MTM5400

TETRA MOBILE RADIO

Enabling Current and Future Critical Communications

Key Benefits Include

Extended Operational Range

- Up to 10W transmit power, with class leading receiver sensitivity delivers comprehensive network coverage
- Integrated DMO Gateway, DMO Repeater capabilities ensure resilient communications where needed most

Superior Audio Performance

- Next generation audio architecture delivering the loudest and clearest audio performance of any Motorola TETRA mobile available on the market*

High Speed Data Connectivity

- TEDS Ready hardware - with a simple software license upgrade, enables 20x faster data connectivity for accessing back-office systems and databases
- Integrated USB 2.0 PEI, enabling rapid radio programming and standardised interfacing to data terminals and accessories. For additional flexibility, USB host and slave modes are also supported

Low User Migration Costs

- Familiar cellular style user interface and VGA colour display for enhanced usability and reduced staff training costs
- Same user interface as market proven MTP850 portable and MTM800 Enhanced mobile radios
- Re-use of MTM800 Enhanced accessories using GCAI connector

Enhanced End to End Encryption Options

- Integrated hardware for SIM based end to end encryption
- Hardware Encryption (AES128 or AES256 MACE) option

Advanced Terminal Management

- USB 2.0 interface for fast radio programming via Motorola's integrated Terminal Management solution
- Hardware ready for Over-The-Air terminal management
- Enabled via a software update, background programming will allow the radio to be programmed whilst staying fully functional

Flexible Installation Options

- Fully DIN-A compatible and available in Dash, Desk, Remote Head and Motorcycle mount formats
- Supports multiple control heads - an ideal solution for installations in trains, ambulances and fire vehicles where more than one control point might be required
- Works seamlessly with existing MTM800 Enhanced control head accessories

Rugged Design with Exceptional Reliability

- Includes IP67 control head option, for exposed and challenging environments
- Front and Rear rugged GCAI connector for reliable connection of audio and data peripheral equipment
- Mobile radio and accessories are performance matched for enhanced reliability

The first of a new generation of TETRA radios, the MTM5400 underlines Motorola's commitment to meeting the current and future needs of critical communications. This new radio supports a number of advanced capabilities including TEDS high speed data connectivity, integrated Direct Mode Gateway-Repeater, over the air programming and Background Programming, that combine to enhance operational efficiency and to enable users to make more informed decisions in the field.

*Assuming the appropriate audio accessory is used.

Specifications

MODELS - COMPLAINT WITH DIN 75490 (ISO 7736)		
Dash	Compact radio for fast vehicle installation	
Desk	Compact radio, for use in the office. Optional range of accessories such as desk tray with integrated loudspeaker	
Multiple Remote Control Head	Radio with multiple remote mount control head capability. Range of installation options enable use in cars, vans and other vehicles	
Motorcycle	Environmentally enhanced radio meeting IP67 specification. Suitable for demanding environments such as motorcycle, fire appliance and marine installations	
Expansion head "Databox"	Radio without a control head, for data applications, or customised application development	
GENERAL		
	Dimensions HxWxD (mm)	Weight Typical (g)
Dash and Desk models (transceiver + control head)	60x188x198	1300
Transceiver only	45x170x169	1070
Standard control head	60x188x31	230
Remote control head	60x188x39	300
Motorcycle control head	60x188x39	320
USER INTERFACE & DISPLAY		
Display	Diagonal dimension	2.8"
	Type	VGA - 640x480 pixels Transflective TFT, 65,000 colours
	Backlight	Variable backlight, User configurable
	Font sizes	Standard & Zoom mode (90 pixels, 4.5mm high) characters
Buttons & Keypad	Numeric	Integral backlit numeric keypad of 12 keys, with keypad lock option
	International keypad versions	Roman, Arabic, Cyrillic, Korean, Chinese, Taiwanese characters
	Programmable function keys	3 programmable function keys (plus 10 programmable numeric keys)
	Navigation	4-way navigation key, menu and soft keys
	Emergency	Emergency button with backlight
	Shortcuts	User configurable shortcuts to menus and common features using "One-Touch-Button" feature
Rotary	Dual function	Talkgroup and volume change with lock option
Indication	LED	Tri-colour LED
	Tones	Configurable notification tones
User Interface Languages	Standard Options	Arabic, Chinese Simplified, Chinese Traditional, Croatian, Danish, Dutch, English, French, German, Greek, Hebrew, Hungarian, Italian, Korean, Lithuanian, Macedonian, Mongolian, Norwegian, Portuguese, Russian, Spanish, Swedish
	User defined	User programmable, using ISO 8859-1 character
Menu	Tailored to user needs	
	Menu Shortcuts	
	Menu Configuration	
Contacts Management	Cellular Type	
Contact List	Up to 1000 contacts	
	Up to 6 numbers per contact, Max 2000 numbers	
Multiple Dialling Methods	User selects how to dial	
Fast/Flexible Call Response	Private Call Response to a Group Call via One Touch Button	
Multiple Ring Tones		
Message Manager	Cellular Type	
Text message list	20	
Intelligent Keypad Text Input		
Status list	100	
Country/Network Code List	100	
Scan lists	40 lists of 20 groups	
Discrete Mode		
Screen Saver	GIF image & text (any user's selection)	
Universal Time Display		
Keypad Lock		
Talkgroup Folders	Dual layer folder structure (folder/subfolder)	
	256 folders	
Favourite Folders	Up to 3 (to store any favourite talkgroup)	
ENVIRONMENTAL SPECIFICATIONS		
Operating Temperature (°C)	-30 to +60	
Storage Temperature (°C)	-40 to +85	
Not in use - Storage	ETSI 300 019-1-1 CLASS 1.3	Non-Weather Protected Storage Locations
Not in use - Transportation	ETSI 300 019-1-2 CLASS 2.3	Public Transportation
Stationary use - Weather Protected Locations	ETSI 300 019-1-3 CLASS 3.2	Partly Temperature Controlled Locations
Mobile use - Ground Vehicle Installation	ETSI 300 019-1-5 CLASS 5.2	Climatic Tests
Mobile use - Ground Vehicle Installation	ETSI 300 019-1-5 CLASS 5M3	Mechanical Tests
MIL STD	810 C/D/E/F Specifications	All 11 categories met (or exceeded)
Dust and Water Ingress Protection	IP54 (dust cat. 2)	Dash/Desk/Remote models
	IP67	Motorcycle model (only control head is IP67; transceiver is IP54)

