Motorola MTM5400

Enabling current and future critical communications

MTM5400



When user safety and operational efficiency are paramount, fast and reliable communication becomes non-negotiable. This is the essence of critical communications and forms the basis of Motorola's commitment to empowering operatives, from public safety and commercial enterprises, with technology that's second nature.

In the new MTM5400, you have a TETRA mobile radio that addresses both your current and future critical communication needs. The MTM5400 leverages the market proven rugged design of the MTM800 Enhanced radio, while introducing many advanced capabilities that set new standards for performance and usability.

KEY REQUIREMENTS OF FIRST RESPONDERS AND PROFESSIONAL USERS

Extended Operational Range
Tunnels. Indoor locations. Remote rural areas. Such environments are often challenged by weak network coverage, posing a hindrance to communications and compromising personnel safety.

Proposition: With its best in class RF sensitivity and 10W transmit power capability the MTM5400 sets a new landmark for TETRA RF performance. Through this exceptional RF capability, the MTM5400 delivers up to a 14% increase in the network's reach compared to similar radios in its class*.

This class leading RF performance can be combined with the radio's integrated DMO repeater and gateway functions to extend the operational range even further. Workflow management can be enhanced through sophisticated algorithms embedded into the radio's operation - these allow Short Data messages, group and individual calls, between DMO and TMO users, to be routed transparently via the gateway, while maintaining participants' identities.

* This estimate of trunked mode operational range extension is based on the Hata urban propagation model, with no intermediate obstructions; based on published data specifications for competing radios; 400MHz channel; Mobile antenna +1dBi gain at 1.8m max height; 40dBm (10W) transmit power.

Flexible Installation
To meet the diversity of needs across critical communications users, solutions must offer flexible installation and configuration options.

Proposition: The MTM5400 mobile offers comprehensive and flexible installation options. The radio is fully DIN-A compatible, ideal for vehicle dash mount installations. It also supports a wide range of configurations including customised multiple control head, desk, and motorcycle install variants.

Efficient Data Sharing
Armed with data, first responders can be better prepared to detect, prevent and respond to incidents. Access to data can also transform the productivity of field operatives by enabling remote access to databases and the ability to send critical information to colleagues.

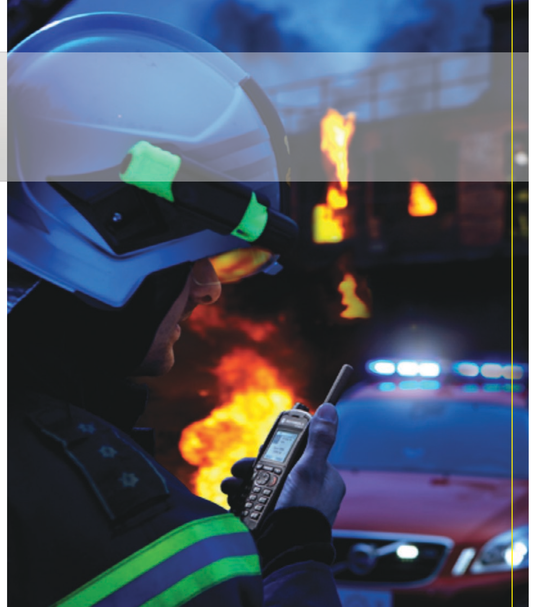
Proposition: In addition to supporting all the common TETRA data services including Short Data, Packet Data and Multi Slot Packet Data, the MTM5400 with its TEDS capability can transform workforce productivity with more than 20 times faster** data connectivity compared to TETRA Single Slot Packet Data. Mobile users can utilise existing data services and migrate to TEDS as service is rolled out across TETRA networks. The radio is also hardware ready for advanced local area networking applications including support for Ethernet, Wi-Fi and Bluetooth®.

** Theoretical data rates for TEDS are in the TETRA standards.

Long Term Operational Performance
Professional users need to protect current investments in critical communications technology and must therefore ensure that new radio purchases not only operate efficiently but also are able to benefit from the latest advances in technology.

Proposition: The MTM5400 is compatible with all MTM800 Enhanced control heads and their associated accessories. With Over-the-Air Programming (OTAP) and background mode software update capabilities, MTM5400 radios can be remotely programmed in the field while active - ground-breaking features that can transform work processes and drive step changes in productivity.

