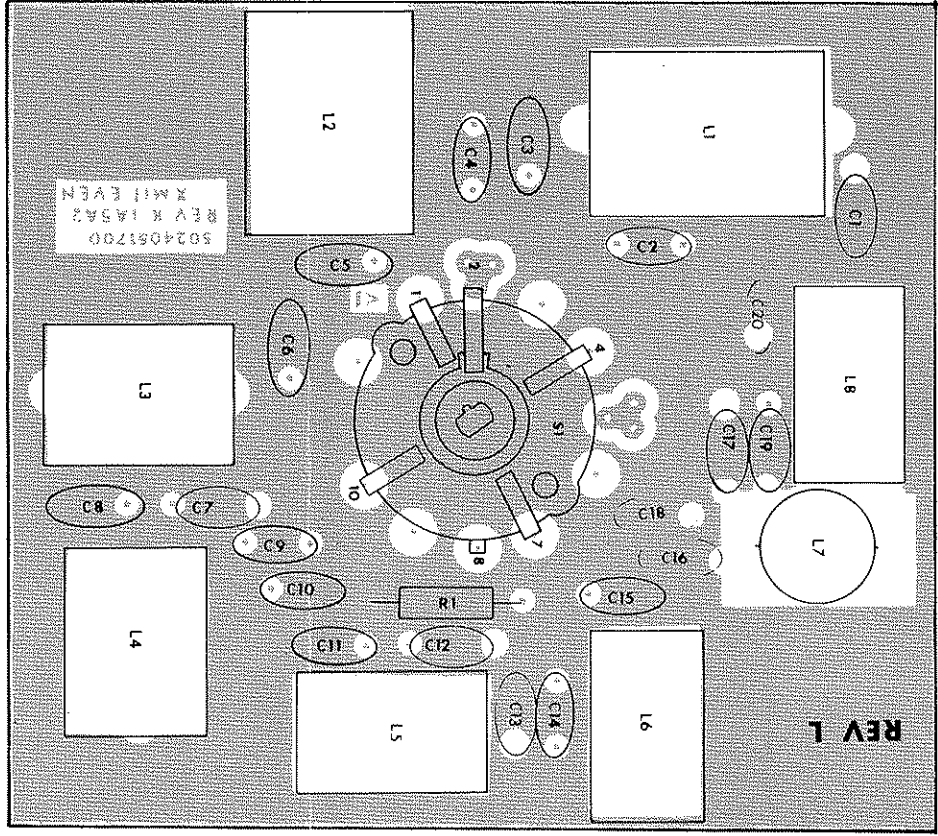
Figure 5.29 Receive Filter Board Schematic (1A5A3)



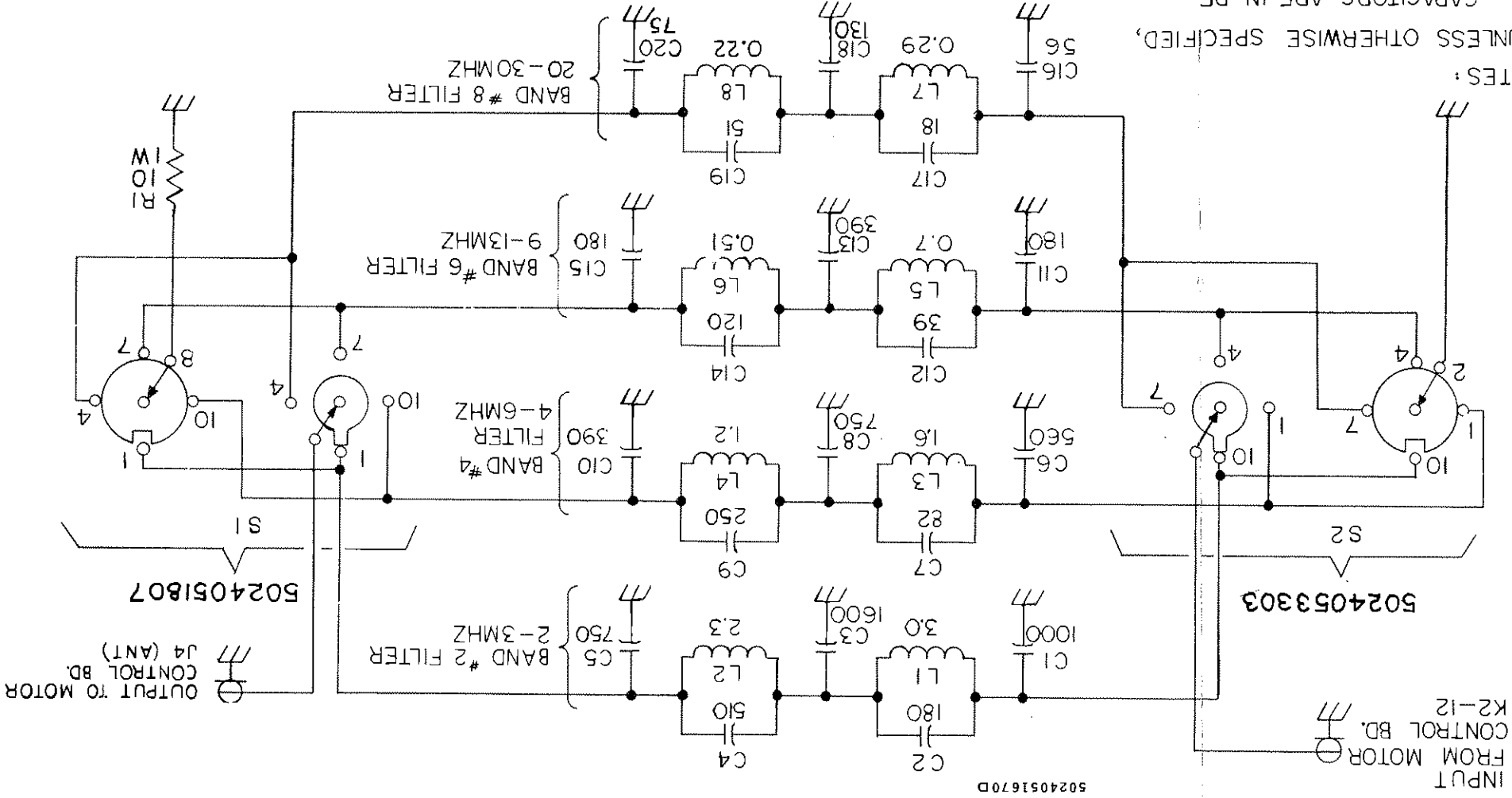
NOTES:
UNLESS OTHERWISE SPECIFIED,
CAPACITORS ARE IN UF,
INDUCTORS ARE IN MH.

PREFIX ALL DESIGNATORS WITH "1A5A3"

Figure 5.29 Receive Filter Board Schematic (1A5A3)



