



CLAY COUNTY DISTRICT SCHOOLS

CLAY COUNTY DISTRICT SCHOOLS 800MHZ RADIO REFRESH

FEBRUARY 22, 2022

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February 22, 2022

Mrs. Bryce Ellis
Clay County District Schools
3674 County Road 220
Middleburg, FL 32068

Dear Mrs. Ellis:

Motorola Solutions, Inc. ("Motorola") is pleased to have the opportunity to provide Clay County District School ("CCDS") with the attached proposal for an upgraded state-of-the-art radio system, which will provide for connectivity to the Clay County APCO (Association of Public-Safety Communications Officials) Project 25 (P25) 800MHz Public Safety Radio System.

Student safety is paramount and educators know that ensuring physical safety for students is vital to their performance and success. This sphere of safety starts and ends on the school bus. As you are aware, P25 two-way radios play a major role in collaborating with first responders and enhancing student safety. APCO is committed to continued support of P25 technology, a long standing partnership between the public safety communications community and standard development organizations. Each group's end goal is to satisfy the complex and evolving mission critical communication needs of users for interoperable equipment and systems. Presently, the current commercial radio system in place at CCDS Transportation is end-of-life and end-of-support. Motorola proposes CCDS Transportation adopt the path taken by their neighboring school districts, such as St. Johns County School District, and join their county public safety radio system. CCDS Transportation will have a host of benefits from this approach, including:

1. Coordination and faster response to a crisis due to interoperability with School Resource Officers, Sheriff's Office, Fire, and EMS.
2. Significant expansion to your existing radio system coverage area.
3. Improved reliability as Clay County continually invests to ensure the network is always at peak performance.
4. Less man hours and costs supporting and troubleshooting a system that is outdated and end of life.

This proposal consists of this cover letter, our quote for equipment and services. This proposal shall remain valid through March 25, 2022. We understand procurement per NASPO/Washington State DES Cooperative Purchasing Master Agreement No. 00318 Public Safety Communication Products, Services, and Solutions with Motorola, Pending signature of Florida Participation/State Contract #-NASPO-ACS will be utilized.

We thank you for the opportunity to furnish the Board of Education with "best in class" solutions and we hope to strengthen our relationship by implementing this project.

Respectfully,



Marie Ventura
Senior Account Manager

SYSTEM DESCRIPTION

Motorola Solutions, Inc. (Motorola Solutions) is proposing to replace the legacy radios currently in the school's buses with APX 1500 mobiles to support seamless communications and interoperability throughout the county. Maintenance and supervisory staff will utilize the APX 900 portable radios to communicate with each other and buses. This will allow Clay County District Schools to take advantage of the advanced P25 800Mhz radio system that Clay County has already invested in while allowing interoperability with other users such as Fire Rescue and Clay County Sheriff. Additionally, Motorola Solutions is proposing two MCC 7500E dispatch consoles positions which will provide Clay County District Schools with the confidence of state-of-the-art secure communications, seamless IP-based connectivity, flexible system architecture with scalable components.

1.1 APX SERIES OF RADIOS

With a rugged, easy-to-operate form factor and advanced voice and data features, Motorola Solutions' IP-enabled APX radios offer reliable, two-way communications for Clay County District Schools' users in any type of environment. Every APX radio includes the following advanced software, hardware, and future-ready capabilities:

- Support for Project 25 (P25) and legacy infrastructures.
- Extreme audio profiles for chaotic, high-noise environments.
- Intuitive audio-visual signaling to increase personnel safety.
- Functions to enable easy operation.
- Easy radio programming.
- Rugged and robust testing standards.

When developing the APX platform, Motorola Solutions' product engineers met with personnel from public safety and law enforcement agencies to identify and design the specific functionality essential for mission-critical communications. Through that research and collaboration, every feature in the APX line has been designed with its users in mind—from the ruggedized form factor to the loudest, clearest audio.



Motorola Solutions' IP-enabled APX radios offer a full array of features and progressive technologies, and are the most sophisticated interoperable and rugged two-way radios on the market. Every APX radio includes the following advanced software, hardware, and future-ready features:

Support for Project 25 and Legacy Infrastructures

All APX radios are compatible with P25 Phase 1 and Phase 2 standards for analog and digital trunking, and support the P25 interoperability features from both Motorola Solutions and other manufacturers. They also operate on analog conventional, Project 25 conventional, and Project 25 trunking systems, as well as systems using Motorola Solutions Project 16 analog trunking, SMARTNET, and SmartZone technologies.

Extreme Audio Profiles for Chaotic, High-Noise Environments

APX two-way radios possess intelligent 2-microphone noise reduction software and the latest AMBE vocoder technology used for audio to dynamically adjust for rapidly changing, high-noise environments. When combined with the microphones and speakers in our APX portables and control heads, these components and software enable the loudest, clearest two-way radio audio available.

Intuitive Audio-Visual Signaling to Increase Personnel Safety

Every APX radio includes auditory and visual alerts to improve user awareness and reduce response time. Digital Tone Signaling instantly alerts on/off duty responders of emergency events. Intelligent Lighting uses color alerts to notify users of the radio mode, potential emergencies, or specific events. These audio-visual alerting mechanisms can be configured on both a radio and a fleet basis, enabling each user and agency to customize audio, lighting, and tone alerts to meet their needs in specific work conditions.

Functions to Enable Easy Operation

The APX platform includes features to allow personnel to communicate quickly and easily in the midst of chaotic situations and extreme environments. Each radio can be configured to announce channels, talkgroups, and zones while the user navigates through the radio's available options—saving valuable time and eliminating the need for the user to look at the radio while operating it. All information associated with each contact in the radio can be consolidated into one unified call list, reducing the time needed to navigate the radio's software.

Easy Radio Programming

The APX platform includes easy-to-use Customer Programming Software (CPS), a Windows-based application with drag-and-drop, clone wizard, and programming over IP capabilities. This software drastically decreases the time needed to configure and update radio programming, and simplifies the addition of new software and future enhancements.

Rugged and Robust Testing Standards

APX radios undergo testing for extreme conditions and physical treatment to ensure that they will remain operational even years of wear and tear in the field. These tests include temperature shock, temperature cycling, drop, display impact, vibration, blowing rain, dust, salt fog, UV exposure and Electro-Static discharge (ESD). The basic test procedures replicate those conducted by the military for field equipment, and APX radios exceed the applicable Military Specification 810 C, D, E, F, and G. Motorola Solutions has supplemented the MIL-STD testing process with an internal testing process that reuses the same test unit for all environmental tests, rather than testing a new unit each time. This ensures that the radios perform to specification regardless of the amount and type of abuse they receive.



Emergency Call Termination

APX radios allow users to remotely clear an emergency status, keeping operations efficient by quickly dealing with accidental activation or the late clearing of emergencies. This allows Clay County District Schools' users to stay focused on other critical tasks instead of getting distracted or interrupted with continued emergencies.

APX Instant Recall

The Instant Recall feature allows Clay County District Schools' users to replay their last received voice call, increasing system efficiency and reducing repeat transmissions. Calls containing detailed information (such as addresses, license plates, or phone numbers) will be stored on the APX device (up to 60 seconds) to be replayed whenever necessary.

1.1.1 APX 1500 Enhanced Mobile Radio Solution

Motorola Solutions' APX 1500 Enhanced mobile radio is a budget-friendly, P25 Phase 1 and Phase 2 solution that provides seamless interoperability and extends the range of communications to keep public safety personnel connected wherever the mission takes them. With ruggedized construction and easy installation, the APX 1500 Enhanced is designed for users who require reliable P25 functionality in a durable, compact, and cost-effective mobile radio.



Figure 1-1: APX 1500 Mobile Radio

Standard features and benefits of the APX 1500 Enhanced include the following:

P25 and Legacy Interoperability – Unifies public works and public safety personnel so they can communicate effectively. Available in 700/800 MHz, VHF, and UHF R1 frequency bands, and is compatible with both P25 Phase 1 and Phase 2 infrastructure.

Ergonomic Controls – Large, multifunctional knobs allow radio users to easily adjust talkgroup and volume settings while wearing bulky gloves. A front color display with intelligent lighting allows easier operation in all lighting conditions. The compatible O2 Control Head is easy to read and operate in all lighting conditions, as well.

Easy Installation – A simplified dash mount design makes APX 1500 Enhanced installation quick and easy, fitting into the existing APX 1500 footprint so mounting holes and cables can be reused to reduce cost.

Ruggedized Form Factor – Uncompromising durability and renowned quality enables the APX 1500 Enhanced to withstand wet, dusty, and hazardous conditions, with a IP56 durability rating and applicable MIL-STD 810C, D, E, F, G standards.



1.1.2 APX 900 Portable Radio

The APX 900 offers affordable, entry-level communications for Clay County District School’s users, without compromising P25 interoperability or voice and data quality. With Bluetooth Low Energy (LE) 4.0, the APX 900 gives users wireless freedom and the “always-on” convenience of pairing to the radio without draining the battery.

The APX 900 features a ruggedized build for reliable, everyday efficiency in all types of environments. The two-knob design makes operation easy and efficient.



- **Improved Efficiency and Safety**– Supports Integrated Voice and Data (IV&D) capabilities to enhance the efficiency and safety of Clay County District School’s users through various data applications (Including Integrated GPS, Single-Key ADP Encryption, and Text Messaging).
- **Smart Interoperability** – The APX 900 is certified compliant with the P25 standard, ensuring a smart, scalable investment. Bluetooth 4.0 (LE) capabilities give Clay County District Schools freedom to use the radio without being wired to it.

1.1.3 APX® All-Band Console

The APX All-Band Console provides a low-cost, mid-power wireless dispatch solution as an ideal complement to a modern P25 dispatch center. Equipped with leading edge P25 Phase 2 TDMA technology and multi-band interoperability, the APX All-Band Console can also be used as an emergency backup station when infrastructure is offline, or for wireless access to different system types for increased interoperability between agencies.



APX All-Band Console

The APX All-Band Console’s P25 operation and compatibility with legacy systems ensures that communications are clear, continuous, and coordinated across multiple users, agencies, and systems. The durable robust metal housing provides durability and allows for easy servicing, while the integrated front panel numeric keypad allows fast access to radio controls. In addition, optional features and benefits of the APX All-Band Console include:

- **Meets Radio Users’ Needs** – The APX All-Band Console is compatible with the following optional advanced features and data applications: Programming over Project 25 (POP25), Text Messaging, Over the Air Rekeying (OTAR), and Enhanced Encryption Software Options. It is also capable of Extended Dispatch Operation including: Emergency Alarm ACK Encode, Radio Inhibit/ Uninhibit Encode, Radio Monitor Encode, Radio Check Encode, Status Query Encode, Status Query Response Decode, Status Update Decode, and Message Update Decode.

1.2 DISPATCH CONSOLE CONFIGURATION FOR CLAY COUNTY DISTRICT SCHOOLS

The proposed console will interface with the Clay County ASTRO® 25 system.



The proposed solution offers Clay County District Schools with two IP dispatch Console positions. The figure titled “MCC 7500E Dispatch Position” shows an MCC 7500E operator position.



Figure 1-2: MCC 7500E Dispatch Position provides a small form factor, familiar GUI, and advanced features.

1.2.1 Embracing Interoperability and Integration

Motorola Solutions is an active participant in establishing P25 standards for interoperability. The proposed console is a key component for the interoperability of the ASTRO 25 system. When a situation requires coordination between multiple agencies, the dispatcher can patch together multiple agencies that utilize the Clay County ASTRO 25 radio system for a coordinated response to dynamic situations.

Incident conversations are seamless from the moment of the patch initiation and can be recorded like any talkgroup conversation within the Land Mobile Radio (LMR) network. The dispatcher can also take part in and monitor conversations for the duration of the incident, as necessary.

1.2.1.1 Integration with the ASTRO 25 Network

The proposed dispatch console integrates into Clay County’s ASTRO 25 system without interface boxes, digital voice gateways for an integrated, mission-critical network. This tight union between radio infrastructure and console equipment has several operational benefits to Clay County District Schools.

The physical space to accommodate the proposed console is comparable to that required for a personal computer. The console can access both trunked talkgroups and conventional radio channels over the same network. This architecture reduces overall transport costs and the need for duplicate fixed network equipment.

1.2.1.2 Connection to ASTRO 25 System

The flexibility of the ASTRO 25 system architecture allows the connection of the proposed console to be suited specifically to Clay County District School's needs.

LAN Switch

The site LAN switch provide LAN interfaces for console site equipment and a LAN port for the link to the core site. Through the switch, service technicians can access the system's configuration manager and service the equipment.

1.2.2 Making Consoles Easy to Operate

Motorola Solutions designs its proposed console to provide mission-critical audio between the dispatcher and users in the field. It is optimized for real-time audio, prioritizing emergency calls over other traffic, and minimizing voice queuing. Using robust error mitigation to maintain call quality even when the system is heavily loaded, the proposed console reduces communication errors that may force dispatchers or radio users to repeat their transmissions.

1.2.2.1 Customizable Dispatch Interface

The proposed console provides dispatchers with a graphical user interface (GUI) that can be customized by agency or by individual users to optimize user efficiency. Based on dispatcher preference, the proposed GUI can be customized to show details of trunked and conventional RF channels on a per-channel basis.

Busy dispatchers can respond to a missed call by simply clicking on an entry in the Activity Log. The number of calls and call information displayed in the Activity Log is customizable to suit the needs of the user.

