Maintenance Manual

MDX™

896-941 MHz MOBILE RADIO

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RF Board..... LBI-38545
System Board..... LBI-38842
Audio / Logic Board..... LBI-38900
Audio Amplifier Board..... LBI-38844
Front Cap Assembly LBI-38850
PA Board LBI-38547
Service Section LBI-38912

ComNet Ericsson
CRITICAL RADIO SYSTEMS

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NOTE

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

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SPECIFICATIONS*

GENERAL	
Regulatory Data	
FCC	AXATR-321-A2
DOC	TR-321
Operating Voltage	13.6 Volts ±10%
Battery Drain	
Receiver (13.8 Vdc)	
Off	0.01 Amperes (maximum)
Squelched	0.80 Amperes (maximum)
Unsquelched	4.0 Amperes (maximum at 10 Watts audio, External Speaker)
Transmitter (13.8 Vdc)	12.0 Amperes (maximum at 25 Watts RF)
Channel Spacing	12.5 kHz
Frequency Stability	±1.5 PPM (±0.00015%)
Temperature Range	-30° to +60°C (-22°F to +140°F)
Dimensions (H x W x D)	
(Less Accessories)	
Height	5.3 cm (2.1 inches)
Width	18.2 cm (7.2 inches)
Depth	24.0 cm (9.5 inches)
Weight	3.0 kg (6.6 pounds)
Antenna Impedance	50 Ohms
TRANSMITTER	
Frequency Range	
Trunked Conventional Repeater	896-902 MHz
Talkaround	935-941 MHz
Output Power	12.5-25 Watts (Intermittent duty cycle; EIA 20%)
Audio Sensitivity	90-120 mVrms (minimum)
Spurious and Harmonics	<-16 dBm
Audio Distortion	≤5% maximum
Modulation Limiting	±2.5 kHz maximum
FM Noise	-40 dB
Audio Frequency Response Per TIA/EIA Standards	Within +1, -3 dB of a 6 dB/octave pre-emphasis curve from 300-2300 Hz with additional 6dB/octave 2300-2700 and 12dB/octave from2700-3000 Hz
RECEIVER	
Frequency Range	935-941 MHz
Acceptable Frequency Displacement	±2.5 kHz minimum
Sensitivity (12 dB SINAD)	-113 dBm minimum
Spurious Rejection	70 dB minimum
Adjacent Channel Selectivity	68 dB minimum at ±25.0 kHz
Intermodulation Distortion	65 dB minimum (measurement per SP-2218)
Audio Frequency Response	Within +1, -3dB of a 6 dB/octave de-emphasis curve from 500-2500 Hz
Audio Output	10 Watts (External Speaker); 4 Watts (Internal Speaker)
Audio Distortion	5% maximum at 1 kHz
Hum and Noise	-45dB (unsquelched)

* These specifications are intended primarily for use by service personnel. Refer to the appropriate Specification Sheet for complete specifications.

GENERAL DESCRIPTION

The 900 MHz MDX™ Mobile Radio is a synthesized, wideband radio that uses integrated circuits and microcomputer technology to provide high performance trunked operation. This radio operates in the Enhanced Digital Access Communications System (EDACS) environment, and in conventional communication systems. The radio provides 25 Watts of RF power output in the 396-902 MHz and 935-941 MHz bands. The receiver operates in the 935-941 MHz band.

All radio functions are stored in a programmable **E**lectrically **E**rasable **PROM** (**EEPROM**). The radio is field programmable using an IBM compatible personal computer with the following equipment:

- Serial Programming Interface Module TQ3370
- Programming Cable (19B801417P10) TQ3372
- MDX Series Programming Software (EDACS) TQ3365

With the interface equipment and software, the computer can be used to program (or re-program) customer systemfrequencies, Channel Guard tones and options. Selection of options is done during radio initialization using the PC programmer.

The 900 MHz MDX™ Mobile Radio assembly contains the following circuit boards and assemblies:

- Power Amplifier Board 19D902944Gxx
- RF Board 19D902123Gxx
- System Board 19D901891Gxx
- Audio/Logic Board 19D903963Gxx
- Audio Amplifier Board 19D904025Gxx
- Front Cap Assembly 19D904151Gxx

The circuit boards are all mounted on a main casting to provide easy access for servicing. Interconnect plugs are used to connect the boards to eliminate pinched wires or other wiring problems.

RF BOARD

The RF Board includes the programmable frequency synthesizer, transmitter exciter, receiver front end and IF circuitry.

Synthesizer

The synthesizer circuit generates all transmit and receive RF frequencies. The synthesizer frequency is controlled by the microprocessor located on the Audio/Logic Board. Frequency stability is maintained by a temperature compensated reference oscillator module. Transmit audio is processed on the Audio/Logic Board and applied to the synthesizer to modulate the VCO and TCXO. The buffered VCO output drives both the transmitter exciter and the receiver mixer.

Transmitter

The transmitter consists of a fixed-tuned exciter module, a PA module and a power control circuit. The PA module provides RF output to drive the antenna. The power control circuit controls the PA module to maintain a constant output power across the band. The RF output level is internally adjustable for rated power. Thermistors in the control circuit protect the PA from overheating by reducing the power output level.

Receiver

The dual conversion receiver circuit consists of a front end section, 39.5 MHz first IF, a 455 kHz second IF, and FM detector. All audio processing and squelch functions are accomplished on the Audio Board.

POWER AMPLIFIER BOARD

The PA board amplifies the RF board output then connects it back to the RF board where it is coupled through a PIN diode antenna switch, the low-pass filter and the directional coupler to provide 25 watts of power output at the antenna connector.

AUDIO/LOGIC BOARD

The Audio/Logic Board provides all audio and digital processing of the receive and transmit audio for digital processing by the Logic Board. The board also contains audio filtering, conventional analog tone processing, and the receiver squelch. The Audio/Logic Board controls the operation of the radio and digitally processes the receive and transmit audio. The board contains a microprocessor and associated memory circuits including an EPROM for controlling the processor and a programmable "personality" memory (an **E**lectrically **E**rasable **PROM - EEPROM**) to store customer frequencies, tones and options. The microprocessor provides control data to the **A**udio **S**ignal **P**rocessor (**ASP**), conventional tone generation and detection, frequency data for the synthesizer, and sends and receives data to another microprocessor on the Display Board for the LCD.

SYSTEM BOARD

The system board controls the main input power to the radio. An IGNITION SENSE input lead provides the necessary signals to the MOSFET switching circuit. The board also interfaces all option connections from the internal boards in the radio with the optional items outside of the radio. All external options for the radio interconnect to the System Board through the back of the radio using an optional cable.