SUNAIR GSB-900SC



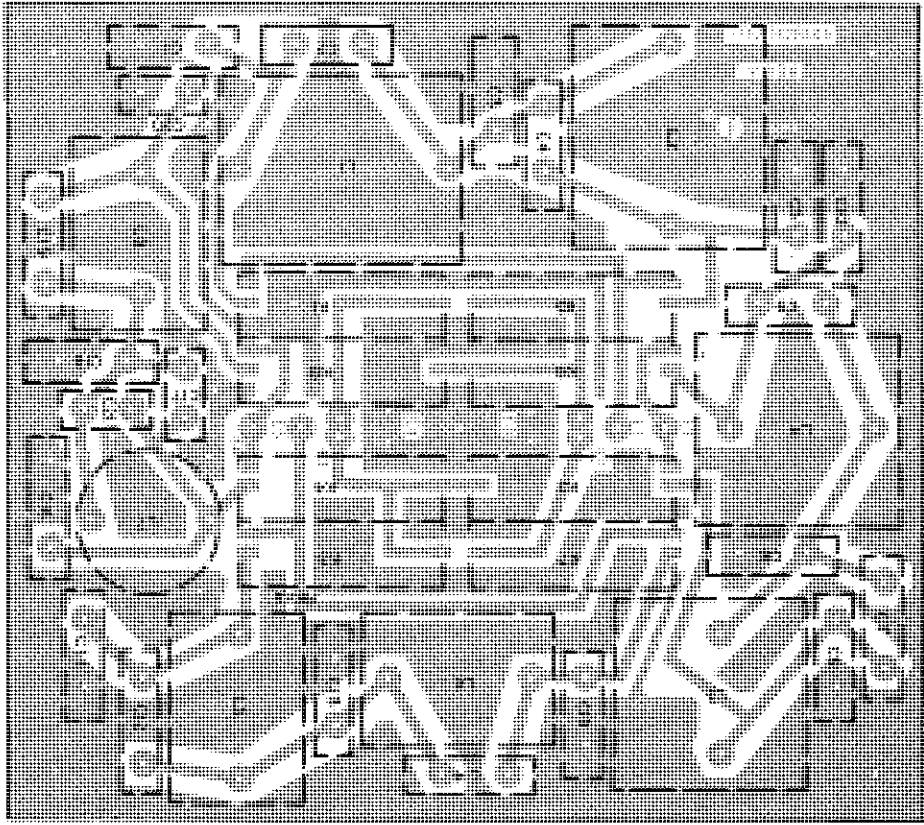
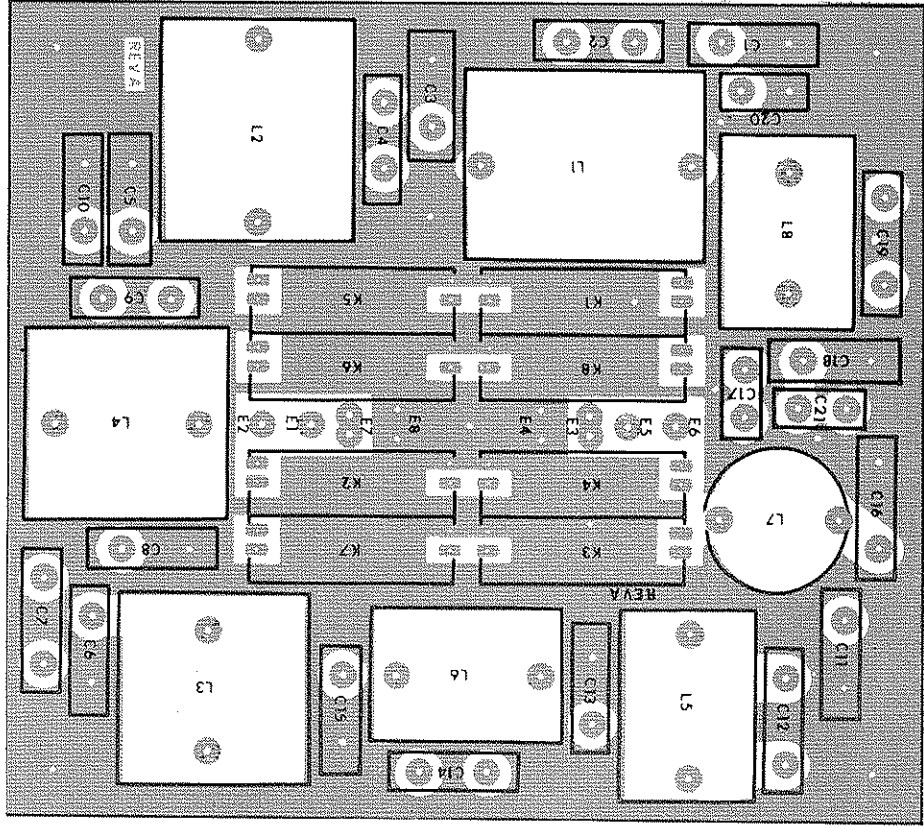
NOTES :
CAPACITORS ARE IN PF.
INDUCTORS ARE IN μ H.
PREFIX ALL DESIGNATORS
WITH "A5A2"

5024051696F PC ASSY EVEN CHANNEL FILTER

REF	SYMBOL	DESCRIPTION	PART NO.
C1		Capacitor, 1000 PF, 500 V, DM19, 2%	0281210004
C2		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005
C3		Capacitor, 1600 PF, 500 V, DM19, 2%	0281220000
C4		Capacitor, 510 PF, 500 V, DM19, 2%	0282630007
C5		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C6		Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C7		Capacitor, 82 PF, 500 V, DM20, 2%	0282790004
C8		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C9		Capacitor, 250 PF, 500 V, DM19, 2%	0282680004
C10		Capacitor, 390 PF, 500 V, DM19, 2%	0282640002
C11		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005
C12		Capacitor, 39 PF, 500 V, DM20, 2%	0282830006
C13		Capacitor, 390 PF, 500 V, CM19, 2%	0282640002
C14		Capacitor, 120 PF, 500 V, DM19, 2%	0282750002
C15		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005

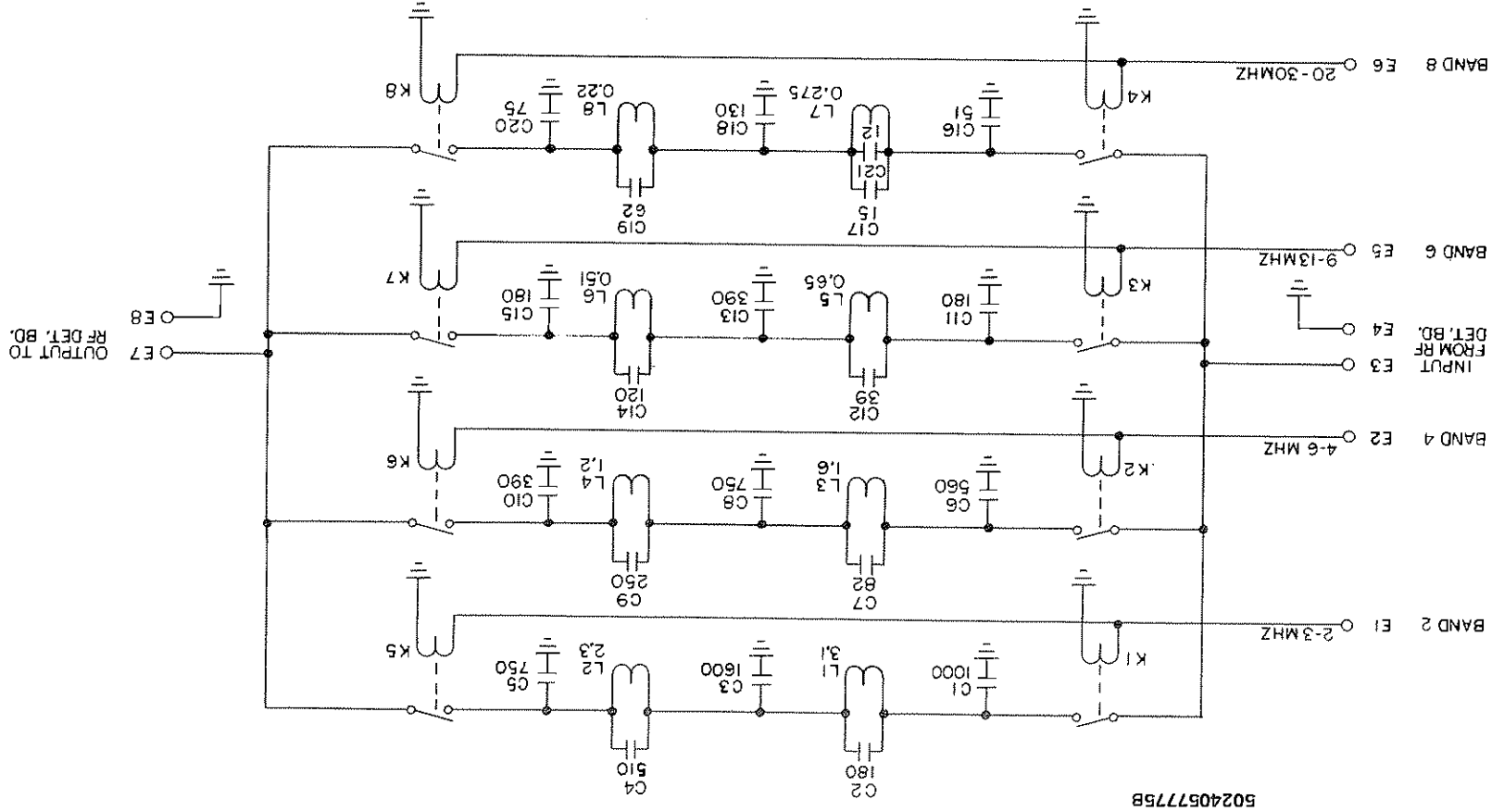
REF	SYMBOL	DESCRIPTION	PART NO.
C16		Capacitor, 51 PF, 500 V, DM20, 2%	0282820001
C17		Capacitor, 18 PF, 500 V, DM20	0282680002
C18		Capacitor, 130 PF, 500 V, DM19, 2%	0282740007
C19		Capacitor, 51 PF, 500 V, DM20	0282820001
C20		Capacitor, 75 PF, 500 V, DM15, 2%	0281110000
L1		Inductor, Filter, 3.10 μ H GRY	5024051904
L2		Inductor, Filter, 2.32 μ H WHt	50240522006
L3		Inductor, Filter, 1.60 μ H GRN	5024051106
L4		Inductor, Filter, 1.20 μ H WH/Red	5024052102
L5		Inductor, Filter, 0.65 μ H WH/GRN	5024052200
L6		Inductor, Filter, 0.51 μ H, WH/Vel	5024052307
L7		Inductor, Filter, 0.275 μ H Vio	5024051505
L8		Inductor, Filter, 0.22 μ H, WH/GRN	5024052501
R1		Resistor, 10, 10%, 1W	0196090008
S1		Switch, Wafer, Even Ch. Top	5024051807
S2		Switch, Wafer, Even Ch. Bottom	5024053303

