MOTOROLA
Mobile Products Division

MaxTrac Two–Way FM Radio

Note: Revisions WMR-0447, WMR-0462, FMR-1626-1, and FMR-1725-1 have been incorporated.

Contents

THIS MANUAL HAS BEEN DISCONTINUED

technical publication services
5555 North Beach Street, Fort Worth, Texas 76137
68P80102W84–O
5/21/90

Safe Handling of CMOS Integrated–Circuit Devices

Many of the integrated–circuit devices used in communications equipment are of the CMOS (Complementary Metal Oxide Semiconductor) type. Because of their high open–circuit impedance, CMOS IC's are vulnerable to damage from static charges. Everyone involved in handling, shipping, and servicing them must be extremely careful not to expose them to such damage.

CMOS IC's do have internal protection, but it is effective only against overvoltages in the hundreds of volts, such as those that could occur during normal operations. Overvoltages from static discharge can be in the thousands of volts.

When a CMOS IC is installed in a system, the system's circuit elements distribute static charges and load the CMOS circuits. This decreases the vulnerability of the IC's to static discharge, but improper handling will probably cause static damage even when the IC's are so installed.

To avoid damaging CMOS IC's, take the following precautions when handling, shipping, and servicing them.

1. Before touching a circuit module, particularly after having moved around in the service area, touch both hands to a bare metal earth–grounded surface. This discharges any static charge you may have accumulated.

Note

Wear a conductive wrist strap (Motorola Part No. RSX–4015A) to minimize the buildup of static charges on your person while you are servicing CMOS equipment.

WARNING

When wearing a conductive wrist strap, be careful near sources of high voltage. By grounding you thoroughly, the wrist strap also increases the danger of lethal shock from accidental contact with such a source.

---

2. Whenever possible, avoid touching any electrically conductive parts of the circuit module with your hands.

3. Check the INSTALLATION and MAINTENANCE sections of the service manual and the notes on the schematic to find out whether or not you can insert or remove circuit modules with power applied to the unit, and act accordingly.

4. When servicing a circuit module, avoid carpeted areas, dry environments, and the wearing of static–generating clothing.

5. Be sure that all electrically powered test equipment is grounded. Attach the ground lead from the test equipment to the circuit module before connecting the test probe. Similarly, disconnect the test probe before removing the ground lead.

6. When you remove a circuit module from the system, lay it on a sheet of aluminum foil or other conductive surface connected to ground through 100,000 ohms of resistance.

WARNING

If the aluminum foil is connected directly to ground, you may get a shock if you touch it and another electrical circuit at the same time.

---

7. When soldering, be sure the soldering iron is grounded.

8. Before connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary during the replacement of an integrated–circuit device), be sure to discharge any static buildup on your person (see Procedure 1, above). Because you can have a voltage difference across your body, you should use only one hand if you must touch the board wiring or any of the pins on the CMOS device.

9. When replacing a CMOS integrated–circuit device, leave the device in its metal rail container or conductive foam until you are ready to insert it into the pronged circuit module.

10. Connect any low–impedance test equipment such as a pulse generator to CMOS device inputs after you have applied power to the CMOS circuitry. Similarly, disconnect such low–impedance equipment before turning off the power.

11. Wrap CMOS modules in conductive material when transporting them from one area to another, even within the same room. Use wrapping material similar to that in which replacement modules are wrapped when they arrive from the factory. (You can also use aluminum foil.) Never use nonconductive material for packaging these modules.

Model Chart for Front Panel For *MaxTrac* Radios

CODE:

● = ONE ITEM SUPPLIED

ITEM	DESCRIPTION	HCN1048A	HCN3293A	HCN1049A	HCN3292A	HCN1043A	HCN3217A
	MODEL						
	DESCRIPTION	FRONT PANEL, 2 FREQUENCY	FRONT PANEL, 2 FREQUENCY	FRONT PANEL, 6 FREQUENCY	FRONT PANEL, 6 FREQUENCY	FRONT PANEL, 16 FREQUENCY	FRONT PANEL, 32 FREQUENCY
HLN5174A	DISPLAY BOARD, 2 FREQUENCY	●	●				
HLN5175A	DISPLAY BOARD, 6/16/32 FREQUENCY			●	●	●	●
HLN5184A	SWITCH BOARD	●	●	●	●	●	●
HLN5273A	FRONT PANEL HARDWARE, 2 FREQUENCY	●					
HLN9731A	FRONT PANEL HARDWARE, 2 FREQUENCY		●				
HLN5311A	FRONT PANEL HARDWARE, 6 FREQUENCY			●			
HLN9730A	FRONT PANEL HARDWARE, 6 FREQUENCY				●		
HLN5186A	FRONT PANEL HARDWARE, 16 FREQUENCY					●	
HLN9584A	FRONT PANEL HARDWARE, 32 FREQUENCY						●

Model Chart for *MaxTrac* Low Band Mobile Radio 60 Watt RF Power 29.7–50 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D51MJA93A5AK	D51MJA97A3AK	D51MJA9DA5AK	D51MGA93A5AK	
DESCRIPTION	*MAXTRAC* 100 2 FREQUENCY	*MAXTRAC* 300 6 FREQUENCY	*MAXTRAC* 300 16 FREQUENCY	*MAXTRAC* 300 32 FREQUENCY	
ITEM					DESCRIPTION
	∅	∅	∅	∅	SUPER UNIFIED CHASSIS
HCN1048A	∅				FRONT PANEL 2 FREQUENCY
OR HCN3293A	∅				FRONT PANEL 2 FREQUENCY
HCN1049A		∅			FRONT PANEL 6 FREQUENCY
OR HCN3292A		∅			FRONT PANEL 6 FREQUENCY
HCN1043A			∅		FRONT PANEL 16 FREQUENCY
HLN3217A				∅	FRONT PANEL 32 FREQUENCY
HHN4029A	●	●	●	●	HOUSING
HKN4191B	●	●	●	●	POWER CABLE KIT
HLN5283A	●				NAMEPLATE 100
HLN5284A		●	●	●	NAMEPLATE 300
HLN5289A	●				ESCUTCHEON 2 FREQUENCY
HLN9063A		●			ESCUTCHEON 6 FREQUENCY
HLN5191A			●	●	ESCUTCHEON 16 FREQUENCY
HLN9073A	●	●	●	●	MICROPHONE HANG–UP CLIP
HLN9333A	●	●	●		ROM KIT
HLN9333B				●	ROM KIT 32 CHANNEL
HLN9404A	●	●	●	●	INSTALLATION KIT
HLN9583A	●	●	●	●	HP SHIELD KIT
HMN1056C	●	●	●	●	MICROPHONE
HLN1245A	●	●	●	●	MICROPHONE (ELECTRICAL)
HLN5307A	●	●	●	●	MICROPHONE HOUSING
HLN5308B	●	●	●	●	RADIUS MICROPHONE WITH LIGHT KIT
HLN9559A	●	●	●	●	COMPACT MICROPHONE COIL CORD
HLN9563A	●	●	●	●	INSTALLATION HARDWARE
HAB9405A	●	●	●	●	ANTENNA 1/4 WAVE 29.7–36.0 MHz
HAB9406A	●	●	●	●	ANTENNA 1/4 WAVE 36.0–42.0 MHz
HAB9407A	●	●	●	●	ANTENNA 1/4 WAVE 42.0–50.0 MHz
HBN9403A	●	●	●	●	PACKING KIT

Model Chart for *MaxTrac* Low Band Mobile Radio 60 Watt RF Power Unified Chassis 29.7–50 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL	HUB3170A	HUB3171A	HUB3172A	HUB3173A	HUB3174A	HUB3175A
DESCRIPTION	UNIFIED CHASSIS (SUPER) 29.7–36.0 MHz	UNIFIED CHASSIS (SUPER) 36.0–42.0 MHz	UNIFIED CHASSIS (SUPER) 42.0–50.0 MHz	UNIFIED CHASSIS (SUPER) 29.7–36.0 MHz	UNIFIED CHASSIS (SUPER) 36.0–42.0 MHz	UNIFIED CHASSIS (SUPER) 42.0–50.0 MHz
HUB1093A	●					
HUB1096A				●		
HUB1094A		●				
HUB1097A					●	
HUB1095A			●			
HUB1098A						●
HLN5172A	●	●	●			
HLN9313A				●	●	●
HLN9436A	●	●	●	●	●	●
HLB4099A	●			●		
HLB4100A		●			●	
HLB4101A			●			●
HLB3048A	●			●		
HLB3049A		●			●	
HLB3050A			●			●
HLB4105A	●			●		
HLB4106A		●			●	
HLB4107A			●			●
HLN9302A	●	●		●	●	
HLN9304A			●			●
HLN9411A	●	●	●	●	●	●

ITEM	DESCRIPTION
HUB1093A	UNIFIED CHASSIS 29.7–36.0 MHz
HUB1096A	UNIFIED CHASSIS 29.7–36.0 MHz
HUB1094A	UNIFIED CHASSIS 36.0–42.0 MHz
HUB1097A	UNIFIED CHASSIS 36.0–42.0 MHz
HUB1095A	UNIFIED CHASSIS 42.0–50.0 MHz
HUB1098A	UNIFIED CHASSIS 42.0–50.0 MHz
HLN5172A	LOGIC BOARD
HLN9313A	LOGIC BOARD, OPTIONS CONNECTOR 16 PIN
HLN9436A	CHASSIS HARDWARE
HLB4099A	RF BOARD
HLB4100A	RF BOARD
HLB4101A	RF BOARD
HLB3048A	PA TANAPA
HLB3049A	PA TANAPA
HLB3050A	PA TANAPA
HLB4105A	PA BOARD
HLB4106A	PA BOARD
HLB4107A	PA BOARD
HLN9302A	PA BOARD HARDWARE
HLN9304A	PA BOARD HARDWARE
HLN9411A	PA HARDWARE

Model Chart for VHF *MaxTrac* LPI Mobile Radio 2 Watts RF Power 146–174 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D03MJA7304AK	D03MJA77A3AK	D03MJA7DA5AK	D03MJA7JA5AK		ITEM	DESCRIPTION
DESCRIPTION	*MAXTRAC* LPI–50, 2 FREQUENCY	*MAXTRAC* LPI–300, 6 FREQUENCY	*MAXTRAC* LPI–300, 16 FREQUENCY	*MAXTRAC* LPI–300, 32 FREQUENCY			
	∅	∅	∅			HUD3198A	UNIFIED CHASSIS
				∅		HUD3204A	UNIFIED CHASSIS, EXPANDED OPTION CONNECTOR 16 PIN
	∅					HCN1048A	FRONT PANEL, 2 FREQUENCY
	∅					OR HCN3293A	FRONT PANEL, 2 FREQUENCY
		∅				HCN1049A	FRONT PANEL, 6 FREQUENCY
		∅				OR HCN3292A	FRONT PANEL, 6 FREQUENCY
			∅			HCN1043A	FRONT PANEL, 16 FREQUENCY
			∅	∅		OR HCN3217A	FRONT PANEL, 32 FREQUENCY
	●	●				HHN9370A	HOUSING, TWO LAYER
			●	●		HHN4029A	HOUSING
	●	●	●	●		HKN4137A	MOBILE POWER CABLE
	●	●	●	●		HLN5189A	INSTALLATION KIT
	●					HLN5289A	ESCUTCHEON, 2 FREQUENCY
		●				HLN9063A	ESCUTCHEON, 6 FREQUENCY
			●	●		HLN5191A	ESCUTCHEON, 16/32 FREQUENCY
	●	●	●	●		HLN9073A	HANG–UP CLIP
	●	●	●	●		HLN9277A	ROM KIT
				●		HLN9333B	ROM KIT, 32 CHANNEL
	●					HLN9521A	NAMEPLATE, LPI–50
		●	●	●		HLN9522A	NAMEPLATE, LPI–300
	●	●	●	●		HMN1056C	MICROPHONE
	●	●	●	●		HLN1245A	MICROPHONE (ELECTRICAL)
	●	●	●	●		HLN5307A	MICROPHONE HOUSING
	●	●	●	●		HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT
	●	●	●	●		HLN9559A	COMPACT MICROPHONE COIL CORD
	●	●	●	●		HLN9563A	INSTALLATION HARDWARE
	●	●	●	●		HAD4007A	ANTENNA, ROOF TOP (144–150.8 MHz)
	●	●	●	●		HAD4008A	ANTENNA, ROOF TOP (150.8–162 MHz)
	●	●	●	●		HAD4009A	ANTENNA, ROOF TOP (162–176 MHz)
	●	●	●	●		HBN4040A	PACKING KIT
				●		HAD4006A	ANTENNA, ROOF TOP (136–144.0 MHz)

Model Chart for VHF *MaxTrac* LPI Mobile Radio Unified Chassis 2 Watt RF Power 146–174 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL		DESCRIPTION
HUD3198A	HUD3204A	
		UNIFIED CHASSIS
		UNIFIED CHASSIS, EXPANDED OPTION CONNECTOR
●	●	HLD3195A PA TANAPA
●	●	HLD9523A PA BOARD
●	●	HLN9524A PA HARDWARE
●	●	HLN9105A CHASSIS HARDWARE
●	●	HLD4322B RF BOARD, 30 KHz
●		HLN5173B LOGIC BOARD, CONVENTIONAL TRUNKING
	●	HLN9313A LOGIC BOARD, OPTIONS CONNECTOR 16 PIN

Model Chart for *MaxTrac* VHF Mobile Radio 25–Watt RF Power 136–174 MHz

CODE:

● = ONE ITEM SUPPLIED
⊗ = BREAKDOWN IN SEPERATE CHART

MODEL	D33MJA1304BK	D33MJA7304BK	D33MJA73A5CK	D33MJA77A3CK	D33MJA7DA5CK	D33MJA7JA5AK
DESCRIPTION	*MAXTRAC 50* 2 FREQUENCY (CSQ)	*MAXTRAC 50* 2 FREQUENCY (PL/DPL/CSQ)	*MAXTRAC 100* 2 FREQUENCY	*MAXTRAC 300* 6 FREQUENCY	*MAXTRAC 300* 16 FREQUENCY	*MAXTRAC 300* 32 FREQUENCY
ITEM	DESCRIPTION					
	UNIFIED CHASSIS	⊗	⊗	⊗	⊗	⊗
HCN1048A	FRONT PANEL 2 FREQUENCY	⊗	⊗	⊗		
OR HCN3293A	FRONT PANEL 2 FREQUENCY	⊗	⊗	⊗		
HCN1049A	FRONT PANEL 6 FREQUENCY				⊗	
OR HCN3292A	FRONT PANEL 6 FREQUENCY				⊗	
HCN1043A	FRONT PANEL 16 FREQUENCY					⊗
OR HCN3217A	FRONT PANEL 32 FREQUENCY					⊗ ⊗
HHN4029A	HOUSING				●	●
HHN9370A	HOUSING	●	●	●	●	
HKN4137A	POWER CABLE KIT	●	●	●	●	● ●
HLN9138A	NAMEPLATE 50	●	●			
HLN5283A	NAMEPLATE 100			●		
HLN5284A	NAMEPLATE 300				●	● ●
HLN5289A	ESCUTCHEON 2 FREQUENCY	●	●	●		
HLN9063A	ESCUTCHEON 6 FREQUENCY				●	
HLN5191A	ESCUTCHEON 16 FREQUENCY					● ●
HLN9073A	MICROPHONE HANG–UP CLIP	●	●	●	●	● ●
HLN5189A	INSTALLATION	●	●	●	●	● ●
HMN1056C	MICROPHONE	●	●	●	●	● ●
HLN1245A	MICROPHONE (ELECTRICAL)	●	●	●	●	● ●
HLN5307A	MICROPHONE HOUSING	●	●	●	●	● ●
HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT	●	●	●	●	● ●
HLN9559A	COMPACT MICROPHONE COIL CORD	●	●	●	●	● ●
HLN9563A	INSTALLATION HARDWARE	●	●	●	●	● ●
HAD4006A	ANTENNA, ROOF TOP 136–144 MHz	●	●	●	●	● ●
HAD4007A	ANTENNA, ROOF TOP 144–150.8 MHz	●	●	●	●	● ●
HAD4008A	ANTENNA, ROOF TOP 150.8–162 MHz	●	●	●	●	● ●
HAD4009A	ANTENNA, ROOF TOP 162–174 MHz	●	●	●	●	● ●
HBN4040A	PACKING KIT	●	●	●	●	● ●
HLN9277A	ROM KIT					●
HLN9333B	ROM KIT, 32 CHANNEL					●

Model Chart for *MaxTrac* VHF Mobile Radio 25–Watt RF Power Unified Chassis 136–162 MHz (Range 1) 146–174 MHz (Range 2)

CODE:

● = ONE ITEM SUPPLIED

MODEL	HUD1703A	HUD1706B	HUD1712A	HUD1705B	HUD1704A
DESCRIPTION	UNIFIED CHASSIS, 146–174 MHz	UNIFIED CHASSIS, 146–174 MHz	UNIFIED CHASSIS, 136–162 MHz (B310 OPTION)	UNIFIED CHASSIS, 136–172 MHz (B310 OPTION)	UNIFIED CHASSIS, 146–174 MHz
HLN9123A LOGIC BOARD (MASKED)	●		●		
HLN5173B LOGIC BOARD (EXPANDED)		●		●	
HLN9313A LOGIC BOARD, OPTIONS CONNECTOR					●
HLN9105A CHASSIS HARDWARE	●	●	●	●	
HLN5188A MAIN BOARD HARDWARE					●
HLD4322B RF BOARD 146–174 MHz	●	●			●
HLD4321B RF BOARD 136–162 MHz			●	●	
HLD3009A PA TANAPA 146–174 MHz	●	●			●
HLD1615A PA TANAPA 136–162 MHz			●	●	
HLD4324A PA BOARD 146–174 MHz	●	●			
HLD4323A PA BOARD 136–162 MHz			●	●	
HLN5183A PA BOARD HARDWARE	●	●	●	●	