Elite Dispatch Graphical User Interface

The proposed Elite Dispatch GUI is an enhanced version of Motorola Solutions' Gold Elite Dispatch GUI. For existing Gold Elite users, the GUI allows a smooth transition and minimal training for dispatchers. For new users, the graphical icons and customization options make the proposed console GUI easy to learn and operate.

1.2.2.2 Standard Radio Transmission and Reception

A typical proposed dispatch position has a headset and two speakers. One speaker is for selected audio and the second speaker is for all remaining unselected audio. Additional speakers can be added to a console allowing dispatchers to configure a specific speaker for a set of designated audio sources. This simplifies multitasking between multiple audio sources and allows flexibility in the way the audio is presented to the dispatcher.

Receiving Calls from the Field and Other Dispatchers

The proposed console provides dispatchers with greater flexibility for how to hear calls from field radio users and other dispatchers. Each dispatcher can define his or her own audio reception profile by selecting a single audio source, whether conventional or talkgroup, to be heard on a selected speaker or headset (Single Select). The dispatcher can also define groups of radio resources that can all be heard on a selected speaker or headset (Multi- Select).

Initiating Calls to the Field and Other Dispatchers

The dispatcher has several different ways of initiating a call. In most circumstances, a General Transmit is appropriate. With the General Transmit, the dispatcher selects a resource on the console and activates the transmission through a footswitch, headset transmit button, or a microphone transmit button. If the dispatcher needs to quickly transmit on a resource that is not selected, the dispatcher uses the Instant Transmit function.

An Instant Transmit safety switch prevents accidental activation of functions that may cause negative consequences.

Audio Communication to the Field and Other Dispatchers

The dispatcher can transmit audio in different ways. They can make calls to all users listening to a specific trunking talkgroup. When multiple resources are required, the dispatcher can select additional talkgroups and/or conventional channels, as needed using the Multi-Select feature.

The proposed console also enables dispatchers to make private calls to individual field radio users or dispatchers. Once a private call is established, it can be patched in with another resource at the dispatcher's discretion.

Controlling Console Audio

The proposed console offers dispatchers several different ways of controlling or muting the audio on their consoles, such as the following:

- Audio volume can be changed for any specific resource.
- All non-selected resources on the console can be muted for 30 seconds (All Mute) or unmuted, if already muted.
- A dispatcher can transmit on a resource while receiving audio from the same resource or other resources.
- A dispatch position can be configured to automatically mute the other dispatch audio on a shared resource to prevent acoustic feedback when a co-located dispatch position transmits.
- RF Cross Mute automatically mutes the receive audio from a specified channel when the dispatcher transmits on another specified channel to prevent acoustic feedback.

1.2.2.3 Emergency Radio Transmission and Reception

As part of a mission-critical communications network, the proposed dispatch console facilitates immediate prioritization and resolution of emergency communications between Clay County District Schools' dispatch and first responders in the field. This enables dispatchers and first responders to focus on their mission and not their equipment, especially during critical situations.

Receiving an Emergency Call

When a user in the field or another dispatcher initiates an emergency call, the console emits both visual and audible indications (Emergency Alarm). The audible indication alerts the dispatcher that an emergency is underway; the visual indication directs the dispatcher's attention to the specific resource making the emergency call. The dispatcher can immediately reserve a voice channel for the duration of the emergency.

Responding to an Emergency Call

A dispatcher can bypass the standard console interface to auto-open a quick list, which contains specific controls for recognizing an emergency call, initiating an emergency call, and ending an emergency call (Auto-Open of Quick List). The dispatcher can then recognize the emergency call,



which ends the audible emergency indication and notifies all dispatchers that the emergency is being addressed (Emergency Recognize).

The audible emergency indication may also be muted by a dispatcher without recognizing the emergency alarm (Mute Tones at a Single Op). This can be used in a situation where one agency is monitoring a channel that belongs to another agency. That channel can be configured to not generate audible and/or visual emergency indications.

Ending an Emergency Call

When an emergency is over, the dispatcher can end the Emergency Alarm. The visual indication on the dispatch position GUI is removed, and the console informs the other dispatch positions that the emergency is over (Emergency End/ Knockdown). The emergency mode remains active on the initiating radio unit until it is ended (reset) by the radio user.

1.2.2.4 Radio Patch Control

The dispatcher can patch communication between trunked and/or conventional radios that are normally unable to communicate with each other due to different features, programming, or even different frequency bands. A patch group is a group of linked resources that can both receive messages from a console and transmit to all other members of the patch group.

Setting up a Standard Patch

Patches are supported between trunked resources and/or conventional resources. After the patch is created, the dispatch position transmits all audio on one resource to all other resources in the patch group. In a patch between trunked resources, patched radio users with displays see the ID or alias of the other patched radio(s), as opposed to that of the console. This minimizes confusion and the need for the dispatcher to intervene in the call. Patches are automatically reestablished, if interrupted, so the dispatcher can concentrate on continuing operations.

Predefined Patches

Patches can be predefined and automatically reinitiated each time a dispatch position computer is restarted (Patch Auto-Start).

1.2.2.5 Call Management and Control

The dispatcher can use the following functionality to manage and control audio for different types of calls between the dispatch position and radio users or other dispatchers.

Automatic Prioritization of Calls

Calls on the dispatch position are prioritized through a transmission hierarchy. Calls from primary supervisors take priority over those from secondary supervisors, which in turn take priority over non-supervisors. Instant Transmit or All-Points Bulletin (APB) transmissions, regardless of whether they are from a supervisor, take priority over general or patch transmissions.

Multiple dispatchers can be designated as primary supervisors on the same system, which is useful when multiple agencies share one system. With the Network Manager Client installed, supervisors can disable and enable dispatch console functionality as needed.

Manual Prioritization of Calls

System Access Priority Select allows a dispatcher to prioritize trunked resources on the system as either normal or tactical. A dispatcher can change the priority of a trunked resource to tactical to give



the resource a better chance of gaining communication access on a busy system. Only emergency calls have a higher priority than tactical.

When the System Access Priority Select status of a resource is changed, it is updated at all dispatch consoles in the systems that are monitoring that trunked resource.

Using the Multi-Select Feature

The Multi-Select feature allows a dispatch position to define groups of selected radio resources. When a Multi-Select group is opened, all of the resources in the group are simultaneously selected. Resources can be added or removed from a Multi-Select group while the group is open. The dispatcher can transmit on several resources simultaneously or can listen to multiple resources simultaneously in their headset or select speakers.

Standard Call Indications

The dispatch position indicates the availability of any given resource, regardless of whether the resource is involved in a transmission. An inbound call indication provides the dispatcher with a visual cue of audio activity on a radio resource and allows a dispatcher to see at a glance what the status of a resource is at any moment.

Call Alerting

A dispatcher can use Call Alert to page an unattended radio or dispatch position through a series of beeps and an indication of the sender's ID. When available, the radio user or dispatcher sees the unit ID of the calling dispatch console or radio ID and is able to return the call.

Additionally, a Call Alert can trigger an activity. For instance, a Call Alert may cause a vehicle's horn to sound and its lights to flash. The dispatcher can even send a Call Alert to a user who is involved in voice and data communications over the network.

1.2.3 Dispatch Console Solution Components

The proposed components are connected together and to the rest of the ASTRO 25 system on an IP network through console site routers and switches. The console functions as an integrated component of the total radio system and fully participates in system-level features, such as end-to-end encryption and Agency Partitioning.

Audio processing, encryption, and switching intelligence for dispatch are performed within each software-based dispatch position without additional centralized electronics.

Since the network is IP-based, the system interfaces and components can be distributed physically throughout the network. Some of the available console components are identified below.

1.2.3.1 MCC 7500E Console Operator Position

The dispatch position supports commercially available accessories, including a USB microphone, USB headset, and USB footswitch, as shown in the figure titled "MCC 7500E Dispatch Position." The following list describes the components included in the proposed configuration.



THE MCC 7500E DISPATCH CONSOLE

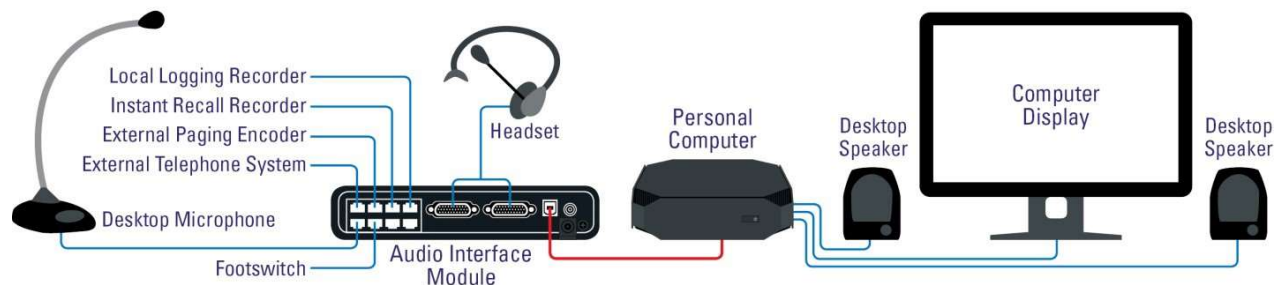


Figure 1-3: MCC 7500E Dispatch Position supports multiple accessories.

Audio Interface Module (AIM)

The USB Audio Interface Module (AIM) acts as an interface between analog devices and the dispatch position and as a general-purpose input/output module. The USB AIM supports audio routing between the dispatcher and Motorola Solutions standard peripherals. The USB AIM connects to the MCC 7500E dispatch position with a USB cable.

Personal Computer (PC)

The personal computer included with the dispatch position is Windows-based and certified by Motorola Solutions.

Computer Display

Each dispatch position will use a 22" Computer Display

Enhanced Integrated Instant Recall Recorder (IRR)

The Enhanced IRR is seamlessly integrated with the dispatch position's software, allowing audio and call data from any radio or telephony resource to be recorded and easily played back. Call data includes PTT IDs, name of resource, start time and date, and stop time and date. Two analog inputs are available for use with recording audio from external devices.

Desktop Speakers

Two audio speakers have been included with each dispatch position and can be configured to transmit audio from a specific talkgroup or set of talkgroups. Each speaker is a self-contained unit, with individual volume controls, and can be placed on a desktop or mounted on a rack or computer display.

Headset Jack

The dispatch position supports up to two headset jacks, both push-to-talk (PTT) and non-PTT-enabled, for simultaneous use by the dispatcher and a supervisor. The headset jack contains two volume controls for the separate adjustment of received radio and telephone audio.

Headset

The proposed headset consists of two elements. The headset base includes an audio amplifier, a Push-to-Talk switch, and a long cord that connects to the dispatch position. The headset top consists of the earpiece and microphone as well as a short cable that connects to the headset base.

Gooseneck Microphone

The microphone controls the dispatch position's general transmit and monitor features through two buttons on its base. The microphone can be fastened down or left loose. It can be used alone or in conjunction with a headset.

Footswitch

Each dispatch position includes a dual pedal footswitch that controls general transmit and monitor functions.

Telephone Headset Interface Port

The telephone/headset port provides a connection for an external telephone to the dispatch position. This allows the operator to use a single headset to communicate on both the radio system and a telephone system.



STATEMENT OF WORK

Motorola Solutions is proposing to Clay County District Schools the installation and configuration of the following equipment at the specified locations.

Subsystem	Location Name
(2) MCC7500e Console Operators	Clay County District Schools Dispatch Center located at 3674 County Rd 220, Middleburg, FL 32068
(240) APX1500 Mobile Radios	Clay County District Schools Bus Maintenance Facility located at 3674 County Rd 220, Middleburg, FL 32068
(5) Spare APX1500 Mobile Radios not installed	Clay County District Schools Bus Maintenance Facility located at 3674 County Rd 220, Middleburg, FL 32068
(1) APX8500 Consolette Radio & Antenna	Clay County District Schools Bus Maintenance Facility located at 3674 County Rd 220, Middleburg, FL 32068
(10) APX 900 Portable Radios	Programmed at Mobile Communications of America Jacksonville location and delivered to Clay County District Schools Dispatch Center located at 3674 County Rd 220, Middleburg, FL 32068

The document delineates the general responsibilities between Motorola Solutions and Clay County District Schools as agreed to by contract.

2.1 MOTOROLA SOLUTIONS RESPONSIBILITIES

Motorola Solutions’ general responsibilities include the following:

- Perform the installation of the Motorola Solutions-supplied equipment described above.
- Schedule the implementation in agreement with Clay County District Schools.
- Coordinate the activities of all Motorola Solutions subcontractors under this contract.
- Administer safe work procedures for installation.
- Provide Clay County District Schools with the appropriate system interconnect specifications.

2.2 CLAY COUNTY DISTRICT SCHOOLS RESPONSIBILITIES

Clay County District Schools will assume responsibility for the installation and performance of all other equipment and work necessary for completion of this project that is not provided by Motorola Solutions. General responsibilities for Clay County District Schools include the following:

- Provide all buildings, equipment shelters, towers and vehicles required for system installation.
- Ensure communications sites meet space, grounding, power, and connectivity requirements for the installation of all equipment.
- Obtain all licensing, site access, or permitting required for project implementation.
- **Provide required system interconnections as described in the section 2.2.1.**
- Clay County District Schools will provide a dedicated delivery point, such as a warehouse, for receipt, inventory, and storage of equipment prior to delivery to the site(s) and installation into vehicles.
- Coordinate the activities of all Clay County District School's vendors or other contractors.