Figure 5.30 Even Channel Filter Schematic (1A5A2)



SUNAIR GSB-900SC

50240577758



NOTES:
1. CAPACITORS ARE IN PICOFARADS;
2. INDUCTANCE VALUES ARE IN MICROHENRIES

5024057791A PC ASSY EVEN CHANNEL FILTER

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		PC ASSY EVEN CHANNEL FILTER	5024057791
C2		Capacitor, 180 PF, 500 V, DM19, 2%	0281210004
C3		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005
C4		Capacitor, 510 PF, 500 V, DM19, 2%	0282630007
C5		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C6		Capacitor, 560 PF, 500 V, DM19, 2%	0281060002
C7		Capacitor, 82 PF, 500 V, DM20, 2%	0282790004
C8		Capacitor, 750 PF, 500 V, DM19, 2%	0280990006
C9		Capacitor, 250 PF, 500 V, DM19, 2%	0282680004
C10		Capacitor, 390 PF, 500 V, DM19, 2%	0282640002
C11		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005
C12		Capacitor, 39 PF, 500 V, DM20, 2%	0282830006
C13		Capacitor, 390 PF, 500 V, DM19, 2%	0282640002
C14		Capacitor, 120 PF, 500 V, DM19, 2%	0282750002
C15		Capacitor, 180 PF, 500 V, DM19, 2%	0282700005
C16		Capacitor, 51 PF, 500 V, DM20, 2%	0282820001
C17		Capacitor, 15 PF, 500 V, DM15	1005320021
C18		Capacitor, 130 PF, 500 V, DM19, 2%	0282740007
C19		Capacitor, 62 PF, 500 V, DM20, 2%	0282810005

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C20		Capacitor, 75 PF, 500 V, OM15, 2%	0281110000
K1		Relay, SPST, 12 V, Reed	1005330000
K2		Relay, SPST, 12 V, Reed	1005330000
K3		Relay, SPST, 12 V, Reed	1005330000
K4		Relay, SPST, 12 V, Reed	1005330000
K5		Relay, SPST, 12 V, Reed	1005330000
K6		Relay, SPST, 12 V, Reed	1005330000
K7		Relay, SPST, 12 V, Reed	1005330000
K8		Relay, SPST, 12 V, Reed	1005330000
L1		Inductor, Filter, 3.10 UH GRY	5024051904
L2		Inductor, Filter, 2.32 UH WHt	5025052005
L3		Inductor, Filter, 1.60 UH Orn	5024051106
L4		Inductor, Filter, 1.20 UH WH/Red	5024052102
L5		Inductor, Filter, 0.65 UH WH/Orn	5024052200
L6		Inductor, Filter, 0.51 UH WH/Yel	5024052307
L7		Inductor, Filter, 0.275 UH, Vio	5025051505
L8		Inductor, Filter, 0.22 UH WH/Grn	5024052501