Model Chart for *MaxTrac* VHF Mobile Radio 40–50 Watt RF Power 146–174 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D43MJA7304BK	D43MJA73A5CK	D43MJA77A3CK	D43MJA7DA5CK	D43MJA7JA5AK
DESCRIPTION	*MAXTRAC* 50 2 FREQUENCY, 40 WATT	*MAXTRAC* 100 2 FREQUENCY, 40 WATT	*MAXTRAC* 300 6 FREQUENCY, 40 WATT	*MAXTRAC* 300 16 FREQUENCY, 50 WATT	*MAXTRAC* 300 32 FREQUENCY, 45 WATT

ITEM	DESCRIPTION	D43MJA7304BK	D43MJA73A5CK	D43MJA77A3CK	D43MJA7DA5CK	D43MJA7JA5AK
	UNIFIED CHASSIS	∅	∅	∅	∅	∅
HCN1048A	FRONT PANEL 2 FREQUENCY	∅	∅			
OR HCN3293A	FRONT PANEL 2 FREQUENCY	∅	∅			
HCN1049A	FRONT PANEL 6 FREQUENCY			∅		
OR HCN3292A	FRONT PANEL 6 FREQUENCY			∅		
HCN1043A	FRONT PANEL 16 FREQUENCY				∅	
HCN3217A	FRONT PANEL 32 FREQUENCY				∅	∅
HHN4029A	HOUSING				●	●
HHN9370A	HOUSING	●	●	●		
HKN4137A	POWER CABLE KIT	●	●	●	●	●
HLN9138A	NAMEPLATE 50	●				
HLN5283A	NAMEPLATE 100		●			
HLN5284A	NAMEPLATE 300			●	●	●
HLN5289A	ESCUTCHEON 2 FREQUENCY	●	●			
HLN9063A	ESCUTCHEON 6 FREQUENCY			●		
HLN5191A	ESCUTCHEON 16 FREQUENCY				●	●
HLN9073A	MICROPHONE HANG–UP CLIP	●	●	●	●	●
HLN5189A	INSTALLATION HARDWARE	●	●	●	●	●
HMN1056C	MICROPHONE	●	●	●	●	●
HLN1245A	MICROPHONE (ELECTRICAL)	●	●	●	●	●
HLN5307A	MICROPHONE HOUSING	●	●	●	●	●
HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT	●	●	●	●	●
HLN9559A	COMPACT MICROPHONE COIL CORD	●	●	●	●	●
HLN9563A	INSTALLATION HARDWARE	●	●	●	●	●
HAD4006A	ANTENNA, ROOF TOP 136–144 MHz		●	●	●	●
HAD4007A	ANTENNA, ROOF TOP 144–150.8 MHz	●	●	●	●	●
HAD4008A	ANTENNA, ROOF TOP 150.8–162 MHz	●	●	●	●	●
HAD4009A	ANTENNA, ROOF TOP 162–174 MHz	●	●	●	●	●
HBN4040A	PACKING KIT	●	●	●	●	●
HLN9277A	ROM KIT				●	
HLN9333B	ROM KIT 32 CHANNEL					●

Model Chart for *MaxTrac* VHF Mobile Radio 40–50 Watt RF Power Unified Chassis 146–174 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL						DESCRIPTION
HUD1707A	HUD1710B	HUD3053B				UNIFIED CHASSIS, 40 WATT
	●					UNIFIED CHASSIS, 50 WATT
		●				UNIFIED CHASSIS, 45 WATT
●	●					HLN9105A CHASSIS HARDWARE
		●				HLN5188A MAIN BOARD HARDWARE
●						HLN9123A LOGIC BOARD (MASKED)
	●					HLN5173B LOGIC BOARD (EXPANDED)
		●				HLN9313A LOGIC BOARD, OPTIONS CONNECTOR
●	●	●				HLD4322B RF BOARD
●	●	●				HLD3010A PA TANAPA
●	●	●				HLD4326A PA BOARD
●	●	●				HLN9071A PA BOARD HARDWARE

Model Chart for UHF *MaxTrac* LPI Mobile Radio 2 Watts RF Power 449–470 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D04MJA7304AK	D04MJA7304BK	D04MJA77A3AK	D04MJA77A3BK	D04MJA7DA5AK	D04MJA7DA5BK	D04MJA7JA5AK					
DESCRIPTION	*MAXTRAC* LPI–50, 2 FREQUENCY	*MAXTRAC* LPI–50, 2 FREQUENCY	*MAXTRAC* LPI–300, 6 FREQUENCY	*MAXTRAC* LPI–300, 6 FREQUENCY	*MAXTRAC* LPI–300, 16 FREQUENCY	*MAXTRAC* LPI–300, 16 FREQUENCY	*MAXTRAC* LPI–300, 32 FREQUENCY					
ITEM	DESCRIPTION											
HUE3197A	∅		∅		∅							
HUE3197B		∅		∅		∅						
HUE3203B							∅					
HCN1048A	∅	∅										
OR HCN3293A	∅	∅										
HCN1049A			∅	∅								
OR HCN3292A			∅	∅								
HCN1043A					∅		∅					
OR HCN3217A						∅	∅					
HKN4137A	●	●	●	●	●	●	●					
HLN5189A	●	●	●	●	●	●	●					
HAE4003A	●	●	●	●	●	●	●					
HBN4040A	●	●	●	●	●	●	●					
HHN4029A					●	●	●					
HHN9370A	●	●	●	●								
HLN5289A	●	●										
HLN9063A			●	●								
HLN5191A					●	●	●					
HLN9073A	●	●	●	●	●	●	●					
HMN1056C	●	●	●	●	●	●	●					
HLN1245A	●	●	●	●	●	●	●					
HLN5307A	●	●	●	●	●	●	●					
HLN5308B	●	●	●	●	●	●	●					
HLN9563A	●	●	●	●	●	●	●					
HLN9559A	●	●	●	●	●	●	●					
HLN9521A	●	●										
HLN9522A			●	●	●	●	●					
HLN9277A	●	●	●	●	●	●						
HLN9333B							●					

Model Chart for *MaxTrac* UHF LPI Mobile Radio 2 Watt RF Power Unified Chassis 449–470 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL	HUE3197A	HUE3197B	HUE3203B			ITEM	DESCRIPTION
DESCRIPTION	UNIFIED CHASSIS	UNIFIED CHASSIS	UNIFIED CHASSIS, EXPANDED				
	●	●	●			HLE3192A	PA ASSEMBLY
	●	●	●			HLE9502A	PA BOARD
	●	●	●			HLN9501A	PA HARDWARE
	●					HLE9310A	RF BOARD
		●	●			HLE9310B	RF BOARD
	●	●				HLN5173B	LOGIC BOARD, CONVENTIONAL TRUNKED
	●	●	●			HLN5188A	MAIN BOARD HARDWARE
			●			HLN9313A	LOGIC BOARD OPTIONS CONNECTOR

Model Chart for *MaxTrac* UHF Mobile Radio 25 Watt RF Power 449–470 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D34MJA1304BK	D34MJA1304CK	D34MJA7304BK	D34MJA7304CK	D34MJA73A5CK	D34MJA73A5DK	D34MJA77A3CK	D34MJA77A3DK	D34MJA7DA5CK	D34MJA7DA5DK	D34MJA75A5AK
DESCRIPTION	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 100 2 FREQUENCY	*MAXTRAC* 100 2 FREQUENCY	*MAXTRAC* 300 6 FREQUENCY	*MAXTRAC* 300 6 FREQUENCY	*MAXTRAC* 300 16 FREQUENCY	*MAXTRAC* 300 16 FREQUENCY	*MAXTRAC* 300 32 FREQUENCY
UNIFIED CHASSIS	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
HCN1048A FRONT PANEL 2 FREQUENCY	∅	∅	∅	∅	∅	∅					
OR HCN3293A FRONT PANEL, 2 FREQUENCY	∅	∅	∅	∅	∅	∅					
HCN1049A FRONT PANEL 6 FREQUENCY							∅	∅			
OR HCN3292A FRONT PANEL, 6 FREQUENCY							∅	∅			
HCN1043A FRONT PANEL 16 FREQUENCY									∅	∅	
OR HCN3217A FRONT PANEL 32 FREQUENCY									∅	∅	∅
HHN4029A HOUSING									●	●	●
HHN9370A HOUSING	●	●	●	●	●	●	●	●			
HKN4137A POWER CABLE KIT	●	●	●	●	●	●	●	●	●	●	●
HLN9138A NAMEPLATE 50	●	●	●	●							
HLN5283A NAMEPLATE 100					●	●					
HLN5284A NAMEPLATE 300							●	●	●	●	●
HLN5289A ESCUTCHEON 2 FREQUENCY	●	●	●	●	●	●					
HLN9063A ESCUTCHEON 6 FREQUENCY							●	●			
HLN5191A ESCUTCHEON 16/32 FREQUENCY									●	●	●
HLN9073A MICROPHONE HANG–UP CLIP	●	●	●	●	●	●	●	●	●	●	●
HLN5189A INSTALLATION HARDWARE	●	●	●	●	●	●	●	●	●	●	●
HMN1056C MICROPHONE	●	●	●	●	●	●	●	●	●	●	●
HLN1245A MICROPHONE (ELECTRICAL)	●	●	●	●	●	●	●	●	●	●	●
HLN5307A MICROPHONE HOUSING	●	●	●	●	●	●	●	●	●	●	●
HLN5306B RADIUS MICROPHONE WITH LIGHT KIT	●	●	●	●	●	●	●	●	●	●	●
HLN9559A COMPACT MICROPHONE COIL CORD	●	●	●	●	●	●	●	●	●	●	●
HLN9563A INSTALLATION HARDWARE	●	●	●	●	●	●	●	●	●	●	●
HAE4003A ANTENNA, ROOF TOP 450–470 MHz	●	●	●	●	●	●	●	●	●	●	●
HBN4040A PACKING KIT	●	●	●	●	●	●	●	●	●	●	●
HLN9277A ROM KIT									●		
HLN9333B ROM KIT 32 CHANNEL										●	●

Model Chart for *MaxTrac* UHF Mobile Radio Unified Chassis 25 Watt RF Power 449–470 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL	HUE2065A	HUE2065B	HUE2060B	HUE2069B	HUE2060C
DESCRIPTION	UNIFIED CHASSIS	UNIFIED CHASSIS	UNIFIED CHASSIS	UNIFIED CHASSIS	UNIFIED CHASSIS
ITEM	DESCRIPTION				
HLE1687A	PA TANAPA	●	●	●	●	●
HLE4431A	PA BOARD	●	●	●	●	●
HLN5182A	PA HARDWARE	●	●	●	●	●
HLE4425B	RF BOARD	●		●		
HLE9310A	RF BOARD		●		●	
HLE9310B	RF BOARD					●
HLN9123A	LOGIC BOARD (MASKED)	●	●			
HLN5173B	LOGIC BOARD (EXPANDED)			●		●
HLN9313A	LOGIC BOARD OPTIONS CONNECTOR				●	
HLN9212A	MAIN BOARD HARDWARE	●		●		
HLN5188A	MAIN BOARD HARDWARE		●		●	●

Model Chart for UHF Mobile Radio 40 Watt RF Power 403–430 MHz 449–470 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D44MJA7340BK	D44MJA7340CK	D44MJA73A5CK	D44MJA73A5DK	D44MJA77A3CK	D44MJA77A3DK	D44MJA7DA5CK	D44MJA7DA5DK	D44MJA7JA5AK
DESCRIPTION	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 50 2 FREQUENCY	*MAXTRAC* 100 2 FREQUENCY	*MAXTRAC* 100 2 FREQUENCY	*MAXTRAC* 300 6 FREQUENCY	*MAXTRAC* 300 6 FREQUENCY	*MAXTRAC* 300 16 FREQUENCY	*MAXTRAC* 300 16 FREQUENCY	*MAXTRAC* 300 32 FREQUENCY
ITEM									
	DESCRIPTION								
	UNIFIED CHASSIS	∅	∅	∅	∅	∅	∅	∅	∅	∅
HCN1048A	FRONT PANEL 2 FREQUENCY	∅	∅	∅	∅					
OR HCN3293A	FRONT PANEL 2 FREQUENCY	∅	∅	∅	∅					
HCN1049A	FRONT PANEL 6 FREQUENCY					∅	∅			
OR HCN3292A	FRONT PANEL 6 FREQUENCY					∅	∅			
HCN1043A	FRONT PANEL 16 FREQUENCY							∅	∅	
OR HCN3217A	FRONT PANEL 32 FREQUENCY							∅	∅	∅
HHN4029A	HOUSING							●	●	●
HHN9370A	HOUSING	●	●	●	●	●	●			
HKN4137A	POWER CABLE KIT	●	●	●	●	●	●	●	●	●
HLN9138A	NAMEPLATE 50	●	●							
HLN5283A	NAMEPLATE 100			●	●					
HLN5284A	NAMEPLATE 300					●	●	●	●	●
HLN5289A	ESCUTCHEON 2 FREQUENCY	●	●	●	●					
HLN9063A	ESCUTCHEON 6 FREQUENCY					●	●			
HLN5191A	ESCUTCHEON 16 FREQUENCY						●	●	●	●
HLN9073A	MICROPHONE HANG–UP CLIP	●	●	●	●	●	●	●	●	●
HLN5189A	INSTALLATION	●	●	●	●	●	●	●	●	●
HMN1056C	MICROPHONE	●	●	●	●	●	●	●	●	●
HLN1245A	MICROPHONE (ELECTRICAL)	●	●	●	●	●	●	●	●	●
HLN5307A	MICROPHONE HOUSING	●	●	●	●	●	●	●	●	●
HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT	●	●	●	●	●	●	●	●	●
HLN9559A	COMPACT MICROPHONE COIL CORD	●	●	●	●	●	●	●	●	●
HLN9563A	INSTALLATION HARDWARE			●	●	●	●	●	●	●
HAE4002A	ANTENNA, ROOF TOP 403–430 MHz	●	●	●	●	●	●	●	●	●
HAE4003A	ANTENNA, ROOF TOP 450–470 MHz	●	●	●	●	●	●	●	●	●
HBN4040A	PACKING KIT							●	●	
HLN9333B	ROM KIT 32 CHANNEL						●			
HLN9277A	ROM KIT									

Model Chart for *MaxTrac* UHF Mobile Radio 40 Watt RF Power Unified Chassis 403–430 MHz

CODE:

● = ONE ITEM SUPPLIED

ITEM	DESCRIPTION	HUE2063A	HUE2063B	HUE2066A	HUE2066B	HUE2064B	HUE2064C	HUE2068A	HUE2068B	HUE3052C
	MODEL									
	DESCRIPTION	UNIFIED CHASSIS UHF 25 KHz 40 WATT LIMITED	UNIFIED CHASSIS UHF 25 KHz 40 WATT LIMITED	UNIFIED CHASSIS UHF 35 WATT PL/DPL	UNIFIED CHASSIS UHF 40 WATT	UNIFIED CHASSIS UHF 25 KHz 40 WATT	UNIFIED CHASSIS UHF 25 KHz 40 WATT	UNIFIED CHASSIS UHF 25 KHz 40 WATT EXPANDED	UNIFIED CHASSIS UHF 25 KHz 40 WATT EXPANDED	UNIFIED CHASSIS UHF 40 WATT
HLE3025A	PA UHF 40 WATT	●	●					●	●	
HLE3011A	PA UHF 40 WATT			●	●	●	●			●
HLE4430A	PA BOARD	●	●					●	●	
HLE4432A	PA BOARD			●	●	●	●			●
HLN5274A	PA HARDWARE			●	●	●	●			●
HLN9153A	PA HARDWARE	●	●					●	●	
HLE4424A	RF BOARD	●	●					●	●	
HLE4425B	RF BOARD			●		●				
HLE9310A	RF BOARD				●					●
HLE9310B	RF BOARD						●			
HLN5173B	LOGIC BOARD (MASKED)	●	●			●	●			
HLN9123A	LOGIC BOARD (EXPANDED)			●	●					
HLN5188A	MAIN BOARD HARDWARE	●	●		●		●	●	●	●
HLN9212A	MAIN BOARD HARDWARE			●		●				
HLN9313A	LOGIC BOARD OPTIONS CONNECTOR							●	●	●

Model Chart for *MaxTrac* 800 MHz Mobile Radio 15 Watt RF Power RX: 851–870 MHz TX: 806–825 MHz TX: 806–825 or 851–870 MHz (T/A Models)