Motorola Solutions has made several assumptions in preparing this proposal, which are noted below. In order to provide a firm quote, Motorola Solutions will need to verify all assumptions or seek alternate solutions in the case of invalid assumptions.

- All existing sites or equipment locations will have sufficient space available for the system described as required/specified by R56.
- All existing sites or equipment locations will have adequate electrical power in the proper phase and voltage and site grounding to support the requirements of the system described.
- Any site/location upgrades or modifications are the responsibility of Clay County District Schools.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment are the responsibility of Clay County District Schools.
- Any required system interconnections not specifically outlined here will be provided by Clay County District Schools. These may include dedicated phone circuits, microwave links, or other types of connectivity.
- Motorola Solutions is not responsible for interference caused or received by the Motorola Solutions-provided equipment except for interference that is directly caused by the Motorola Solutions-provided transmitter(s) to the Motorola Solutions-provided receiver(s). Should the Clay County District Schools system experience interference, Motorola Solutions can be contracted to investigate the source and recommend solutions to mitigate the issue.
- The design assumes that the Clay County radio system will be at version 7.18 or higher at the time of purchase.
- No box level or performance spec testing will be conducted.
- No towers, shelters, or generators are included in this quote.
- The Clay County System Manager must approve the addition of the operator position and Mobile Radios for Clay County District Schools. Consoles utilized on the Clay County system will operate on version 7.18 ASTRO P25 system release or higher. Clay County District Schools shall work directly with Clay County personnel to obtain any working agreements or documentation that may be required regarding use of console system and mobile radios connected to the Clay County system.

2.2.1 Required IP Connectivity

The design assumes that Clay County District Schools will provide Ethernet connectivity to the Clay County Master / Core Site and DSR Core Site as defined below. **This quote does not include any**

transport to support the console system. Please provide the specifications listed below to Clay County's IT Department.

- A 5Mb IP connection between Clay County District Schools Dispatch Center located at 3674 County Rd 220, Middleburg, FL 32068 and the Clay County Master Site Core located at the Clay County Sheriff's Office 901 N Orange Ave. Green Cove Springs, FL 32043.
- A 5Mb IP connection between Clay County District Schools Dispatch Center located at 3674 County Rd 220, Middleburg, FL 32068 and the Clay County Master Site Core located at the Clay County Fairgrounds tower site.
- Both IP connections must meet the following minimum specifications.
 - Jitter less than 10ms
 - One-way latency of less than 20ms
 - Packet loss less than .1% end to end
 - Must be a VPLS (Virtual Private Lan Service) direct connection and not meshed



SECTION 3

PRICING

3.1 SYSTEM PRICING



MOTOROLA SOLUTIONS

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8-Feb-22		Clay County District Schools							
NASPO Category	MODEL #	DESCRIPTION	LIST PRICE	LIST EXTENDED	DISCOUNT	DISCOUNTED EACH	QTY	EXTENDED PRICE	
Category 1.2 Radio: Single-Band Mobile Radio (P25) APX1500									
1.2	M36URS9PW1BN	APX1500 ENHANCED 7/800 MHZ	\$1,564.00	\$375,360.00	27.00%	\$1,141.72	240	\$274,012.80	
1.2	G174AD	ADD: ANT 3DB LOW-PROFILE 762-870	\$43.00	\$10,320.00	27.00%	\$31.39	240	\$7,533.60	
1.2	GA01339AA	ENH: SW P25 TRUNKING	\$1,070.00	\$256,800.00	27.00%	\$781.10	240	\$187,464.00	
1.2	GA00226AA	ADD: GPS ANTENNA	\$75.00	\$18,000.00	27.00%	\$54.75	240	\$13,140.00	
1.2	W432AG	ADD: AUXILIARY SPKR 13W (3.2OHM)	\$71.50	\$17,160.00	27.00%	\$52.20	240	\$12,526.80	
1.2	G66BF	ADD: DASH MOUNT O2 APXM	\$125.00	\$30,000.00	27.00%	\$91.25	240	\$21,900.00	
1.2	G193AK	ADD: ADP ONLY (NON-P25 CAP COMPLIANT) (US ONLY)	\$0.00	\$0.00	27.00%	\$0.00	240	\$0.00	
1.2	W22BA	ADD: STD PALM MICROPHONE APX	\$72.00	\$17,280.00	27.00%	\$52.56	240	\$12,614.40	
1.2	G444AH	ADD: APX CONTROL HEAD SOFTWARE	\$0.00	\$0.00	27.00%	\$0.00	240	\$0.00	
1.2	GA00804AA	ADD: APX O2 CONTROL HEAD	\$492.00	\$118,080.00	27.00%	\$359.16	240	\$86,198.40	
Category 1.2 Radio: Single-Band Mobile Radio (P25) APX1500 Warranty Options									
1.2	G24AX	ADD: 3Y ESSENTIAL SERVICE	\$138.00	\$33,120.00	0.00%	\$138.00	240	\$33,120.00	
Services									
Services	SVC03SVC0123D	INSTALLATION (hourly)	\$240.00	\$54,960.00	0.00%	\$240.00	229	\$54,960.00	
Services	SVC03SVC0123D	CONFIGURATION/DESIGN (hourly)	\$240.00	\$480.00	0.00%	\$240.00	2	\$480.00	
						APX1500 Bus	Radio Subtotal	\$703,950.00	
Category 1.1 Radio: Single-Band Portable Radio (P25) APX900									
1.1	H92UCF9PW6AN	APX 900 7/800 MHZ MODEL 2 PORTABLE	\$1,597.00	\$15,970.00	27.00%	\$1,165.81	10	\$11,658.10	
1.1	QA04096AA	ENH: P25 TRUNKING	\$1,070.00	\$10,700.00	27.00%	\$781.10	10	\$7,811.00	
1.1	Q667BB	ADD: ADP ONLY (NON-P25 CAP COMPLIANT) (US ONLY)	\$0.00	\$0.00	27.00%	\$0.00	10	\$0.00	
1.1	QA06765AA	ALT: IMPRES LI-ION 3000MAH	\$85.00	\$850.00	27.00%	\$62.05	10	\$620.50	
1.1	PMNN4493A	BATT IMPRES LIION HE DENS IP68 3000T	\$135.00	\$1,350.00	27.00%	\$98.55	10	\$985.50	
1.1	PMPN4174A	CHGR DESKTOP SINGLE UNIT IMPRES, US/NA	\$76.00	\$760.00	27.00%	\$55.48	10	\$554.80	
Category 1.1 Radio: Single-Band Portable Radio (P25) APX900 Warranty Options									
1.1	H885BK	ADD: 3Y ESSENTIAL SERVICE	\$90.00	\$900.00	0.00%	\$90.00	10	\$900.00	
Services									
Services	SVC03SVC0123D	INSTALLATION (hourly)	\$240.00	\$720.00	0.00%	\$240.00	3	\$720.00	
Services	SVC03SVC0123D	CONFIGURATION/DESIGN (hourly)	\$240.00	\$480.00	0.00%	\$240.00	2	\$480.00	
						APX900 Portable Subtotal	\$23,729.90		
Category 1.2 Radio: Single-Band Mobile Radio (P25) APX1500									
1.2	M36URS9PW1BN	APX1500 ENHANCED 7/800 MHZ	\$1,564.00	\$7,820.00	27.00%	\$1,141.72	5	\$5,708.60	
1.2	G174AD	ADD: ANT 3DB LOW-PROFILE 762-870	\$43.00	\$215.00	27.00%	\$31.39	5	\$156.95	
1.2	GA01339AA	ENH: SW P25 TRUNKING	\$1,070.00	\$5,350.00	27.00%	\$781.10	5	\$3,905.50	
1.2	GA00226AA	ADD: GPS ANTENNA	\$75.00	\$375.00	27.00%	\$54.75	5	\$273.75	
1.2	W432AG	ADD: AUXILIARY SPKR 13W (3.2OHM)	\$71.50	\$357.50	27.00%	\$52.20	5	\$260.98	
1.2	G66BF	ADD: DASH MOUNT O2 APXM	\$125.00	\$625.00	27.00%	\$91.25	5	\$456.25	
1.2	G193AK	ADD: ADP ONLY (NON-P25 CAP COMPLIANT) (US ONLY)	\$0.00	\$0.00	27.00%	\$0.00	5	\$0.00	
1.2	W22BA	ADD: STD PALM MICROPHONE APX	\$72.00	\$360.00	27.00%	\$52.56	5	\$262.80	
1.2	G444AH	ADD: APX CONTROL HEAD SOFTWARE	\$0.00	\$0.00	27.00%	\$0.00	5	\$0.00	
1.2	GA00804AA	ADD: APX O2 CONTROL HEAD	\$492.00	\$2,460.00	27.00%	\$359.16	5	\$1,795.80	
Category 1.2 Radio: Single-Band Mobile Radio (P25) APX1500 Warranty Options									
1.2	G24AX	ADD: 3Y ESSENTIAL SERVICE	\$138.00	\$690.00	0.00%	\$138.00	5	\$690.00	
Services									
Services	SVC03SVC0123D	PROGRAMMING (hourly)	\$240.00	\$240.00	0.00%	\$240.00	1	\$240.00	
						APX1500 Spares Subtotal	\$13,750.63		
Category 1.6 Radio: Multi-Band Desktop Radio (P25) APX8500									
1.6	L37TS59PW1AN	ALL BAND CONSOLLETTE	\$8,040.00	\$8,040.00	27.00%	\$5,869.20	1	\$5,869.20	
1.6	GA05508AA	DEL: DELETE VHF BAND	(\$800.00)	(\$800.00)	27.00%	(\$584.00)	1	(\$584.00)	
1.6	GA05509AA	DEL: DELETE UHF BAND	(\$800.00)	(\$800.00)	27.00%	(\$584.00)	1	(\$584.00)	
1.6	G51AT	ENH: SMARTZONE OPERATION APX	\$1,500.00	\$1,500.00	27.00%	\$1,095.00	1	\$1,095.00	
1.6	G361AH	ENH: P25 TRUNKING SOFTWARE APX	\$300.00	\$300.00	27.00%	\$219.00	1	\$219.00	
1.6	G193AK	ADD: ADP ONLY (NON-P25 CAP COMPLIANT) (US ONLY)	\$0.00	\$0.00	27.00%	\$0.00	1	\$0.00	
1.6	W382AM	ADD: CONTROL STATION DESK GCAl MIC	\$169.00	\$169.00	27.00%	\$123.37	1	\$123.37	
1.6	G444AH	ADD: APX CONTROL HEAD SOFTWARE	\$0.00	\$0.00	27.00%	\$0.00	1	\$0.00	
1.6	CA01598AB	ADD: AC LINE CORD US	\$0.00	\$0.00	27.00%	\$0.00	1	\$0.00	
1.6	G806BL	ENH: ASTRO DIGITAL CAI OP APX	\$515.00	\$515.00	27.00%	\$375.95	1	\$375.95	
1.6	L999AB	ADD: FULL FP W/O5/KEYPAD/CLOCK/VU	\$789.00	\$789.00	27.00%	\$575.97	1	\$575.97	
Category 1.6 Radio: Multi-Band Desktop Radio (P25) APX8500 Warranty Options									
1.6	G78AR	ADD: 3Y ESSENTIAL SERVICE	\$168.00	\$168.00	0.00%	\$168.00	1	\$168.00	

Services								
Services	SVC03SVC0115D	INSTALLATION (hourly)	\$240.00	\$1,200.00	0.00%	\$240.00	5	\$1,200.00
Services	SVC03SVC0123D	CONFIGURATION/DESIGN (hourly)	\$240.00	\$480.00	0.00%	\$240.00	2	\$480.00

APX Console for Maintenance	\$8,938.49
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Category 4 Dispatch Consoles								
4	B1948	MCC 7500E DISPATCH POSITION LICENSES	\$0.00	\$0.00	15.00%	\$0.00	2	\$0.00
4	UA00653AA	ADD: BASIC CONSOLE OPERATION	\$4,800.00	\$9,600.00	15.00%	\$4,080.00	2	\$8,160.00
4	UA00654AA	ADD: ASTRO 25 TRUNKING OPERATION	\$6,000.00	\$12,000.00	15.00%	\$5,100.00	2	\$10,200.00
4	UA00659AA	ADD: ADP/AES/DES-OFB ENCRYPTION	\$2,160.00	\$4,320.00	15.00%	\$1,836.00	2	\$3,672.00
4	UA00658AA	ADD: SECURE OPERATION	\$3,900.00	\$7,800.00	15.00%	\$3,315.00	2	\$6,630.00
4	UA00652AA	ADD: 160 RADIO RESOURCES LICENSE	\$18,820.00	\$37,640.00	15.00%	\$15,997.00	2	\$31,994.00
4	UA00661AA	ADD: ENHANCED IRR	\$3,000.00	\$6,000.00	15.00%	\$2,550.00	2	\$5,100.00
4	B1949	MCC 7500E SOFTWARE DVD	\$250.00	\$500.00	15.00%	\$212.50	2	\$425.00
4	DSTG191B	TECH GLOBAL EVOLUTION SERIES 19INCH NON TOUCH	\$1,422.00	\$2,844.00	15.00%	\$1,208.70	2	\$2,417.40
4	DSY7B61AA	HP Z2 MINI ARM WALL VESA MOUNT	\$77.00	\$154.00	15.00%	\$65.45	2	\$130.90
4	TT3492	Z2 G4 MINI WORKSTATION NON RETURNABLE	\$2,500.00	\$5,000.00	15.00%	\$2,125.00	2	\$4,250.00