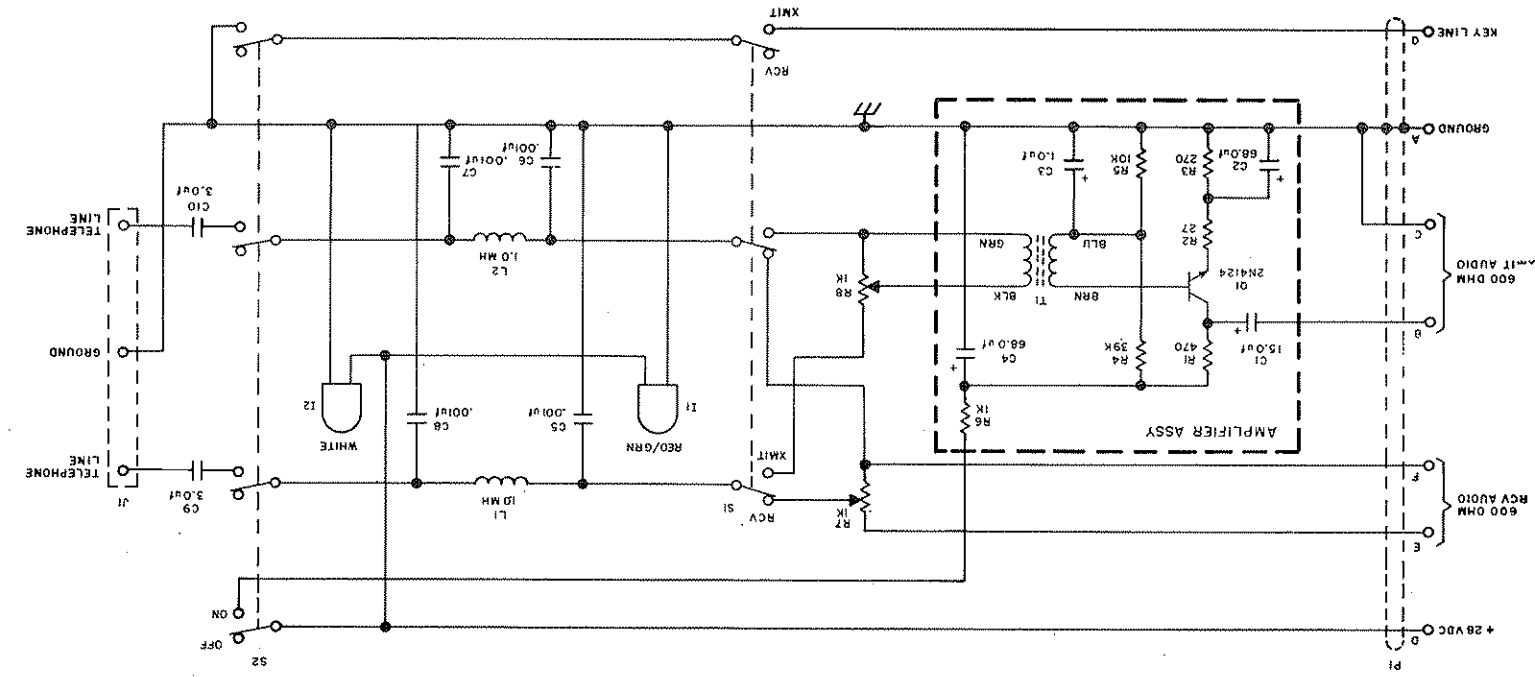


Figure 6.2 Manual Phone Patch Schematic Diagram

6-3

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		Capacitor, 15 uF, 20 V, 198 D	0280920008
C2		Capacitor, 68 uF, 15 V, T368	0296540005
C3		Capacitor, 1 uF, 50 V, 198 D	0280910002
C4		Capacitor, 68 uF, 15 V, T368	0296540005
C5		Capacitor, 0.001 uF, 250 V, X5 R, 10%	0286260000
C6		Capacitor, 0.001 uF, 250 V, X5 R, 10%	0286260000
C7		Capacitor, 0.001 uF, 250 V, X5 R, 10%	0286260000
C8		Capacitor, 0.001 uF, 250 V, X5 R, 10%	0286260000
C9		Capacitor, 3 uF, 200 V, Mylar	0278520006
C10		Capacitor, 3 uF, 200 V, Mylar	0278520006
L1		Inductor, Molded, 2000 uH, 5%	0653590008
L2		Inductor, Molded, 2000 uH, 5%	0653590008
P1		Connector, Power, 10 Pin Round	0754000001
Q1		Transistor, NPN, SI, 2N4124	0448010003
R1		Resistor, 470, 5%, 1/4 W	0184110009
R2		Resistor, 27, 10%, 1/4 W	0172590001
R3		Resistor, 270, 10%, 1/4 W	0178450006
R4		Resistor, 39 K, 10%, 1/4 W	0177800003
R5		Resistor, 10 K, 10%, 1/4 W	0170410005
R6		Resistor, 1 K, 10%, 1/4 W	0171560001
R7		Pot., 1 K, 10%, 3/4 W, 1/8 Shaft	0346610001
R8		Pot., 1 K, 10%, 3/4 W, 1/8 Shaft	0346610001
T1		Transformer, Audio	0491590008
TB1		Barrier Strip, 3 Pos, 6-32	0542330008
		Switch Assy.	0346390095
		Switch Assy.	0346400091
		Knob, .50 D, BIK, W/D Br. Screw	0346420008
		Clamp, Cable 1/4 ID, 3/8 W	0501840001
		Bushing, Telescoping, .31 ID	0700550038
		Bushing, Telescoping, .44 ID	0700550046
		Bushing, Telescoping, .56 ID	0700550054
		Clamp, Cable, Connector	0740250001
		Panel, Front	50244005xx
		Panel, Rear	50244007xx
		Plate, Mounting	50244009xx
		Bar, Mounting	5024401000
		Plate, Cover	50244011xx

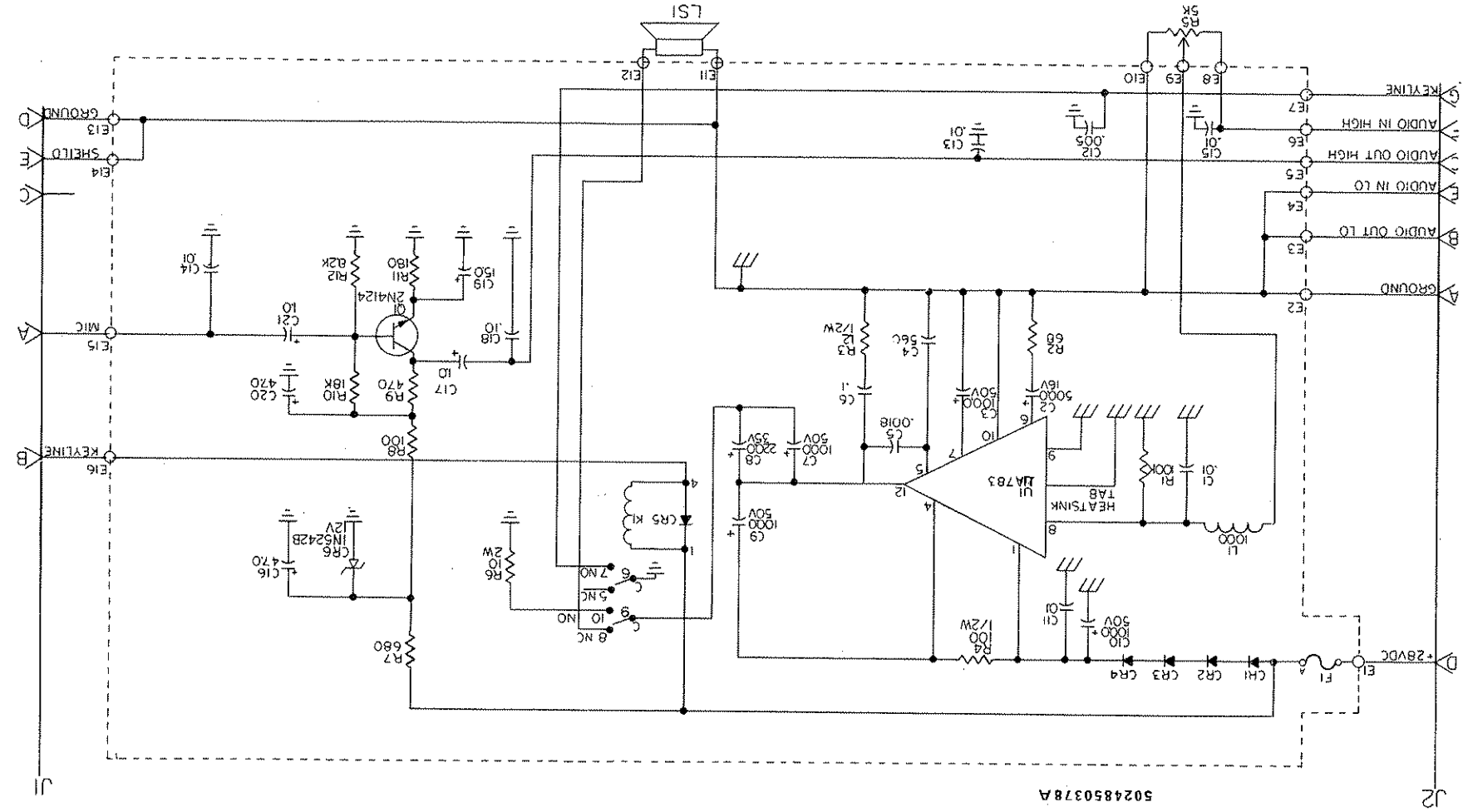
5024400976 PC ASSY/CHAS, PHONE PATCH

PANEL, FRONT

REF	SYMBDL	DESCRIPTION	SUNAIR PART NO.
		Panel, Front	5024400500
		Panel, Rear	5024400704
		Plate, Mounting	5024400909
		Bar, Mounting	5024401000
		Plate, Cover	5024401107
C5		Capacitor, Disc Ceramic, .001 UF, 250 V	0286260000
C6		Capacitor, Disc Ceramic, .001 UF, 250 V	0286260000
C7		Capacitor, Disc Ceramic, .001 UF, 250 V	0286260000
C8		Capacitor, Disc Ceramic, .001 UF, 250 V	0286260000
J1		Barrier Strip, 3 Terminal	05423330008
L1		Inductor, 2 MHz	06533590008
L2		Inductor, 2 MHz	06533590008
P1		Connector, 10 Pin	07540000001
R7		Potentiometer, Carbon, 1K, 10%, 1/2W	0346610001
R8		Potentiometer, Carbon, 1K, 10%, 1/2W	0346610001
S1		Switch, Illuminated, 4 PDT Red/Green,	0346610001
S2		Switch, Illuminated, 4 PDT Wht 28 V	0346400091
		Bulb	0346390095
		Amplifier, Assembly (see separate parts list)	5024400097
		Cable, 7 Conductor	0604710003
		Knob, Black	0346420008
		Boot	0700550046
		Boot	0700550038
		Cable Clamp	0740250001

PHONE PATCH AMPLIFIER ASSY.