ELECTRICAL SPECIFICATIONS		
Voltage Range	10.8 to 15.6 V DC	
Current Consumption (A, typ.)	Idle / Rx / Tx @ 10W	0.5 / 1.0 / 1.2 (TX 3.4A Peak)
	Idle / Rx / Tx @ 3W	0.5 / 1.0 / .9 (TX 2.2A Peak)
	Tx - Multi Slot PD (4 slots) @ 5.6W	2.7
	Tx - TEDS @ 3W	2.3
	Using USB host	Adds 0.5A
RF SPECIFICATIONS		
Frequency Bands (MHz)	380 - 430	
Transmit / Receive Separation (MHz)	10	
TMO Switching Bandwidth (MHz)	50	
DMO Switching Bandwidth (MHz)	50	
RF Channel Bandwidth (kHz)	25	
Transmitter RF Power	TETRA Release 1	Adjustable to Class 2 (10W), Class 2L (5.6W), Class 3 (3W) Note: MSPD limited to Class 2L (5.6W)
	TETRA Release 2 (TEDS)	Class 3 (3W)
RF Power Control	6 Power Step Levels (steps of 5 dBm)	Starting at 15 dBm; finishing at 40 dBm
RF Power Level Accuracy	+/- 2dB	
Receiver Class	A & B	
Receiver Static Sensitivity (dBm)	-114 minimum, -116 typical	
Receiver Dynamic Sensitivity (dBm)	-105 minimum, -107 typical	
GPS SPECIFICATIONS		
Simultaneous Satellites	12	
Mode of Operation	Autonomous or assisted (A-GPS)	
GPS Antenna	Supports active antenna (5V, 25mA supply)	
Autonomous Acquisition Sensitivity	-143 dBm / -173 dBW	
Tracking Sensitivity	-159 dBm / -189 dBW	
Accuracy	<5m (50% probable) <10m (95% probable)	
TTFF (HOT Start - Autonomous)	<1s	
TTFF (WARM Start - Autonomous)	<36s	
TTFF (COLD Start - Autonomous)	<36s	
Location Protocols	ETSI Location Information Protocol (LIP)	
	Motorola LRRP	
VOICE SERVICES		
Talkgroups	2048 (TMO) & 1024 (DMO)	
Phone book entries	1000 persons. Up to 6 numbers per entry (mobile, office etc). Max 2000 entries	
Scan lists	40 lists of 20 talkgroups	
Trunked Mode (TMO) Services	Group call	Late Entry, TMO/DMO Mapping
	Private call	Half / Full Duplex
	Telephony (PABX, PSTN, MS-ISDN)	Full Duplex
	DGNA	Up to 2047 groups
	Scanning	Attachment signalling, supports SWMI initiated attachment/detachment
Direct Mode (DMO) Services	Group call	
	Private call	
Emergency (tailored by users)	Tactical	Emergency Group Call to ATTACHED talkgroup
	Non-Tactical	Emergency Group Call to DEDICATED talkgroup
	Individual	Emergency Call to PREDEFINED party (half/full duplex)
	Smart emergency	TMO/DMO/DMO to TMO automatic switching options
	Hot Mic	Configurable timers for automatic open mic (talk without PTT)
	Location	Location (GPS) sent with emergency
	Target Address	Sent to individual or group address (selected or dedicated)
	Alarm (status message)	Emergency Status (or other pre-defined status)
DATA SERVICES		
Status	Alias messages	400 Entries
	Options	Can be sent via One-Touch or via menu
Short Data Service (SDS)	Inbox	200 Entries (short messages), 40 Entries (long messages of up to 1000 characters)
	Cellular style iTAP predictive text entry	
	Target Address	Sent to individual or group address (selected or dedicated)
	Voice Call Interaction	SDS messages can be sent and received during a voice call
Packet Data (PD)	Multi-slot PD	Data transmission with up to 4 slots supporting up to 28.8 kbit/s gross
	TETRA Enhanced Data Service (TEDS) (via software upgrade)	Supporting 25kHz and 50kHz channel bandwidths and enabling practical data rates of up to 80kbit/s
TEDS (capable)	QAM Channels: 25 kHz and 50 kHz (but not D8PSK channels)	
	QAM modulation/coding modes: 4-QAM R1/2, 16-QAM R1/2, 64-QAM R1/2, and 64-QAM R2/3	
WAP	Integrated WAP browser (including WAP-PUSH)	Integrated Openwave browser
		WAP 1.2.x and WAP 2.0 compatibility for UDP/IP Stack
Peripheral Equipment Interface (PEI)	Interface Protocol	AT Commands - Full Set ETSI Mandatory Compliant
		AT Multiplexer - 4 Virtual Physical Port (simultaneous PD, SDS, AT commands and Air Tracer SESSIONS)
		TNP1; enables simultaneous PD and SDS sessions
Terminal Management	Programmable via Motorola Integrated Terminal Management (iTM) solution	
	Over-The-Air Programming (OTAP) Mode* Capable	Background Mode Programming (BMP) capable* - while radio is operational (providing TETRA services) it is being programmed/configured. * Planned features with software upgrade