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D35MJA73A5CK	D35MJA73A6AK	D35MJA73A6BK	D35MJA77A4AK	D35MJA7DA6AK	D35MJA75A6AK
DESCRIPTION	*MaxTrac* 100 2 FREQUENCY	*MaxTrac* 100 6 FREQUENCY	*MaxTrac* 100 6 FREQUENCY	*MaxTrac* 300 6 FREQUENCY	*MaxTrac* 300 16 FREQUENCY	*MaxTrac* 300 32 FREQUENCY
ITEM	DESCRIPTION					
HUF1036A	UNIFIED CHASSIS 806–870 MHz	∅					
HUF3090A	UNIFIED CHASSIS TALKAROUND		∅		∅		
HUF3054A	UNIFIED CHASSIS TALKAROUND			∅			
HUF3024A	UNIFIED CHASSIS TALKAROUND 806–870 MHz				∅		
HUF3137A	UNIFIED CHASSIS TALKAROUND SIGNALLING						∅
HCN1048A	FRONT PANEL 2 FREQUENCY	∅	∅	∅			
OR HCN3293A	FRONT PANEL 2 FREQUENCY	∅	∅	∅			
HCN1049A	FRONT PANEL 6 FREQUENCY				∅		
OR HCN3292A	FRONT PANEL 6 FREQUENCY				∅		
HCN1043A	FRONT PANEL 16 FREQUENCY					∅	∅
HHN4029A	HOUSING					●	●
HHN9370A	HOUSING	●	●	●	●		
HKN4137A	POWER CABLE KIT	●	●	●	●	●	●
HLN5283A	NAMEPLATE 100	●	●	●			
HLN5284A	NAMEPLATE 300				●	●	●
HLN5289A	ESCUTCHEON 2 FREQUENCY	●	●	●			
HLN9063A	ESCUTCHEON 6 FREQUENCY				●		
HLN5191A	ESCUTCHEON 16 FREQUENCY					●	●
HLN9073A	MICROPHONE HANG–UP CLIP	●	●		●	●	●
HLN4606A	MICROPHONE HANG–UP CLIP			●			
HLN5189A	INSTALLATION HARDWARE	●	●	●	●	●	●
HMN1056C	MICROPHONE	●	●		●	●	●
HLN1245A	MICROPHONE (ELECTRICAL)	●	●		●	●	●
HLN5307A	MICROPHONE HOUSING	●	●		●	●	●
HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT	●	●		●	●	●
HLN9559A	COMPACT MICROPHONE COIL CORD	●	●		●	●	●
HLN9563A	INSTALLATION HARDWARE	●	●		●	●	●
HMN1035A	MICROPHONE			●			
HMN5238A	MICROPHONE BOARD			●			
HLN5239A	MICROPHONE C/F HARDWARE			●			
HAF4002A	ANTENNA, ROOF TOP UNITY 800	●	●	●	●	●	●
HBN4040A	PACKING KIT	●	●	●	●	●	●
HLN9277A	ROM KIT				●	●	
HLN9333B	ROM KIT 32 CHANNEL						●

Model Chart for *MaxTrac* 800 MHz Mobile Radio Unified Chassis 15 Watt RF Power RX: 851–870 MHz TX: 806–825 MHz TX: 806–825 or 851–870 MHz (T/A Models)

CODE:

● = ONE ITEM SUPPLIED

ITEM	DESCRIPTION	HUF1036A	HUF3090A	HUF3054A	HUF3024A	HUF3137A
	MODEL					
	DESCRIPTION	UNIFIED CHASSIS 806–870 MHz	UNIFIED CHASSIS TALKAROUND	UNIFIED CHASSIS TALKAROUND	UNIFIED CHASSIS TALKAROUND 806–870 MHz	UNIFIED CHASSIS TALKAROUND SIGNALLING
HLF1038A	PA TANAPA	●	●	●	●	●
HLF4097A	PA BOARD SIMPLEX	●	●	●	●	●
HLN5293A	PA HARDWARE SIMPLEX	●	●	●	●	●
HLF4095B	RF BOARD	●				
HLF9122A	RF BOARD TALKAROUND		●	●	●	
HLN9123A	LOGIC BOARD (MASKED)	●	●	●		
HLN5173B	LOGIC BOARD (EXPANDED)				●	
HLN9313A	LOGIC BOARD OPTIONS CONNECTOR					●
HLN5188A	MAIN BOARD HARDWARE	●	●	●	●	●

Model Chart for *MaxTrac* 800 MHz Trunked Mobile Radio 15 Watt RF Power

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D35MQA5GB1AK	D35MQA5GB1BK	D35MQA5GB3AK	D35MQA5GB4AK	D35MQA5GB5BK	D35MWA5GB6AK	D35MWA5GB7AK	ITEM	DESCRIPTION
DESCRIPTION	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED	*MaxTrac* 800 MHz TRUNKED		
	∅	∅	∅		∅			HUF1041A	UNIFIED CHASSIS, CONVENTIONAL LTD
				∅		∅	∅	HUF3037A	UNIFIED CHASSIS, CONVENTIONAL LPD
	∅	∅	∅	∅	∅			HCN1048A	FRONT PANEL, 2 FREQUENCY
	∅	∅	∅	∅	∅			OR HCN3293A	FRONT PANEL, 2 FREQUENCY
						∅	∅	HCN1043A	FRONT PANEL, 16 FREQUENCY
						∅	∅	OR HCN3217A	FRONT PANEL, 32 FREQUENCY
	●	●	●	●	●	●	●	HHN4029A	HOUSING
	●	●	●	●	●	●	●	HKN4137A	POWER CABLE KIT
	●	●	●	●	●	●	●	HLN5189A	INSTALLATION HARDWARE KIT
	●	●	●	●	●	●	●	HLN5286A	NAMEPLATE, 800
	●	●			●			HLN5319A	ESCUTCHEON, 820
			●					HLN5320A	ESCUTCHEON, T200
				●				HLN9251A	ESCUTCHEON, 820 B4
						●		HLN9252A	ESCUTCHEON, 840 B4
							●	HLN9253A	ESCUTCHEON, 840 B7
	●	●		●	●	●	●	HLN9073A	HANG–UP CLIP
		●		●	●	●	●	HMN1056C	MICROPHONE, COMPACT
		●		●	●	●	●	HLN1245A	MICROPHONE
		●		●	●	●	●	HLN5307A	MICROPHONE HOUSING
		●		●	●	●	●	HLN5306B	MICROPHONE WITH LIGHT KIT
		●		●	●	●	●	HLN9563A	INSTALLATION HARDWARE
		●		●	●	●	●	HLN9559A	COILED CORD
	●							HMN1035A	MICROPHONE, FULL SIZE
	●							HLN5238A	MICROPHONE BOARD
	●							HLN5239A	INSTALLATION HARDWARE
			●					HMN3013A	MICROPHONE DTMF TRUNKED
	●	●	●	●	●	●	●	HAF9067A	ANTENNA, 3dB GAIN 800 ROOF
						●	●	OR RRA4914B	ANTENNA
	●	●	●	●	●	●	●	HBN4040A	PACKING KIT
	●	●	●	●	●	●	●	HLN9260C	ROM KIT

Model Chart for *MaxTrac* 800 MHz Trunked Mobile Radio 15 Watt Unified Chassis RF Power

CODE:

● = ONE ITEM SUPPLIED

MODEL		DESCRIPTION	
HUF1041A	HUF3037A	ITEM	DESCRIPTION
			UNIFIED CHASSIS CONVENTIONAL LIMITED
●		HLF4095B	RF BOARD
	●	HLF9122A	RF BOARD
●	●	HLN5172A	LOGIC BOARD
●	●	HLN5188A	UNIFIED CHASSIS HARDWARE
●	●	HLF1038A	PA TANAPA
			UNIFIED CHASSIS CONVENTIONAL
●	●	HLF4097A	PA BOARD SIMPLEX
●	●	HLN5293A	PA HARDWARE SIMPLEX

Model Chart for *MaxTrac* 800 MHz Mobile Radio 35 Watt RF Power with Talkaround TX: 806–825 or 851–870 MHz RX: 851–870 MHz

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL							
DESCRIPTION	D45MJA73A6AK	D45MJA77A4AK	D45MJA7DA6AK	D45MJA75J6AK			
	MaxTrac 100 2 FREQUENCY	*MaxTrac* 300 6 FREQUENCY	*MaxTrac* 300 16 FREQUENCY	*MaxTrac* 300 32 FREQUENCY			
ITEM							DESCRIPTION
HUF3188A	∅	∅					SUPER UNIFIED CHASSIS MASKED
HUF3191A			∅				SUPER UNIFIED CHASSIS EXPANDED
HUF3189A				∅			SUPER UNIFIED CHASSIS
HCN1048A	∅						FRONT PANEL 2 FREQUENCY
OR HCN3293A	∅						FRONT PANEL 2 FREQUENCY
HCN1049A		∅					FRONT PANEL 6 FREQUENCY
OR HCN3292A		∅					FRONT PANEL 6 FREQUENCY
HCN1043A			∅				FRONT PANEL 16 FREQUENCY
HCN3217A				∅			FRONT PANEL 32 FREQUENCY
HHN4029A			●	●			HOUSING
HHN9370A	●	●					HOUSING
HKN4191B	●	●	●	●			POWER CABLE KIT
HLN5283A	●						NAMEPLATE 100
HLN5284A		●	●	●			NAMEPLATE 300
HLN5289A	●						ESCUTCHEON 2 FREQUENCY
HLN9063A		●					ESCUTCHEON 6 FREQUENCY
HLN5191A			●	●			ESCUTCHEON 16 FREQUENCY
HLN9073A	●	●	●	●			MICROPHONE HANG-UP CLIP
HLN9404A	●	●	●	●			INSTALLATION HARDWARE
HMN1056C	●	●	●	●			MICROPHONE
HLN1245A	●	●	●	●			MICROPHONE (ELECTRICAL)
HLN5307A	●	●	●	●			MICROPHONE HOUSING
HLN5306B	●	●	●	●			RADIUS MICROPHONE WITH LIGHT KIT
HLN9559A	●	●	●	●			COMPACT MICROPHONE COIL CORD
HLN9563A	●	●	●	●			INSTALLATION HARDWARE
HAF4002A	●	●	●	●			ANTENNA, ROOF TOP UNITY
HBN9403A	●	●	●	●			PACKING KIT
HLN9277A		●	●				ROM KIT
HLN9333B				●			ROM KIT 32 CHANNEL

Model Chart for *MaxTrac* 800 MHz Mobile Radio Unified Chassis 35 Watt RF Power with Talkaround TX: 806–825 or 851–870 MHz RX: 851–870 MHz

CODE:

● = ONE ITEM SUPPLIED

MODEL	**DESCRIPTION**
HUF3188A	SUPER UNIFIED CHASSIS MASKED
HUF3191A	SUPER UNIFIED CHASSIS EXPANDED
HUF3189A	SUPER UNIFIED CHASSIS SIGNAL

HUF3188A	HUF3191A	HUF3189A			ITEM	DESCRIPTION
●					HUF1038A	UNIFIED CHASSIS SIMPLEX EXPANDED
	●				HUF1034A	UNIFIED CHASSIS SIMPLEX LIMITED
		●			HUF1042A	UNIFIED CHASSIS CONVENTIONAL LIMITED
●	●	●			HLF9122A	RF BOARD TALKAROUND
●					HLN9123A	LOGIC BOARD (MASKED)
	●				HLN5173B	LOGIC BOARD (EXPANDED)
		●			HLN9313A	LOGIC BOARD OPTIONS CONNECTOR
●	●	●			HLN9436A	UNIFIED CHASSIS HARDWARE
●	●	●			HLF3030A	PA TANAPA
●	●	●			HLF4098A	PA BOARD
●	●	●			HLN9305A	PA HARDWARE
●	●	●			HLN9411A	SUPER UNIFIED CHASSIS HARDWARE

Model Chart for *MaxTrac* 800 Series 800 MHz Trunked Mobile Radio 35 Watt RF Power RX: 851–870 MHz TX: 806–825 MHz TX: 806–825 or 851–870 MHz (T/A Models)

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

ITEM	DESCRIPTION	D45MQA5GB1AK *MaxTrac* 820 1/1	D45MQA5GB3AK *MaxTrac* 820 2/1, DTMF MIC	D45MQA5GB5AK *MaxTrac* 820 2/2	D45MQA5GB4AK *MaxTrac* 820 1/1, 1 CONV, T/A	D45MWA5GB6AK *MaxTrac* 840 6/6, 2 CONV, T/A	D45MWA5GB7AK *MaxTrac* 840 10/10, 10 CONV, T/A	D45MWA5GC3AK *MaxTrac* 840 8/8, 8 CONV, T/A	D45MWA5GC5AK *MaxTrac* 840 8/8, 8 CONV, T/A
HUF3190A	SUPER UNIFIED CHASSIS TRUNKED	∅	∅	∅	∅	∅	∅		
HUF3189A	SUPER UNIFIED CHASSIS SIGNAL							∅	∅
HCN1048A	FRONT PANEL 2 FREQUENCY	∅	∅	∅	∅				
OR HCN3293A	FRONT PANEL 2 FREQUENCY	∅	∅	∅	∅				
HCN1043A	FRONT PANEL 16 FREQUENCY					∅	∅	∅	∅
OR HCN3217A	FRONT PANEL 16/32 FREQUENCY					∅	∅		
HHN4029A	HOUSING	●	●	●	●	●	●	●	●
HKN4191B	POWER CABLE KIT	●	●	●	●	●	●	●	●
HLN5286A	NAMEPLATE 800	●	●	●	●	●	●		
HLN9387A	NAMEPLATE *SMARTNET*							●	●
HLN5319A	ESCUTCHEON 820	●		●					
HLN5320A	ESCUTCHEON T200		●						
HLN9251A	ESCUTCHEON 820 B4				●				
HLN9252A	ESCUTCHEON 840 B4					●			
HLN9386A	ESCUTCHEON *SMARTNET* C3							●	
HLN9384A	ESCUTCHEON *SMARTNET* SCAN								●
HLN9253A	ESCUTCHEON 840 B7						●		
HLN9073A	MICROPHONE HANG–UP CLIP	●		●	●	●	●	●	●
HLN9404A	INSTALLATION	●	●	●	●	●	●	●	●
HMN1056C	MICROPHONE	●		●	●	●	●	●	●
HLN1245A	MICROPHONE (ELECTRICAL)	●		●	●	●	●	●	●
HLN5307A	MICROPHONE HOUSING	●		●	●	●	●	●	●
HLN5306B	RADIUS MICROPHONE WITH LIGHT KIT	●		●	●	●	●	●	●
HLN9559A	COMPACT MICROPHONE COIL CORD	●		●	●	●	●	●	●
HLN9563A	INSTALLATION HARDWARE	●		●	●	●	●	●	●
HMN3013A	DTMF TRUNKED MICROPHONE		●						
HAF9067A	ANTENNA, 3 dB GAIN	●	●	●	●	●	●	●	●
OR RRA4914B	ANTENNA	●	●	●	●	●	●	●	●
HBN9403A	PACKING KIT	●	●	●	●	●	●	●	●
HLN9260C	ROM KIT	●	●	●	●	●	●	●	●
HLN9383A	ROM KIT *SMARTNET*							●	●

Model Chart for *MaxTrac* 800 Series 800 MHz Trunked Mobile Radio Unified Chassis, 35 Watt RF Power RX: 851–870 MHz TX: 806–825 MHz TX: 806–825 or 851–870 MHz (T/A Models)

CODE:

● = ONE ITEM SUPPLIED

MODEL / DESCRIPTION	HUF3190A SUPER UNIFIED CHASSIS TRUNKED	HUF3189A SUPER UNIFIED CHASSIS SIGNAL	ITEM	DESCRIPTION
	●		HUF1043A	UNIFIED CHASSIS CONVENTIONAL 15 WATT EXPANDED
		●	HUF1042A	UNIFIED CHASSIS CONVENTIONAL 35 WATT LIMITED
	●	●	HLF9122A	RF BOARD TALKAROUND
	●		HLN5172A	LOGIC BOARD
		●	HLN9313A	LOGIC BOARD OPTIONS CONNECTOR
	●	●	HLN9436A	UNIFIED CHASSIS HARDWARE
	●	●	HLF3030A	PA TANAPA
	●	●	HLF4098A	PA BOARD
	●	●	HLN9305A	PA HARDWARE
	●	●	HLN9411A	SUPER UNIFIED CHASSIS HARDWARE

Model Chart for *MaxTrac SMARTNET* 800 MHz Trunked Mobile Radio 15 Watt RF Power

CODE:

● = ONE ITEM SUPPLIED
∅ = BREAKDOWN IN A SEPARATE CHART

MODEL	D35MWA5GC0AK	D35MWA5GC3AK	D35MWA5GC5AK	D35MWA5GC6AK
DESCRIPTION	*MaxTrac SMARTNET* 800 MHz TRUNKED	*MaxTrac SMARTNET* 800 MHz TRUNKED	*MaxTrac SMARTNET* 800 MHz TRUNKED	*MaxTrac SMARTNET* 800 MHz TRUNKED