4	B1952	SPEAKER, DESKTOP, USB	\$485.00	\$1,940.00	15.00%	\$412.25	4	\$1,649.00
4	CA03406AA	ADD: AC LINE CORD, NORTH AMERICA	\$13.00	\$52.00	15.00%	\$11.05	4	\$44.20
4	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4.5M	\$39.00	\$156.00	15.00%	\$33.15	4	\$132.60
4	B1941	USB AUDIO INTERFACE MODULE	\$1,900.00	\$3,800.00	15.00%	\$1,615.00	2	\$3,230.00
4	B1951	MICROPHONE, DESKTOP, USB	\$445.00	\$890.00	15.00%	\$378.25	2	\$756.50
4	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4.5M	\$39.00	\$78.00	15.00%	\$33.15	2	\$66.30
4	B1913	MCC SERIES HEADSET JACK	\$200.00	\$800.00	15.00%	\$170.00	4	\$680.00
4	RLN6098	HDST MODULE BASE W/PTT, 15 FT CBL	\$210.00	\$420.00	15.00%	\$178.50	2	\$357.00
4	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTO	\$308.00	\$616.00	15.00%	\$261.80	2	\$523.60
4	NPI_001431	MCAFFEE AV CLIENT **REFER TO SYSTEM PRODUCT CATALOG FOR	\$165.00	\$330.00	15.00%	\$140.25	2	\$280.50
4	DSUSB31000S	STARTECH USB 3.0 TO GIGABIT ETHERNET ADAPTER	\$39.00	\$78.00	15.00%	\$33.15	2	\$66.30
4	NPI_001432	WINDOWS SUPP FULL/TRANS CONFIG **REFER TO SYSTEM PROD	\$50.00	\$100.00	15.00%	\$42.50	2	\$85.00
4	CLN1868	2930F 24-PORT SWITCH	\$2,500.00	\$2,500.00	15.00%	\$2,125.00	1	\$2,125.00
4	CLN1866	FRU: 1M DAC CABLE	\$200.00	\$200.00	15.00%	\$170.00	1	\$170.00
4	T8492	SITE ROUTER & FIREWALL- AC	\$875.00	\$875.00	15.00%	\$743.75	1	\$743.75
4	CA03445AA	ADD: MISSION CRITICAL HARDENING	\$3,300.00	\$3,300.00	15.00%	\$2,805.00	1	\$2,805.00
4	CA03448AA	ADD: STATEFUL FIREWALL	\$1,000.00	\$1,000.00	15.00%	\$850.00	1	\$850.00
4	DS1101990	SPD, SHIELDED RJ-45 JACK, SINGLE LINE GBE (1000MBPS) R56 CO	\$140.00	\$140.00	15.00%	\$119.00	1	\$119.00
4	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DA	\$85.00	\$85.00	15.00%	\$72.25	1	\$72.25
4	TRN7343	SEVEN AND A HALF FOOT RACK	\$495.00	\$495.00	15.00%	\$420.75	1	\$420.75
4	SQM01SUM0323	ASTRO MASTER SITE	\$0.00	\$0.00	15.00%	\$0.00	1	\$0.00
4	CA03517AD	ADD: CORE EXPANSION	\$0.00	\$0.00	15.00%	\$0.00	1	\$0.00
4	UA00156AA	ADD: MCC7500 CONSOLE LICENSES (QTY 5)	\$5,000.00	\$5,000.00	15.00%	\$4,250.00	1	\$4,250.00
Services								
Services	SVC03SVC0115D	INSTALLATION (hourly)	\$240.00	\$6,960.00	0.00%	\$240.00	29	\$6,960.00
Services	ST labor	IMPLEMENTATION (hourly)	\$240.00	\$10,080.00	0.00%	\$240.00	42	\$10,080.00
Services	SVC03SVC0115D	PROJECT MANAGEMENT (hourly)	\$240.00	\$14,160.00	0.00%	\$240.00	59	\$14,160.00

Dispatch Consoles Subtotal	\$123,606.05
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Category 4 Dispatch Consoles

4	T8492	SITE ROUTER & FIREWALL- AC	\$875.00	\$875.00	15.0%	\$743.75	1	\$743.75
4	CA03445AA	ADD: MISSION CRITICAL HARDENING	\$3,300.00	\$3,300.00	15.0%	\$2,805.00	1	\$2,805.00
4	CA03448AA	ADD: STATEFUL FIREWALL	\$1,000.00	\$1,000.00	15.0%	\$850.00	1	\$850.00
4	B1941	USB AUDIO INTERFACE MODULE	\$1,900.00	\$1,900.00	15.0%	\$1,615.00	1	\$1,615.00
4	B1952	SPEAKER, DESKTOP, USB	\$485.00	\$485.00	15.0%	\$412.25	1	\$412.25
4	CA03406AA	ADD: AC LINE CORD, NORTH AMERICA	\$13.00	\$52.00	15.0%	\$11.05	1	\$11.05
4	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4.5M	\$39.00	\$39.00	15.0%	\$33.15	1	\$33.15
4	B1951	MICROPHONE, DESKTOP, USB	\$445.00	\$445.00	15.0%	\$378.25	1	\$378.25
4	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4.5M	\$39.00	\$39.00	15.0%	\$33.15	1	\$33.15
4	B1913	MCC SERIES HEADSET JACK	\$200.00	\$200.00	15.0%	\$170.00	1	\$170.00
4	TT3492	Z2 G4 MINI WORKSTATION NON RETURNABLE	\$2,500.00	\$2,500.00	15.0%	\$2,125.00	1	\$2,125.00
4	CLN1868	2930F 24-PORT SWITCH	\$2,500.00	\$2,500.00	15.0%	\$2,125.00	1	\$2,125.00
4	CLN1866	FRU: 1M DAC CABLE	\$200.00	\$200.00	15.0%	\$170.00	1	\$170.00

Dispatch Spares	\$11,471.60
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Services

Services	MOT_Training_Dept	1 Day MCC7500e 1/2 Day APX Mobile & Travel (hourly)	\$320.00	\$8,960.00	0.00%	\$320.00	28	\$8,960.00
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Training Subtotal	\$8,960.00
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Trade in of existing radios	(\$140,216.13)
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CLAY COUNTY SCHOOLS SALE PRICE	\$754,190.54
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Procurement per NASPO/Washington State DES Cooperative Purchasing Master Agreement No. 00318 Public Safety Communication Products, Services, and Solutions with Motorola, Pending signature of Florida Participation/State Contract #-NASPO-ACS.

3.2 LIFECYCLE SUPPORT AND MAINTENANCE

During the first year of warranty, Motorola and the School Board will develop a plan for ongoing lifecycle support and maintenance.

SECTION 4

BROCHURES AND DATA SHEETS

Provided on the following pages.





ASTRO[®] 25 TWO-WAY RADIOS AT A GLANCE SAFETY REDEFINED





YOU ARE READY FOR THE NEXT CALL. WITH APX™, SO IS YOUR RADIO.

In an emergency, other first responders may be a few feet or several miles away. When every second counts, you need a radio you can rely on to get the job done. Since coordinating response and protecting lives is at the heart of every mission, every two-way radio transmission is crucial. Every radio has one job and one job only: to keep you safe.

ASTRO 25 is the leading Project (P25) standards-based system used by over 11,000 agencies around the world. With uncompromising real-world performance and legendary Motorola reliability, the ASTRO 25 solution continues to evolve, adding practical innovations and performance-driven capabilities that enable government agencies to protect the communities they work in and support neighboring communities through interoperability.

The APX P25 two-way radio series redefines safety in communication. APX puts the right device into the hands of the right user. Every feature and function is designed with its users in mind - from the rugged, easy to operate design to the loudest, clearest audio. The result is the ability to keep your people and community safer than ever before.



THE WORLD'S LEADING P25 PLATFORM

IMMEDIATE AND ASSURED VOICE IN AN EMERGENCY

When the emergency is critical, a call for help must get through. Motorola's ASTRO 25 system is a dedicated, communication system optimized to make sure the voice call gets through even during times of peak demand.

ACCESSIBILITY IN CHALLENGING ENVIRONMENTS

Tunnels, high rises and sub-basements create unique challenges for wireless communications, but ASTRO 25 is optimized to handle them. We offer unique solutions to minimize interference in specific environments.

RELIABLE VOICE AND DATA INTEGRATED AS ONE

Expanding your data usage while maintaining mission critical voice, ASTRO 25 provides reliable, always-available communications so multiple agencies can share voice and data communication simultaneously among their teams, deploy resources efficiently, maintain communication security and track personnel.

FUTURE READY PLATFORM

ASTRO 25 and APX radios are flexible and future- ready, adapting to your communications needs and evolving to support new technologies and applications, so you can be ready for the next call the moment it happens.

INTEROPERABILITY ON DEMAND








A variety of our APX radios work across P25 systems and digital and analog networks to achieve true interoperability. Some of these radios, such as the APX 8000/APX 8000XE, APX 7000/7500 offer not only this, but also the means to communicate seamlessly through any multiple frequency bands.



THE MOST COMPLETE LINEUP OF TWO-WAY RADIOS DESIGNED TO KEEP YOU SAFE

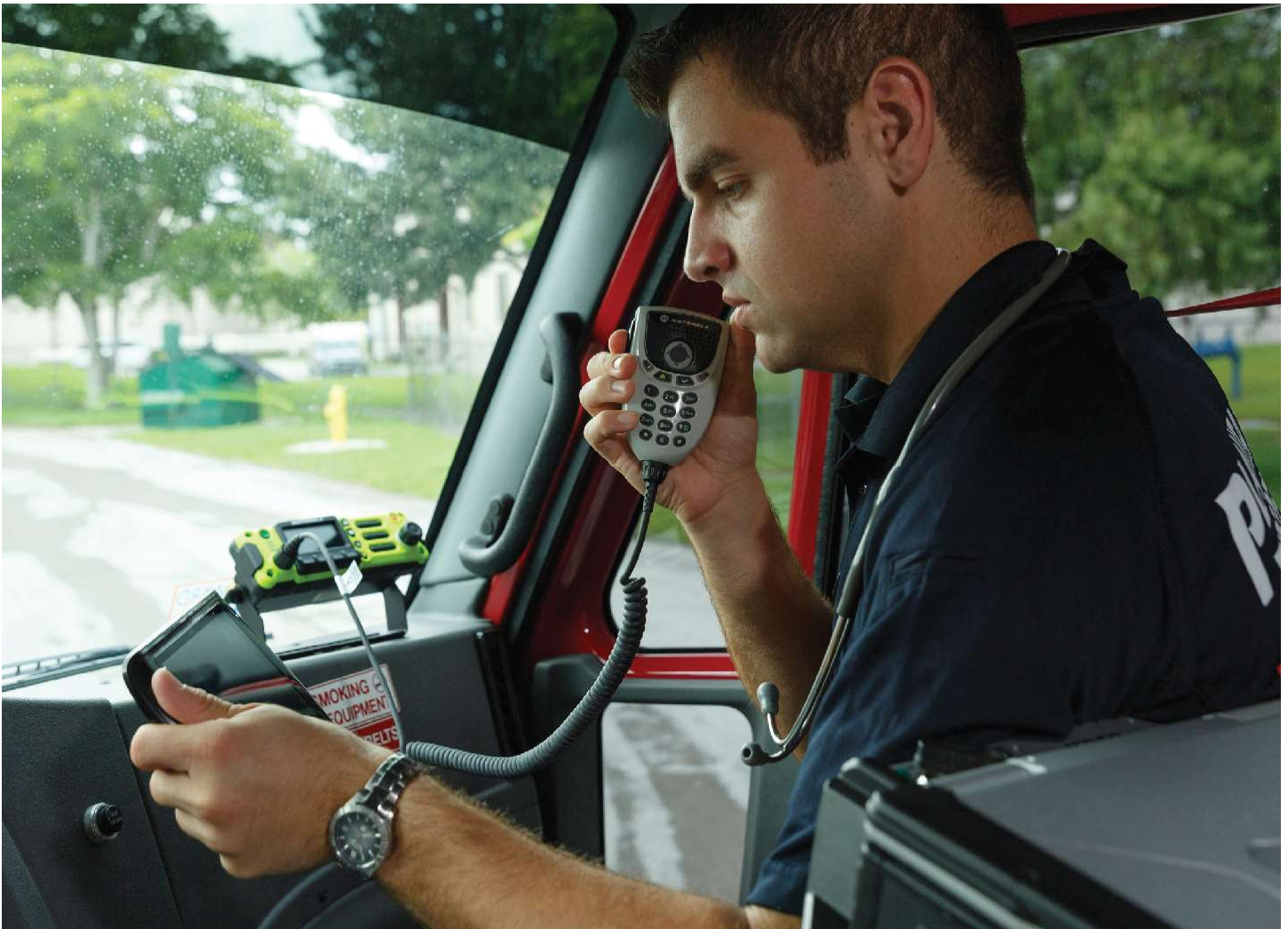
Agencies expect their investment to deliver maximum value and performance. From day one, every portable and mobile radio will meet your most demanding performance expectations.