FRONT CAP ASSEMBLY

The Front Cap Assembly contains the Audio Amplifier Board. This board provides compression of the microphone audio. It also provides audio compression for the received audio in the discriminator and internal/external speaker audio paths. A 10-watt power amplifier is provided on the board to drive a 4-ohm internal/external speaker.

ACCESSORIES AND OPTIONS

PC PROGRAMMER OPTIONS

The radio is programmed using an IBM compatible personal computer equipped with a RS-232 port. Option TQ3370 provides the RS-232 serial interface unit and the cable between the PC and the unit. An auxiliary power supply for the unit is also included but is not needed to program the radio.

Option TQ3372 provides the radio programming cable between the PC interface unit and the radio microphone jack. MDX PC programming software Option TQ3373 (EDACS) is provided on 3.5 inch diskettes.

PC PROGRAMMED OPTIONS

Carrier Control Timer (CCT)

The Carrier Control Timer turns off the transmitter after the microphone push-to-talk (PTT) switch has been keyed for a pre-programmed time period. A pulsing alert tone warns the operator to unkey and then rekey the PTT to continue the transmission. The timer can be programmed, using the PC programmer. Any time periods between 30 seconds and 7.5 minutes can be programmed in 30 second increments. The timer can be enabled or disabled for each channel.

Channel Guard

Channel Guard provides a means of restricting calls to specific radios through the use of a Continuous Tone Coded Squelch System (CTCSS), or a Continuous Digital Coded Squelch System (CDCSS). Tone frequencies range from 67.0 Hz to 210.7 Hz in 0.1 steps. There are eighty three standard PC programmable digital codes. The Channel Guard tone frequencies and codes are listed in **Table 1 - Channel Guard Tone Frequencies** and **Table 2 - Digital Channel Guard Codes** (see below).

NOTE

To reverse the polarity of the digital Channel Guard codes, in the PC programmer, type I (inverted) before the code number, i.e. I023.)

Table 1 - Standard Tone Frequencies (Hz)

67.0	71.9	74.4	77.0	79.7	82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8	123.0	127.3	131.8	136.5	141.3
146.2	151.4	156.7	162.2	167.9	173.8	179.9	186.2	192.8	203.5	210.7

1. Do not use 179.9 Hz or 118.8 Hz in areas served by 60 Hz power distribution systems (or 100.0 Hz or 151.4 Hz in areas supplied with 50Hz power). Hum modulation of co-channel stations may "false" Channel Guard decoders.
2. Do not use adjacent Channel Guard tone frequencies in systems employing multiple Channel Guard tones. Avoid same-areas co-channel use of adjacent Channel Guard tones whenever possible. As stated in EIA Standard RS-220, there is a possibility of decoder falsing.
3. To minimize receiver turn-on time delay, especially in system using Channel Guard repeaters or receiver voting, choose the highest usable Channel Guardtone frequency. Do not use tones below 100 Hz when it is necessary to meet the receiver response time requirements of EIA Standard RS-220.

Table 2 - Digital Channel Guard Codes

PRIMARY CODE	EQUIVALENT CODE	PRIMARY CODE	EQUIVALENT CODE	PRIMARY CODE	EQUIVALENT CODE
023	340 766	251	236 704 742	632	123 657
025		261	227 567	565	307 362
026	566	263	213 736	654	163 460 607
031	374 643	265	171 426	662	363 436 443 444
032		271	427 510 762	664	344 471 715
043	355	306	147 303 761	703	150 256
047	375 707	311	330 456 561	712	136 502
051	520 771	315	321 673	723	235 611 671
054	405 675	331	372 507	731	447 473 474 744
065	301	343	324 570	732	164 207
071	603 717 746	346	616 635 724	734	066
072	470 701	351	353 435	743	312 515 663
073	640	364	130 641	754	076 203
074	360 721	365	107	**036**	137
114	327 615	371	217 453 530	**053**	
115	534 674	411	117 756	**122**	535
116	060 737	412	127 441 711	**145**	525
125	173	413	133 620	**212**	253
131	572 702	423	234 563 621 713	**225**	536
132	605 634 714	431	262 316 730	**246**	542 653
134	273	432	276 326	**252**	661
143	333	445	222 457 575	**255**	425
152	366 415	464	237 642 772	**266**	655
155	233 660	465	056 656	**274**	652
156	517 741	466	144 666	**325**	550 626
162	416 553	503	157 322	**332**	433 552
165	354	506	224 313 574	**356**	521
172	057	516	067 720	**446**	467 511 672
174	142 270	532	161 345	**452**	524 765
205	135 610	546	317 614 751	**454**	513 545 564
223	350 475 750	606	153 630	**455**	533 551
226	104 557	612	254 314 706	**462**	472 623 725
243	267 342	624	075 501	**523**	647 726
244	176 417	627	037 560	**526**	562 645
245	370 554	631	231 504 636 745		

NOTE:
Primary codes in bold are unique Com-Net Ericsson codes.

Squelch Tail Elimination (STE)

STE is used with tone and digital Channel Guard to eliminate squelch tails. The STE burst is transmitted when the microphone PTT is released. The receiving radio decodes the burst and mutes the receiver audio for 250ms. This mute time allows the transmission to end and to mute the squelch tail. The radio looks for STE on the received signal when the microphone is either on or off-hook. The STE is enabled for transmit and/or receive by PC programming the radio's personality.

HARDWARE AND HARDWARE OPTIONS

The location and placement of system hardware options are shown on Sheet 4 of the 900 MHz MDX Mobile Interconnect Diagrams.

OPTION CABLE

Option Cable Option PMCD7Z (19C851585P18) is used to bring all option connections from the System Board through the back of the radio to the outside. This cable is required with all external options.

NOISE SUPPRESSION KIT OPTION

Noise Suppression Kit Option PMPD1A (consisting of Filter 19A148539G1 and Installation Manual LBI-31363) is available for installations where excessive alternator or electrical noises, present on the power cable, do not permit the radio to operate properly. Refer to the interconnect diagram for the radio and options.

POWER CABLE OPTION

18-foot Power Cable Option PMCD9A, (19B801358P17), is available for installations requiring more than the standard 9-foot cable.

EXTERNAL SPEAKER OPTION

External Speaker and Cable Option PMZM1T, provides the user with a five-inch waterproof speaker in a LEXAN housing. PMCC9M is an 18 inch interconnecting cable for the speaker. The radio's 10-watt amplifier drives the speaker's 4-ohm impedance. The speaker leads are connected to pins 2 and 9 of Option Cable Option PMCD7Z (19C851585P18), using External Speaker Cable Option PMCC9M (19A149590P8)(18 inches) included in the PMZM5T kit. A 16-foot cable, Option PMCD1W (19A149590P10) is also available.