Direct Mode Gateway Mode ▶
The MTM5400 features an integrated gateway that connects users operating in Direct Mode with control room staff and other colleagues on the trunked radio network. A comprehensive set of gateway services are supported, including configurable handling of individual and group calls as well as SDS messages.



EXTENDED OPERATIONAL RANGE

The MTM5400 supports multiple modes of operation that enable enhanced workflow management and improved communications in areas where network coverage is weak or unpredictable. The integrated DMO Repeater is Type 1A compliant, operating on a just a single RF carrier for efficient spectrum usage. Combining its best in class receive sensitivity with 10W transmit power capability enables a DMO range extension of up to 12%* relative to the TETRA standard reference. Furthermore, with its scalable transmit power output, the MTM5400 allows users to balance the competing requirements of extended coverage and spectrum efficiency.

* This estimate of DMO range extension is based on mobile radio to mobile radio communication, using the Hata urban propagation model, with no intermediate obstructions; in a 400MHz channel. Mobile antenna: +1dB gain at 1.5m max height; 40dBm (10W) transmit power.



Direct Mode Repeater Mode

MTM5400





Vehicle dashboard configuration *Desktop configuration* *Remote head configuration* *Weather Resistant 'Motorcycle' model*

FLEXIBLE INSTALLATION OPTIONS

Vehicle dashboard configuration
A compact installation option - allows the MTM5400 to be deployed as a self-contained transceiver unit and control head in the vehicle dashboard. The configuration is fully compliant with the DIN-A standard for installation on car dashboards, making it easy to deploy.

Desktop configuration
A fully-integrated solution that is ideal for office environment, it features a base tray with a built-in loudspeaker and a sleek desk microphone. A wide range of other desktop accessories are also available.

Remote head configuration
By allowing multiple control heads to be installed remotely from the transceiver, the remote head option offers additional flexibility for vehicle and small control room installations. For fixed installations such as small control rooms, it allows the transceiver to be installed close to roof mounted antennas, enabling enhanced RF performance. Space constrained vehicle installations are also simplified through the separation of the transceiver and control head modules.

Weather Resistant 'Motorcycle' model
This solution features an IP67 ruggedized control head, making it ideal for any user requiring an environmentally-hardened, weather-resistant installation such as for motorcycles, fire-engine pump bays or inshore patrol boats.

Usability is enhanced by allowing control of the radio via external devices such as the control box next to the handgrip - simplifying common tasks such as talkgroup and volume level changes.

CUSTOM INSTALLATIONS. OPTIMISED PERFORMANCE.

Pump Bay Voice Terminals for Fire & Rescue
Custom Voice Terminals can be installed in the pump bay of a fire engine, providing an additional control point for Fire & Rescue teams.

Pump Bay Voice Terminal switch
Transfers control of the transceiver to the PBVT.

Integrated Vehicle Installations
By leveraging the Expansion Head's hardware and software API's, specialist integrated car solutions can be implemented, including customised control heads.

Customised Passenger Voice Terminals
Custom push to talk control points can be installed in train cabins, allowing communication between passengers and control room operators.

Integrated Passenger Information Systems
By leveraging the Peripheral Equipment Interface's data capabilities of MTM5400 transceiver, passenger information systems can be remotely controlled by train operators – providing passengers with up to date information and enhancing their safety.



Expansion Head



Pump Bay Voice Terminals for Fire & Rescue *Pump Bay Voice Terminal switch* *Integrated Vehicle Installations* *Customised Passenger Voice Terminals* *Integrated Passenger Information Systems*