ASTRO 25 PORTABLES

APX 8000		<p>Providing unlimited mobility and seamless WiFi connectivity, the APX 8000 multi-band radio places instant interoperability into the hands of mission-critical first responders.</p> <ul style="list-style-type: none"> • All-Band to enable communications across multiple agencies • WiFi for quicker wireless and codeplug updates • Adaptive Audio Engine to provide better audio experience in any environment
APX 8000XE		<p>The APX 8000XE is redefining mission critical communications by delivering an intrinsically safe radio that combines unlimited mobility, loud audio and secure WiFi connectivity for safety personnel in extreme environments.</p> <ul style="list-style-type: none"> • All-band to enable communications across multiple agencies • WiFi for quicker wireless and codeplug updates • Adaptive Audio Engine to provide better audio experience in any environment • 2m/4h submersion and intrinsically safe standard for extreme conditions
APX 7000L		<p>Delivering simultaneous LMR voice with LTE data, the APX 7000L is an ideal solution for federal government first responders that require the most up-to-date information faster and more efficiently.</p> <ul style="list-style-type: none"> • Provides simultaneous voice and data operation • Support for 4G LTE and FirstNet LTE Public Safety network providing access to nationwide wireless data coverage • Available in 800 MHz (3W) & VHF MHz only
APX 7000XE		<p>Taking safety to the extreme, the APX 7000XE is specifically designed for extreme environments with exaggerated controls and dual-band interoperability in a rugged design.</p> <ul style="list-style-type: none"> • Dual-Band to enable instant, interoperable communications • 2m/2h submersion and intrinsically safe standard for harsh conditions • Largest emergency button in the industry
APX 7000		<p>Efficiently manage mission critical voice and data in any environment across multiple agencies. The APX 7000 dual-band radio can operate in any of 2 bands (700/800, VHF, UHF R1, or UHF R2 MHz frequencies).</p> <ul style="list-style-type: none"> • Dual-Band to enable instant, interoperable communications • Largest Colored Front Display offered on the APX series • Dual 1 Watt Speakers to receive loud and clear audio
APX 6000XE		<p>Designed for gloved users working in extreme environments with exaggerated ergonomics and rugged specifications, the APX 6000XE is ideal for agencies requiring advanced features in a smaller, single-band form factor.</p> <ul style="list-style-type: none"> • Single band with extreme ergonomics and excellent audio • Extreme 1-sided noise reduction designed to locate the talker while canceling out ambient noise • Equipped with a unique speaker grill design that improves water runoff
APX 6000		<p>Delivering outstanding performance in a lightweight form factor, the APX 6000 is built for agencies requiring a single band solution with advanced features.</p> <ul style="list-style-type: none"> • Economical single band solution for federal, and state and local public safety users • Innovative T-grip design gives you a secure grip and better control • Available in 3 models (Top and Front display with full DTMF keypad, Top and Front display with limited keypad and Top Display Only)

ASTRO 25 PORTABLES

<p>APX 4000</p>		<p>Durable and compact with key features in an easy to use design, the APX 4000 is ideal for agencies requiring a budget friendly P25 Phase 2 solution.</p> <ul style="list-style-type: none"> • Available in 2 models - Multi-function Single knob and Dedicated Dual Knob for volume and channel controls • Offered in black housing only
<p>APX 3000</p>		<p>Allowing your teams to operate discreetly without attracting interest or creating a distraction, the APX 3000 P25 TDMA capable covert radio can help you communicate securely while blending into the surroundings.</p> <ul style="list-style-type: none"> • Slim, compact radio that operates via accessories • Optional flexible antenna attaches to the body under clothing • Radio ships standard with a 3-wire surveillance kit (black or beige)
<p>APX 1000</p>		<p>Engineered with a simplified control top to ensure ease of use, the APX 1000 is ideal for local government and public works users that require a budget friendly P25 Phase 2 solution.</p> <ul style="list-style-type: none"> • Meets IP54 Environmental Specifications • Available in models 1.5, 2 and 3



ASTRO 25 MOBILES

<p>APX 7500</p>		<p>Delivering interoperability on demand, the APX 7500 was designed for first responders who need best-in-class audio and intuitive technology.</p> <ul style="list-style-type: none"> • Multi-band capable for better coordination among agencies • Complete portfolio of 5 control heads and 5 mounting options • Supports Dual Radio operation and integrates vehicle controls
<p>APX 6500</p>		<p>A complete solution for mission critical responders, the APX 6500 was built for first responders that need advanced features in a single band form factor.</p> <ul style="list-style-type: none"> • Single-band capable and supports dual radio operation with APX 7500 • Mid-power model fits into any existing XTL footprint, so you can reuse mounting holes and cables • RFID label helps you track mobile radio information without uninstalling

ASTRO 25 MOBILES

APX 4500



Durable with basic features, the APX 4500 is ideal for public works, utilities and natural resources customers requiring a rugged P25 mobile solution.

- Compatible with rugged O2 Control Head, designed for extreme environments
- Durable IP56 certified form factor
- Leverage XTL accessories for O5 and O3 control heads to maximize your investment

APX 1500



Compact, easy-to-install dash mount design with basic features, the APX 1500 is ideal for local government and public works users needing a budget-friendly P25 mobile solution.

- Flexible, space-saving design for easier installation
- Compatible with O2 control head for intuitive operation
- Standard APX features (ie. intelligent lighting, dual-mic noise suppression, ADP privacy)



ASTRO 25 CONTROL HEADS

09		<p>Compatible with APX 7500 and 6500 radios. Contains an extra large full color display with intelligent lighting, integrated full size DTMF keypad, large programmable one-touch buttons, dedicated siren controls, integrated response selector, and day/night mode capability.</p>
07		<p>Compatible with APX 7500 and 6500 radios. Contains large color display with intelligent lighting, multiple control head configurations with 02 and 07, motorcycle configuration available, multifunction volume/channel knob, day/night mode, and available with Lighting and Siren Controls or DTMF keypad.</p>
05		<p>Compatible with APX 7500 and 6500 radios. Provides tri-color display with intelligent lighting support, compatible with keypad microphone, can configure up to 4 05 control head configurations, and available in motorcycle configuration.</p>
03		<p>Compatible with APX 7500 and 6500 radios. Contains full integrated DTMF keypad, hand-held control head with intuitive user interface, and large color display with intelligent lighting. Compatible with Siren and Light Interface Module.</p>
02		<p>Compatible with APX 7500, 6500, 4500, and 1500 radios. Provides XE ergonomics controls, multiple control head configuration with 02 and 07, motorcycle availability, multifunction control knob, intelligent lighting, with a built in 7.5 watt speaker.</p>

ASTRO TWO-WAY PORTABLES

SELECT THE RIGHT PRODUCT TO ENSURE SAFETY AND RELIABILITY

Features	APX 8000	APX 8000XE	APX 7000L	APX 7000	APX 7000XE	APX 6000	APX 6000XE	APX 4000	APX 3000	APX 1000
Supported Frequencies										
VHF (136 - 174) Power Level 6W	•	•	•	•	•	•	•	•	•	•
UHFR1 (380 - 470) Power Level 5W	•	•		•	•	•	•	•	•	•
UHFR2 (450 - 520) Power Level 6W	•	•		•	•	•	•	•	•	•
700/800 MHz (764 - 870) Power Level 3W	•	•	•	•	•	•	•	•	•	•
900 MHz (896 - 901, 935 - 940) Power Level 2.5W								•		•
Protocols and Systems Supported										
Multi-Band Capable	•	•	•	•	•					
Dynamic Dual Mode (FDMA/TDMA)	•	•	•	•	•	•	•	•	•	•
Analog Conventional	•	•	•	•	•	•	•	•	•	•
P25 Phase I (FDMA) Conventional and Trunking	•	•	•	•	•	•	•	•	•	•
P25 Phase II (TDMA) Trunking	•	•	•	•	•	•	•	•	•	•
Smart Net/Smart Zone Analog and Digital Trunking	•	•	•	•	•	•	•	•	•	•
3600 and 9600	•	•	•	•	•	•	•	900MHz Only	•	
MDC-1200 Analog Signaling	•	•	•	•	•	•	•	•	•	•
Standard Channels	3000	3000	3000	3000	3000	1000	1000	512	512	512
Encryption Capability										
Encryption Capability (Optional)	AES and DES	AES and DES	AES and DES	AES and DES	AES and DES	AES and DES	AES and DES	AES ONLY	AES and DES	
Multi-key	128	128	128	128	128	64	64	48	48	48
ADP	•	•	•	•	•	•	•	•	•	SW only
Radio Authentication	•	•	•	•	•	•	•	•	•	•
POP 25	•	•	•	•	•	•	•	•	•	•
P25 OTAR	•	•	•	•	•	•	•		•	
Applications										
Rugged	Std IP67, Delta T option	IS & Delta T Std	Std IP67, Delta T option	Std IP67, Delta T option	IS & Delta T Std	Std IP67, Delta T option	IS & Delta T Std	Std IP67, Delta T option	Standard IP67	Standard IP54
Models	1.5, 2.5, 3.5	1.5, 2.5, 3.5	1.5, 3.5	1.5, 3.5	1.5, 3.5	1.5, 2.5, 3.5	1.5, 2.5, 3.5	2 and 3	1	1.5, 2, and 3
Colors	Black, Yellow, Green	Black, Yellow, Green	Black	Black, Yellow, Green	Black, Yellow, Green	Black, Yellow, Green	Black, Yellow, Green	Black	Black	Black
Color Sleeves/Stickers				Sleeves Only Red, Orange, Blue		Sleeves Only Red, Orange, Blue		Metallic Display Stickers only		Metallic Display Stickers only
Mission Critical Wireless (Bluetooth)	•	•	•	•	•	•	•	•	•	
Option Board/Expanded Mem	•	•	•	•	•					
Mandown	•	•	•	•	•	•	•	•	•	
GPS	•	•	•	•	•	•	•	•	•	•
Integrated Voice and Data	•	•	•	•	•	•	•	•	•	•
Enhanced Data	•	•	•	•	•	•	•	•	•	
Voice Announcement	•	•	•	•	•	•	•	•	•	•

ASTRO TWO-WAY MOBILES

SELECT THE RIGHT PRODUCT TO ENSURE SAFETY AND RELIABILITY

Features	APX 7500	APX 6500	APX 4500	APX 1500
Control Heads				
Control Heads	02, 03, 05, 07, 09	02, 03, 05, 07, 09	02	02
Max. # of Control Heads	4	2	1	1
Rugged (IP Rating)	IP54	IP54	IP56	IP54
Protocols and Systems Supported				
Multi-Band Capable	•			
Dynamic Dual Mode Capable (FDMA/TDMA)	•	•	•	•
Analog Conventional	•	•	•	•
P25 Phase I (FDMA) Conventional and Trunking	•	•	•	•
P25 Phase II (TDMA) Trunking	•	•	•	•
SmartNet/SmartZone Analog and Digital Trunk	•	•	•	•
3600 and 9600	•	•	3600 or 9600	9600 Only
MDC-1200 Analog Signaling	•	•	•	•
Standard Channels	3000	1000	512	512
Mounting Options				
Dash Mount	•	•	•	•
Remote Mount	•	•	•	
Motorcycle	•			
Control Station	•	•	•	•
Console	•			
Encryption Capability				
Encryption Capability (Optional)	AES and DES	AES and DES	AES Only	ADP
Multi-key	128	64	48	
ADP	•	•	•	•
POP 25	•	•	•	•
P25 OTAR	•	•		
Applications				
Integrated Voice and Data	•	•	•	•
Enhanced Data	•	•	•	
Integrated GPS - Outdoor Location	•	•	•	•
Radio Authentication	•	•	•	•
Voice Announcement	•	•	•	•
Dual Radio Capability	•	•		

ADVANCED SOFTWARE FEATURES

DIGITAL TONE SIGNALING – Instantly alerts large groups of on-duty and off-duty responders over their APX radio to reduce response time.

LEX L10 COLLABORATION – Uses the LEX L10 Mission Critical LTE Handheld to remotely manage the zone, channel, volume and monitor signal strength and battery of the APX portable radio using Mission Critical Bluetooth.

WiFi – Quickly update codeplug, firmware and FLASHport features using the high-speed of WiFi 802.11n with WEP, WPA and WPA-2 security, while maintaining voice communications.

INTELLIGENT LIGHTING – Uses color alerts to notify you of the radio mode, potential emergencies or specific events.

RADIO PROFILES – Radios can be configured to adjust audio level, lighting and tones through user selected or automated options. Whether on surveillance or working in bright sunlight, you can customize settings as needed.

EXTREME AUDIO PROFILE – Intelligent 2-microphone noise reduction software and the latest AMBE vocoder dynamically adjusts for changing high noise environments.

TEXT MESSAGING – Offers a freeform or canned messaging solution so you can efficiently and discreetly send and receive messages to and from subscribers or dispatch operators.

UNIFIED CALL LIST – Consolidates all call lists underneath one unified list so you can easily access all information associated with a particular contact.

VOICE ANNOUNCEMENT – Allows you to navigate through channels/talk-groups and zones in the radio while an audible, pre-recorded voice file provides a description of the selected channel or zone.

P25 TDMA CAPABLE – Provides twice the voice capacity, so you can add more users to your system without the need for additional frequencies or infrastructure.

MULTIBAND OPERATION – Multiple frequency bands supported with best-in-class transceiver specifications and performance.