EXTERNAL ALARM

External Alarm Horn Relay Option PMSU1C (19A705499P1) can sound the vehicle horn when a call is received. The option connects to pin 13 of Option Cable Option PMCD7Z (19C851585P18) and is controlled by a front panel option switch.

SYSTEM DESCRIPTION

EDACS

The 900 MHz MDX Mobile Radio operates in EDACS (digital) mode providing opportunities to increase RF channel utilization through faster channel access and the privacy inherent with selective signalling.

The EDACS system uses 4800 baud, high speed, digital signalling to identify individual units, user groups, fleets, and agencies. Agencies contain multiple fleets and fleets contain multiple user groups (sub-fleets). By using this addressing scheme large user groups can be accessed simultaneously all the way down to individual users. The programming to determine transmit encoded groups and decoded received groups is contained in the personality EEPROM of the mobile radio. This information is individually programmed to suit each user's needs via the PC programmer for the radio.

The typical system configuration consists of at least 2 repeater stations (with a maximum number of 25), and the associated mobiles. One repeater always is a control channel dedicated to sending out continuous control data and also to receive channel request data from the mobiles. When a mobile is first turned on it scans the available list of frequencies programmed in the personality EEPROM for a control channel. When a control channel is found the mobile locks on to the frequency and monitors the data for a channel assignment (incoming call).

When receiving a channel assignment (incoming call), the monitoring mobile immediately switches over to the assigned voice channel and waits for a high speed data confirmation message. Upon receipt of this message the voice paths are unmuted and the user can hear the call.

While on the voice channel, the mobile also continuously monitors the low speed, 75 baud (subaudible) data and carrier noise squelch to ensure consistent operation. Upon loss of subaudible data reception (i.e., deep fade, or out-of-range), the mobile returns to the control channel frequency.

To initiate a call, the user keys the radio (which is locked to the control channel), and a high speed data slotted channel request is transmitted to the control channel receiver. The control channel processes the request from the mobile and transmits back a voice channel assignment on an unused channel.

When all available voice channels are in use, the control channel places the mobile into a queue, transmits a queue message back to the mobile, and gives a channel assignment to the requesting mobile as soon as a voice channel is free. If the system is busy and the station queue is filled to capacity,

a system busy message is returned to the requesting mobile and an alert signal is given to the user.

After the initiating mobile receives a channel assignment from the control station, it immediately switches frequency over to the assigned voice channel and sends a burst of 4800 baud dotting. The microphone voice paths are then unmuted and the transmission begins. The transmitting mobile also continuously sends out a subaudible tone (along with voice) for system reliability. If the station loses this signaling, the voice channel is muted and all receiving mobiles are sent back to the control channel.

In normal operation, the transmitting mobile sends a high speed data burst to indicate that the user has unkeyed, causing all listening mobiles to switch back to the control channel.

CONVENTIONAL MODE

In conventional mode (not trunked) the radio can operate either with tone Channel Guard, digital Channel Guard, or carrier squelch, depending on personality programming. Tone Channel Guard range is 67.0 to 210.7 Hz. Squelch Tail Elimination (STE) is used with Channel Guard to eliminate squelch tails at the receiving radio by phase shifting the transmitted Channel Guard tone when the PTT is released.

Direct mode works identically to conventional mode except that the transmit frequency band is changed to 935 to 941 MHz to permit direct mobile-to-mobile communications.

RADIO OPERATION

A complete set of operating instructions for the 900 MHz MDX Radio are given in LBI-38914. This manual is provided with each radio.

This radio is flexible in operation and can be used in either of two operating modes: Conventional radio system or Enhanced Digital Access Communications (EDACS) system.

In an EDACS trunked environment the user selects a communications system and group. In this mode, audio channel selection is transparent to the user and is controlled via digital communication with the system controller. This mode incorporates advanced programmable features and fast access to communication channels.

In Conventional mode, the user selects a channel and communicates on that channel. In this mode, a system refers to a set of channels and a channel is a transmit/receive radio frequency pair.

The exact operation of any radio depends upon the operating mode, the programming of the radio and the particular radio system. Most features described in these operating instructions can be enabled or disabled through programming. Both of these important factors must be considered when addressing the following instructions.

USER INTERFACE

Operating controls are located on the radio front panel and microphone.

The front panel LED provides radio status, and communication control information to the operator. The keypad is used for manual number entry for individual calls, access to a telephone interconnect system and activation of various EDACS, and conventional features.

Turning The Radio ON/OFF

The radio is turned ON/OFF by pressing the PWR button in the upper left corner of the front panel. A self diagnostic test is performed when the radio is first turned on if enabled through programming. To turn the radio OFF press the PWR button again.

ALERT TONES

The 900 MHz MDX™ radio generates a set of unique alert tones to indicate operating status. The following section identifies and describes the alert tones used in the 900 MHz MDX™ radio for Conventional and EDACS applications.

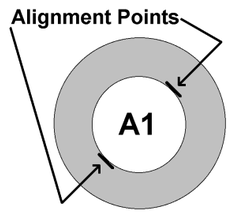
EDACS APPLICATIONS

CALL ORIGINATE ALERT	If programmed, a short tone is sounded whenever the Push-To-Talk key is pressed and the radio has acquired a channel. This tone indicates the user can begin communications.
CALL QUEUED	If one short, high-pitched tone sounds after the transmitter is keyed, this indicates that the system has placed the request in a queue. This tone sounds at both the transmitting unit and the receiving unit(s), indicating to the user on the receiving end that a call is being directed to them. If the PTT is unkeyed while in the queue, the radio autokeys (automatically keys) Push-To-Talk when a channel becomes available (see AUTOKEY).
AUTOKEY	When the PTT is keyed to place a call on the system, but the PTT is released before getting to the channel (e.g. a queued call), the radio automatically keys on the channel when it gets the assignment. The radio generates a long beep and holds the transmitter keyed for two seconds. Pressing the PTT button keeps the channel and sends the message before this two second time-out has expired.
SYSTEM BUSY	If you press the PTT key and hear three short, medium-pitched tones, this indicates that the receiving party is already on the system or the system is busy and its queue is full. You must rekey later to access the system.
CALL DENIED	A single, low-pitched beep sounds when the PTT key is pressed and the request is denied by the system. This happens if the unit is an invalid user or if the unit is requesting an unavailable service.
OUT-OF-RANGE/ SYSTEM INOPERATIVE	A single, low-pitched tone sounds immediately after the PTT key is pressed indicating the radio is out of range of the repeater. The radio tries to place the call for a short period (3 seconds) after the initial attempt. The radio generates a second low-pitched tone when it gives up trying to place the call. These tones may also heard even when the radio is within calling range of the repeater if the system is off the air or the radio needs servicing.