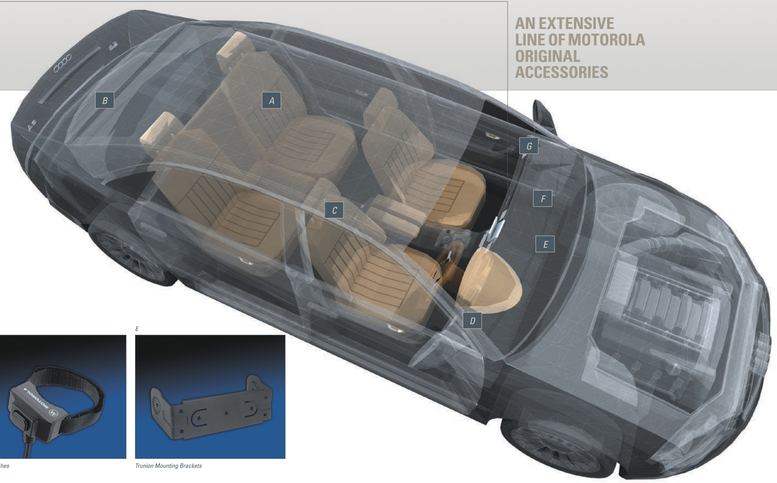


MTM5400



Remote Head

AN EXTENSIVE LINE OF MOTOROLA ORIGINAL ACCESSORIES



Our vast experience in delivering mobile radios to professional users is reflected in the quality and range of accessories available. With the MTM5400, you can re-use many of the accessories from the MTM 800 Enhanced radio, including all those that use our smart Global Common Accessory Interface (GCAI) connector - helping users to maximise investments while extracting benefits from the latest technology.

A



RF Antennas

B



Expansion Head

C



Microphones

D

PTT Switches

E

Trunion Mounting Brackets

F



Fist Microphones

G



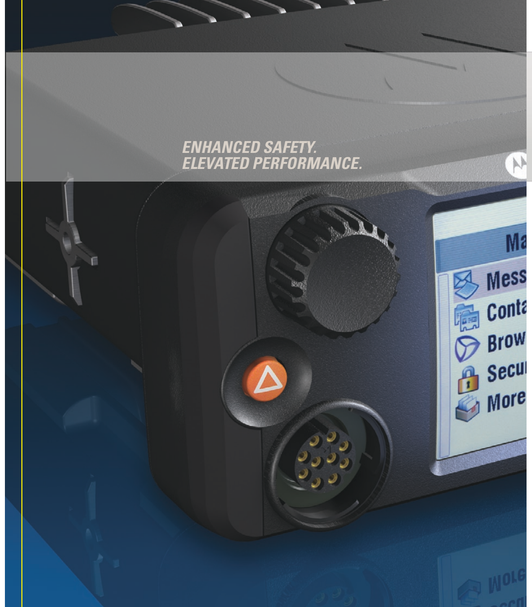
Loudspeakers

ENHANCED CONTROL HEAD*

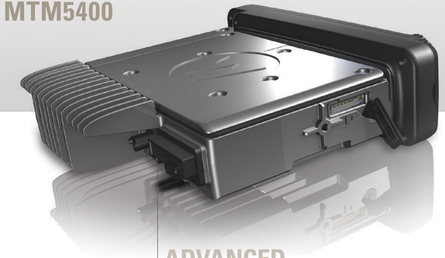
- *640 X 480 PIXEL COLOUR VGA DISPLAY AND TACTILE KEYPAD*
- *USER CONFIGURABLE SHORTCUTS TO MENUS AND COMMON FEATURES*
- *3 PROGRAMMABLE FUNCTION KEYS*
- *SUPPORT FOR DUAL CONTROL HEAD CONFIGURATIONS*
- *4 X DIGITAL I/O, 1 X ANALOG I/O FOR CUSTOM INSTALLATIONS SUCH AS INTEGRATED VEHICLE SYSTEMS*
- *MOTOROLA GCAI SUPPORTING ENHANCED AUDIO AND DATA CONNECTIVITY*
- *RUGGEDIZED IP67 CONTROL HEAD VARIANT AVAILABLE, PROVIDING INCREASED DUST AND WATER RESISTANCE*
- *DUAL FUNCTION ROTARY WITH LOCK OPTION FOR TALKGROUP AND VOLUME CHANGES*
- *EMERGENCY BUTTON WITH BACKLIGHT*

***This is the same control head as that used for the MTM800 Enhanced radio.**

While the MTM5400 retains the same user-friendly, cellular-style user interface found on portable and mobile product range, it also introduces innovations that will enhance safety of your personnel and enable high operational efficiency.