SEAMLESS SCAN – Seamless scanning of multiple protocols including FDMA and TDMA systems and multiple RF bands.

ENHANCED DATA – Utilizing TDMA technology, this feature offers greater capacity and reliability of the slotting mechanism where fewer collisions occur.

SITE SELECTABLE ALERT – Continuous tones sent to alert sites of mining detonation activity, evacuation of sites, or vehicle stops.

ADVANCED HARDWARE FEATURES

GPS LOCATION – Integrated GPS receiver can transmit the outdoor location of an individual or vehicle to map-based location software.

MISSION CRITICAL WIRELESS BLUETOOTH – A unique Bluetooth® solution that provides an encrypted link to high performance accessories and applications to support different mission critical environments. Supports commercial off the shelf (COTS) and personal area network (PAN) devices.

MAN DOWN – Unique accelerometer that senses the physical position of the user to communicate updated information to incident command/dispatch. Contains an audible bech with a unique critical emergency tone that will repeat itself until the emergency is manually deactivated.

RADIO AUTHENTICATION – Providing an extra, secure level of verification every time a radio registers onto a system.

FUTURE READY

MEMORY – Equipped with 64 MB of industrial grade internal memory and a removable memory MicroSD card slot. The removable memory card allows future expandability for growing technology needs.

PROGRAMMING OVER PROJECT 25 – Motorola's POP25 solution allows subscriber radios to be programmed over the air via the ASTRO 25 systems while remaining in the field without interruption.



ASTRO 25 TWO-WAY RADIO APPLICATIONS

Highlighting the most reliable and efficient application solution for ASTRO subscriber radio products to meet each customer's need.

APX™ P25 PERSONNEL ACCOUNTABILITY

Created and designed for fire safety personnel and battalion officers, APX P25 Personnel Accountability is an integrated solution that provides a cohesive report and improves responder safety. A NIMS compliant based solution, APX Accountability allows for better roll call integration, integrated graphical user interface (GUI) and Personnel Accountability Report (PAR) timers based on when agencies arrive on scene and when key events have occurred on scene.

USER-FRIENDLY GUI

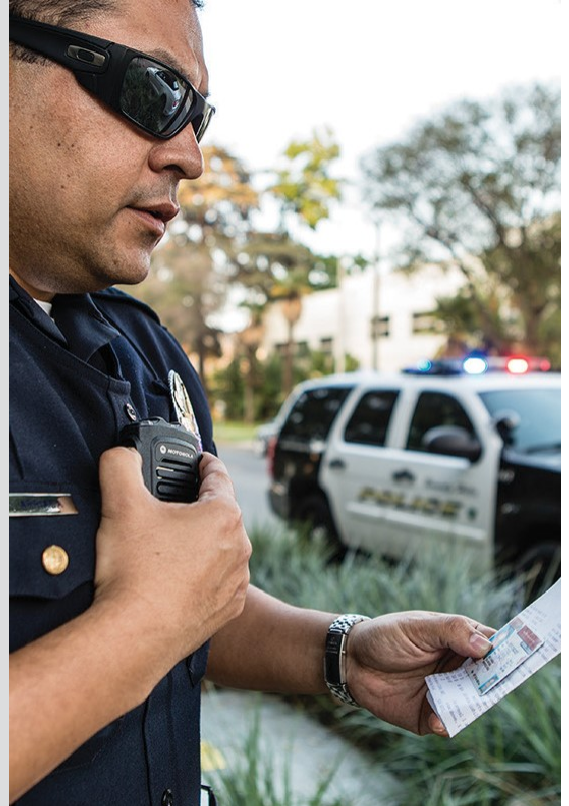
Partnering with Systems Definition Inc., we developed a new, streamlined GUI that integrates multiple tasks on a single screen. Now, incident commanders can manage all of their tasks - conducting roll call, monitoring PAR checks and issuing evacuation notifications - from the convenience of one user-friendly screen.

ROLL CALL ALERT

With advanced features such as roll-call accountability, you no longer have to acknowledge your status with a voice-based response. Simply open the roll call window from the laptop at incident command to initiate an accountability roll call. Each responder acknowledges the Incident Commander's request for PAR from their APX series portable radios; they simply press the PTT button to acknowledge. Incident command receives confirmation of who has acknowledged the roll call and a count of those yet to respond. As a result, they not only have better accountability of personnel but the solution significantly reduces cycle time on PAR checks throughout the incident.

MAN DOWN ALERT

An optional, automatic Man Down alert on APX series P25 portable two-way radios adds another valuable level of safety. The on-board accelerometer in the radio monitors an individual's movement and orientation. If a responder is motionless or in a horizontal position for a predetermined amount of time, the APX portable radio will automatically transmit an emergency alert, notifying incident command that the responder is in distress.



APX™ RADIO MANAGEMENT

The APX CPS Management application can program up to 16 radios at one time and track which radios have been successfully programmed, providing a clear view of the entire radio fleet and a codeplug history for each radio.

ACCESS AND SHARE CODEPLUGS

When codeplug updates occur, the radio codeplug database can be stored on a network server allowing remote programmers to access and program radios and share a codeplug template across multiple radios. Changes to codeplug templates can be automatically applied to all affected radios while radio programming jobs can be scheduled ahead of time giving you more flexibility and operational efficiency.

MINIMIZE DOWNTIME

Save time and fuel by programming radios either via a USB port on a local or remote PC, or with Over-the-Air-Programming (OTAP) on a Project 25 system. With USB programming, a Device Programmer application resides on a PC and you can connect up to 16 radios via a USB hub to expedite the programming. To read/write multiple radios through a single computer or USB hub, the radios must be programmed with a unique IP address the first time they are read/written.

No application knowledge or application interaction is necessary by the user to program a radio with the Device Programmer application. The user simply plugs the radio into a USB port and the application automatically reads and writes the updates from the server to the radio.

Radio Management batch programming of APX radios via OTAP can only occur with a Motorola ASTRO® 25 Project 25 system, which has voice priority over data, so a user's call, emergency notifications or critical communications will not be interrupted with OTAP. Should an OTAP session be interrupted with communications, programming will resume after the call without the need to restart, expediting the process.

APX™ BATTERY MANAGEMENT

A radio is only as good as the battery that powers it. So when a battery fails and communication is lost, it impacts every aspect of your organization from serving customers to saving lives. But monitoring and maintaining the status of a large fleet of batteries can be time-consuming, inefficient and potentially overwhelming.

That's why we created our proprietary IMPRES™ Battery Management technology. It saves you the guesswork, complexity and costs of managing hundreds even thousands of radio batteries and chargers wherever they're located, and make it easier for your employees to do their work safely and successfully.

HOW DOES IT WORK?

Our IMPRES Battery Management software automatically collects critical data from IMPRES batteries when they are inserted into an IMPRES charger including battery age, capacity, charge and recondition history, the dates manufactured and put into service. This software analyzes battery data and tells you how "healthy" a battery is and when it needs to be changed, so you can quickly and efficiently determine when to remove a poor-performing battery, purchase a new one or redeploy it to less demanding, users, and even identify missing batteries.

VIEW CURRENT REPORTS OR CREATE CUSTOM ONES

Use existing reports or customize new ones to see the most relevant information for your organization. Data is stored in your database and can be exported to an Excel file or printed. IMPRES Battery Management software records and organizes a variety of data so you can:

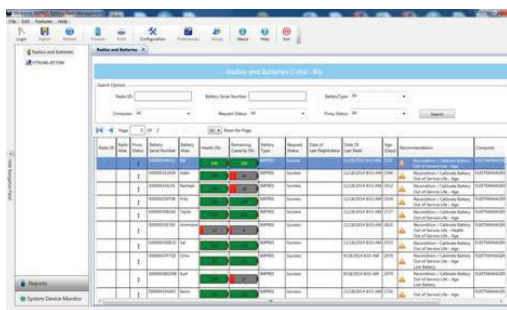
- See a status snapshot of your entire battery fleet
- Evaluate whether batteries are meeting your performance criteria
- Determine when batteries are nearing their end-of-life
- Decide exactly when to buy new batteries
- Get a lost battery report
- Optimize your charger utilization
- Monitor all devices in the system

IMPRES BATTERY MANAGEMENT DELIVERS BATTERY-CRITICAL INFORMATION

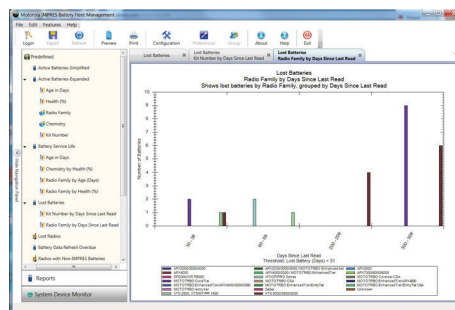
- Tells you when batteries are below an acceptable capacity
- Helps ensure users have enough capacity for a full work shift
- Alerts you to low capacity batteries so you can remove them
- Eliminates unexpected downtime and work interruptions
- Avoids the expense of throwing batteries away prematurely
- Confirms chargers are optimally distributed and used

EACH SOFTWARE LICENSE SUPPORTS:

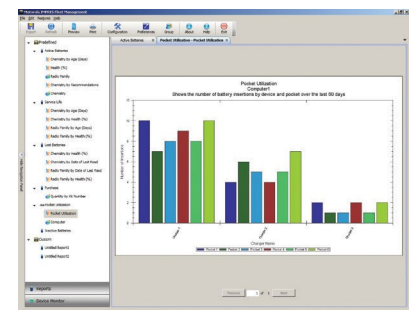
- 1 System Administrator Server
- 19 Remote Clients
- 25 IMPRES Chargers or IMPRES Battery Readers per client
- 25,000 IMPRES Batteries (the total number of batteries for the entire system cannot exceed 25,000)



Active battery report



Lost battery by location



Charger pocket utilization



DIGITAL VEHICULAR REPEATER SYSTEM (DVRS)

Digital Vehicular Repeater Systems (DVRS) from Futurecom is a radio system component that provides repeater capability between portable subscribers and RF base station infrastructure, extending radio coverage of your network.

Installed in the trunk of a car, fire truck, or other vehicles, the DVRS extends your ASTRO 25 network when portable users are outside of your vehicle, inside of a building or in any marginal coverage area. The DVRS also supports fixed mounting and is transportable.



- | | | | |
|---|---|--|--|
| <p>FEATURES AND BENEFITS</p> <ul style="list-style-type: none"> • Flexible Coverage • In-Band/Cross-Band • Intelligent Activation | <ul style="list-style-type: none"> • End-to-End Encryption • Portable ID Pass-Through • Flash Upgradable • Power Output 1-10W | <ul style="list-style-type: none"> • Compatible with XTL 5000, XLT 2500, APX 7500 and APX 6500 Remote Mount | <ul style="list-style-type: none"> • P25 Digital/Analog Operation • Available in VHF, UHF, 700 MHz and 800 MHz |
|---|---|--|--|

Vehicle Radio Extender (VRX) 1000 from Futurecom is an alternative radio system component to the Digital Vehicle Repeater Systems (DVRS) delivering extended ASTRO25 network to portable radios in areas where coverage isn't the most reliable. The compact and durable design allows for ease of installation in patrol cars and utility trucks.

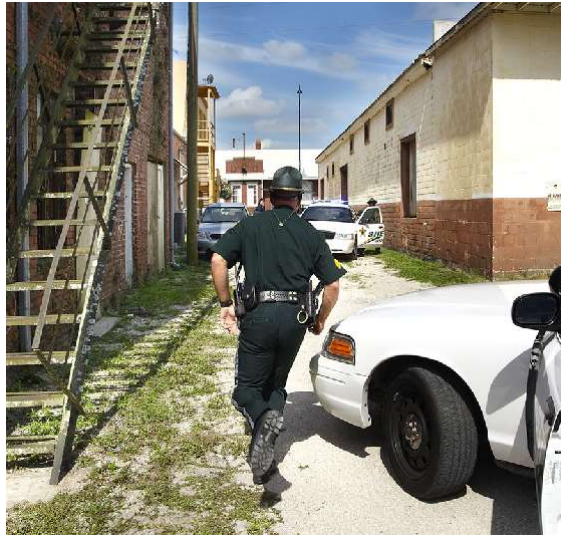
The 3W simplex radio extender is available in 700/800 MHz, VHF and UHF frequencies and compatible with P25 APX 7500, APX6500 and APX 4500 mobile radios.



- | | | | |
|---|---|---|--|
| <p>FEATURES AND BENEFITS</p> <ul style="list-style-type: none"> • Flexible Coverage • IP54 Rated | <ul style="list-style-type: none"> • Power Output .5-3W • Compatible with APX 7500, APX 6500, APX 4500 Remote Mount | <ul style="list-style-type: none"> • P25 Analog Operation • Simplex Operation | <ul style="list-style-type: none"> • Available in VHF, UHF, 700/800 MHz • In-Band/Cross-Band |
|---|---|---|--|



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WORK SAFER WHEREVER THE MISSION TAKES YOU

APX™ 1500 PROJECT 25 MOBILE RADIO

Whether a marathon race is passing through the streets of downtown or a water main breaks in the city's largest pipeline, you need the ability to interoperate seamlessly and securely with other agencies and responders. You need to instantly connect and be informed to make better decisions to keep your responders and the community safe. While the advanced technology of APX radios expertly equips you for your day to day operations and the unexpected, your organization may be challenged to improve operating expenses.