ITEM	DESCRIPTION	D35MWA5GC0AK	D35MWA5GC3AK	D35MWA5GC5AK	D35MWA5GC6AK
HUF3137A	UNIFIED CHASSIS, 800 T/A SIGNALLING		∅	∅	∅
HUF3037A	UNIFIED CHASSIS, 800 MHz CONVENTIONAL LPD	∅			
HCN1043A	FRONT PANEL, 16 FREQUENCY	∅	∅	∅	∅
OR HCN3217A	FRONT PANEL, 16 FREQUENCY	∅			
HHN4029A	HOUSING	●	●	●	●
HKN4137A	POWER CABLE KIT	●	●	●	●
HLN5189A	INSTALLATION HARDWARE KIT	●	●	●	●
HLN4606A	HANG–UP CLIP	●			
HLN9073A	HANG–UP CLIP		●	●	●
HLN9383A	ROM KIT		●	●	
HLN9383B	ROM KIT				●
HLN9386A	ESCUTCHEON, C3		●		
HLN9384A	ESCUTCHEON, SCAN			●	
HLN9536A	ESCUTCHEON				●
HLN9144A	ESCUTCHEON	●			
HLN9387A	NAMEPLATE		●	●	●
HLN5286A	NAMEPLATE	●			
HLN9166A	EMERGENCY PUSH SWITCH ATM HARDWARE	●			
HMN1056C	MICROPHONE, COMPACT		●	●	●
HLN1245A	MICROPHONE		●	●	●
HLN5307A	MICROPHONE HOUSING		●	●	●
HLN5306B	MICROPHONE WITH LIGHT KIT		●	●	●
HLN9563A	INSTALLATION HARDWARE		●	●	●
HLN9559A	COILED CORD		●	●	●
HMN1035A	MICROPHONE, FULL SIZE	●			
HLN5238A	MICROPHONE BOARD	●			
HLN5239A	INSTALLATION HARDWARE	●			
HAF9067A	ANTENNA, 3dB GAIN 800 ROOF	●	●	●	●
OR RRA4914B	ANTENNA				
HBN4040A	PACKING KIT	●	●	●	●

Model Chart for *MaxTrac SMARTNET* 800 MHz Trunked Mobile Radio 15 Watt RF Power Unified Chassis

CODE:

● = ONE ITEM SUPPLIED

MODEL		DESCRIPTION						
		HUF3137A	HUF3037A					
		UNIFIED CHASSIS, 800 T/A SIGNALLING	UNIFIED CHASSIS, 800 MHz CONVENTIONAL LPD					
ITEM	DESCRIPTION							
HLF9122A	RF BOARD, TALKAROUND	●	●					
HLN5172A	LOGIC BOARD		●					
HLN9313A	LOGIC BOARD, OPTIONS CONNECTOR	●						
HLN5188A	MAIN BOARD HARDWARE	●	●					
HLF1038A	PA TANAPA	●	●					
HLF4097A	PA BOARD SIMPLEX	●	●					
HLN5293A	PA HARDWARE SIMPLEX	●	●					

CoveragePLUS MaxTrac 800 MHz Trunked Mobile Radio 15/35 Watt RF Power

MODEL DESCRIPTION	D35AHA5GB1AK 15 WATT *COVERAGEPLUS MAXTRAC*	D45AHA5GB1AK 35 WATT *COVERAGEPLUS MAXTRAC*	ITEM	DESCRIPTION
	●		HUF3137A	UNIFIED CHASSIS KIT (15W)
	●		HLF1038A	PA TANAPA, 15 WATT (See Note 1)
		●	HUF3189A	UNIFIED CHASSIS KIT (35W)
		●	HLF3030A	PA TANAPA, 35 WATT (See Note 1)
		●	HLN9583A	SHIELD KIT (35W)
	●	●	HCN3217A	FRONT PANEL
	●	●	HLN9386A	ESCUTCHEON, C3
	●		HKN4372A	POWER CABLE KIT (15W)
		●	HKN9498A	POWER CABLE KIT (35W)
			HMN3013A	MICROPHONE KIT (NON–BACKLIT) (See Note 2)
	●	●	TDN8310A	MICROPHONE KIT (BACKLIT)
	●	●	HHN4029A	COVER KIT
	●		HLN5189A	INSTALLATION HARDWARE KIT (15W)
		●	HLN9404A	INSTALLATION HARDWARE KIT (35W)
	●	●	RAF4031ARM	ANTENNA KIT
	●		HBN4040A	PACKING KIT (15W)
		●	HBN9403A	PACKING KIT (35W)
	●	●	HLN9569A	LABEL, *COVERAGEPLUS MAXTRAC*
	●	●	HLN9597A	ROM KIT

ITEM	DESCRIPTION	HLF1038A	HLF4097A	HLN5293A	HLF3030A	HLF4096A	HLN9305A	HUF1042A	HLF9122A	HLN5188A	HLN9313A	HLN9436A	HLN9411A	HLN5175A	HLN5184A	HLN9584A
HUF3137A	UNIFIED CHASSIS KIT (15W)	●							●	●	●					
HLF1038A	PA TANAPA, 15 WATT (See Note 1)		●	●												
HUF3189A	UNIFIED CHASSIS KIT (35W)				●			●	●		●	●	●			
HLF3030A	PA TANAPA, 35 WATT (See Note 1)					●	●									
HLN9583A	SHIELD KIT (35W)															
HCN3217A	FRONT PANEL													●	●	●
HLN9386A	ESCUTCHEON, C3															
HKN4372A	POWER CABLE KIT (15W)															
HKN9498A	POWER CABLE KIT (35W)															
HMN3013A	MICROPHONE KIT (NON–BACKLIT) (See Note 2)															
TDN8310A	MICROPHONE KIT (BACKLIT)															
HHN4029A	COVER KIT															
HLN5189A	INSTALLATION HARDWARE KIT (15W)															
HLN9404A	INSTALLATION HARDWARE KIT (35W)															
RAF4031ARM	ANTENNA KIT															
HBN4040A	PACKING KIT (15W)															
HBN9403A	PACKING KIT (35W)															
HLN9569A	LABEL, *COVERAGEPLUS MAXTRAC*															
HLN9597A	ROM KIT															

NOTES:

1. HLF1038A IS PART OF HUF3137A AND HLF3030A IS PART OF HUF3189A.
2. THE BACKLIT DTMF MICROPHONE (TDN8310A) COMES STANDARD WITH THE *COVERAGEPLUS* RADIO.

Performance Specifications for *MaxTrac* Low Band Mobile Radios

GENERAL

Model Series:	D51MJA, D51MGA
Typical RF Output:	60 Watts
Frequency (MHz):	29.7–36, 36–42, 42–50
Dimensions (H x W x L):	2" x 7" x 9.9" (50.8 x 178 x 251mm)
Primary Voltage Input:	13.8 Volts DC
Weight:	76 oz. (2.16 kg)
Typical Current Drain	
Receive (5W):	1.6 Amps
Transmit:	17 Amps
Standby:	500 milliAmps
Channel Capability:	2 channel, 6 channels, 16 channels, 32 channels
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch
External Speaker (Option):	5 Watts
FCC Designation:	ABZ89FT1620

TRANSMITTER

Spurious & Harmonic Emissions:	–61 dB
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Modulation:	16K0F3E, 16K0F1D, 15K0F2D
Max Frequency Separation	
29.7–36 MHz:	6.3 MHz
36–42 MHz:	6.0 MHz
42–50 MHz:	8.0 MHz
Audio Distortion:	5% measured per EIA
Output Impedance:	50 Ohms
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz

RECEIVER

Channel Spacing:	20 kHz
Sensitivity 12 dB SINAD:	0.30 uV −117.5dBm
Intermodulation EIA SINAD:	–80 dB
Spurious & Image Rejection:	–80 dB
Selectivity EIA SINAD:	–80 dB
Audio Output:	3 Watts (5 Watts with external speaker) at less than 5% distortion
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation	
29.7–36 MHz:	6.3 MHz
36–42 MHz:	6.0 MHz
42–50 MHz:	8.0 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac* LPI VHF Mobile Radio

GENERAL

Band:	VHF
Model Series:	D03MJA
Typical RF Output:	2 Watts
Frequency:	146–174 MHz
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198mm)
Primary Voltage Input:	13.8 Volts DC
Weight:	61 oz. (1.73 kg)
Typical Current Drain	
Receive (5W):	1.5 Amps
Transmit:	2.5 Amps
Standby:	400 milliAmps
Channel Capability	
MaxTrac LPI 50:	2 channels
MaxTrac LPI 300:	6 or 16 channels
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch
External Speaker (Option):	5 Watts

TRANSMITTER

Spurious & Harmonic Emissions:	–46 dBc
Frequency Stability (–30°C to +60°C, 25°C ref.):	±0.0005%
Modulation:	16K0F1D, 16K0F3E, 15K0F2D
Max. Frequency Separation	
MaxTrac LPI 50:	12 MHz
MaxTrac LPI 300:	28 MHz
Audio Distortion:	5% measured per EIA
Output Impedance:	50 Ohms
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1kHz

RECEIVER

Channel Spacing:	30 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD	
MaxTrac LPI 50:	–75 dB
MaxTrac LPI 300:	–78 dB
Spurious & Image Rejection	
MaxTrac LPI 50:	–75 dB
MaxTrac LPI 300:	–80 dB
Selectivity EIA SINAD	
MaxTrac LPI 50:	–75 dB
MaxTrac LPI 300:	–80 dB
Audio Output:	3 Watts (5 Watts with optional external speaker) at less than 5% distortion
Frequency Stability (–30°C to +60°C, 25°C ref.):	±0.0005%
Max. Frequency Separation	
MaxTrac LPI 50:	12 MHz
MaxTrac LPI 300:	28 MHz
Output Impedance:	50 Ohms

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac 50* VHF Mobile Radios

GENERAL

Model Series:	D33MJA	D34MJA
Typical RF Output:	25 Watts	45 Watts
Frequency (MHz):	146–174	
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198 mm)	
Primary Voltage Input:	13.8 Volts DC	
Weight:	61 oz. (1.73 kg)	
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 9.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability:	2 channels	
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT3712	ABZ89FT3730

TRANSMITTER

Spurious & Harmonic Emissions:	–57 dB	–60 dB
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation	11.2 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz	

RECEIVER

Channel Spacing:	30 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD:	–75 dB
Spurious & Image Rejection:	–75 dB
Audio Output:	3 Watts (5 Watts with optional speaker) at less than 5% distortion
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation	11.2 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac* 100/300 VHF Mobile Radios

GENERAL

Model Series:	D33MJA	D43MJA
Typical RF Output:	25 Watts	45 Watts
Frequency (MHz):	136–162	146–174
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198 mm)	
Primary Voltage Input:	13.8 Volts DC	
Weight:	54 oz. (1.51 kg)	
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 9.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability: *MaxTrac 100:* *MaxTrac 300:*	 2 channels 6, 16, or 32 channels	
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT3712	ABZ89FT3730

TRANSMITTER

Spurious & Harmonic Emissions:	–57 dB	–60 dB
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation 136–172 MHz: 146–174 MHz:	 26 MHz 28 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz	

RECEIVER

Channel Spacing:	30 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD:	–78 dB
Spurious & Image Rejection:	–80 dB
Selectivity EIA SINAD:	–80 dB
Audio Output:	3 Watts (5 Watts with optional speaker) at less than 5% distortion
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation 136–172 MHz: 146–174 MHz:	 26 MHz 28 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

MXW–7334–O
2/28/90

Performance Specifications for *MaxTrac* LPI UHF Mobile Radio

GENERAL

Band:	UHF
Model Series:	D04MJA
Typical RF Output:	2 Watts
Frequency:	449–470 MHz
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198mm)
Primary Voltage Input:	13.8 Volts DC
Weight:	61 oz. (1.73 kg)
Typical Current Drain	
Receive (5W):	1.5 Amps
Transmit:	2.5 Amps
Standby:	400 milliAmps
Channel Capability	
MaxTrac LPI 50:	2 channels
MaxTrac LPI 300:	6, 16, or 32 channels
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch
External Speaker (Option):	5 Watts

TRANSMITTER

Spurious & Harmonic Emissions:	–46 dBc
Frequency Stability (–30°C to +60°C, 25°C ref.):	±0.0005%
Modulation:	16K0F1D, 16K0F3E, 15K0F2D
Max. Frequency Separation	
MaxTrac LPI 50:	10 MHz
MaxTrac LPI 300:	21 MHz
Audio Distortion:	5% measured per EIA
Output Impedance:	50 Ohms
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1kHz

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD	
MaxTrac LPI 50:	–70 dB
MaxTrac LPI 300:	–75 dB
Spurious & Image Rejection	
MaxTrac LPI 50:	–70 dB
MaxTrac LPI 300:	–75 dB
Selectivity EIA SINAD	
MaxTrac LPI 50:	–70 dB
MaxTrac LPI 300:	–75 dB
Audio Output:	3 Watts (5 Watts with optional external speaker) at less than 5% distortion
Frequency Stability (–30°C to +60°C, 25°C ref.):	±0.0005%
Max. Frequency Separation	
MaxTrac LPI 50:	10 MHz
MaxTrac LPI 300:	21 MHz
Output Impedance:	50 Ohms

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac 50* UHF Mobile Radios

GENERAL

Model Series:	D34MJA	D44MJA
Typical RF Output:	25 Watts	40 Watts
Frequency (MHz):	449–470	
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198 mm)	
Primary Voltage Input:	13.8 Volts DC	
Weight:	61 oz. (1.73 kg)	
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 9.5 Amps 400 milliAmps	 1.5 Amps 12.5 Amps 400 milliAmps
Channel Capability:	2, 6, 16, or 32 channels	
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT4713	ABZ89FT4725

TRANSMITTER

Spurious & Harmonic Emissions:	–57 dB	–60 dB
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation	21 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz	

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD:	–70 dB
Spurious & Image Rejection:	–70 dB
Audio Output:	3 Watts (5 Watts with optional speaker) at less than 5% distortion
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation	21 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac* 100/300 UHF Mobile Radios

GENERAL

Model Series:	D43MJA	D44MJA
Typical RF Output:	25 Watts	40 Watts
Frequency (MHz):	449–470 MHz	403–430 MHz; 449–470 MHz
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198 mm)	
Primary Voltage Input:	13.8 Volts DC	
Weight:	61 oz. (1.73 kg)	
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 9.5 Amps 400 milliAmps	 1.5 Amps 12.5 Amps 400 milliAmps
Channel Capability: MaxTrac 100: MaxTrac 300:	 2 channels 6, 16, or 32 channels	
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT4713	ABZ89FT4741 (403–430 MHz) ABZ89FT4725 (449–470 MHz)

TRANSMITTER

Spurious & Harmonic Emissions:	–57 dB	–60 dB
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation 403–430 MHz 449–470 MHz	 27 MHz 21 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz	

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.30 uV
Intermodulation EIA SINAD:	–75 dB
Spurious & Image Rejection:	–75 dB
Selectivity EIA SINAD	–75 dB
Audio Output:	3 Watts (5 Watts with optional speaker) at less than 5% distortion
Frequency Stability:	+0.0005% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation 403–430 MHz 449–470 MHz	 27 MHz 21 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

Performance Specifications for *MaxTrac* 100/300/800 MHz Mobile Radios

GENERAL

Model Series:	D35MJA	D45MJA
Typical RF Output:	15 Watts *	35 Watts *
Frequency (MHz):	TX: 806–825 MHz; 851–870 MHz: T/A RX: 851–870 MHz	
Dimensions (H x W x L):	2" x 7" x 9.9" (50.8 x 178 x 251mm)	
Primary Voltage Input:	13.8 Volts DC	
Weight:	76 oz. (2.16 kg)	
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 7.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability *MaxTrac 100:* *MaxTrac 300:*	 2 channels 6, 16, or 32 channels	
Squelch Capability:	*Private–Line, Digital Private–Line,* coded squelch and/or carrier squelch	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT5672 ABZ89FT5677 (Talkaround)	ABZ89FT5709

TRANSMITTER

Spurious & Harmonic Emissions:	–55 dB	–59 dB
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation:	19 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Modulation Sensitivity:	80 mV rms for 60% max. deviation @ 1 kHz	

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.40 uV
Intermodulation EIA SINAD:	–68 dB
Spurious & Image Rejection:	–70 dB
Selectivity EIA SINAD:	–68 dB
Audio Output:	3 Watts (5 Watts with external speaker) at less than 5% distortion
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation:	19 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE
* 12 Watt in Talkaround
* 20 Watt in Talkaround

Performance Specifications for *MaxTrac 820* Trunked Mobile Radios

GENERAL

Model Series:	D35MQA	D45MQA
Typical RF Output:	15 Watts *	35 Watts *
Frequency (MHz):	TX: 806–825 MHz; 851–870 MHz: T/A RX: 851–870 MHz	
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198mm)	2" x 7" x 9.9" (50.8 x 178 x 251mm)
Primary Voltage Input:	13.8 Volts DC, Negative ground	
Weight:	61 oz. (1.73 kg)	76 oz. (2.16 kg)
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 7.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability:	20 Trunked channels	
Metering:	Adjustments and alignments are performed electronically using an IBM PC, a Radio Interface Box (RIB), and field maintenance software.	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT5672 ABZ89FT5677 (Talkaround)	ABZ89FT5709

TRANSMITTER

Spurious & Harmonic Emissions:	–55 dB	–59 dB
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation:	19 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Audio Frequency Response:	+1 to –3 dB from 6 dB per octave pre–emphasis characteristic from 300 to 3000 Hz	
FM Hum and Noise (EIA method):	–40 dB	

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.40 uV
Intermodulation EIA SINAD:	–68 dB
Spurious & Image Rejection:	–70 dB
Selectivity EIA SINAD:	–68 dB
Audio Output:	3 Watts (5 Watts with external speaker) at less than 5% distortion
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation:	19 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE
* 12 Watt in Talkaround
* 20 Watt in Talkaround