REF	SYMBOL	DESCRIPTION	SUNAIR PART NO.
C1		Capacitor, Tantalum, 15UF, 20V	0280920008
C2		Capacitor, Tantalum, 68UF, 15V	0296540005
C3		Capacitor, Tantalum, 1UF, 35V	0280910002
C4		Capacitor, Tantalum, 68UF, 15V	0296540005
Q1		Transistor, NPN, 2N4124	0448010003
R1		Resistor, Carbon, 470 ohm, 10%, 1/4W	0184110009
R2		Resistor, Carbon, 27 ohm, 10%, 1/4W	0172590001
R3		Resistor, Carbon, 270 ohm, 10%, 1/4W	0178450006
R4		Resistor, Carbon, 39K, 10%, 1/4W	0177800003
R5		Resistor, Carbon, 10K, 10%, 1/4W	0170410005
R6		Resistor, Carbon, 1K, 10%, 1/4W	0171560001
T1		Transformer, Audio, 150 ohm to 600 ohm	0491590008



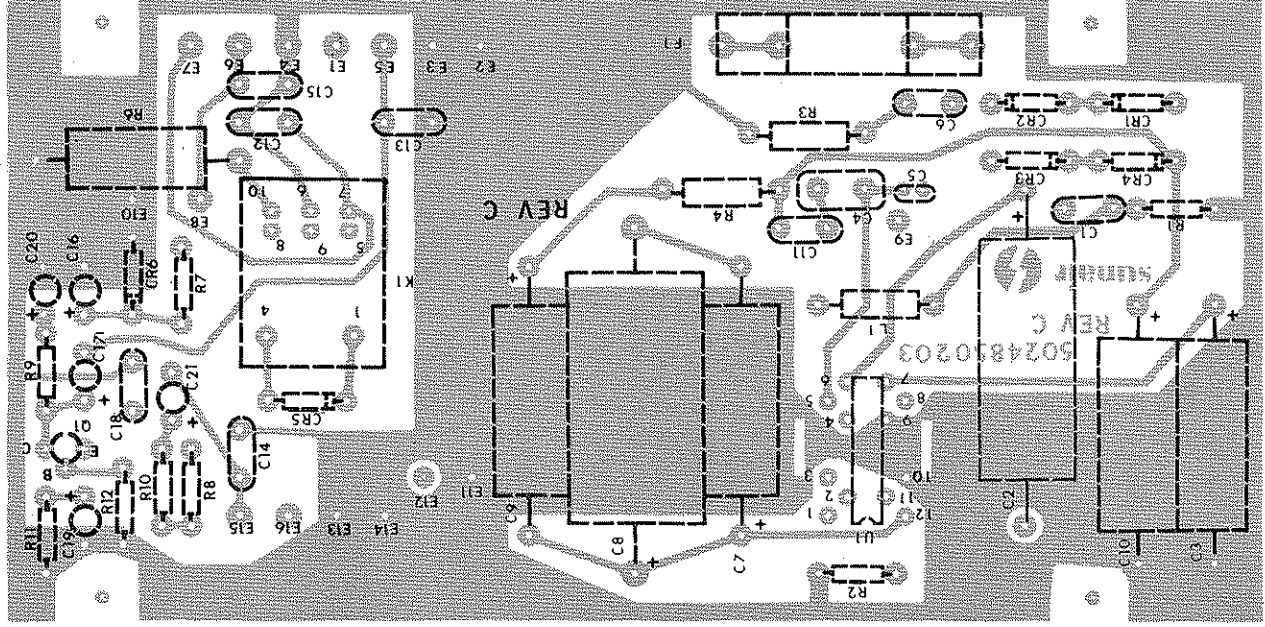
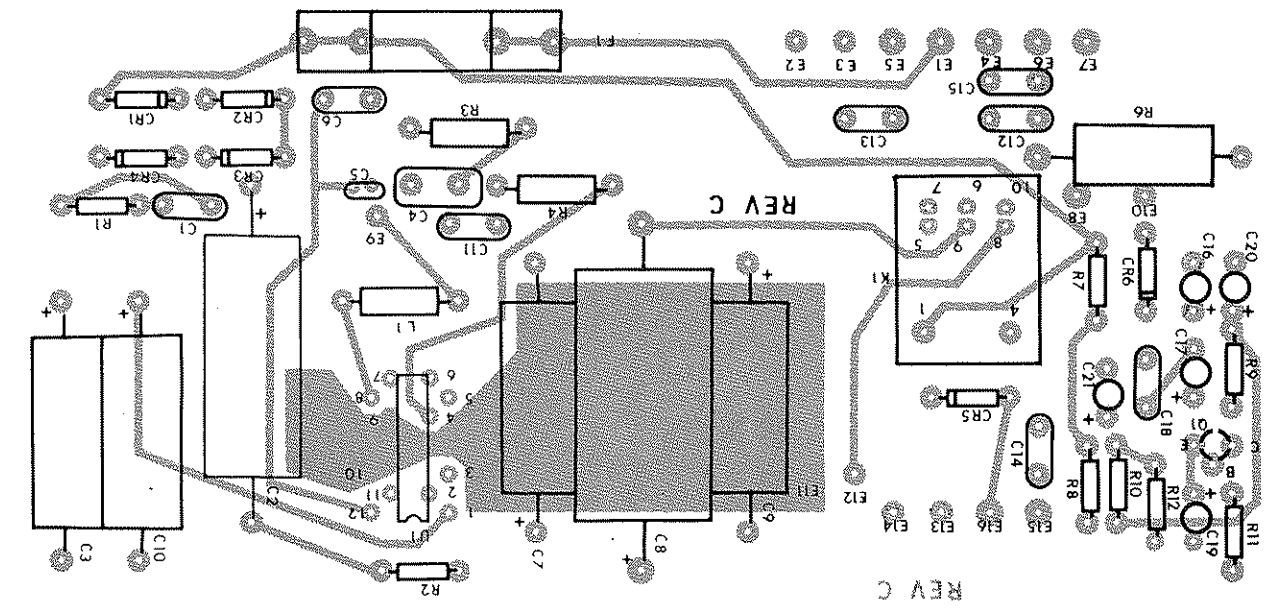
QTY	DESCRIPTION	REF
1	783	U1
1	2N4124	Q1
1	2N4124	Q2
1	1N4004	CR1
1	1N4004	CR2
1	1N4004	CR3
1	1N4004	CR4
1	1N4004	CR5
1	1N4004	CR6
1	1N4004	CR7
1	1N4004	CR8
1	1N4004	CR9
1	1N4004	CR10
1	1N4004	CR11
1	1N4004	CR12
1	1N4004	CR13
1	1N4004	CR14
1	1N4004	CR15
1	1N4004	CR16
1	1N4004	CR17
1	1N4004	CR18
1	1N4004	CR19
1	1N4004	CR20
1	1N4004	CR21
1	1N4004	CR22
1	1N4004	CR23
1	1N4004	CR24
1	1N4004	CR25
1	1N4004	CR26
1	1N4004	CR27
1	1N4004	CR28
1	1N4004	CR29
1	1N4004	CR30
1	1N4004	CR31
1	1N4004	CR32
1	1N4004	CR33
1	1N4004	CR34
1	1N4004	CR35
1	1N4004	CR36
1	1N4004	CR37
1	1N4004	CR38
1	1N4004	CR39
1	1N4004	CR40
1	1N4004	CR41
1	1N4004	CR42
1	1N4004	CR43
1	1N4004	CR44
1	1N4004	CR45
1	1N4004	CR46
1	1N4004	CR47
1	1N4004	CR48
1	1N4004	CR49
1	1N4004	CR50
1	1N4004	CR51
1	1N4004	CR52
1	1N4004	CR53
1	1N4004	CR54
1	1N4004	CR55
1	1N4004	CR56
1	1N4004	CR57
1	1N4004	CR58
1	1N4004	CR59
1	1N4004	CR60
1	1N4004	CR61
1	1N4004	CR62
1	1N4004	CR63
1	1N4004	CR64
1	1N4004	CR65
1	1N4004	CR66
1	1N4004	CR67
1	1N4004	CR68
1	1N4004	CR69
1	1N4004	CR70
1	1N4004	CR71
1	1N4004	CR72
1	1N4004	CR73
1	1N4004	CR74
1	1N4004	CR75
1	1N4004	CR76
1	1N4004	CR77
1	1N4004	CR78
1	1N4004	CR79
1	1N4004	CR80
1	1N4004	CR81
1	1N4004	CR82
1	1N4004	CR83
1	1N4004	CR84
1	1N4004	CR85
1	1N4004	CR86
1	1N4004	CR87
1	1N4004	CR88
1	1N4004	CR89
1	1N4004	CR90
1	1N4004	CR91
1	1N4004	CR92
1	1N4004	CR93
1	1N4004	CR94
1	1N4004	CR95
1	1N4004	CR96
1	1N4004	CR97
1	1N4004	CR98
1	1N4004	CR99
1	1N4004	CR100