REPLACEMENT OF KEYCAPS

The keycaps (SCN, A1, A2, MNU, SYS, CLR) can be replaced if damaged or if the function has changed by using the keycap kit 344A4254G2. Included in this kit is a keycap extractor tool 19C852344P1. This extractor tool must be used to remove keycaps to prevent damage to the key switches.

1. Align the extractor tool over the selected keycap, observing the alignment points on the keycap, and slide over keycap until the tool is seated.
2. Squeeze the extractor tool to release the keycap from the switch shaft and gently pull outward.
3. To replace a keycap, observe the correct alignment of the keycap.
4. Push the keycap onto the switch shaft until it is seated.

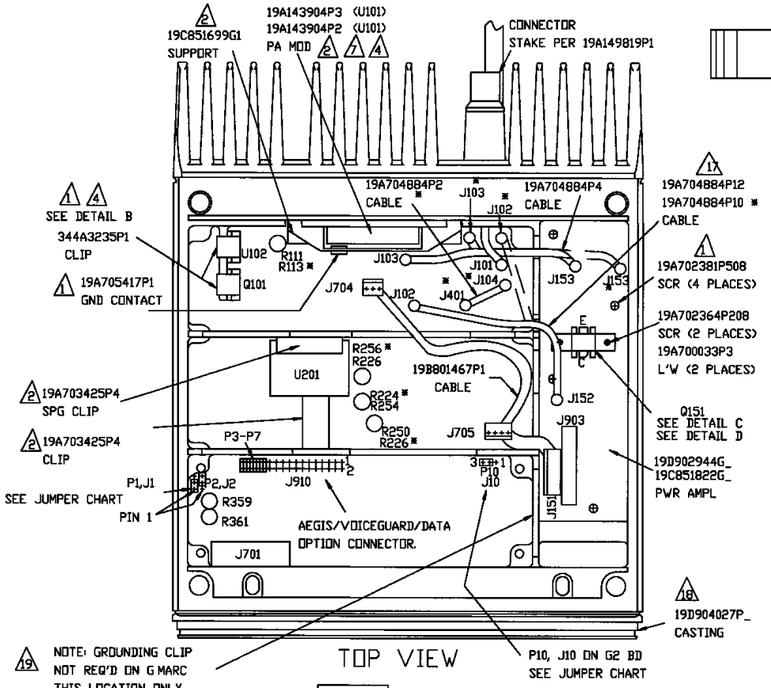


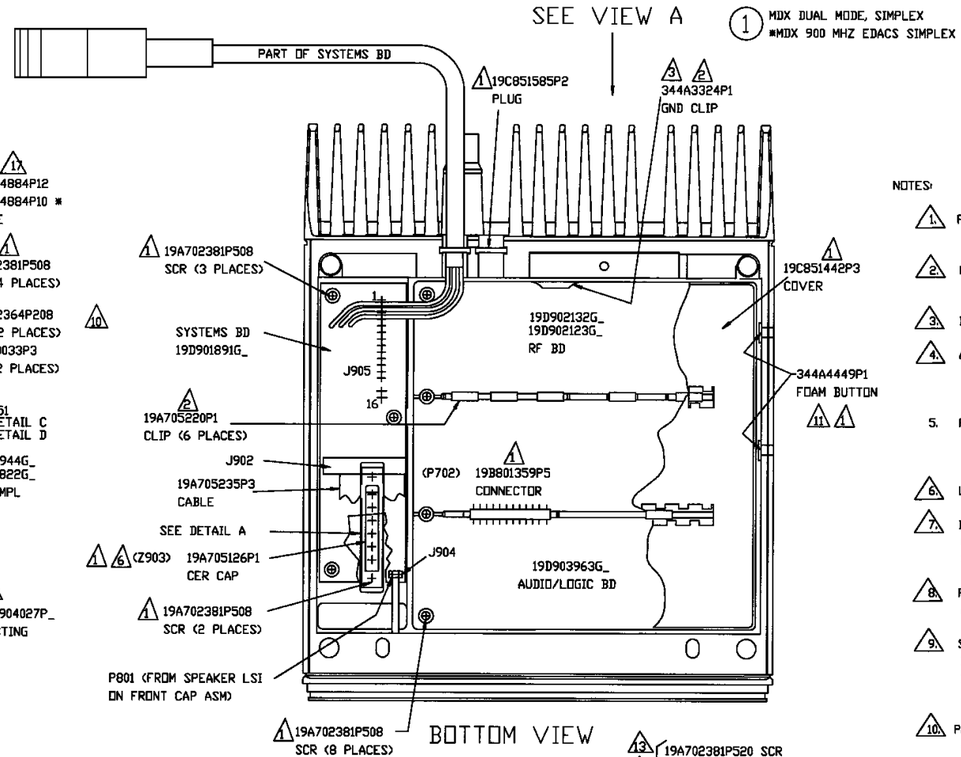
900 MHz MDX/ MOBILE RADIO ASSEMBLY

ISSUE 1

SYMBOL	PART NO.	DESCRIPTION
		APPLICATION ASSEMBLY 19D902944
		----------ASSEMBLIES----------
A1	19D902132G3	RF BOARD
A2	19D901891G3	SYSTEM BOARD
A3	19D904025G2	AUDIO AMPLIFIER BOARD
A4	19D903963G1	AUDIO/LOGIC BOARD
A5	19D902944G1	PA BOARD
A6	19D904151G1	FRONT CAP ASSEMBLY
		----------KITS----------
	344A4253G1	Hardware Kit (No. 1)
	344A4255G8	Hardware Kit (No. 2)
	344A4256G12	Hardware Kit (No. 3)
	344A4254G1	Key Cap Kit
		----------CABLES----------
	19A705301P6	Cable, Antenna (W1)
	19B801253P5	Cable, Ribbon (W4)
	19A705235P3	Cable, Ribbon, J901 on Audio Amplifier to J902 on System Board (W3)
	19A704884P10	Cable Assembly, RF (W23)
	19A704884P4	Cable Assembly, RF (W22)
	19B801467P1	Cable (W6)
	19A704884P2	Cable Assembly, RF
		----------MISCELLANEOUS----------
	19D904027P1	Casting
	19D904186G2	Cover, Radio Top
	19D904185G1	Cover, Radio Bottom
		Label, Microphone C9 Connector
	19B801398P5	Hanger, Microphone, Magnetic HSW LG
	19B801358P18	Cable, 9 Foot, Power
	344A4528P1	Microphone
	344A4678P1	Hanger, Microphone (Used with Microphone 344A4528P1).