MXW–7337–O
2/28/90

Performance Specifications for *MaxTrac 840* Trunked Mobile Radios

GENERAL

Model Series:	D35MWA	D45MWA
Typical RF Output:	15 Watts *	35 Watts *
Frequency (MHz):	TX: 806–825 MHz; 851–870 MHz: T/A RX: 851–870 MHz	
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198mm)	2" x 7" x 9.9" (50.8 x 178 x 251mm)
Primary Voltage Input:	13.8 Volts DC, Negative ground	
Weight:	61 oz. (1.73 kg)	76 oz. (2.16 kg)
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 7.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability:	20 Trunked/10 Conventional	
Metering:	Adjustments and alignments are performed electronically using an IBM PC, a Radio Interface Box (RIB), and field maintenance software.	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT5677	ABZ89FT5709

TRANSMITTER

Spurious & Harmonic Emissions:	–55 dB	–59 dB
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)	
Modulation:	16K0F3E, 16K0F1D, 15K0F2D	
Max Frequency Separation:	19 MHz	
Audio Distortion:	5% measured per EIA	
Output Impedance:	50 Ohms	
Audio Frequency Response:	+1 to –3 dB from 6 dB per octave pre–emphasis characteristic from 300 to 3000 Hz	
FM Hum and Noise (EIA method):	–40 dB	

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.40 uV
Intermodulation EIA SINAD:	–68 dB
Spurious & Image Rejection:	–70 dB
Selectivity EIA SINAD:	–68 dB
Audio Output:	3 Watts (5 Watts with external speaker) at less than 5% distortion
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation:	19 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE
* 12 Watt in Talkaround
* 20 Watt in Talkaround

Performance Specifications for *SMARTNET MaxTrac* Trunked Mobile Radios

GENERAL

Model Series:	D35MWA	D45MWA
Typical RF Output:	15 Watts *	35 Watts *
Frequency (MHz):	TX: 806–825 MHz; 851–870 MHz: T/A RX: 851–870 MHz	
Dimensions (H x W x L):	2" x 7" x 7–3/4" (50.8 x 178 x 198mm)	2" x 7" x 9.9" (50.8 x 178 x 251mm)
Primary Voltage Input:	13.8 Volts DC, Negative ground	
Weight:	61 oz. (1.73 kg)	76 oz. (2.16 kg)
Typical Current Drain Receive (5W): Transmit: Standby:	 1.5 Amps 7.5 Amps 400 milliAmps	 1.5 Amps 15.0 Amps 400 milliAmps
Channel Capability:	20 Trunked/8 Conventional	
Metering:	Adjustments and alignments are performed electronically using an IBM PC, a Radio Interface Box (RIB), and field maintenance software.	
External Speaker (Option):	5 Watts	
FCC Designation:	ABZ89FT5672	ABZ89FT5702

TRANSMITTER

Spurious & Harmonic Emissions:	–55 dB / –59 dB
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)
Modulation:	16K0F3E, 16K0F1D, 15K0F2D
Max Frequency Separation:	19 MHz
Audio Distortion:	5% measured per EIA
Output Impedance:	50 Ohms
Audio Frequency Response:	+1 to –3 dB from 6 dB per octave pre–emphasis characteristic from 300 to 3000 Hz
FM Hum and Noise (EIA method):	–40 dB

RECEIVER

Channel Spacing:	25 kHz
Sensitivity 12 dB SINAD:	0.40 uV
Intermodulation EIA SINAD:	–68 dB
Spurious & Image Rejection:	–70 dB
Selectivity EIA SINAD:	–68 dB
Audio Output:	3 Watts (5 Watts with external speaker) at less than 5% distortion
Frequency Stability:	+0.00025% (–30°C to +60°C, 25°C ref.)
Max Frequency Separation:	19 MHz
Output Impedance:	50 Ohms

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE
* 12 Watt in Talkaround
* 20 Watt in Talkaround

MaxTrac FM Two–Way Radio Options

Option	Description	Adds	Deletes
B109	Handset	Handset Kit & Accessories	Compact Microphone & Hang–Up Kit
B113	Ignition Switch Cable	Cable Kit	
B18	5–Watt External Speaker	External Speaker & Mtg Hardware	Internal Radio Speaker
B20	DTMF Microphone	Touch Code Microphone	Compact Microphone
B221	External Alarms Relay/Cable/Switch Kit *MaxTrac 300*	Relay Kit Cable & Switch	
B239	Noise Cancelling Microphone	Noise–Cancelling Microphone	Compact Microphone
B308	Expanded Options Connector		
B382	Full Size Microphone	Full Size Microphone	Compact Microphone
B470	Emergency Footswitch	Footswitch	
B663	Extra Stability Mount	3–Point Mounting Bracket & Hardware	
B665	Control Station Operation	Power Supply Desk Microphone Mounting Tray	Compact Microphone & Hang–Up Kit
B674	External Alarms Relay/Cable/Switch Kit *MaxTrac 100*	Relay Kit Cable & Switch	
B688	Emergency Pushbutton	External Mount Pushbutton Switch	
B81	Keylock Mounting Trunnion	Keylock Mtg Installation Kit	Standard Installation Kit
Antenna Options:			
B124	UHF 5 dB Gain Trunk Lip Mount		
B172	UHF 5 dB Gain Roof Mount		
B542	VHF/800 MHz 3 dB Gain Trunk Lip Mount		
B542	UHF 3.5 dB Gain Trunk Lip Mount		
B652	29.7–50 MHz Broad–Band		
B925	VHF/UHF 1/4 Wave Trunk Lip Mount		
B925	800 MHz Unity Gain Trunk Lip Mount		
B926	VHF/800 MHz 3 dB Gain Roof Mount		
B926	UHF 3.5 dB Gain Roof Mount		

MaxTrac Mobile Radio Service Aids, Tools, & Programming Devices

The following service aids are available through Motorola Communications Parts Division to facilitate servicing and programming of the *MaxTrac* Mobile Radio. Please contact 1–800–422–4210 for price and delivery.

SERVICE AIDS

01–80352A01	TEST CABLE – Mini UHF to BNC cable (3 ft.) used for connecting the *MaxTrac* mobile to the RF test instruments.
01–80355A09	TEST ADAPTER – Attaches to the Program/Test cable in place of the RIB; used to manually key the radio and to inject a tone for troubleshooting purposes.
30–80373B41	VCO TEST CABLE – Provides the interface between the mobile's RF board and the test equipment for troubleshooting.
30–80373B42	TEST CABLE – Mini UHF to N–type RF coax (low loss) cable (14 inch) used for connecting the *MaxTrac* mobile to the RF test instruments.
RLN4137A	External Keying Plug – Used to place the radio in test mode and key the radio.

SERVICE TOOLS

66–80388A26	CRIMPING TOOL – For customer installations requiring crimping of mini UHF RF connector (28–84606M01) onto antenna cable.
66–80947W01	EXTRACTION TOOL – Provides the ability to remove the terminal pins (29–84249N01) from the 16 pin Expanded Options Connector housing (15–80922V01).

PROGRAMMING DEVICES

RPX–4719	RADIO SERVICE SOFTWARE LICENSING AND INFORMATION PACKAGE – Provides the necessary software licensing information required to purchase radio service software listed below.
RVN–4019	RADIO SERVICE SOFTWARE ON 5 1/4 IN. DISK – Operates on the IBM PC, XT, AT, or PERSONAL SYSTEM/2 family of computers for programming and servicing of the *MaxTrac* Mobile radios. IBM DOS 3.0 or higher, an RS–232 Asynchronous Serial Communications adapter and RAM memory of 512K bytes minimum are necessary for the programmer. This software provides the capability of changing the radio frequencies, squelch codes, and other radio parameters.
RVN–4020	RADIO SERVICE SOFTWARE ON 3 1/2 IN. DISK – Same as RVN–4019 descriptions.
RVN–4043	*SMARTNET* RADIO SERVICE SOFTWARE ON 5 1/4 IN. DISK – Operates on the IBM PC, XT, AT or PERSONAL SYSTEM/2 family of computers for programming and servicing of the *SMARTNET MaxTrac* mobile radios. IBM DOS 3.0 or higher, an RS–232 Asynchronous Serial Communications Adapter and RAM memory of 512K bytes minimum are necessary for the programmer. This software provides the capability of changing the radio frequencies, squelch codes and other radio parameters.
RVN–4044	*SMARTNET* RADIO SERVICE SOFTWARE ON 3 1/2 IN. DISK – Same as RVN–4043 description.
RLN–4008	RADIO INTERFACE BOX (RIB) – Voltage level shifter to enable the communications between the radio and the computers RS–232 Asynchronous Serial Communications Adapter. Requires the Wall Mount Power Supply (01–80357A57).
01–80357A57	WALL MOUNT POWER SUPPLY – Used to supply power to the RIB. For 120 VAC use only.
01–80359A29	*MAXTRAC* DUPLEX PROGRAMMING ADAPTER – Used on all T25CPA series models. The 01–80359A29 adapter must be used in conjunction with the 30–80070N01 Program/Test Cable and the RLN–4008 Radio Interface Box to program the radio.
30–80070N01	PROGRAM/TEST CABLE – Provides the electrical interconnection from the programming receptacle inside the radio to the RIB (RLN–4008) programming the *SMARTNET MaxTrac* mobile radio.
30–80369B71	COMPUTER INTERFACE CABLE – Used to connect the IBM PC, XT, PC CONVERTIBLE or PERSONAL SYSTEM/2 computer's Asychronous Serial Communications Adapter to the RIB (01–80353A72). The previously offered 01–80357A44 Computer Interface Cable will provide the proper connections.
30–80369B72	COMPUTER INTERFACE CABLE – Used to connect the IBM AT computer's Asychronous Serial Communications Adapter to the RIB (01–80353A74.) The previously offered 01–80357A64 Computer Interface Cable will provide the proper connections.

SERVICE MANUALS/OPERATING INFORMATION

Service manuals for:

Conventional *MaxTrac* 68–80101W76
800 Trunked *MaxTrac* 68–80900Z01
900 Trunked *MaxTrac* 68–02977G10
MaxTrac Detailed Service Information Manual 68–80102W84
Direct Entry Keyboard 68–80103W09
CoveragePlus Mobile System Installation and Service Guide 68–80103W08

Operators cards for:

MaxTrac 50 ..... 68–80900Z17
MaxTrac 50/100 ..... 68–80900Z99
MaxTrac 100 ..... 68–80101W68
MaxTrac 300 (6 Channel) 68–80101W96
MaxTrac 300 (16 Channel) 68–80900Z46
MaxTrac 300 (16 Channel w/MDC–1200 Signalling) . 68–80900Z26
MaxTrac 300 (16 Channel w/Selective Signalling) ... 68–80901Z01
Privacy Plus 820 *MaxTrac* (B1,B3,B5) Trunked 68–80101W92
Privacy Plus 820 *MaxTrac* (B4) Dual Mode 68–80900Z50
Privacy Plus 840 *MaxTrac* (B6) Dual Mode without Scan 68–80900Z51
Privacy Plus 840 MaxTrac (B7) Dual Mode with Scan 68–80900Z52
SMARTNET 800 *MaxTrac* (C3) 68–80900Z74
SMARTNET 800 *MaxTrac* (C5,C6) Dual Mode with Scan 68–80900Z75
SMARTNET 800 (C5,C6) Dual Mode with Search ... 68–80900Z76
CoveragePlus MaxTrac 68–80103W07
Privacy Plus 900 *MaxTrac* (B2,B3) 68–02977G11
Privacy Plus 900 *MaxTrac* (B6,B7) 68–02977G12
SMARTNET 900 *MaxTrac* 68–02979G91
SMARTNET 900 *MaxTrac* (C5) with Scan 68–02979G92
SMARTNET 900 *MaxTrac* (C5) with Search 68–02979G93

Operator's manuals for:

MaxTrac 50 ..... 68–80900Z18
MaxTrac 100/300 ..... 68–80900Z04
Privacy Plus 820 *MaxTrac* (B1,B3,B5) Trunked 68–80900Z54
Privacy Plus 820 *MaxTrac* (B4) Dual Mode 68–80900Z54
Privacy Plus 840 *MaxTrac* (B6) Dual Mode without Scan 68–80900Z54
Privacy Plus 840 *MaxTrac* (B7) Dual Mode with Scan 68–80900Z54
SMARTNET 800 *MaxTrac* (C3) 68–80102W37
SMARTNET 800 *MaxTrac* (C5,C6) Dual Mode with Scan 68–80102W37
SMARTNET 800 (C5,C6) Dual Mode with Search .. 68–80102W37
CoveragePlus MaxTrac 68–80103W07
Privacy Plus 900 *MaxTrac* (B2,B3) 68–02977G15
Privacy Plus 900 *MaxTrac* (B6,B7) 68–02977G15
SMARTNET 900 *MaxTrac* 68–02979G75
SMARTNET 900 *MaxTrac* (C5) with Scan 68–02979G75
SMARTNET 900 *MaxTrac* (C5) with Search 68–02979G75
MaxTrac 888 ..... 68–80102W98

MXW–7855–O
4/28/90

1. Description

This section of the manual includes a general system troubleshooting guide and a basic troubleshooting chart to assist in isolating radio problems to board level.

The other sections of this manual troubleshoot down to component level. A number of parts in the *MaxTrac* radio, which are not field serviceable, are identified in the schematics in shaded areas. Field replacement of these parts will affect the factory calibrated numbers on the tuning label. If any of these parts are found to be defective, board replacement is the only acceptable means of repair.

Replacement of the Logic Board, RF Board, or Power Amplifier requires that recalibration be performed using the Motorola Radio Service Software. Therefore, it is strongly advised that the servicer become familiar with the programming techniques applicable to the *MaxTrac* Radios.

A personal computer capable of running the *MaxTrac* RADIO SERVICE SOFTWARE package (RVN4019C for 5.25 inch drives and RVN4020C for 3.5 inch drives) is required in addition to the items listed in the Recommended Test Equipment Section. Refer to *MaxTrac* Mobile Radio Service Aids, Tools, and Programming Devices for more information on equipment requirements.

Failure to perform the required calibration procedure will affect performance of the Reference Oscillator, RF Power Leveling and Protection, and Transmitter Modulation over frequency and temperature. An uncalibrated radio may not comply with FCC rules and may be unreliable at temperature extremes.

2. Recommended Test Equipment

The following is a list of recommended equipment, with which the servicer of *MaxTrac* radios can be as flexible and effective as possible.

(1) *R2001D Communications System Analyzer.* This analyzer utilizes a microprocessor to control more than 16 different functions associated with performing tests and analyzing problems on the *MaxTrac* radios. The R2001D can be upgraded to a R2021D Trunking Systems Analyzer by adding a Trunking Systems Option Board (RPX4392A).

(2) *R2021D Trunking Systems Analyzer.* This analyzer includes all the functions of the R2001D plus a trunking service option which allows the servicer to "final test" a *MaxTrac* mobile in a simulated trunking system. The R2021D will provide the necessary signalling to change frequencies and allow "handshaking" between the *MaxTrac* mobile and a simulated system controller.

(3) *R2200 Communications Service Monitor.* This unit contains all the features necessary to service *MaxTrac* radios. The R2200 cannot be upgraded to a trunking system analyzer.

(4) *DC Multimeter/Milliohmmeter.* This is a general purpose instrument for troubleshooting. Recommended equipment is the Motorola R–1047/1048 Digital Multimeter.

(5) *High Current Power Supply.* This power supply must be capable of handling at least 10–15 amps. Recommended equipment is the Motorola R–1011 Power Supply.

(6) *RF Millivoltmeter.* This device is used for measuring the RF sections of the *MaxTrac*. Recommended equipment is the Motorola S1339A RF Millivoltmeter.

3. Recommended Repair Equipment

The following is a list of repair equipment recommended for the repair of the *MaxTrac* printed circuit boards.

(1) *RSX4057A Repair Station.* This device is recommended for replacing leadless chip carriers on *MaxTrac* radio boards. With it, desoldering and soldering is accomplished by controlling the flow of hot air through accessory precision heat focus heads. A spring loaded mechanism automatically senses solder melt and removes the component from the printed circuit board.

(2) *Miniature Digital Readout Soldering Station.* Motorola Part Number 01–80386A81.

(3) *Leadless Component Extractor.* Motorola Part Number 66–80387A59. A desoldering device for safe removal of leadless components.

Table 1. Conventional Radio Error Tones

TONE	PROBLEM
High–pitch beep (900 Hz 119 ms) on turn on or when key pressed.	Normal operation — no error.
Low–pitched tone (163 Hz) for 5 seconds following turn on.	Code plug error. For all code plug errors, try to re–program radio. If this does not clear the fault or if problem recurs, replace the logic board.
Low frequency (163 Hz) continuous tone present whenever radio is on.	Logic board failure. Refer to Logic Board Section for troubleshooting.
Low pitch beep (300 Hz 200 ms) when a button is pressed.	Do not press that button in the current operating condition. Change operating condition (select another mode, etc.).
Low frequency (150 Hz or 112.5 Hz) continuous tone while PTT is held.	Transmit is not allowed. If it was time–out–timer, you may release PTT then continue your call.

Table 2. Trunking Radio Error Tones

TONE	PROBLEM
Low pitched tone (163 Hz) for 5 seconds after turn on.	Try to re–program tuning codeplug. If this does not clear the fault or of the problem recurs, replace the logic board.
Volume set tone (450 Hz) for 1 second, followed by illegal function tone after turn on.	Re–program or replace the trunking codeplug.
Continuous pattern of one beep (1000 Hz) followed by a pause after turn on.	Microprocessor RAM failure. Replace logic board.
Continuous pattern of two beeps (1000 Hz) followed by a pause after turn on.	External RAM failure. Replace logic board.
Continuous pattern of three beeps (1000 Hz) followed by a pause after turn on.	Watchdog error. Re–program the microprocessor CONFIG register. If the error still exists, replace the logic board.
Continuous pattern of five beeps (1000 Hz) followed by a pause after turn on.	External ROM checksum failure. Re–program or replace external ROM.