NOTES:
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE IN OHMS, 1/4W, 10%
ALL CAPACITORS ARE IN UF, OTHERS ARE IN PF.
3 INDUCTORS ARE IN MICROHENRIES
4 DIODES ARE : 1N4004

5024850378A

Figure 6.5 GRC-951 Audio Remote Control Unit

SUNAIR GSB-900SC



REF	SYMBOL	DESCRIPTION	PART NO.
C1		Capacitor, 0.1uF, 50V, X7R, 20%	0281620002
C2		Capacitor, 500uF, 15V, B+	0273070002
C3		Capacitor, 100uF, 50V	1004260016
C4		Capacitor, 560PF, 300V, DM15, 5%	02883750006
C5		Capacitor, 1800PF, 100V, X7R, 10%	02886900001
C6		Capacitor, 0.1uF, 50V, X7R, 20%	0281610002
C7		Capacitor, 100 uF, 50V	1004260016
C8		Capacitor, 220MF, 50V	0282200002
C9		Capacitor, 100uF, 50V	1004260016
C10		Capacitor, 100uF, 50V	1004260016
C11		Capacitor, 0.1uF, 50V, X7R, 20%	0281610002
C12		Capacitor, 0.005uF, 100V, Z5V	0273330004
C13		Capacitor, 0.01uF, 25V, X55	0281620008
C14		Capacitor, 0.01uF, 25V, X55	0281620008
C15		Capacitor, 0.01uF, 25V, X55	0281620008
C16		Capacitor, 47uF, 20V, 196D	0281700001
C17		Capacitor, 1uF, 50V, 198D	0280910002
C18		Capacitor, .01uF, 25V, X55	0281610008
C19		Capacitor, 15uF, 20V, 198D	0280920008
C20		Capacitor, 47uF, 20V, 196D	0281700001
C21		Capacitor, 1uF, 50V, 198D	0280910002
CR1		Diode, Rectifier 1N4004	0405180004
CR2		Diode, Rectifier 1N4004	0405180004
CR3		Diode, Rectifier 1N4004	0405180004
CR4		Diode, Rectifier 1N4004	0405180004
CR5		Diode, Rectifier 1N4004	0405180004
CR6		Diode, Zener 1N5242	0400120003
F1		Fuse, MDL, 1Amp, 250V	0841100004
K1		Relay, DPDT, 24V, PC Mount	1005120013
L1		Inductor, Molded, 1000uH, 5%	0643310002
Q1		Transistor, NPN, Si, 2N4124	048010003
R1		Resistor, 100K, 10%, 1/4W	0170390004
R2		Resistor, 68, 10%, 1/4W	0187960003
R3		Resistor, 1.2, 10%, 1/2W	0188490001
R4		Resistor, 100, 10%, 1/2W	0174790007
R5		Potentiometer, 5K, 10%, 2W, 1/4 Shaft	0346020000
R6		Resistor, 10, 10%, 2W	0163840008
R7		Resistor, 680, 10%, 1/2W	0167500007
R8		Resistor, 100, 5%, 1/4W	0171180003
R9		Resistor, 470, 5%, 1/4W	0184110009
R10		Resistor, 18K, 10%, 1/4W	0175720002
R11		Resistor, 180, 10%, 1/4W	0175220000
R12		Resistor, 8.2K, 10%, 1/4W	0181620006
U1		IC Linear UA 783P	1004260024
		Fuseclip, PC Mount	0534610005
		Connector, Power, 5 Pin Round	0753560003
		Connector, Power, 10 Pin Round	0753790008
		Speaker, 3x5 Oval, 8 ohm, 5W	0877970009

SECTION 6

ACCESSORIES

6.1.2 OPERATION

To operate the patch, turn on the GSB-900SC, then turn the patch power switch up to "ON". The TRANSMIT-RECEIVE switch should be in the center position. The power switch should light "WHITE" and the TRANSMIT-RECEIVE switch should light "RED". The receiver output is now patched to the telephone lines. Adjust the RCV GAIN control on the patch for a comfortable level in the telephone handset (if exceptionally lossy telephone lines are encountered, more receive gain may be obtained by turning IA3A4 R48 on the GSB-900SC Audio Board clockwise 5 or 6 turns).

To transmit from the phone lines through the GSB-900SC, move the TRANSMIT-RECEIVE switch up to "TRANSMIT" position. The switch should now show a "RED" color and the transmitter should be keyed. Adjust the XMIT GAIN control clockwise until the GSB-900SC front panel meter (switch in FWD position) shows no further increase, indicating ALC has been reached. (If exceptionally lossy telephone lines are encountered, additional transmit gain may be obtained by turning IA3A4 R58 on the GSB-900SC Audio Board, clockwise ten turns).