GATEWAY SERVICES		
DMO/TMO Gateway (Specific services are software release dependent)	Group voice calls from DMO to TMO	
	Group voice calls from TMO to DMO	
	Emergency group call from DMO to TMO	
	Emergency group call from TMO to DMO	
	Transmission of Gateway Presence Signal	
	Automatic detection and management of co-located Gateways	
	Call Pre-emption (in either direction)	
	SDS messaging from DMO to TMO (including GPS) or from TMO to DMO	
	Configurable routing of SDS to console or PEI	
	Management of point to point calls and SDS messages whilst operating as a Gateway	
REPEATER SERVICES		
DMO Repeater (Specific services are software release dependent)	Repeats DMO voice and tone signalling on selected talkgroup	
	Repeats SDS and Status messaging on selected talkgroup	
	ETSI type 1A DMO Repeater for channel efficient operation	
	Transmission of Repeater Presence Signal	
	Priority Call	
	Emergency Call (Pre-emptive Priority Call)	
	E2EE Encrypted DMO traffic	
	Monitoring of and participation in calls whilst in Repeater mode	
	Configurable Repeater Power Levels	
INTERFACES		
RS232	For PEI (Four Virtual Ports via AT Multiplexer enable PC applications to run simultaneously Packet Data, AT Commands, SDS, SCOUT)	
USB	USB 2.0 support for PEI (Two Virtual Ports via standard Windows drivers enable PC applications to run simultaneously Packet Data and AT Commands)	
	USB 2.0 support for PEI (Four Virtual Ports via AT Multiplexer enable PC applications to run simultaneously Packet Data, AT Commands, SDS, SCOUT); rapid programming	
	USB On-The-Go (host & slave) capability for intelligent PEI applications	
	USB 1.1 support (Host Mode) to manage USB Slave Devices (e.g. SIM CARD READER)	
Rugged Accessory Connector (GCAI)	GCAI - Motorola accessory and ancillary interface for connection of accessories, data terminals and programming	
General Purpose Input/Output	Digital I/O	7 (4 on remote and motorcycle control head, 3 on transceiver)
	Analog input	4 (1 on remote and motorcycle control head, with 4 levels)
SECURITY FEATURES		
Air Interface Encryption	Algorithms	TEA1, TEA2, TEA3
	Security Classes	Class 1 (Clear), Class 2 (SCK), Class 3 (GCK) [Encryption support on DMO/TMO Gateway and DMO Repeater requires specific software release]
	Authentication	Infrastructure initiated and made mutual by terminal
Provisioning	Secure provisioning tool via Key Variable Loader (KVL)	
User Access Control	PIN/PUK code access	
	Service Profile Selection for Radio User Assignment / Radio User Identity (RUA/RUI) Operation	Based on login credentials, a radio user can be limited to only those radio capabilities defined in pre-installed service profiles, selected by the infrastructure
Data	Packet Data user authentication	
End to End Encryption (EtEE)	Voice E2EE	Enhanced End to End Encryption with OTAR supported through AES128 or AES256 Hardware or SIM (via integrated card slot)
	Packet Data E2EE	
	Short Data (SDS) E2EE	
REGULATORY COMPLIANCE		
Radio (R&TTE Article 3.2)	EN 303 035-1	
	EN 303 035-2	
	ETSI EN 300-394-1	
	ETSI EN 300-392-2	
EMC (R&TTE Article 3.1.b)	EN 301 489-1 V1.3.1	
	EN 301 489-18 V1.3.1	
Electrical Safety (R&TTE Article 3.1.a)	EN 60950-1 (2001)	
	EN50360:2001 EME	
Environmental	Directive 2002/96/EC WEE	
	Directive e2002/95/EC RoHS	
Automotive	E-mark, Automotive EMC Directive 95/54/EC	

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