(4) *Power Desoldering System.* Motorola Part Number 01–80333B61. An excellent power solder removal system, complete with temperature controlled hollow tip iron. Aids in cleaning plated through holes of solder.

4. General Troubleshooting

The *MaxTrac* radio consists of five major sections:

- Front Panel
- Logic Board
- RF Board
- Power Amplifier
- Unified Chassis.

Each radio section is covered by theory of operation, troubleshooting information, schematics, board overlays, and parts lists. The troubleshooting section includes troubleshooting flow charts, tables, and descriptive text. The schematics show voltage levels and waveforms as needed.

5. Preliminary Checks

The *MaxTrac* radio goes through a self check of the control logic section upon initial turn on. If the radio passes the self test, a single high–pitched, short–duration beep (900 Hz) sounds. If other types of tones or tone sequences are heard, the self test has failed. Refer to Table 1 for conventional radio error tones and Table 2 for trunked radio error tones.

The error tone tables will help direct the servicer to the appropriate section(s) of the manual for troubleshooting information.

6. Trunked FM Radio Test Mode Routine

6.1 GENERAL

In normal field operation, the microcomputer in the radio controls RF channel selection, transmitter key–up, and receiver muting functions. However, when the unit is on the bench and is out of its normal operating environment, the microcomputer does not key the PA or unmute the receiver, and this prevents use of normal test procedures. To solve this problem, a special test routine has been incorporated into the radio.

6.2 INITIAL SETUP

To enter the TEST mode, short across VR806 on the Logic Board prior to turning the radio on. This grounds the Serial Data Input (SERIAL BUS +). To exit the TEST mode, turn the radio off, remove the short, then turn the radio back on.

There are seven TEST frequencies: three fixed TEST mode frequencies (see Table 3), and four control channel frequencies of the system selected when the TEST mode was entered.

Table 3. Fixed Test Mode Frequencies

TEST MODE CHANNEL	RECEIVE FREQUENCY	TRANSMIT FREQUENCY
1	851.0125 MHz	806.0125 MHz
2	869.9875 MHz	824.9875 MHz
3	860.5125 MHz	815.5125 MHz

Operation of the radio in TEST mode is described in the following paragraphs and is the same whether using the customer code plug frequencies or the internal plug test frequencies.

6.3 CHANNEL SELECTION AND RECEIVE MODE

(1) Short across VR806 (as described above). Apply power to the radio. A single 450 Hz beep in the speaker indicates operation on test mode Channel 1 (CH1), after which the receiver unmutes.

(2) Step the radio to the next channel by tapping the microphone PTT button (push the PTT and release it within 200 milliseconds). Two beeps in the speaker indicate CH2, after which the receiver unmutes. Repeat this procedure to step the receiver from CH1 through CH7 with the number of beeps indicating the chosen test channel. (CH1 through CH3 are fixed test mode frequencies.)

Note

The test mode cycles, which means that the radio reverts back to the first frequency (CH1) after the last possible test mode frequency.

6.4 TRANSMITTER ALIGNMENT MODES OF OPERATION

Four transmit modes are used for various transmitter checks and adjustments.

(1) Transmit Mode 1: Silent Carrier

On a given test channel, when the microphone PTT button is pressed once and held, the microcomputer keys the PA without data modulation, and MIC audio is enabled. In this mode, the transmitter frequency, hum and noise, and voice deviation can be checked and adjusted.

When the PTT button is released, the PA is de–keyed and the receiver unmutes.

(2) Transmit Mode 2: Sub–audible Connect Tone Plus Voice (Low–Speed Mode)

If the microphone PTT button is pressed and held the second time, the power amplifier is keyed with low–speed sub–audible tone modulation, and a pulsed 150 Hz tone is heard at the speaker. This 150 Hz tone is the BUSY tone. This procedure is used to adjust the maximum voice plus sub–audible tone deviation. Deviation levels are shown below.

- 3.7 kHz deviation for voice
- 1 kHz deviation for sub–audible connect tone
- 4.7 kHz deviation total

When the PTT button is released, the PA is de–keyed and the receiver unmutes.

Note

The low–speed sub–audible tone may be 76.60 Hz, 83.72 Hz, 90.00 Hz, 97.30 Hz, 105.88 Hz, 116.13 Hz, 128.57 Hz, or 138.46 Hz. The specific tone is coded in the codeplug, and is a specific tone for a specific system.

(3) Transmit Mode 3: High–Speed Acknowledge Tone (High–Speed Mode)

If the microphone PTT button is pressed and held for the third time, the PA is keyed with 1800 Hz tone modulation. The MIC audio is disabled and a 900 Hz alert tone is heard at the speaker. This tone is known as talk permit. This step is used to check high–speed data deviation. The deviation level should be 2.4 kHz to 3.1 kHz.

When the PTT button is released, the PA is de–keyed and the receiver remains muted.

(4) Transmit Mode 4: DTMF Transmit Mode

If the microphone PTT button is pressed and held for the fourth time, the PA is keyed and modulated with DTMF for the # button (combination of a 1477 Hz and a 973 Hz tone).

The MIC audio is disabled and a unique tone is heard at the speaker. This tone is known as the Dynamic Regrouping tone. This step is used to check the DTMF deviation (for the DTMF generated by the auto–dial feature). The deviation level should be 3 kHz to 4.5 kHz.

When the PTT button is released, the PA is de–keyed and the receiver remains muted.

Note

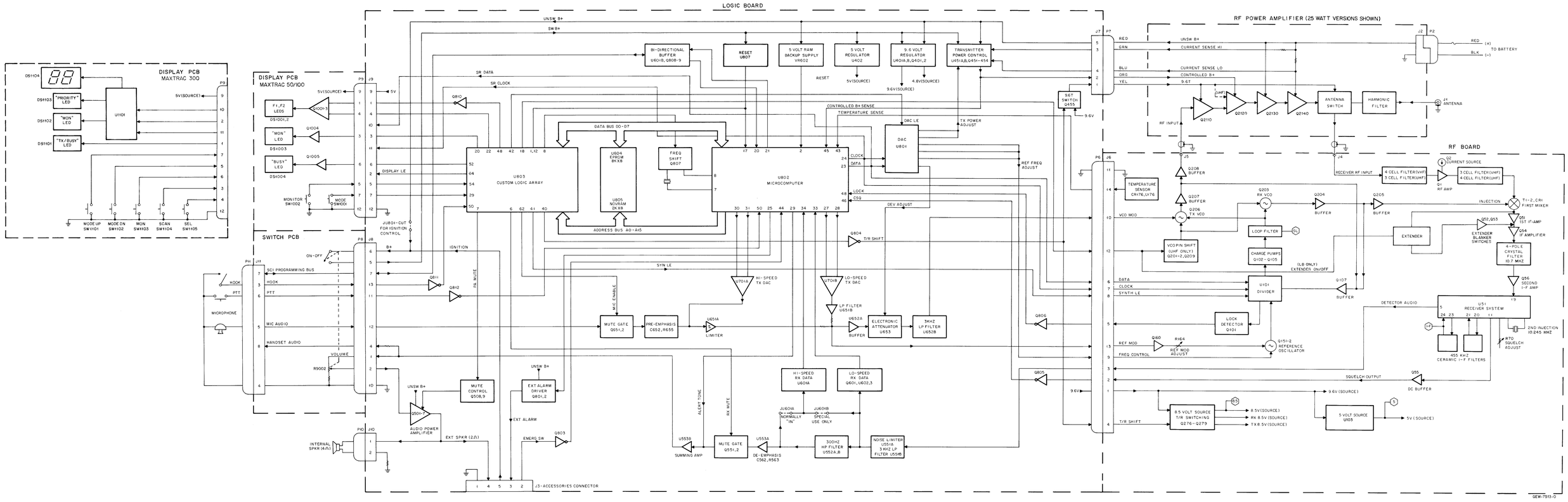
Repeated pressing and releasing the PTT button cycles the radio through the four modes described above.

Note

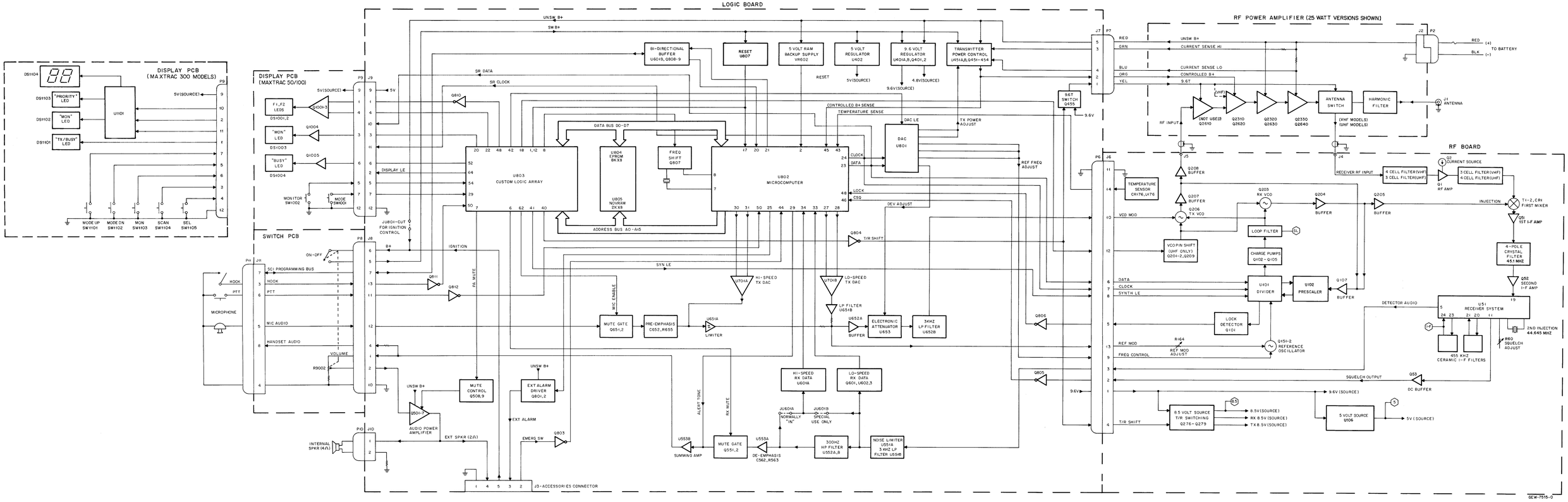
If any of the above tests indicate that adjustment of the transmitter deviation is necessary, refer to the *MaxTrac* RADIO SERVICE SOFTWARE package for procedures.

Table 4. General System Troubleshooting Guide

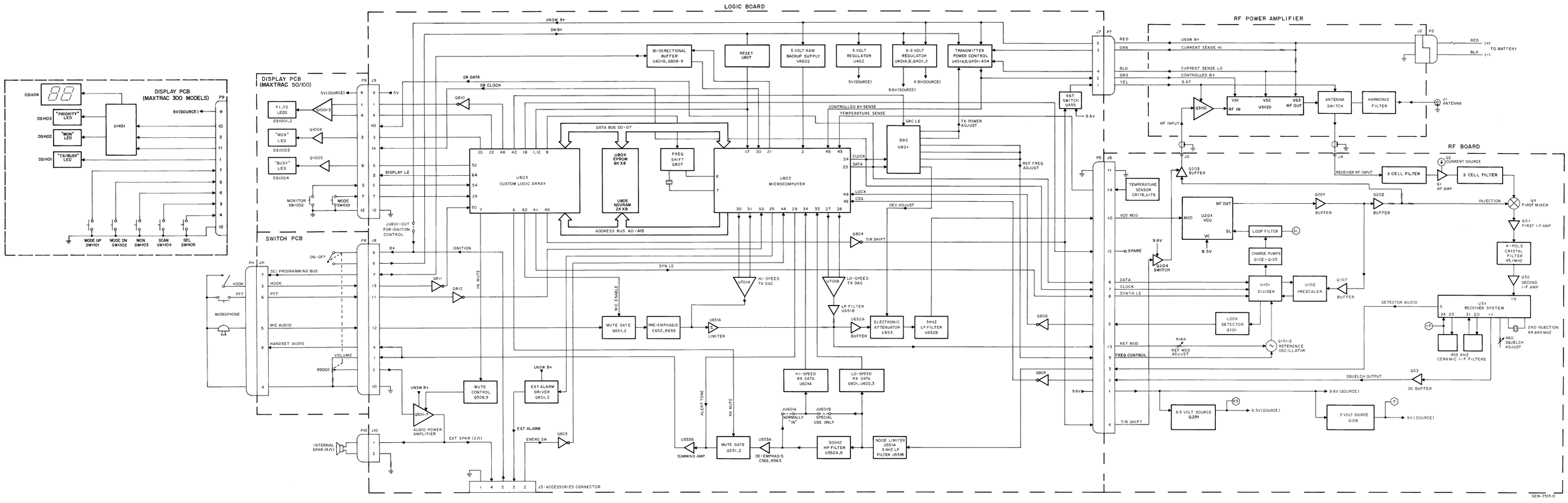
SYMPTOM	POSSIBLE TROUBLE SOURCE	REFER TO CHART OR DIAGRAM
No Receive Audio.	Red Lead Fuse. Audio PA. Squelch. Synthesizer Out of Lock. Receiver Front End. Receiver Back End.	None, check fuse. "NO/LOW AUDIO" Chart. "BAD SQUELCH or PL/DPL" Chart. "SYNTHESIZER/VCO" Chart. "RECEIVER" Chart. "RECEIVER" Chart.
Distorted Audio.	Audio PA. QUAD Detector. IF Amplifiers.	"NO/LOW AUDIO" Chart. "RECEIVER" Chart. "RECEIVER" Chart.
Failure to Squelch.	Squelch Circuit. Audio Mute Gate. Microcomputer.	"BAD SQUELCH or PL/DPL" Chart. Logic Board Schematic. Logic Board Schematic.
Failure to Unsquelch.	Microcomputer.	Logic Board Schematic.
Absence of PL/DPL ENCODE/DECODE.	Microcomputer. Logic Board Audio Circuitry.	Logic Board Schematic. Logic Board Schematic.
Poor Receiver Sensitivity.	RF Amplifier. First Mixer. First IF Amplifier. QUAD Detector. Second IF Amplifier.	"RECEIVER" Chart and Receiver Schematic.
Synthesizer Fails to Lock.	Synthesizer. VCO. Microcomputer.	"SYNTHESIZER/VCO" Chart. "SYNTHESIZER/VCO" Chart. Logic Board Schematic.
Absence of RF Power Output.	Power Control Circuitry. Keyed 9.6 Voltage. Synthesizer. Transmit VCO. PA Transistors.	Logic Board Schematic. "NO PTT" Chart. "SYNTHESIZER/VCO" Chart. "SYNTHESIZER/VCO" Chart. PA Schematic.
Absence of Power Control.	Power Control Circuitry. Microcomputer.	Logic Board Schematic. Logic Board Schematic.
Absence of Transmitter Modulation.	Logic Board Transmit Audio. VCO. Microcomputer.	"BAD TX MODULATION" Chart. "SYNTHESIZER/VCO" Chart. Logic Board Schematic.
Improper Microphone Sensitivity.	Logic Board Transmit Audio. Microcomputer. VCO.	"BAD TX MODULATION" Chart. Logic Board Schematic. "SYNTHESIZER/VCO" Chart.
Alternator Whine.	Excessive Whine in Vehicle.	Manual 68P81109E33.



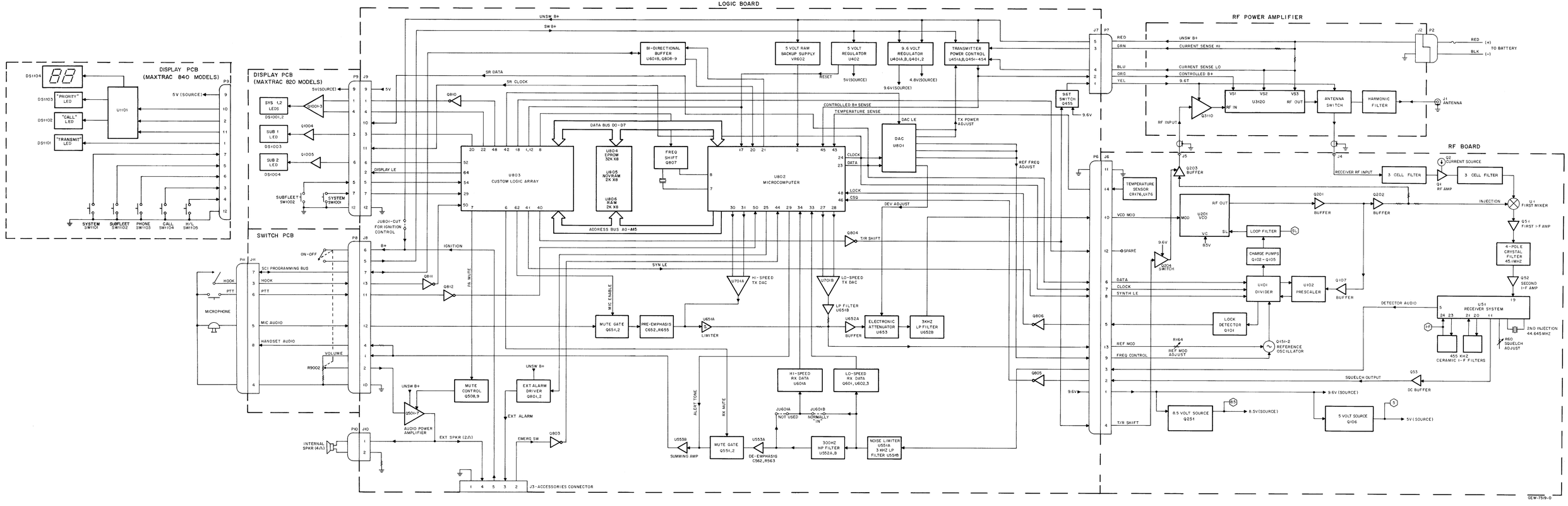
MaxTrac Lowband
Functional Block Diagram
PW–7514–O
2/28/90



MaxTrac VHF/UHF
Functional Block Diagram
PW–7516–O
2/28/90



MaxTrac 800 MHz
Functional Block Diagram
PW–7518–O
2/28/90



MaxTrac 820/840 MHz
Functional Block Diagram
PW–7520–O
2/28/90

1. Theory Of Operation

The *MaxTrac* Radio has two different front panels. *MaxTrac* Models 50, 100, and 820 use the Dual Mode front panel. The *MaxTrac* Models 300 and 840 use the 6/16/32 Mode front panel. Each Front panel assembly consists of a display board and a switch board. The switch board is common to all *MaxTrac* Models.