MTM5400



ADVANCED TRANSCEIVER HARDWARE

DESIGNED FOR THE FUTURE

Enhanced Integrated GPS
Knowing where your resources are enables you to allocate tasks in an efficient manner as well as to enhance the safety of your staff. Available as a licensable feature, the integrated GPS receiver provides accurate resource location information to control rooms via ETSI Location Information Protocol (LIP) or via the Motorola LRRP protocol.

Alternatively, GPS information can be interrogated via the comprehensive AT command set on the Peripheral Equipment Interface (PEI) to support user applications such as navigation.

Comprehensive Encryption
The MTM5400 supports a flexible suite of TETRA security functions, from Air Interface to End to End Encryption using either a Smartcard (internal or external) or Motorola's proven hardware based crypto engine.

Exceptional Audio Performance
The MTM5400 is built on our next generation audio architecture that delivers the loudest and clearest audio performance of any Motorola TETRA mobile available on the market.

Faster Connectivity
The integrated USB 2.0 PEI interface enables rapid radio programming and offers a high speed connection to data terminals and peripheral equipment.

Future Readiness
The transceiver interface has been designed with the necessary flexibility to support future connectivity and integration scenarios. This includes support for Ethernet and Wi-Fi local area networking and secure Bluetooth® wireless connectivity.

UNLEASHING THE POWER OF DATA



20 x TETRA Data Connectivity Speeds
The use of data applications such as database lookups, picture sharing and form filling is gaining in popularity among professional users. To date, support of these requirements has been based on Mutli Slot Packet Data transmission and Short Data services.

With its built-in support for TETRA Enhanced Data Service the MTM5400 takes secure data connectivity to a whole new level. Through a simple software upgrade, the radio can now provide 20 x faster TETRA data connectivity to back office systems, allowing transformed work processes and increased personnel productivity.

Over-The-Air Remote Terminal Management
Enabled via software, this ground-breaking feature allows the radio to stay live while being remotely programmed and software upgraded. This capability maximises productivity by effectively eliminating radio downtime.

Enabling Field Dispatch Applications
From the powerful SDS Remote Control feature to the simultaneous support of Packet Data and AT commands on the PEI, the MTM5400 is packed with advanced features that are critical for developers of custom mobile command and control solutions.

Exemplifying the flexibility of these capabilities, Motorola has worked with a specialist partner to develop advanced mobile radio control applications for public safety agencies. Alongside tasks of controlling one or several TETRA digital radios, such applications can be used to process GPS position data interrogated from relevant radios and offer a variety of options for displaying the information on a mobile data terminal.

Smarter Solutions for Enhanced Productivity
Reflecting our commitment to innovation, we have introduced unique features such as Call Out that can help you drive efficient resource mobilisation as well as enable immediate incident alerts and management. Our radio and infrastructure solutions can also enable the efficient use of pooled terminals and access control on a per user basis, leverage WAP Push functionality with the integrated WAP browser to deliver the right information to the right person at the right time and through our Radio Messaging Solution, allow improved operational efficiency in the field.

MTM5400 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	10W, Class 2 Note: MSPD limited to 5.6W, Class 2L
	TETRA Release 2 (TEDS)	3W, Class 3
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.

GATEWAY SERVICES	
DMO/TMO Gateway	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 messages to console or PEI
	Intelligent handling of point to point calls and SDS messages whilst operating as a Gateway

REPEATER SERVICES	
DMO Repeater	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 3G
	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 Universal Crypto Module (UCM) and 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

* Planned features with software upgrade

MOTOROLA TETRA TERMINALS ARE ENGINEERED TO LAST



Partnership
Choose a partner with the experience and expertise to work with you and deliver the solutions you need.



Integration
Maximise long term performance with integrated solutions enabled by a comprehensive portfolio of terminal accessories, applications and complementary technologies.



Design
Be able to call on a wide range of products designed to handle any specialist task…anywhere, anytime.



Longevity
Maximise the return on your investment with innovation, quality and product support that lasts well into the future.



To learn more about the MTM5400, visit **motorola.com/mtm5400**

MOTOROLA

www.motorola.com/caribbean/tetra

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