The APX 1500 P25 mobile radio is equipped with all the features you need at a price you can afford. It delivers all the benefits of TDMA technology in the most compact P25 capable mobile in the industry. The APX 1500 brings together powerful technology in an easy-to-use radio that's easy on your budget. It seamlessly unifies public works, utility, rural public safety and transportation users to first responders so they can interoperate effectively in the moments that matter.

BE UP TO THE MINUTE INFORMED

Keeping your crew safe is your number one priority. Like all our APX P25 radios trusted by responders worldwide, the APX 1500 mobile redefines safety. Your crews can count on quick, seamless interoperability and extended range wherever the mission may take them. You can depend on ADP software encryption for secure, tamperproof voice and data communications every time they connect.

The O2 Control Head with color display is easy to read and operate in all lighting conditions, from bright sunlight to dark streets. The intelligent lighting on the O2 Control Head notifies your workers when a call is received, an emergency arises, or when they are out of range. Plus, an enlarged multifunction knob makes it easy to use talk-group and volume settings when they're wearing gloves.

SIZED RIGHT FOR YOUR BUDGET

The APX 1500 gives you the ruggedibility and reliability you need at an affordable price. Since the APX 1500 is P25 Phase 2 capable for twice the voice capacity, you can add more users without adding more frequencies or infrastructure. Count on APX quality for years to come. The APX 1500 can withstand wet, dusty and hazardous conditions.



APX 1500 SPECIFICATIONS

FEATURES AND BENEFITS:

Available in 700/800 MHz, VHF, UHF R1 and UHF R2 frequency bands

Channels: Standard 512

Trunking Standards supported:

- Clear or digital private Trunked Operation

Analog MDC-1200 and Digital APCO P25 Conventional System Configurations

Narrow and wide bandwidth digital receiver (6.25/12.5/20/25 kHz)

Embedded digital signaling (ASTRO and ASTRO 25)

Intelligent lighting

Radio profiles

Unified Call List

Meets applicable MIL-STD 810C, D, E, F, G

Ships standard IP56

Customer Programming Software (CPS) supported on Windows XP, Vista, 7 and 8

(Windows 7 or 8 required for CPS R12.00.00 [June 2014] and later)

- Supports USB Communications
- Built in FLASHport™ support

Uses standard Dash mounted APX accessories

Software Key

ASTRO 25 integrated Voice and Data

ADP Privacy (Available with no encryption for public safety)

Integrated GPS/GLONASS for outdoor location tracking

OPTIONAL FEATURES:

Programming over Project 25 (POP25)

Text Messaging

APX 1500 CONTROL HEAD PORTFOLIO



O2 RUGGED CONTROL HEAD

- Large color display with intelligent lighting
- 3 lines of text 14 characters max / 1 line of icons / 1 line of menus
- Built in 7.5 W speaker
- Multifunction volume/channel knob
- Night/day mode button

TRANSMITTER - TYPICAL PERFORMANCE SPECIFICATIONS

	700 MHz		800 MHz		VHF		UHF Range 1		UHF Range 2			
Frequency Range/Bandsplits	764-776 MHz 794-806 MHz		806-824 MHz 851-870 MHz		136-174 MHz		380-470 MHz		450-520 MHz			
Channel Spacing	25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz			
Maximum Frequency Separation	Full Bandsplit		Full Bandsplit		Full Bandsplit		Full Bandsplit		Full Bandsplit			
Rated RF Output Power* (Adjustable)	3-30 W (2-3 W Itinerant)		3-35 W		1-50 W		1-40 W		1-45 W			
Frequency Stability* (-30°C to +60°C; +25°C Ref.)	±0.8 PPM		±0.8 PPM		±0.8 PPM		±0.8 PPM		±0.8 PPM			
Modulation Limiting*	±5/±2.5 kHz		±5/±4 (NPSPEC) /±2.5 kHz		±5/±2.5 kHz		±5/±2.5 kHz		±5/±2.5 kHz			
Modulation Fidelity (C4FM) 12.5kHz Digital Channel	1.5%		1.5%		2.5%		1.1%		1.1%			
Emissions*	Conducted [†] -75/-85 dBc		Radiated [†] -20/-40 dBm		Conducted -75 dBc		Radiated -20 dBm		Conducted -85 dBc		Radiated -20 dBm	
Audio Response*	+1, -3 dB (EIA)		+1, -3 dB (EIA)		+1, -3 dB (EIA)		+1, -3 dB (EIA)		+1, -3 dB (EIA)			
FM Hum & Noise	25 & 20 kHz 12.5 kHz	-50 dB -48 dB	-50 dB -48 dB	-50 dB -48 dB	-52 dB -51 dB	-51 dB -48 dB	-51 dB -48 dB	-51 dB -48 dB	-51 dB -48 dB			
Audio Distortion*	25 & 20 kHz 12.5 kHz	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%	0.50% 0.50%			

RECEIVER – TYPICAL PERFORMANCE SPECIFICATIONS

	700 MHz		800 MHz		VHF		UHF Range 1		UHF Range 2	
Frequency Range/Bandsplits	764-776 MHz		851-870 MHz		136-174 MHz		380-470 MHz		450-520 MHz	
Channel Spacing	25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz		25/20/12.5 kHz	
Maximum Frequency Separation	Full Bandsplit		Full Bandsplit		Full Bandsplit		Full Bandsplit		Full Bandsplit	
Audio Output Power 3% distortion, 8/3.2 Ohm speakers	7.5/15 W		7.5/15 W		7.5/15 W		7.5/15 W		7.5/15 W	
Frequency Stability* (-30°C to +60°C; +25°C Ref.)	±0.8 PPM		±0.8 PPM		±0.8 PPM		±0.8 PPM		±0.8 PPM	
Analog Sensitivity*	12 dB SINAD	-120 dBm (0.224 µV)	-120 dBm (0.224 µV)	-120 dBm (0.224 µV)	Pre-Amp -123 dBm (0.158 µV)	Standard -119 dBm (0.251 µV)	Pre-Amp -123 dBm (0.158 µV)	Standard -119 dBm (0.251 µV)	Pre-Amp -123 dBm (0.158 µV)	Standard -119 dBm (0.251 µV)
Digital Sensitivity	5% BER	-121 dBm (0.199 µV)	-121 dBm (0.199 µV)	-121 dBm (0.199 µV)	-123 dBm (0.158 µV)	-119 dBm (0.251 µV)	-123 dBm (0.158 µV)	-119 dBm (0.251 µV)	-123 dBm (0.158 µV)	-119 dBm (0.251 µV)
Intermodulation Rejection	25 kHz 12.5 kHz	82 dB 82 dB	82 dB 82 dB	82 dB 85 dB	84 dB 85 dB	86 dB 86 dB	82 dB 83 dB	86 dB 85 dB	82 dB 83 dB	86 dB 85 dB
Spurious Rejection		91 dB	91 dB	91 dB	95 dB	95 dB	91 dB	91 dB	91 dB	91 dB
Audio Distortion at rated*		2%	2%	2%	2%	2%	2%	2%	2%	2%
Selectivity*	25 kHz 12.5 kHz 30 kHz	85 dB 75 dB —	85 dB 75 dB —	85 dB 75 dB —	89 dB 77 dB 90 dB	89 dB 77 dB 90 dB	83 dB 72 dB —	83 dB 72 dB —	83 dB 72 dB —	83 dB 72 dB —

DIMENSIONS

	Inches	Millimeters
Mid Power Radio Transceiver	2 x 7 x 6.4	50.8 x 178 x 163
O2 Control Head	2.7 x 8.1 x 2.1	69 x 207 x 53
Mid Power Radio Transceiver and O2 Control Head - Dash Mount	2.7 x 8.1 x 8.8	69 x 207 x 223
Mid Power Radio Transceiver and O2 Control Head Weight	5.28 lbs	2.45 kg

RADIO MODELS

700/800 (763-870 MHz)	M36URS9PW1AN
VHF (136-174 MHz)	M36KSS9PW1AN
UHF Range 1 (380-470 MHz)	M36QSS9PW1AN
UHF Range 2 (450-520 MHz)	M36SSS9PW1AN

SIGNALING (ASTRO MODE)

Signaling Rate	9.6 kbps
Digital ID Capacity	10,000,000 Conventional / 48,000 Trunking
Digital Network Access Codes	4,096 network site addresses
ASTRO® Digital User Group Addresses	4,096 network site addresses
Project 25 - CAI Digital User Group Addresses	65,000 Conventional / 4,094 Trunking
Error Correction Techniques	Golay, BCH, Reed-Solomon codes
Data Access Control	Slotted CSMA: Utilizes infrastructure-sourced data status bits embedded in both voice and data transmissions.

POWER AND BATTERY DRAIN

Model Type	136-174 MHz, 380-470 MHz, 450-520 MHz, 764-870 MHz				
Minimum RF Power Output	2-25 W (764-776 MHz), 2-25 W (794-806 MHz), 2-25 W (806-824 MHz), 2-25 W (851-870 MHz), 1-25 W (136-174 MHz), 1-25 W (380-470 MHz), 1-25 W (450-520 MHz)				
Operation	13.8V DC ±20% Negative Ground				
Standby at 13.8V	0.85A (764-870 MHz), 0.85A (136-174 MHz), 0.85A (380-470 MHz), 0.85A (450-520 MHz)				
Receive Current at Rated Audio at 13.8V	3.2A (764-870 MHz), 3.2A (136-174 MHz), 3.2A (380-470 MHz), 3.2A (450-520 MHz)				
Transmit Current (A) at Rated Power	136-174 MHz (1-25 W) 380-470 MHz (1-25 W) 450-520 MHz (1-25 W)	9.5A (25 W) 9.5A (25 W) 9.5A (25 W)	764-870 MHz (10-35 W)	(2-25 W)	9.5A (25 W)

MOBILE MILITARY STANDARDS 810 C, D, E, F, G

	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F		MIL-STD 810G	
	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.
Low Pressure	500.1	I	500.2	II	500.3	II	500.4	II	500.5	II
High Temperature Storage	501.1	I	501.2	I/A1	501.3	I/A1	501.4	I/Hot	501.5	I/A1
High Temperature Operation	501.1	II	501.2	II/A1	501.3	II/A1	501.4	II/Hot	501.5	II
Low Temperature Storage	502.1	I	502.2	I/C3	502.3	I/C3	502.4	I/C3	502.5	I/C3
Low Temperature Operation	502.1	I	502.2	II/C1	502.3	II/C1	502.4	II/C1	502.5	II
Temperature Shock	503.1	-	503.2	I/A1-C3	503.3	I/A1-C3	503.4	I/Hot-C3	503.5	I/C
Solar Radiation	505.1	II	505.2	I	505.3	I	505.4	I	505.5	I/A1
Rain Blowing	506.1	I	506.2	I	506.3	I	506.4	I	506.5	I
Rain Steady	506.1	II	506.2	II	506.3	II	506.4	III	506.5	III
Humidity	507.1	II	507.2	II	507.3	II	507.4	-	507.5	II-Aggravated
Salt Fog	509.1	-	509.2	-	509.3	-	509.4	-	509.5	1 Proc
Blowing Dust	510.1	I	510.2	I	510.3	I	510.4	I	510.5	I
Blowing Sand		-	510.2	II	510.3	II	510.4	II	510.5	II
Vibration Min. Integrity	514.2	VIII/F, Curve-W	514.3	I/10	514.4	I/10	514.5	I/24	514.6	I-Cat.24
Vibration Loose Cargo	514.2	XI	514.3	II/3	514.4	II/3	514.5	II/5	514.6	-
Shock Functional	516.2	I	516.3	I	516.4	I	516.5	I	516.6	I, V, VI

ENCRYPTION

Supported Encryption Algorithms	ADP SW (Available with no encryption for public safety)
Encryption Type	Digital
Key Storage	Tamper protected volatile or non-volatile memory
Key Erasure	Keyboard command

* Measured in the analog mode per TIA/EIA 603 under nominal conditions

** Accuracy specs are for long-term tracking (95th percentile values >5 satellites visible at a nominal -130 dBm signal strength)

† Specs includes performance for the non-GNSS/GNSS bands

Specifications subject to change without notice. All specifications shown are typical. Radio meets applicable regulatory requirements.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-30°C/+60°C
Storage Temperature	-40°C/+85°C
Humidity	Per MIL-STD
ESD	IEC 801-2 KV
Water and Dust Intrusion	IP56, MIL-STD

TRANSMITTER CERTIFICATION

700/800 (764-775, 793-805, 806-824, 851-869 MHz)	AZ492FT7055
VHF (136-174 MHz)	AZ492FT4916
UHF R1 (380-470 MHz)	AZ492FT3826
UHF R2 (450-520 MHz)	AZ492FT4915

FCC EMISSIONS DESIGNATORS

FCC Emissions Designators	8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E, 16K0F3E, 20K0F1E
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MCC 7500E IP DISPATCH CONSOLE

THE CONTINUAL PURSUIT FOR OPERATIONAL EFFICIENCY

Better manage the flow of critical information and be the pipeline of intelligence to those who need it most with the MCC 7500E IP Dispatch Console. The ultra small form factor makes deployment simple and easy across dispatch centers where space is at a premium. Additionally, the MCC 7500E offers dual Ethernet connections minimizing the risk of a lost connection.