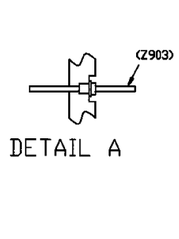
* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

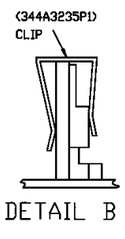


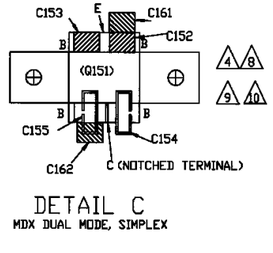


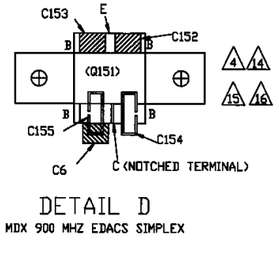
NOTES:

1. PART OF MDX/MDR MARRIAGE HARDWARE KIT 344A4253G1.
2. PART OF RF BD HARDWARE KIT 344A4255G6 (800MHZ). *PART OF RF BD HARDWARE KIT 344A4255G8 (900MHZ).
3. INSTALL BETWEEN PWB AND CASTING. SOLDER TO PWB.
4. APPLY SILICONE GREASE (19A701337P1) TO PA MOD, Q101 AND U102 ON RF BD AND Q151 ON PA BD ALSO U801 AND U727 ON AUDIO AMPLIFIER BD.
5. PROCESS SCREWS PER PROCESS P6D-EA111 PRIOR TO ASSEMBLY INTO CASTING. TORQUE TO 15 INCH-POUNDS.
6. LUBRICATE Z903 PINS WITH GREASE (19A704532P1).
7. INSTALL U101 FLUSH TO PWB AND FASTEN WITH SUPPORT TO CASTING BEFORE SOLDERING LEADS TO PWB. TOP OF U101 SHALL NOT EXTEND MORE THAN 0.25 ABOVE ADJACENT CASTING.
8. PRE-TIN AREA AROUND Q151 WHERE TRANSISTOR LEADS AND C152 - C155, C161 AND C162 ARE TO BE SOLDERED.
9. SOLDER Q151 LEADS WITH A MINIMUM OF SOLDER TO BD BEFORE INSTALLING CAPACITORS. SOLDER C152 - C155 AGAINST BODY OF Q151 ON TOP OF TRANSISTOR LEADS AS SHOWN BEFORE INSTALLING C161 AND C162 AGAINST C152 AND 155 AS SHOWN.
10. PART OF PA BD KIT 344A4256G10 (800MHZ). *PART OF PA BD KIT 344A4256G12 (900MHZ).
11. APPLY OVER TWO HOLES ON INSIDE OF CASTING.
12. P1001 PART OF REMOTE MOUNT.
13. WEATHERPROOF HOLES AROUND SCREWS USING RTV162 PER PROCESS P15F-EA106.
14. PRE-TIN AREA AROUND Q151 WHERE TRANSISTOR LEADS AND C152-C155 & C6 ARE TO BE SOLDERED.
15. SOLDER Q151 LEADS WITH A MINIMUM OF SOLDER TO BD BEFORE INSTALLING CAPACITORS. SOLDER C152 - C155 AGAINST BODY OF Q151 ON TOP OF TRANSISTOR LEADS AS SHOWN BEFORE INSTALLING C6 AGAINST C155 AS SHOWN.
16. PART OF PA BD KIT 344A4256G12.
17. ROUTE THE TWO PA CABLES AS SHOWN; J103-J153 CABLE THROUGH THE LARGE NOTCH NEAREST HEATSINK. J102-J152 CABLE THROUGH SMALL NOTCH.
18. SECURE GASKET TO CASTING USING RTV3140 PER PROCESS P15F-EA106
19. 19A8038825P1 CLIP, GND. 6 PLACES. THESE CLIPS TYP DENOTED BY CROSS-HATCH CLIPS CAN BE BROKEN TO MAKE HALF CLIPS AS NEEDED.







