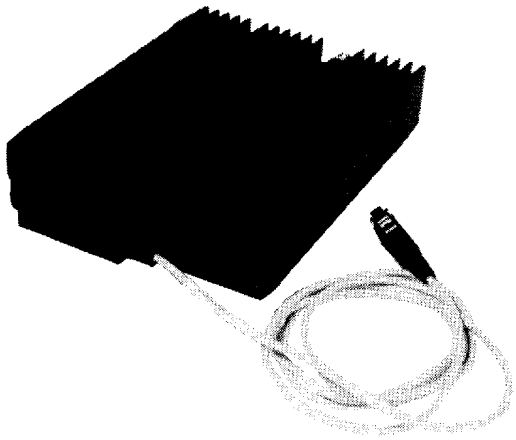
ERICSSON

Mobile Communications

DATA ONLY MDX™
806 - 870 MHz MOBILE RADIO
(Weatherproof Enclosure)



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SPECIFICATIONS*

GENERAL	
Operating Voltage	13.8 Volts ±20%
Battery Drain	
Receiver (13.8 Vdc)	0.65 Amperes (maximum)
Transmitter	4.0 Amperes (maximum at 10 Watts RF)
Channel Spacing	25 kHz (12.5 kz NPSPAC)
Frequency Stability	±1.5 PPM (±0.00015%)
Temperature Range	-30°C 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
Data Input/Output	RS-232 Levels
TRANSMITTER	
Frequency Range	806.0125-824.9875 MHz
Output Power	10 Watts (Intermittent duty cycle; EIA 20%)
Spurious and Harmonics	less than -16 dBm
Modulation Limiting	+5 kHz (maximum) 4 kHz max 821.000-824.9875 and 866.000-869.9875 MHz)
FM Hum and Noise	-45 dB
RECEIVER	
Frequency Range	851.0125-869.9875 MHz
Acceptable Frequency Displacement	±2.5 kHz minimum
Sensitivity (12 dB SINAD)	-113 dBm minimum
Spurious Response	70 dB minimum
Adjacent Channel Selectivity	68 dB minimum at ±25.0 kHz
Intermodulation Distortion	65 dB minimum

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

GENERAL DESCRIPTION

The Ericsson GE DATA ONLY 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 10 Watts of RF power output in the 806.0125-824.9875 MHz and 851.0125-869.9875 MHz bands. The receiver operates in the 851.0125-869.9875 MHz band.

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

- Programming Cable (19B801417P11) TQ3378
- MDX Series Programming Software (EDACS) TQ3373

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

The DATA ONLY MDX™ Mobile Radio assembly contains the following circuit boards and assemblies:

- Interconnect Interface Board 19D903504G3
- RF Board 19D902123G22
- System Board 19D901891G2
- Audio/Logic Board 19D903963G1
- RS-232 Interface Board 19C337705G1
- Connector Interface Board 19C852331G1

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 during overtemperature conditions.

Receiver

The dual conversion receiver circuit consists of a front end section, 43.5 MHz first IF, a 455 kHz second IF, and FM detector. All audio processing and squelch functions are accomplished on the Audio Board.

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 Electrically Erasable **PROM - EEPROM**) to store customer frequencies, tones and options. The microprocessor provides control data to the Audio Signal Processor (**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 provides the main input power to the radio and routes power to various parts of the radio. The MOSFET on/off switch is disabled (source and drain connected) so that the radio is fully powered when A+ is applied to the power cable.

ACCESSORIES AND OPTIONS

PC PROGRAMMER OPTIONS

The radio is programmed using an IBM compatible personal computer equipped with a RS-232 port. To program the radio, the Data Interface Cable (19B802623) is connected to the radio. Programming cable (19B801417P11) is then connected between the Data Interface Cable and the DB-25 connector at the PC communications port. Serial Programming Interface module (TQ3370) is not required since the radio accepts RS-232 levels. Flash programming requires that the banana plug on the Programming Cable be connected to +12 Vdc prior to powering up the radio. Programming software option TQ3373 (EDACS), used for this programming, is provided in both 3.5 and 5.25 inch diskettes.

PC PROGRAMMED OPTIONS

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.

Hook Switch Programming Option

"Off Hook Call" originate and **"On Hook Call"** terminate can be enabled using the PC programmer. When this option is enabled placing the handset on the handset holder terminates a call. When originating a call, the number to be called can be keyed in, or recalled from memory, and when the handset is removed from the holder the call is initiated without further user intervention. When placing a trunked **SPECIAL CALL** mobile to land interconnect call, the **ON HOOK CALL TERMINATE** feature cannot be disabled. When hanging up on an interconnect call, the call is always terminated and disconnected. This feature is only usable in the trunked dispatch mode.

Retry Option

If no channel is free, the radio can be programmed to activate the Call Retry state. Retrying causes the radio to revert to Idle mode and scan for an incoming call while trying to acquire a free repeater approximately every 5 seconds for a 2 minute period.

HARDWARE AND HARDWARE OPTIONS

The location and placement of system hardware options are shown on Sheet 3 of the DATA RADIO Mobile Interconnect Diagrams.

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, inhibit proper radio operation. 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.

DATA CABLE OPTIONS

The radio is normally supplied with a six (6) foot data cable, Option PMCE7S. Using delete option PMCE8S, this cable can be eliminated, and one of the following cables substituted.

PMCE7S - 6 foot Data Cable (Standard)
PMCE7T - 9 foot Data Cable
PMCE7U - 12 foot Data Cable
PMCE7V - 18 foot Data Cable

SYSTEM DESCRIPTION

EDACS

The 800 MHz DATA Mobile Radio operates in EDACS (digital) mode providing increased RF channel utilization through faster channel access and the privacy inherent with selective signalling.

The EDACS system uses 9600 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 encode and decode transmitted and received group identities 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 is designated a control channel dedicated to sending and receiving continuous control data channel requests and assignments 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 to the assigned channel and waits for a high speed data confirmation message. Upon receipt of this message the data transmission is processed.

To initiate a transmission, 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 user channel assignment on an unused channel. When all available data channels are in use, the control channel places the mobile in a queue, transmits a queue message back to the mobile, and gives a channel assignment to the requesting mobile as soon as a data 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 channel and sends a burst of 9600 baud dotting. The data paths are then unmuted and the transmission begins.

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.

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