TAKE IT WITH YOU

The MCC 7500E IP Dispatch Console provides a full console interface experience anywhere inside or outside of your radio network. It can operate as a permanent, back up or mobile solution, with full console functionality. Whether for a planned event or immediate emergency response, command a wealth of information for high-impact results. Connect to responders with voice, Talkgroup Text Message and tone communication on ASTRO® 25 trunked and conventional systems.

NEW SMALL FORM FACTOR

CONTINUAL REDUCTION IN PHYSICAL SPACE REQUIREMENTS FOR THE HARDWARE

REDUNDANCY IN ETHERNET CONNECTIONS HELPING TO ENSURE HIGH AVAILABILITY OF THE SYSTEM

DISPATCH APPLICATION ECOSYSTEM

The ability to integrate Motorola Solutions and other third party dispatch applications with the MCC 7500E console API creates a dispatch environment that helps you meet the needs of your first responders.

Motorola Solutions Certified Logging Recorders

The Motorola Solutions certified NICE and Verint Logging Recorders provide seamless dedicated recording for the MCC 7500E console to improve productivity and offer post incident insights to your operations. They are the only recording solutions that meet all of the extensive Motorola Solutions performance specifications required to be implemented on the ASTRO 25 IP network.

PremierOne™ Computer Aided Dispatch

PremierOne CAD integrates with the MCC 7500E console to streamline workflows, minimize key strokes and reduce input error for more dispatch efficiency. Your personnel can operate within a single interface and from one mouse and keyboard to receive 9-1-1 calls, manage an incident response and communicate critical information to responders in the field.



Advanced Messaging Solution

The Advanced Messaging Solution builds upon the Talkgroup Text Messaging capability of the MCC 7500E IP Dispatch Console, further enhancing responder decision-making abilities by facilitating two-way texting between dispatch and users in the field. When voice communication is not an option, Advanced Messaging Solution provides responders with critical information, right at their fingertips, on portable radios or broadband devices.

APX Personnel Accountability

Streamline on-scene roll calls and gain the confidence to make critical decisions with an easy to use single screen view showing the status of all on-scene personnel. Rapidly execute evacuation orders to quickly alert your team to changing situations and see that everyone acknowledges.

EASE OF USE MAKES FOR MORE EFFECTIVE SUPPORT

First responders don't know or care where your dispatchers are. Yet, they need the same high level of responsiveness in each and every emergency. The MCC 7500E leverages a graphical user interface (GUI) that has been continuously improved upon based on user feedback for over 10 years. Examples of enhancements range from various color choices for resource backgrounds, buttons, or on screen text to fully customizable sizes of resources. The continual pursuit of operational efficiency enables your dispatchers to quickly adapt to a new system with a short learning curve and minimal training allowing them to feel right at home.

The customizable GUI design helps your dispatchers become more efficient and productive using purpose-designed workflows with minimal click-throughs, critical resource information displays and contextual right-click menus. It is also beneficial for switching seamlessly between the MCC 7500E, MCC 7500 and MCC 7100 IP Dispatch Consoles. enabling dispatchers to provide the same level

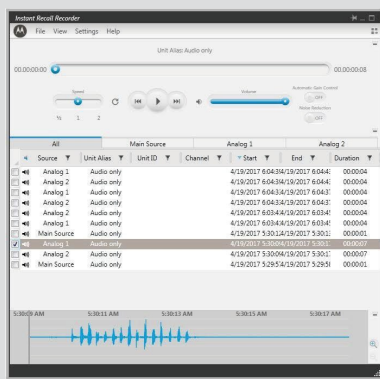
of service every time, with no additional training. Extra features are designed specifically to enable a smooth transition. The Enhanced Integrated Instant Recall Recorder helps maintain typical dispatch operation without extra equipment or installations. It can provide your dispatchers with access to the audio and associated call information across all call on their dispatch consoles. With flexible configuration options the Enhanced Integrated Instant Recall Recorder can be easily customized to meet the needs of individual dispatchers. The optional Audio Interface Module (AIM) facilitates use of purpose-built dispatch accessories if desired in place of commercial off-the-shelf USB accessories. With the MCC 7500E, you'll maximize your effectiveness in coordinating and informing first responders, from anywhere.

THE INTELLIGENCE YOU NEED, EVERY TIME, ALL THE TIME

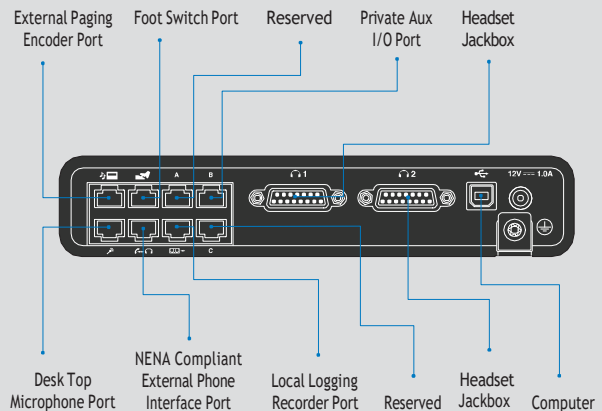
First responders rely heavily on dispatch for support. They need to be confident that your team can always offer the right information and coordination when an emergency arises. The inherent reliability and security of the ASTRO 25 system ensures first responders and dispatchers stay connected with best-in-class audio quality. Redundant Ethernet connections provide dispatchers with continued access to their dispatch consoles even during failures in the IP network LAN switches. For peace of mind that the right information always gets through, rely on the MCC 7500E IP Dispatch Console's smart voice prioritization and intelligent audio routing capabilities at your dispatch positions. Furthermore, continuous link and resource polling gives your dispatchers the confidence that once connected they stay connected.

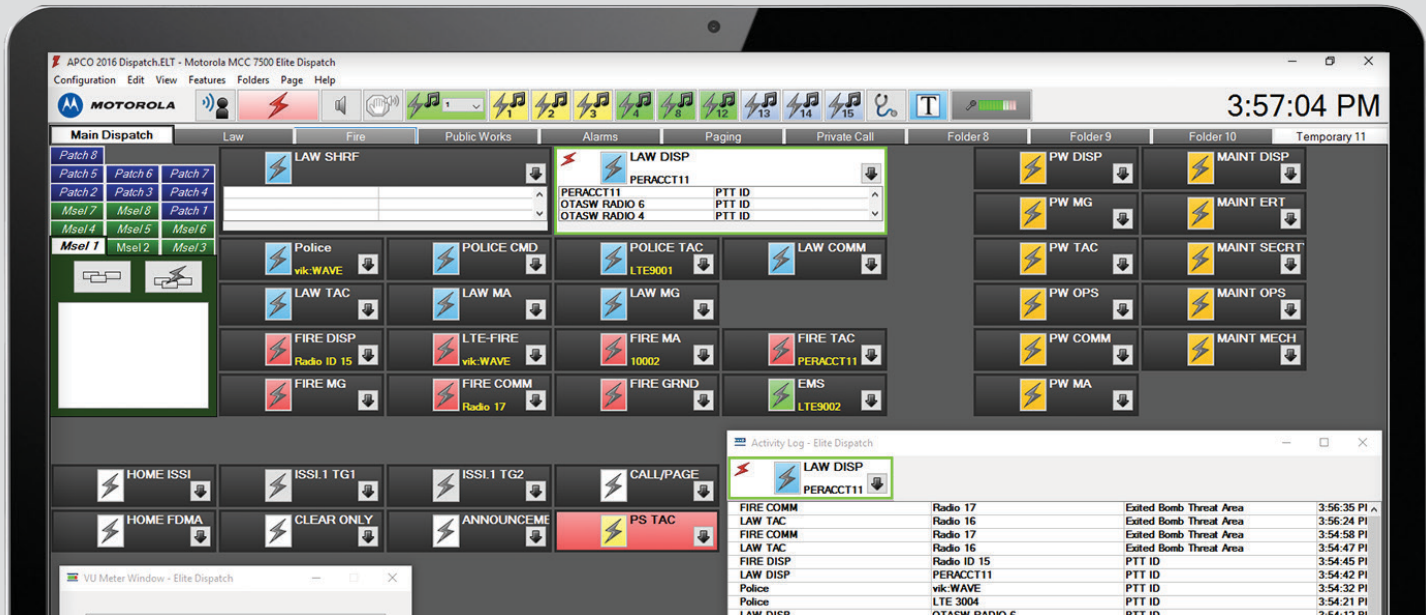
SCALE UP YOUR SYSTEM NOT YOUR COST

If your public safety agency is like most others, money is tight for you right now.



Enhanced Integrated Instant Recall Recorder





Tailor the MCC 7500E IP Dispatch Console to your needs with the customizable user interface

The MCC 7500E console is a cost effective, completely software-based solution. Flexible deployment options reduce physical space requirements and system management does not require specialized hardware knowledge. New functionality and expanded capacity arrive via software updates - upgradeable from a centralized, single point of contact. This cuts down on the time, expense and inconvenience of growing or managing your system.

Scale to the needs of your organization now and into the future with licensed capacity of 15, 30, 45, 60, 100, or 160 Radio Resources. Deploy the MCC 7500E console incrementally with interoperation with the MCC 7500, for even more installation flexibility.

SOLUTION COMPONENTS

MCC 7500E Console Positions

The MCC 7500E console connects directly to the radio system's IP transport network without gateways or interface boxes. Vocoding and encryption are performed within each software-based operator position. MCC 7500E consoles function as an integrated component of the total radio system without additional centralized electronics.

The MCC 7500E console position can be comprised of a desktop workstation with just a headset, or operate with a small formfactor computer and monitor with a keyboard, mouse/trackball/touchscreen, up to 8 assignable speakers, and a range of audio accessories. The MCC 7500E is designed for the workspace of the future. At 2.3 inches tall, the HP Z2 Mini is perfectly suited for dispatch operations where space is limited.

Audio Accessories

Both Mission-Critical Audio Accessories are available including goose neck microphone, foot-switch and headset jack-box. Additionally, commercially available USB connected accessories can be used if desired.

Compatibility

For dispatch users who need to conduct dispatching activities and other tasks on a single computer, the following applications are supported for such installation:

- K Core Configuration Manager
- ASTRO 25 Advanced Messaging Solution
- MKM 7000 Console Alias Manager Server
- MKM 7000 Console Alias Manager Client
- PRX 7000 Console Proxy Server
- Voting Control and Display Client
- Personnel Accountability Client
- PremierOne Text Messaging Client.

Radio Resource Capacity Licenses

Radio Resource Capacity Licenses are available for 15, 30, 45, 60, 100, or 160 radio resources.

Capacity licenses are issued for the life of the product and continue in force when the system is upgraded.

Remote Operation

Full dispatch capability is provided when operating outside of the ASTRO 25 Network. The MCC 7500E console supports firewall controlled access for up to 160 channels into the secure ASTRO 25 network from the Customer Enterprise Network (CEN). For remote access with additional security, virtual private network (VPN) access is also supported through the CEN.

SPECIFICATIONS

System Compatibility	ASTRO® 25 System
Vocoder Algorithms Supported	AMBE, (IMBE is compatible with AMBE), G.728 (for Analog Conventional), G.711 (Telephony)
Encryption Algorithms Supported	AES (256 bit), DES-OFB, ADP (Advanced Digital Privacy)
MCC 7500E IP DISPATCH CONSOLE CAPACITIES	
Assignable Radio Resource Capacities	15, 30, 45, 60, 100, 160
Simultaneous Audio Sessions per Console	60
Bandwidth Requirement per Channel	35 kbps
Simultaneous Encryption/ Decryption Sessions per Secure Capable Console	60
Multi-Select Groups per Dispatch Console	Up to 16 (with up to 20 Members per Multi-Select group)
Patch Groups per Dispatch Console	Up to 16 (with 20 members per patch group)

USB AUDIO INTERFACE MODULE SPECIFICATIONS

Before you mount and install the USB Audio Interface device (AIM), verify that you meet the environmental requirements necessary for the device to operate.

	Connector type	Device
Audio Interface Module (AIM)	RJ45	One desktop gooseneck microphone, one local logging recorder, one external telephone headset, one external paging encoder, one footswitch, and support for four private Aux I/O's.
	DB15	Two headset jacks connectors.
Dimensions (H x D x W)	1.69 x 5.23 x 8.39 in (43 x 133 x 213 mm)	
Weight	1.43 lbs (0.65 kg)	
AC Operating Voltage for the USB AIM Power Supply	90 VAC - 264 VAC	
Minimum Input Voltage	90 VAC with 57-63 Hz	
Maximum Input Voltage	264 VAC with 47-53 Hz	
Typical Input Voltages	115 VAC and 230 VAC	
DC Operating Voltage for the USB AIM Device	12 VDC (nominal)	
Maximum Power Consumption	0.5 A at 12 VDC (6 Watt)	
Operating Temperature	5°C (41°F) - 40°C (104°F)	
Storage Temperature	-25°C (-13°F) - 70°C (158°F)	
Relative Humidity Operating	0% - 90% relative humidity at 40°C non-condensing	
Certifications	CE CMM EPUF 50 EAC Safety CSA 60950-1-07 2011-12 UL 60950-1 2011 IEC 60950-1 2005	EMC Emissions & Immunity FCC part15B Class B ICES-003 EN 60950 - 1 : 2006 + A11 : 2009 + A1 : 2010 + A12: 2011 EN55022 :2010 EN55024 :2010 EN 61000-3-2:2006 +A1:2009 +A2:2009 EN 61000-3-3:2008 Energy Efficiency International Energy Efficiency Level V (AIM power supply only)



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