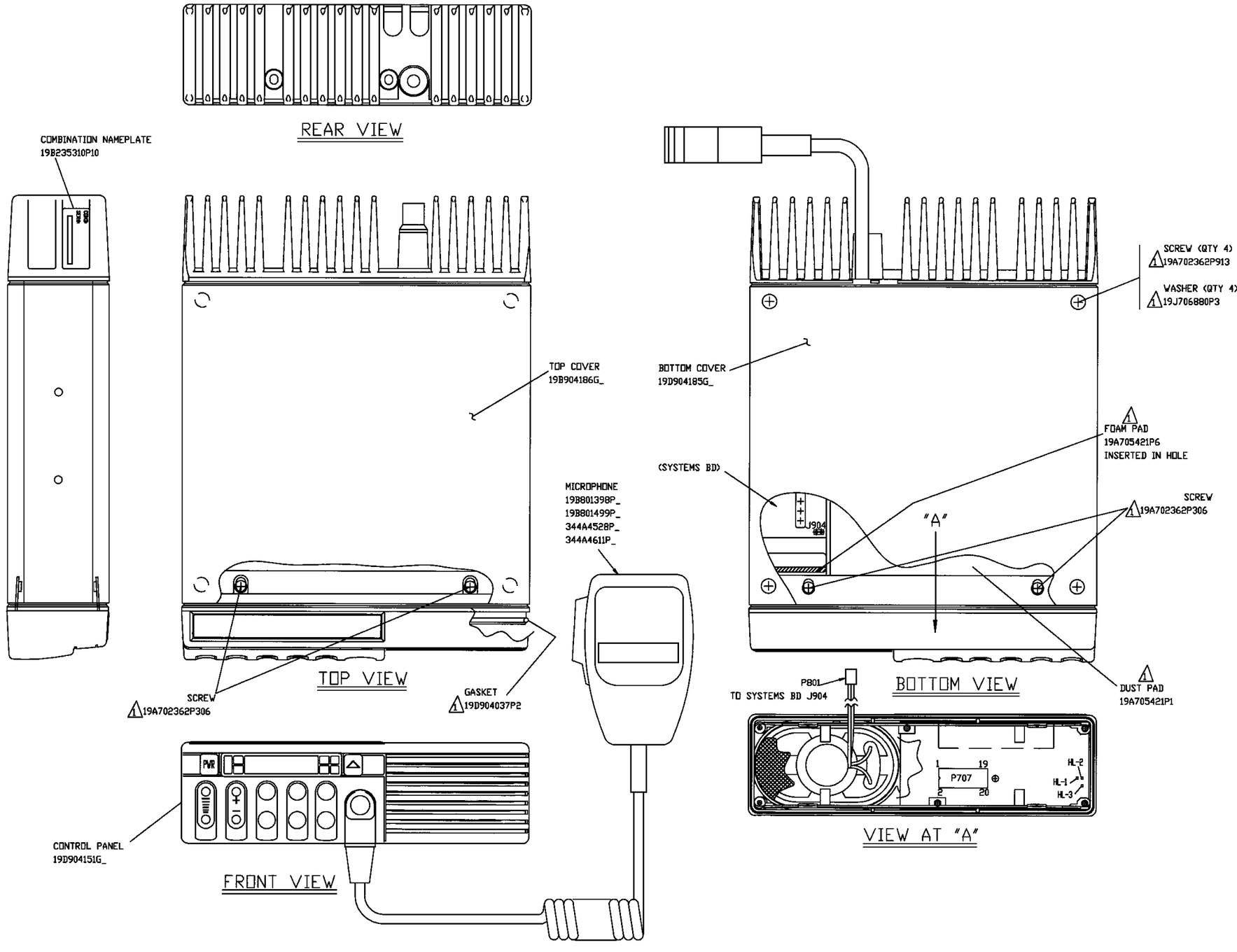


* 900 MHZ ONLY

AUDIO/LOGIC BD JUMPER CHART		
JUMPER	INSTALLATION	NOTES
P1	J1-1&2	BASE BOOST DISABLED
P2	J2-2&3	TX SIDETONE NEG.POLARITY
P3	J910-23 & 24	NO OPTION INSTALLED
P4	J910-25 & 26	NO OPTION INSTALLED
P5	J910-27 & 28	NO OPTION INSTALLED
P6	J910-29 & 30	NO OPTION INSTALLED
P7	J910-31 & 32	NO OPTION INSTALLED
P10	J10-2 & 3	MDX,EXCEPT 900 MHZ
P10	NOT INSTALLED	MDX, 900 MHZ

AUDIO AMPLIFIER BD JUMPER CHART		
JUMPER	INSTALLATION	NOTES
P1	J1-1&2	12V SW PW. CONTROLED
P3	J3-1&2	MODE SELECT HIGH
P7	J7-2 & 3	SWITCHED SPKR HI AUDIO

(19D904183, Sh. 1, Rev. 19)



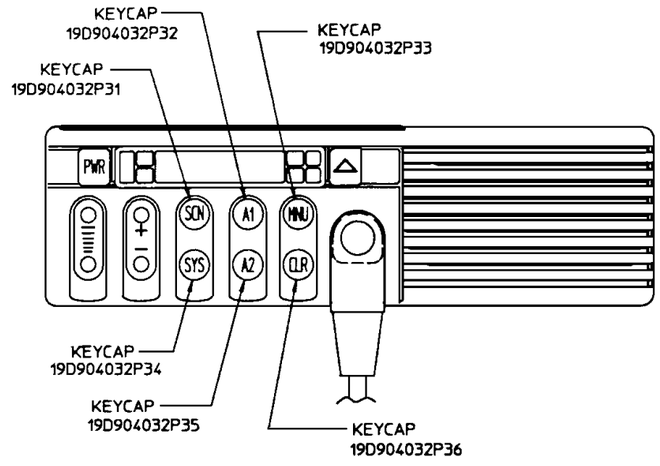
PART 1 CONTINUED
MDX DUAL MODE (SIMPLEX)
SEE SHEET 8

PART 5 CONTINUED
MDX CONVENTIONAL, UHF & VHF
SEE SHEET 8

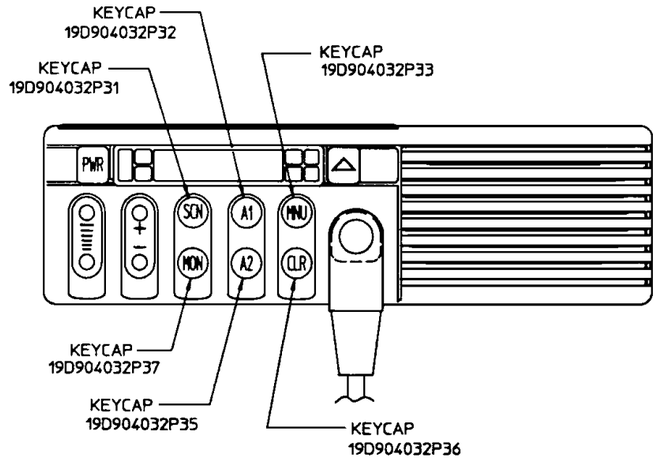
(10) INSTALL LABEL ON MICROPHONE

NOTES:
1. PART OF MDX/MDR HARDWARE KIT 344A4253G1.

(19D904183, Sh. 2, Rev. 19)