1.1 DUAL MODE DISPLAY BOARD

1.1.1 Description

The *MaxTrac* Models 50, 100, and 820 use the Dual Mode Display Board. The difference between trunking and conventional models is the way the controls and indicators are labeled.

1.1.2 Operation

To select a particular system or Channel LED, the microprocessor (U802) changes the state of P9–4 (CH1/CH2). When Channel One is selected, P9–4 is a logic level low and Q1003 is in cut off. This action places an open on the cathode of DS1002, and allows +5V DC to be applied to the base of Q1001 via R1005 and R1006. Q1001 enables DS1001 by placing a ground on its cathode. If Channel Two is selected, +2.7V DC is seen on P9–4, causing Q1003 to conduct and Q1001 to cut off. This action places a ground on the cathode of DS1002 while removing the ground from DS1001.

To select the color of the System/Channel LED, the microprocessor changes the state of P9–1 (TX/RX). In receive, this line is +2.1V DC, causing the green side of the selected dual LED to illuminate. At the same time, Q1002 is being saturated, grounding the red anodes and preventing them from turning on. In transmit, P9–1 is grounded, which turns off the green LED and Q1002. Via R1004, Q1002 removes the ground from, and applies +5V DC to, the red anodes.

P9–3 and P9–6 control the illuminating of DS1003 and DS1004 respectively. DS1003 acts as the Monitor or Subfleet A Indicator. DS1004 acts as the Busy or Subfleet B Indicator. To illuminate the LED, the microprocessor must raise the respective control line to +2.7V DC. This turns on Q1004 or Q1005 which provides a ground path for the LED.

SW1001 (Mode/System) and SW1002 (Monitor/Subfleet) are connected to P9–7 and P9–5. Normally, these lines are +5V DC. When the associated button is pressed, it places a ground on the line being read by the microprocessor.

1.2 6/16/32 MODE DISPLAY PANEL

1.2.1 Description

The 6/16/32 Mode Display board consists of three separate LED's (DS1101–3), five normally open switches (SW1101–5), a dual 7–segment LED display (DS1104), and a Display Driver (U1101).

1.2.2 Operation

After power up, the microprocessor (U802) loads U1101 with information using SERIAL DATA (P9–10), SERIAL CLOCK (P9–11), and DISPLAY ENABLE (P9–2). This data tells U1101 which segments and LED's to illuminate. Note that DS1101 is controlled directly by the logic board via P9–1.

U1101 is a Shift Register Latch. When a ground appears on a particular output, the associated LED illuminates. When the LED is to remain off, the O/P from U1101 will be an open. It is important to note that the LED's cathode will be +3.15V DC when on and +3.5V DC when off.

DS1104 is the Display Unit LED. Note that the decimal points are not connected and the common anodes are tied directly to +5V DC. To illuminate a segment, U1101 pulls the segments cathode line to ground.

SW1101 through SW1105 are normally–open momentary pushbutton switches. SW1101 and SW1102 are the Mode up/down switches; SW1103–SW1105 are Option Select buttons.

1.3 SWITCH BOARD

The Switch Board, common to all *MaxTrac* Models, consists of:

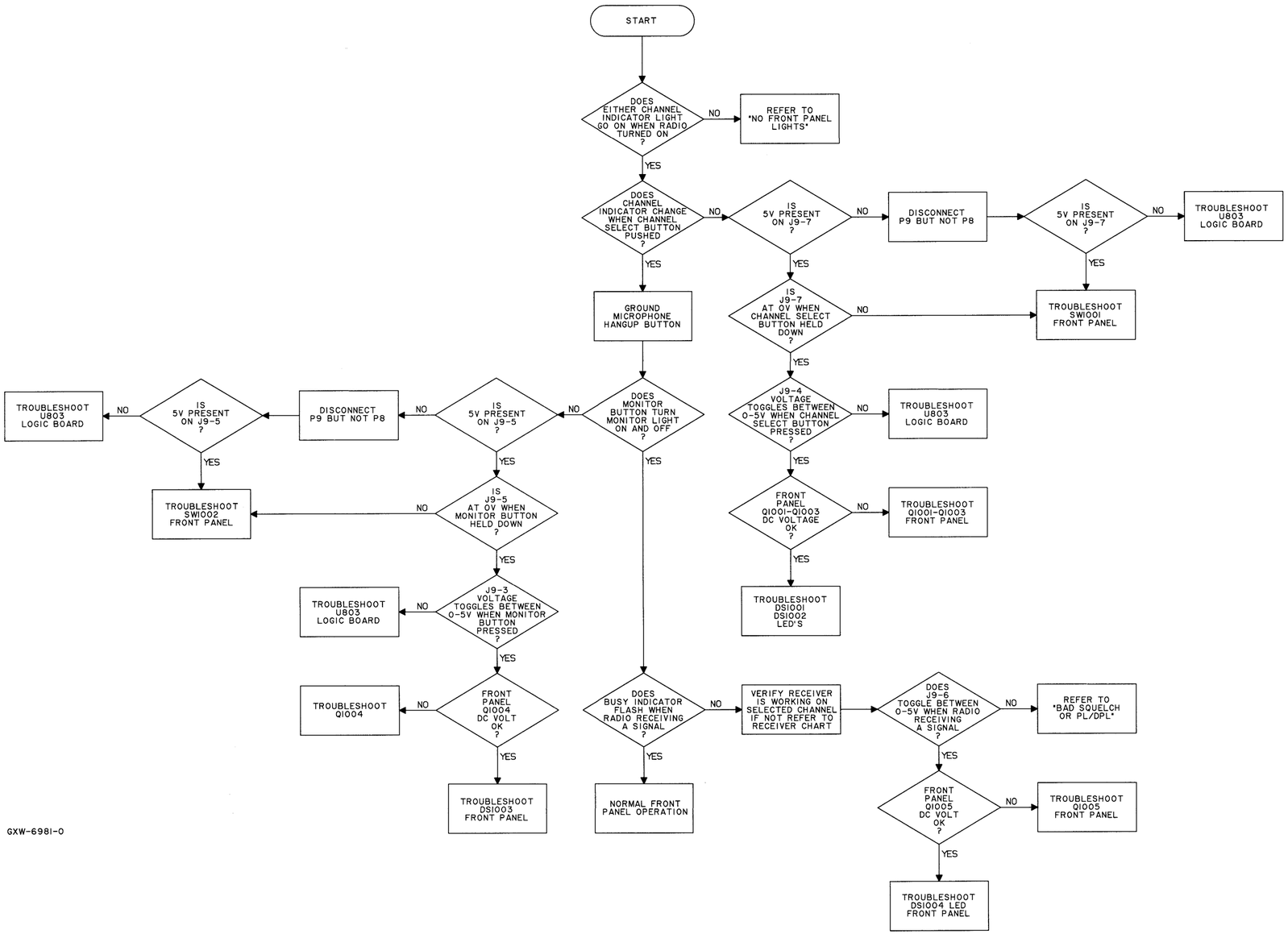
- R9001 – Fixed Resistor
- R9002 – ON/OFF Volume Control
- J11 – Microphone Jack
- Printed Circuit Board

Use continuity checks and ohmic measurements to verify proper operation of the switch board.

2. Troubleshooting and Repair

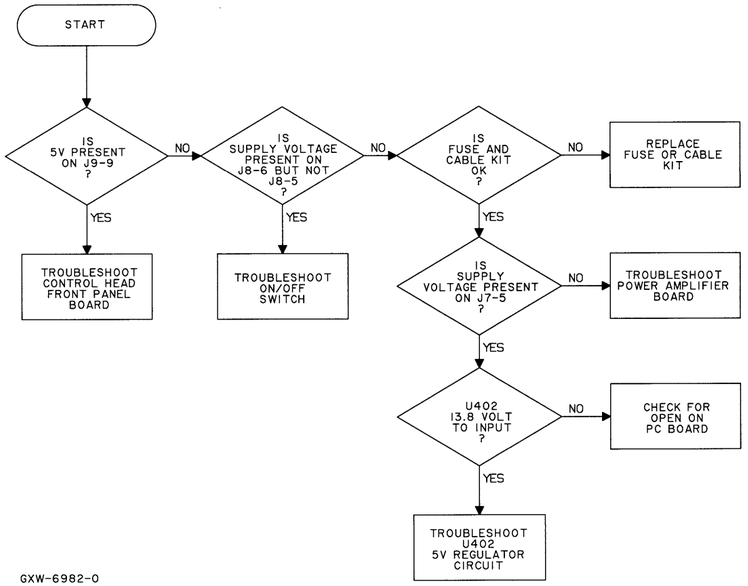
The troubleshooting diagrams on the following pages will help you diagnose problems which may occur on the front panel boards. Use these diagrams, and the schematics, circuit board diagrams, and parts lists to locate failed components and remedy the problem.

ABNORMAL FRONT PANEL OPERATION (*MaxTrac* 50/100)



GXW-6981-O

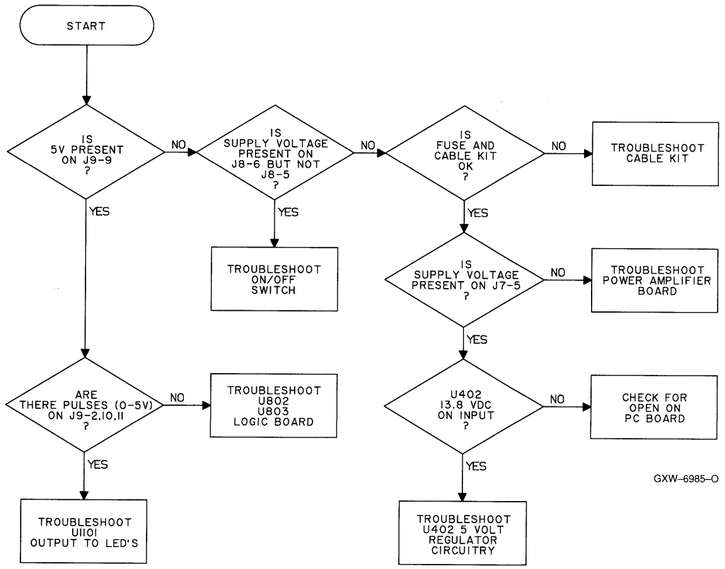
NO FRONT PANEL LIGHTS (*MaxTrac* 50/100)



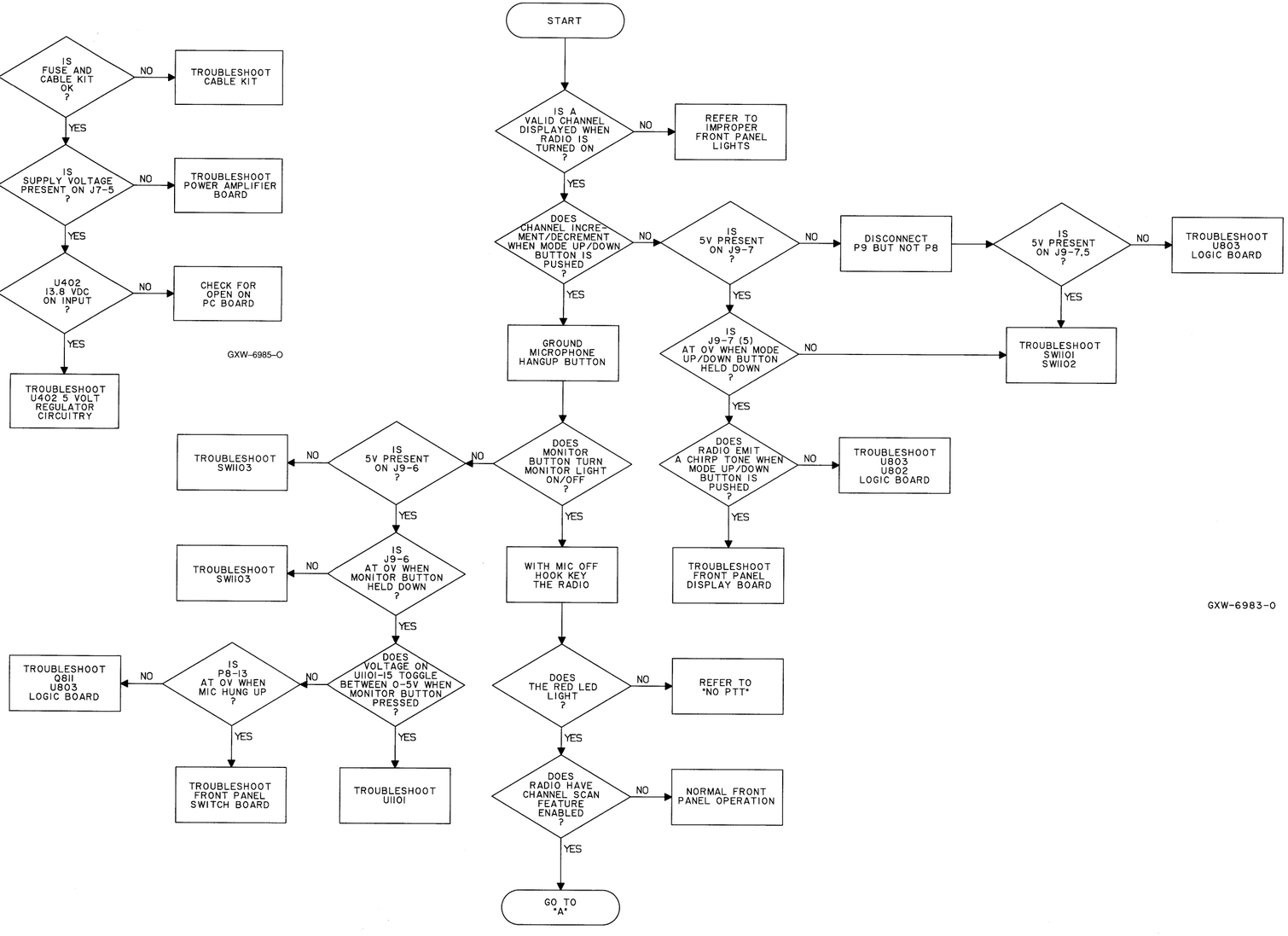
GXW-6982-O

Front Panel Troubleshooting Charts
PW–6980–O
(Sheet 1 of 2)
2/28/90

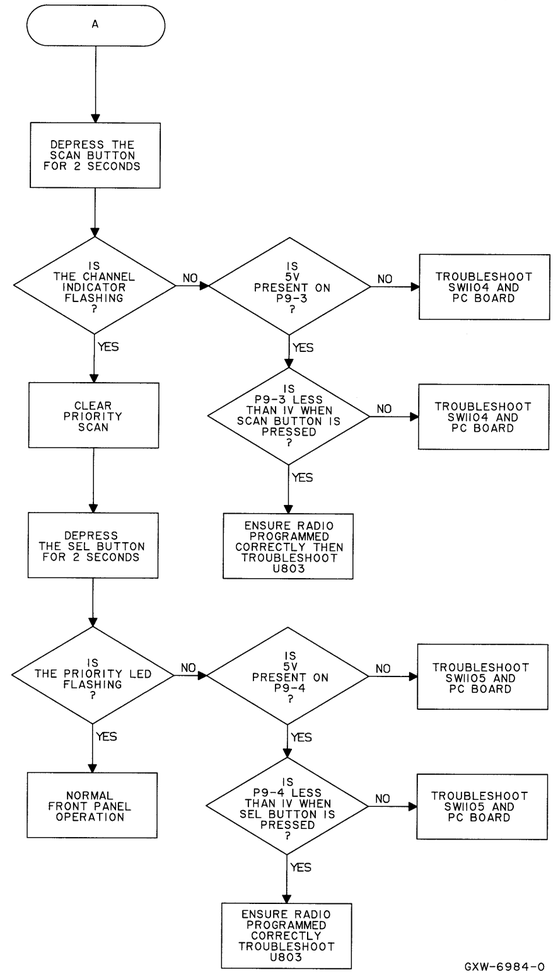
IMPROPER FRONT PANEL LIGHTS (*MaxTrac 300*)