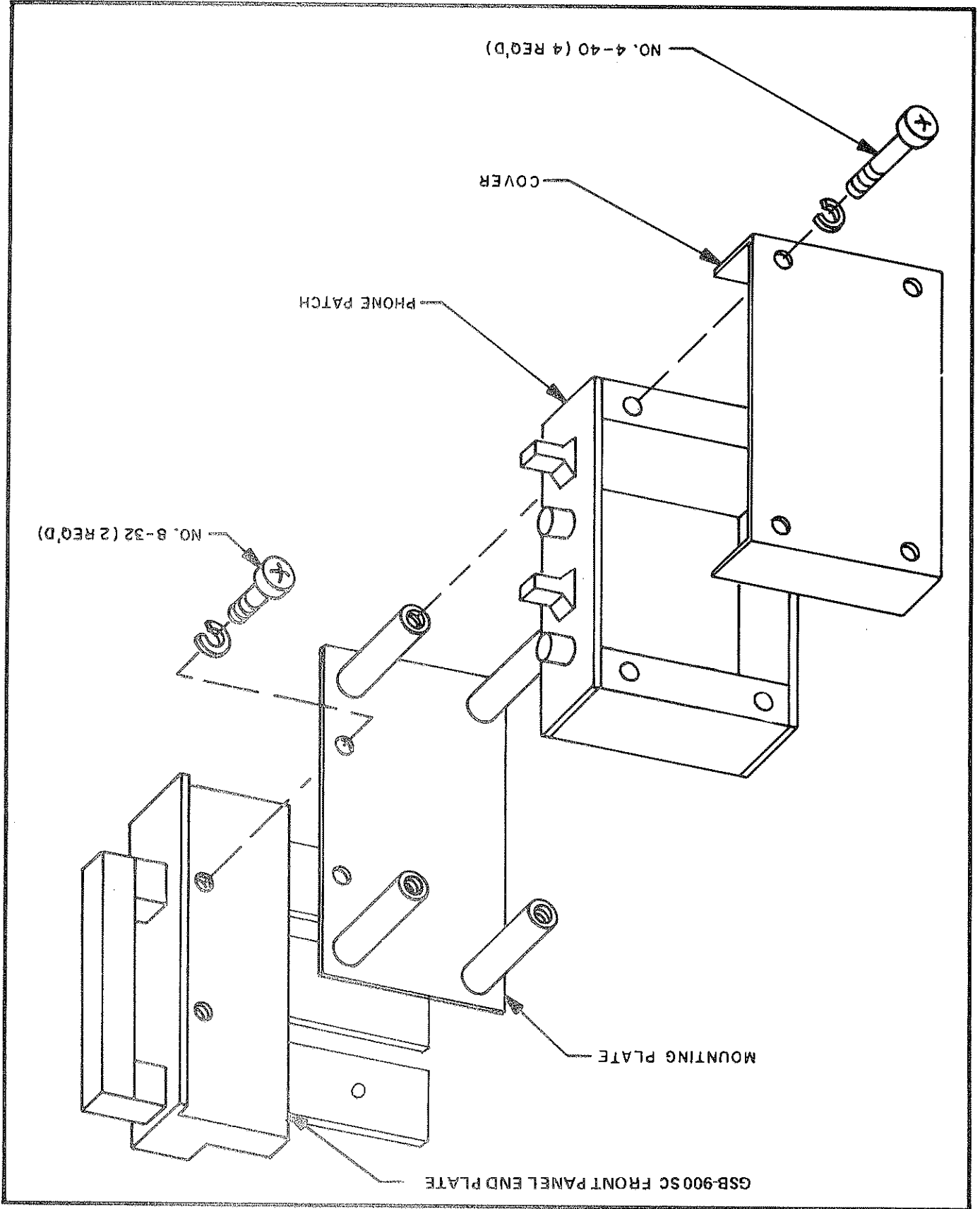
6.1 PHONE PATCH OPTION

The Phone Patch option may be used to transfer information from the telephone lines through the GSB-900SC. The patch is not automatic and must be manually switched between receive and transmit functions. This requires that both conversing parties say "OVER" upon completion of each transmission to enable the radio operator to switch the patch unit.

6.1.1 INSTALLATION

The Phone Patch may be installed on either the left or right hand front panel end plates (See Figure 6.1). The mounting plate is installed first to the end plate (the microphone mounting clip must be relocated if patch is installed on the left side). Then the patch assembly is slid over the four mounting posts and the cover placed over the assembly. The telephone line is connected to the two outside terminals on the terminal strip on the rear apron of the patch. The patch control connector is then plugged into the audio connector, IA8J2, on the rear panel of the GSB-900SC.

Figure 6.1 GSB-900SC Phone Patch Mounting Instructions



6.2.1 GENERAL

The Receiver Protector is an instant shunt peak power limiter which prevents damage to the sensitive receiver "front end" of the GSB-900SC from high level RF signals picked up by the antennas. The option is recommended whenever there is a possibility of operating the GSB-900SC in the vicinity of other high powered transmitters as is often the case in shelter and marine installations. The protector requires no operating power and is therefore effective even if the receiver is disconnected from the power mains.

As operation of the protector is extremely rapid, it affords adequate protection against out-of-band signals well up into the microwave region. The option is installed in the filter module, 1A5 (see figure 5-28).

62.2.3 INSTALLATION

1. Remove the filter module, 1A5 from the GSB-900SC.

2. Remove the 4 flat head screws on the sides of the filter module case and carefully slide the PC assembly out of the case.

3. Apply a thin film of thermal compound to the mounting flange of each diode.

CAUTION
Do not apply excess torque.

4. Reassemble filter module and replace in radio.
5. When assembly is complete, connect an ohmmeter such as a Simpson Model 260 on the RX1 range between the antenna jack and ground. The meter should indicate less than 20 ohms. Reverse the polarity of the ohm meter leads. Approximately the same reading should be obtained.

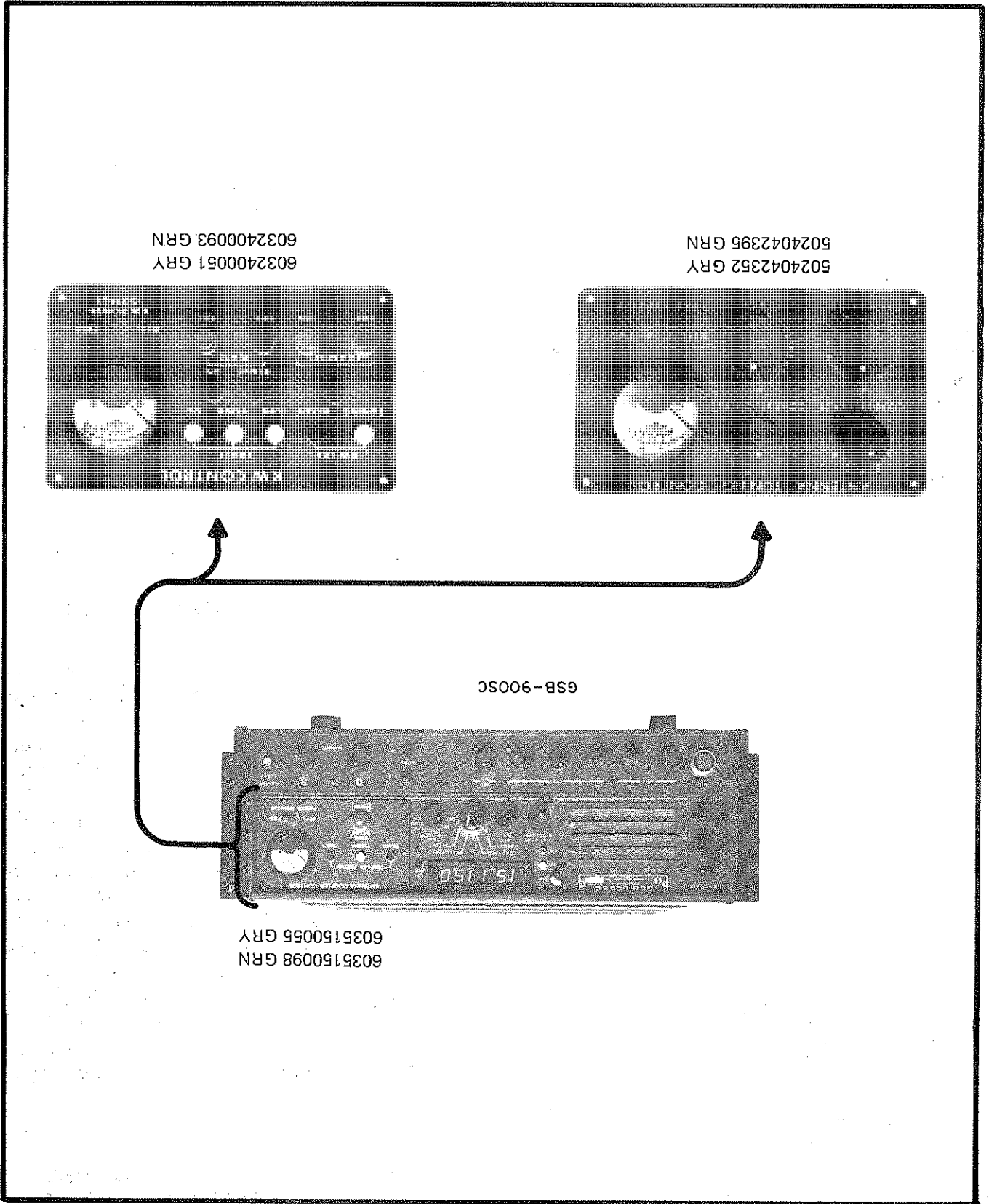
Use care not to apply excess heat to the diodes when soldering. Apply heat only to the top of the insulated terminals of the diodes. Because of the small size of the diodes, do not attempt to crimp the wires to the diodes, but, rather, lay the wires on the tops of the diodes and solder.