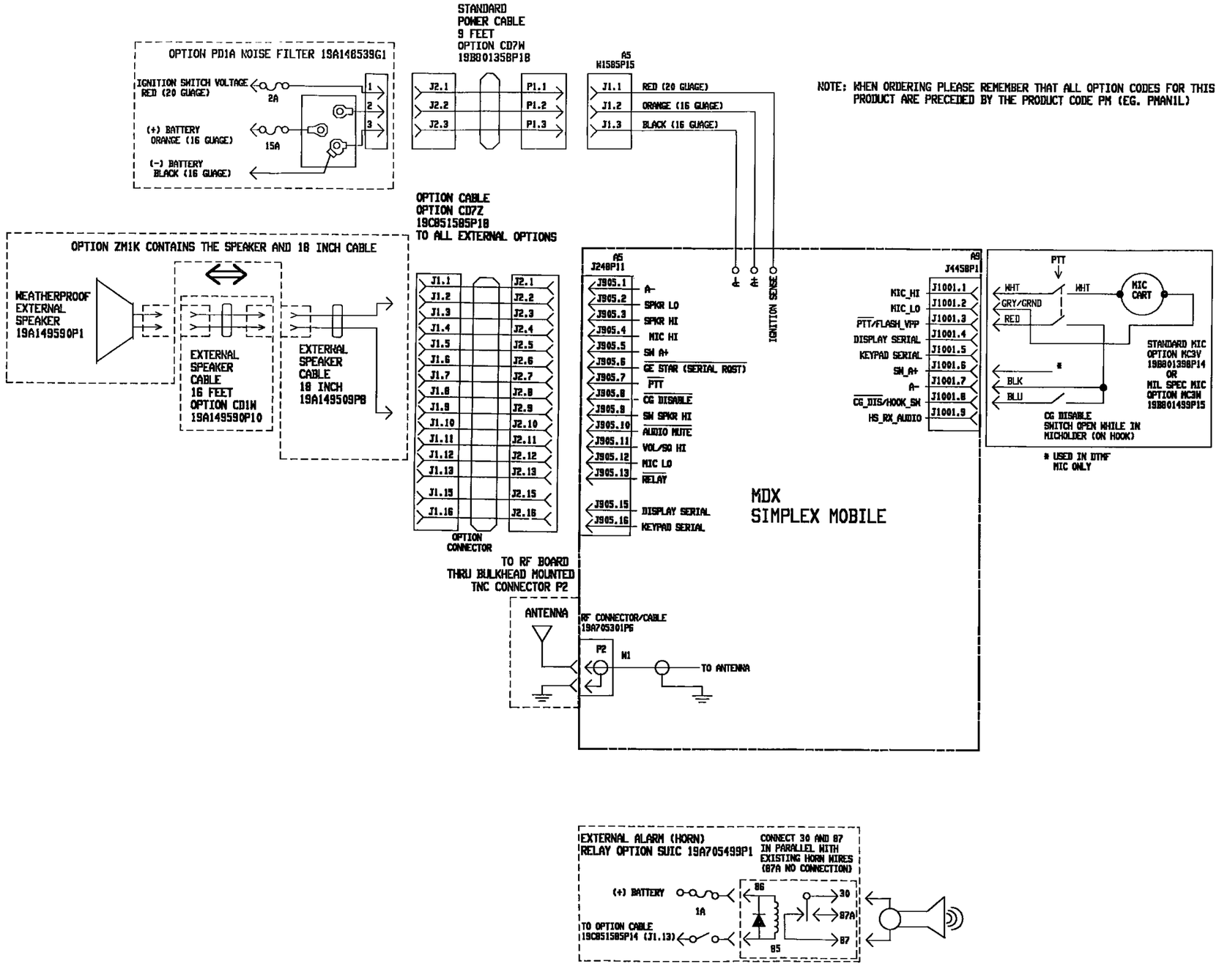


MDX 800 MHZ (SIMPLEX)
MDX 900 MHZ (SIMPLEX)

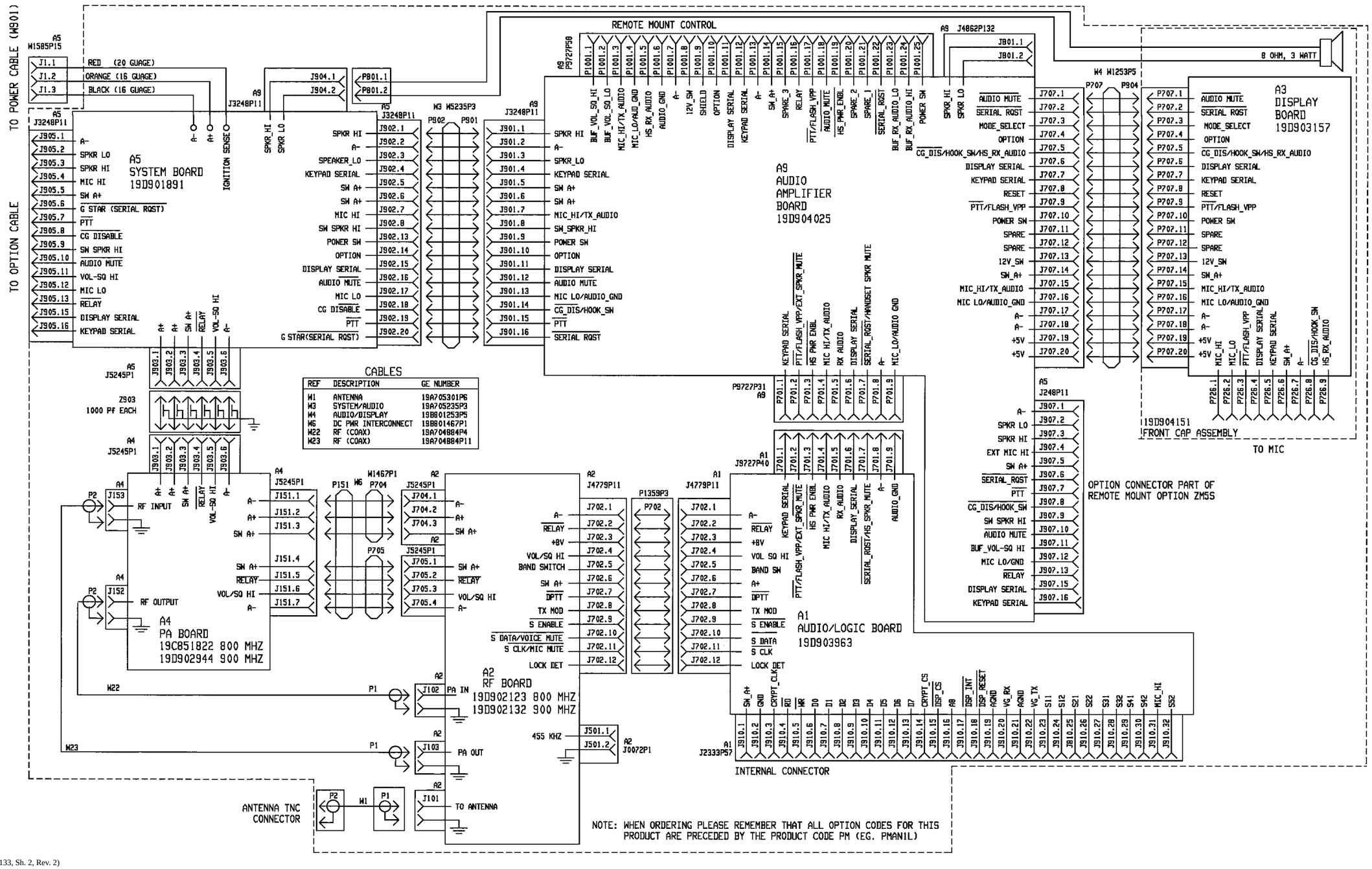


MDX CONVENTIONAL (SIMPLEX)

(19D904183, Sh. 5, Rev. 1)



(19D904133, Sh. 1, Rev. 4)

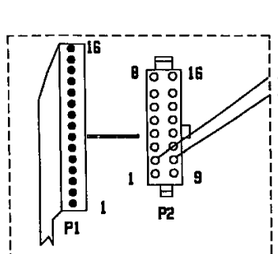


(19D904133, Sh. 2, Rev. 2)