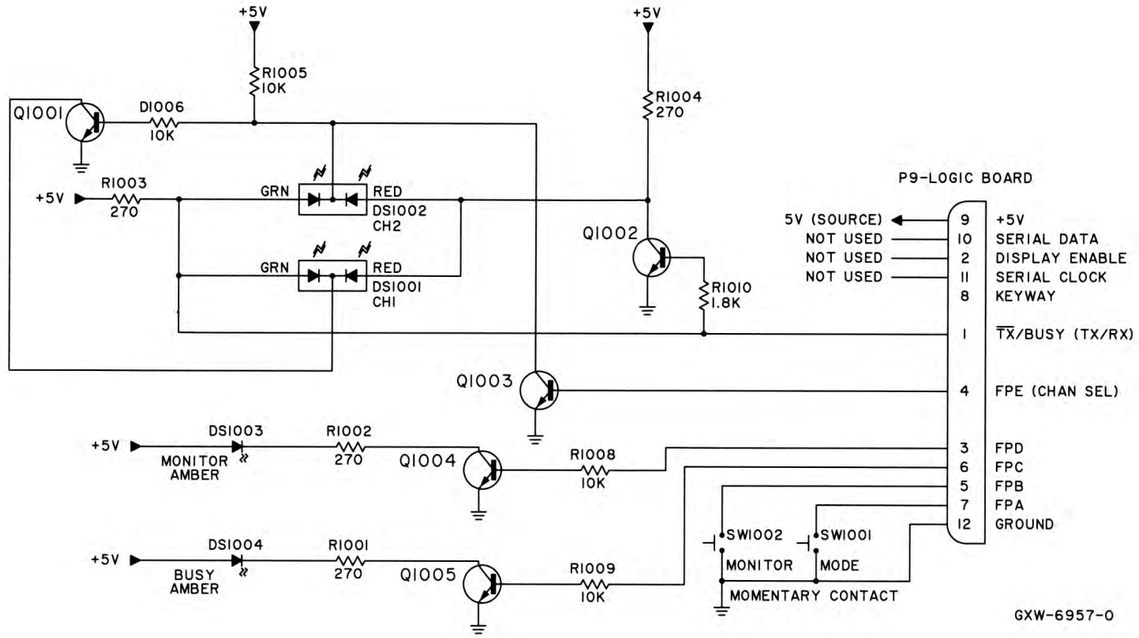


ABNORMAL FRONT PANEL OPERATION (*MaxTrac 300*)



ABNORMAL FRONT PANEL OPERATION CONT'D
(FOR RADIOS WITH *Channel Scan* FEATURES)





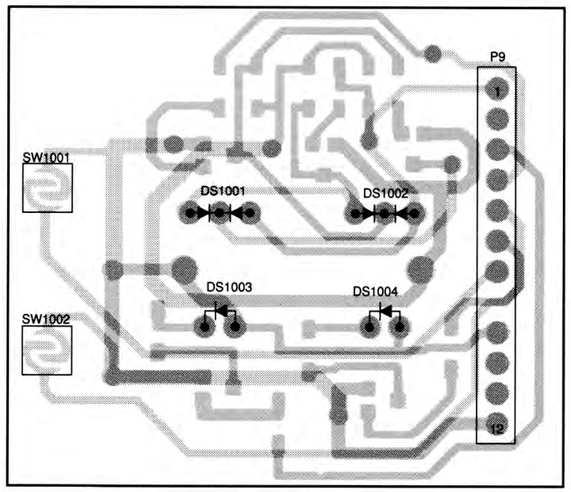
parts list

HLN5174A Front Panel Display Board (2 Frequency) MXW–6958–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
display, LED		
DS1001,1002	48–80051M07	green–red
DS1003,1004	48–80051M06	amber
transistor (see note)		
Q1001–1005	48–80124G02	NPN
resistor, fixed, chip, ±5%, 1/8 watt (unless otherwise stated)		
R1001–1004	06–11077A60	270
R1005–1009	06–11077A98	10k
R1010	06–11077A80	1.8k
	non–referenced parts	
M1001	84–80184L02	display circuit board
M1002	43–80279L01	LED spacer
M1006	01–80747T11	cable assembly (includes P9)
	42–80052N01	ground strap

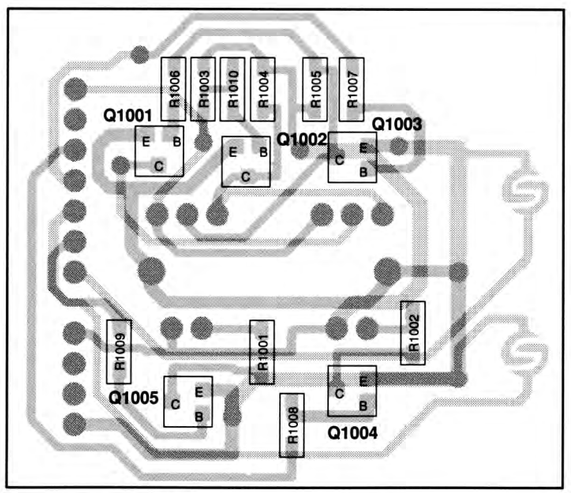
2/28/90

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.



SOLDER SIDE
COMPONENT SIDE — GPW–6960–O
OVERLAY — GPW–6961–O

COMPONENT SIDE VIEW



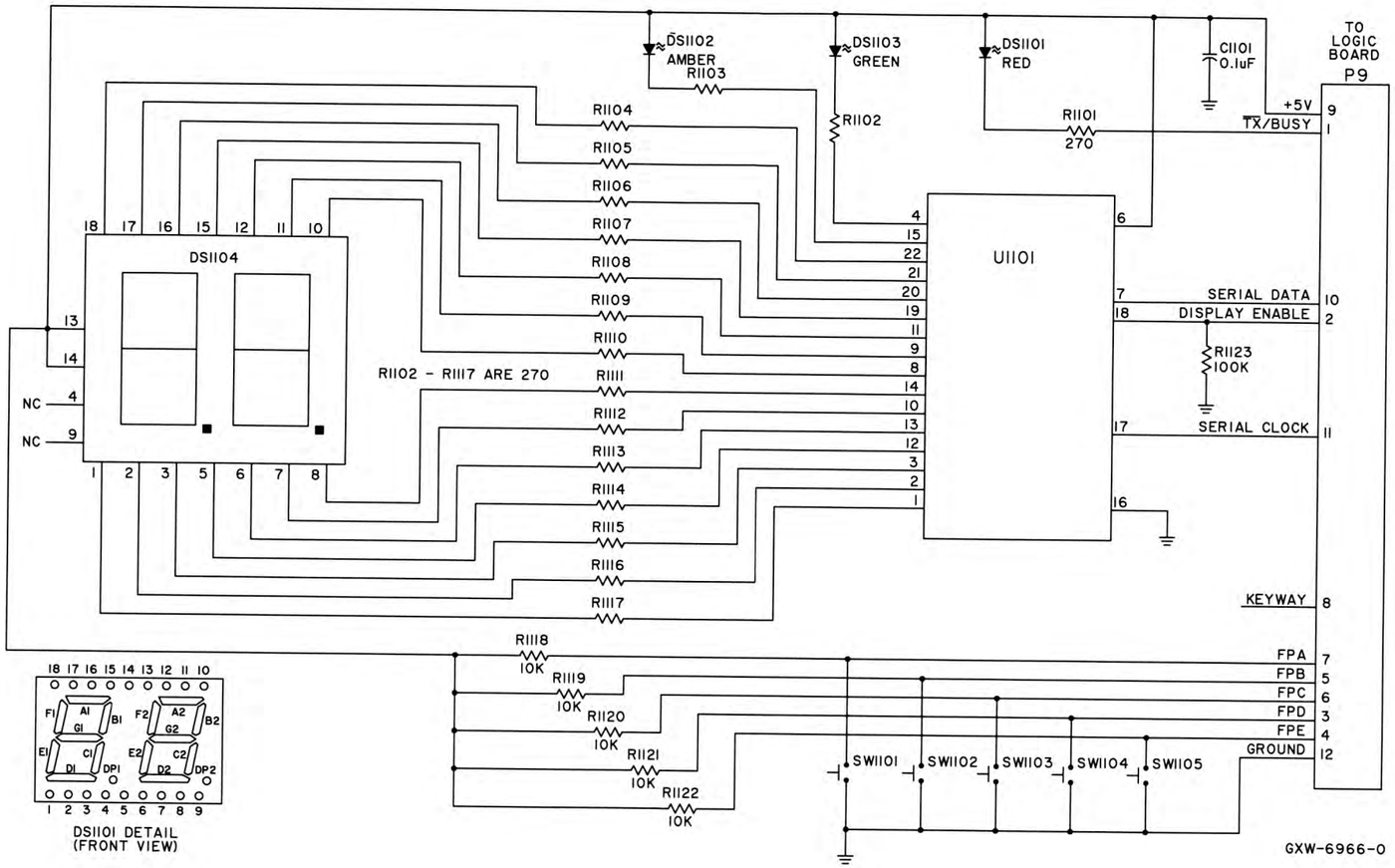
SOLDER SIDE
COMPONENT SIDE — GPW–6960–O
OVERLAY — GPW–6962–O

SOLDER SIDE VIEW

Schematic, Circuit Board Diagrams, and Parts List
for *MaxTrac* HLN5174A Display Board
PW–6956–O
2/28/90

DS1104 PIN ASSIGNMENTS

PIN	ASSIGNMENT
1	Cathode e1
2	Cathode d1
3	Cathode c1
4	Cathode dp1
5	Cathode e2
6	Cathode d2
7	Cathode g2
8	Cathode c2
9	Cathode dp2
10	Cathode b2
11	Cathode a2
12	Cathode f2
13	anode digit 2
14	anode digit 1
15	Cathode b1
16	Cathode a1
17	Cathode g1
F1	Cathode f1



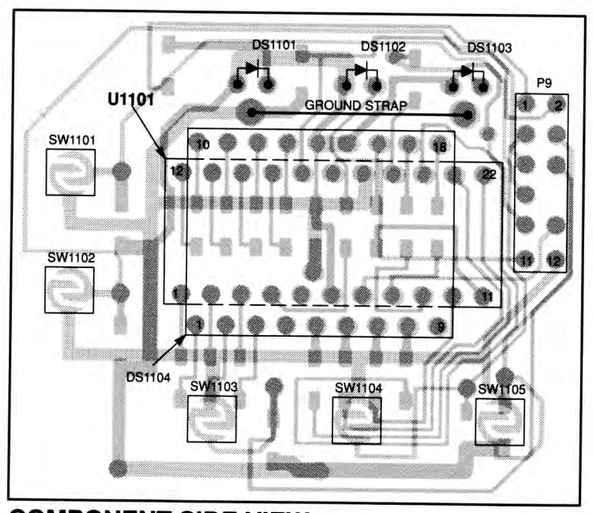
parts list

HLN5175A Front Panel Display Board (6/16 Frequency) MXW–6967–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, uF, ±5%, 50V (unless otherwise stated)		
C1101	21–13741B96	0.1
display, LED		
DS1101	48–80051M01	red
DS1102	48–80051M03	amber
DS1103	48–80051M02	green
DS1103	48–80055M01	dual, 7 segment
resistor, fixed, ohm, ±5%, 1/8 watt (unless otherwise stated)		
R1101–1117	06–11077A60	270
R1118–1122	06–11077A98	10k
R1123	06–11077B23	100k
integrated circuit (see note)		
U1101	51–84437N25	driver, serial to parallel
	non–referenced parts	
	01–80747T11	cable assembly (includes P9)
	42–80053N01	ground strap
M1102	43–80280L01	spacer, LED
M1103	43–80278L01	spacer, LED display
	84–80155L02	display circuit board

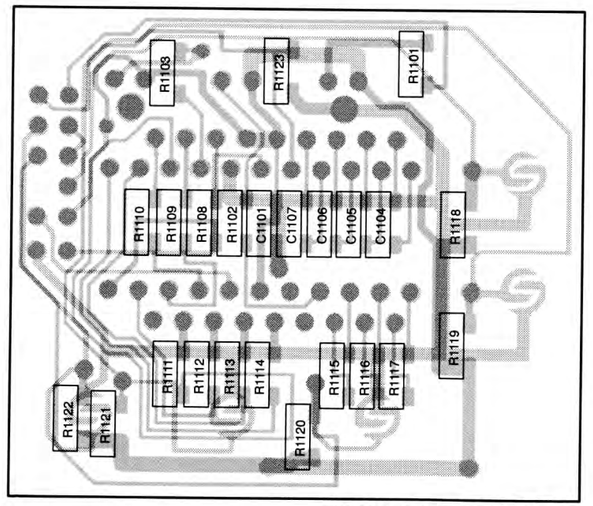
2/28/90

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.



COMPONENT SIDE VIEW

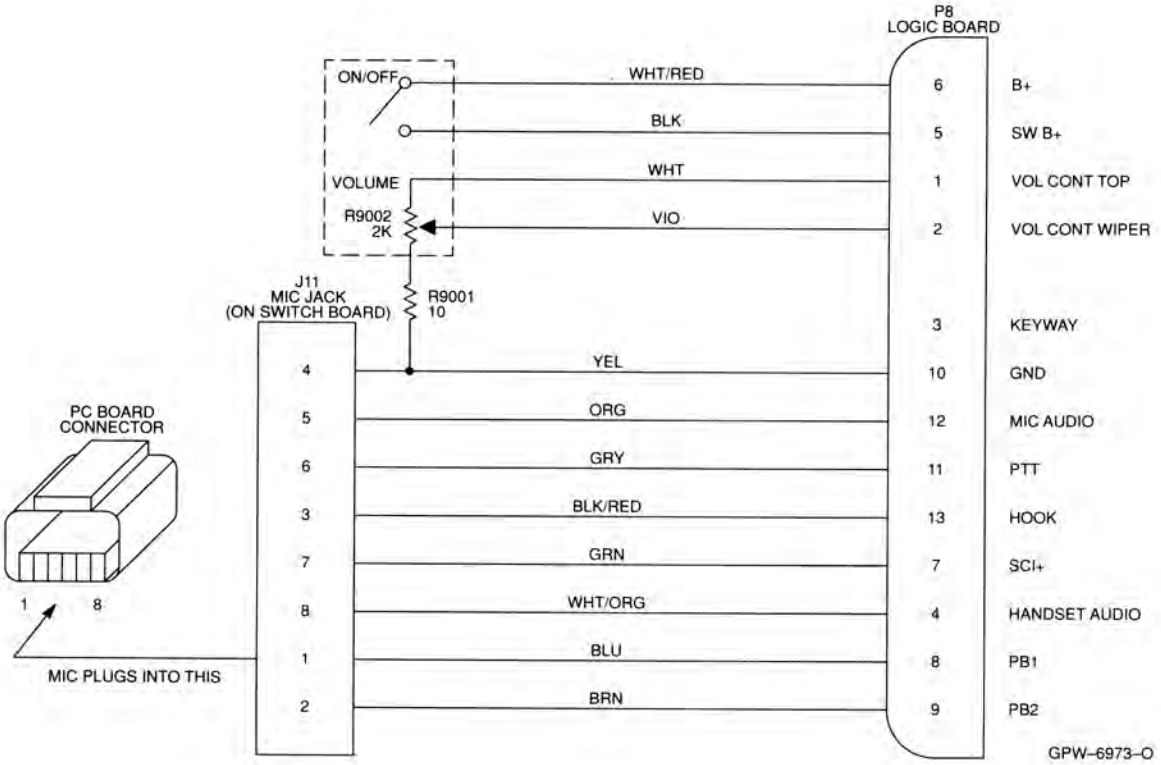
SOLDER SIDE
COMPONENT SIDE — GPW–6968–O
OVERLAY — GPW–6970–O

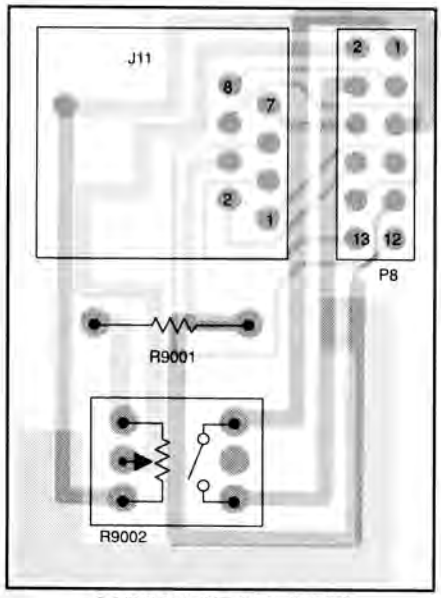


SOLDER SIDE VIEW

SOLDER SIDE
COMPONENT SIDE — GPW–6968–O
OVERLAY — GPW–6971–O

Schematic, Circuit Board Diagrams, and Parts List
for *MaxTrac* HLN5175A Display Board
PW–6965–O
2/28/90





COMPONENT SIDE VIEW

SOLDER SIDE
COMPONENT SIDE — GPW–6975–O
OVERLAY — GPW–6977–O

parts list

HLN5184A Front Panel Switch Board — MXW–6974–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
receptacle, jack		
J11	09–80132M01	telephone type, 8 contact 3.15
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R9001	06–11009A01	10
R9002	18–80140M01	2k, VOLUME potentiometer with switch
	non–referenced parts	
M9001	84–80185L02	switch circuit board
	01–80747T12	cable assembly (includes P8)

2/28/90

Schematic, Circuit Board Diagram, and Parts List
for HLN5184A Front Panel Switch Board
PW–6972–O
2/28/90

END OF PART 1 OF 4