CAUTION

Since the diodes are connected across the coax, and one diode has its anode connected to its mounting stud while the other has its cathode connected to its stud, it does not matter which diode is mounted in which hole.

NOTE

Figure 6.3 GSB-900SC Optional Antenna Tuning/Coupler/KW Control Panels



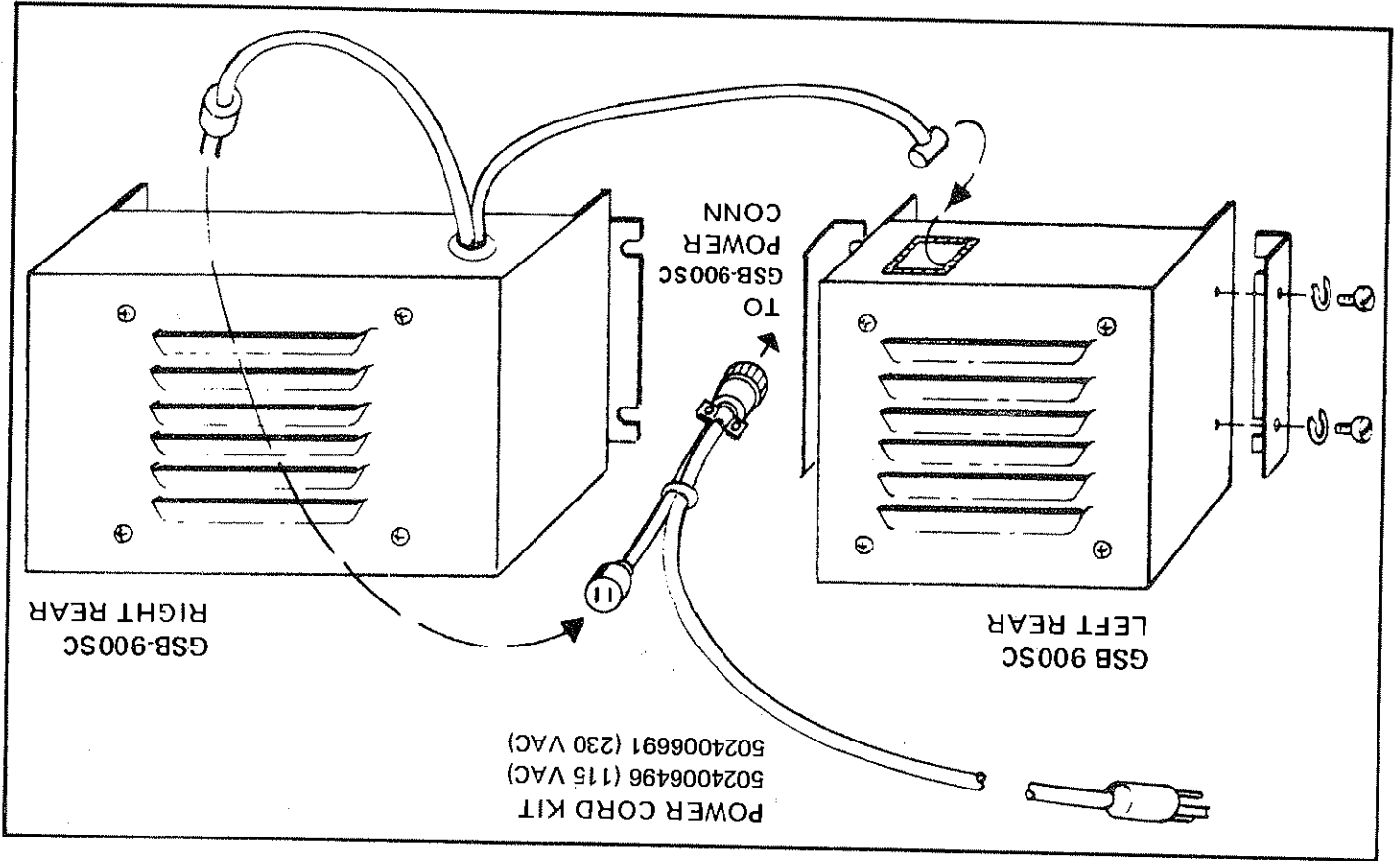
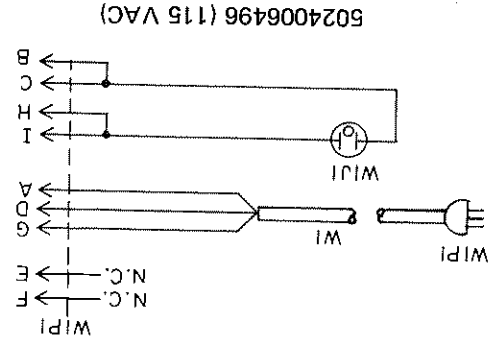
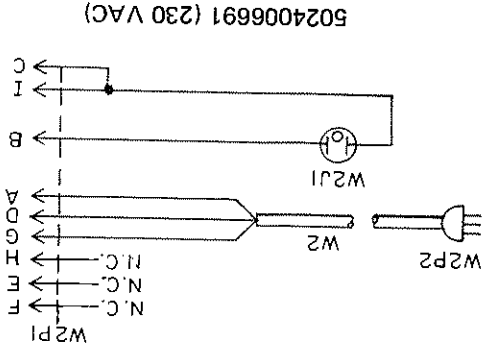


Figure 6.4 Blower Kit Installation Instructions

INSTALL SMALL BRACKETS TO POWER SUPPLY HEAT SINK (THE SMALLER ONE) THEN INSTALL SMALL BLOWER AND ENCLOSURE TO BRACKETS AS SHOWN; INSTALL LARGE BLOWER TO POWER AMPLIFIER HEAT SINK. CONNECT SMALL CORD TO CONNECTOR ON SMALLER



BLOWER, THROUGH CUTOUT IN ENCLOSURE AS SHOWN. CONNECT POWER CONNECTOR (TWO PRONGED) TO SOCKET ON PIGTAIL FROM GSB-900SC POWER CONNECTOR. BLOWERS WILL BE ENERGIZED WHENEVER GSB-900SC POWER SWITCH IS TURNED ON.



SUNAIR GSB-900SC

6.3 GRC-951 AUDIO REMOTE CONTROL

Refer to figure 6.4

The receive audio from the remote 600 ohm audio of the GSB-900SC is applied to speaker driver U1 via remote control cable 0588690007. U1 is a hybrid integrated circuit audio amplifier identical to that used in the speaker driver, IA1A1 (see section 4.3.5). On receive, the output of U1 is applied to speaker LS1 through relay K1. On

transmit, K1 is energized and disconnects LS1 from the amplifier. Dummy load R3 is switched across the output of the amplifier to maintain the proper loading on the speaker driver.

On transmit, the audio from the microphone is amplified by Q1 and is applied to the 600 ohm audio input of the GSB-900SC via remote control cable 0588690007.

REFER TO SECTION 2.7 FOR INSTALLATION AND SYSTEM ADJUSTMENTS.