OPTION NUMBER	OPTIONS AVAILABLE	CNE NUMBER
ANIL	ANTENNA, 800 MHZ, ROOFTOP, TNC	19B209568P5
*	POWER CABLE, 9 FEET	19B801358P18
CD9A	POWER CABLE, 18 FEET	19B801358P17
*	STANDARD MICROPHONE	19B801398P14
MC3W	MIL SPEC MICROPHONE	19D801499P15
*	MIC HANGER	---
ANIM	ANTENNA, 900 MHZ, ROOFTOP, TNC	19B801182P3
LS1F	WATER-PROOF SPEAKER 5" X 5"	19A149590P1
CC9M	EXTERNAL SPEAKER CABLE, 18 INCHES	19A149509P8
CD1W	EXTERNAL SPEAKER CABLE, 16 FEET (REQUIRES CC9M)	19A149590P10
ZM1K	SPEAKER KIT (LS1F, CC9M)	---
CD7Z	OPTION CABLE	19C851585P14
PD1A	NOISE SUPPRESSION KIT	19A148539G1
SU1C	HORN ALARM RELAY KIT	19A705499P1
TQ3372	PC PROGRAMMER CABLE	19B801417P9
TQ3310	PC PROGRAMMING INTERFACE BOX	19D438367G1
TQ3364	PC PROGRAMMING SOFTWARE (EDACS & G MARC)	---
TQ3346	PC PROGRAMMING SOFTWARE (G MARC ONLY)	---
*	MOUNTING BRACKET KIT	19A138051G11
ZM5S	18 FEET REMOTE MOUNT KIT (MA3K, CD9C, MA3J)	---
SU5A	PUBLIC ADDRESS RELAY/EXT SPEAKER RELAY KIT	19C851585P17
CY1B	DC REMOTE CONTROL	19A704686P7
TQ3370	PC PROGRAMMING/FLASH INTERFACE BOX	19D438367G2

* OPTIONS ARE STANDARD

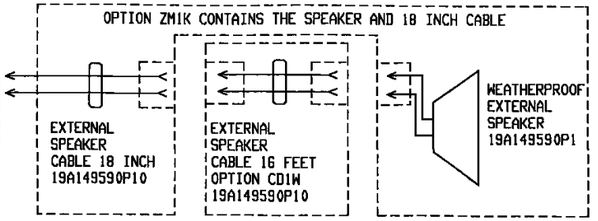
NOTE: WHEN ORDERING PLEASE REMEMBER THAT ALL OPTION CODES FOR THIS PRODUCT ARE PRECEDED BY THE PRODUCT CODE PM (EG. PMANIL). FOR A COMPLETE LISTING OF OPTIONS SEE YOUR AUTHORIZED EGE DEALER.

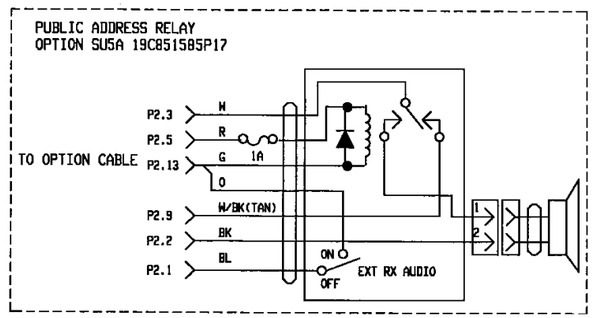


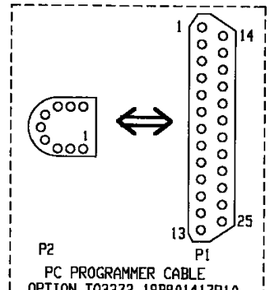
OPTION CABLE CD7Z
19C851585P18

P1 CONNECTS TO A5
SYSTEM BOARD @ J905

WIRE CONNECTION CHART		
FROM	COLOR	TO
P1-1	BLACK	P2-1
P1-2	RED	P2-2
P1-3	BROWN	P2-3
P1-4	WHITE	P2-4
P1-5	GREY	P2-5
P1-6	PINK	P2-6
P1-7	BLUE	P2-7
P1-8	YELLOW	P2-8
P1-9	ORG/WHITE	P2-9
P1-10	GREEN	P2-10
P1-11	VIOLET	P2-11
P1-12	ORANGE	P2-12
P1-13	TAN	P2-13
P1-15	G/W	P2-15
P1-16	BL/W	P2-16

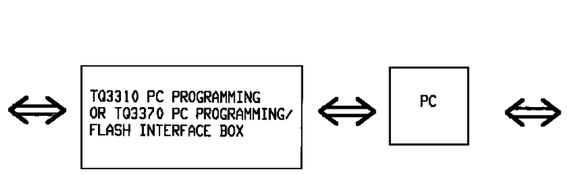


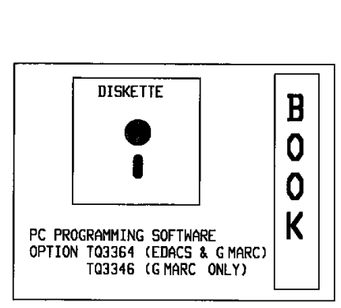


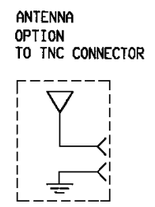


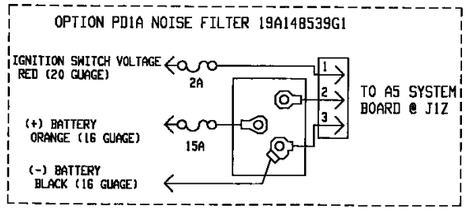
PC PROGRAMMER CABLE
OPTION TQ3372 19B801417P10

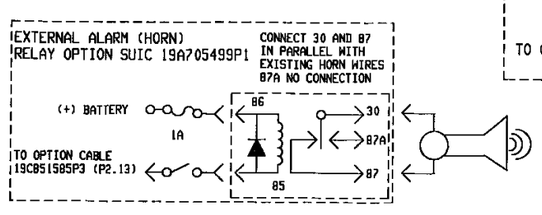
WIRE CONNECTION CHART		
FROM	TO	FUNCTION
P1-3	P1-4	AGND
P1-2	P2-2	AGND
P1-5	P2-3	PTT/FLASH_VPP
P1-6	P1-18	SW_A+
P1-18	P2-6	SW_A+
P1-9	P1-25	CTS
P1-14	P2-9	HS_RX_AUDIO
P1-11	P2-4	DISPLAY
P1-12	P2-5	KEYPAD
P1-13	P2-7	A-
P1-16	P2-1	TX AUD
P1-5	P1-15	PTT/VPP

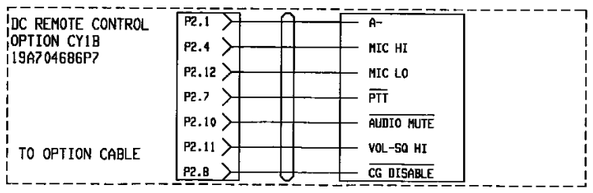












(19D904133, Sh. 3, Rev. 4)