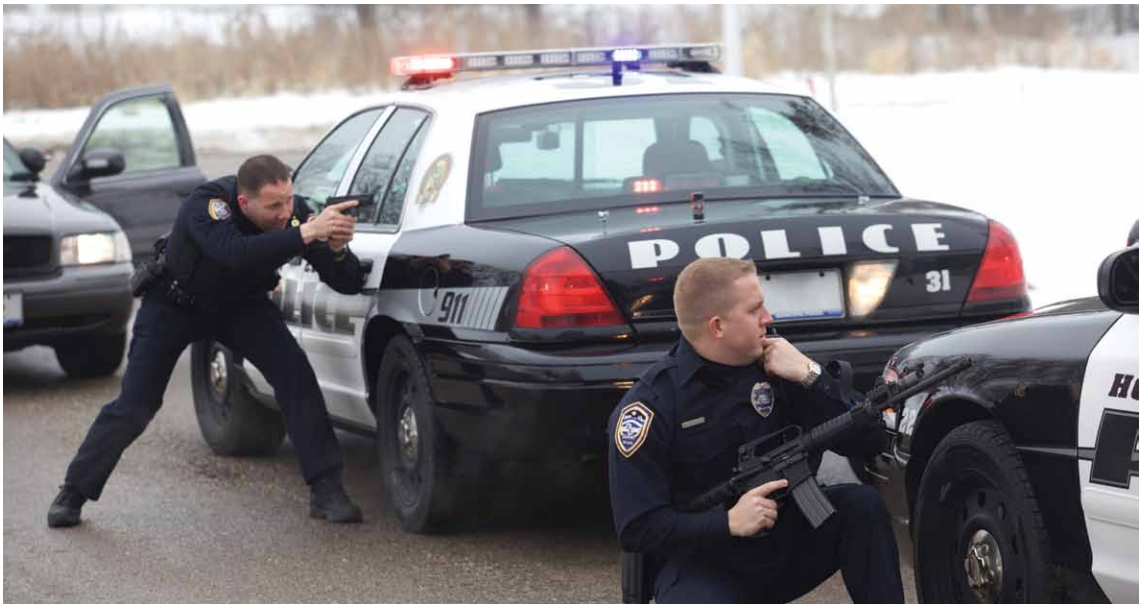
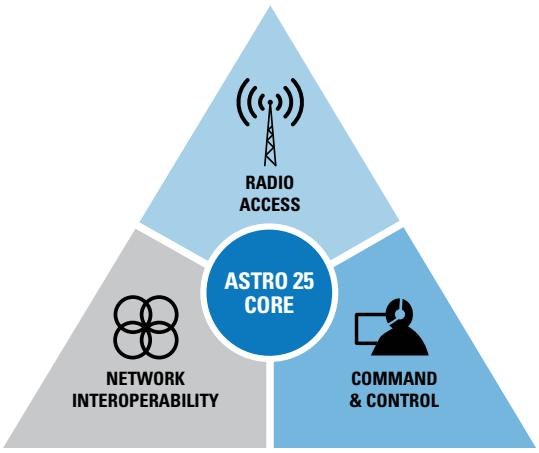


FLEXIBLE, SCALABLE CONFIGURATIONS

ASTRO® 25 CORE

Small town or major city… single department or multi-agency… your radio system should fit your needs and your budget. Motorola's dynamic architecture gives you the freedom to deploy a right-sized system today, with the confidence that you can easily add coverage, capacity, and new capabilities as your agency's needs evolve in the future.



AN ADAPTABLE PLATFORM FOR MISSION CRITICAL COMMUNICATIONS

Designed to meet the demands of public safety, ASTRO 25 systems are dependable under challenging conditions when lives are on the line. ASTRO 25 is the most widely used Project 25 (P25) compliant mission critical solution in the world, giving agencies complete control over their wireless voice and data on an integrated, interoperable and easy to manage network they will not outgrow.

The scalable and virtualized ASTRO 25 core provides an adaptable and affordable platform for mission critical wireless communications. Powerful servers combined with Motorola's proven software are leveraged to reliably and cost-effectively support a variety of critical voice and data services. This flexibility helps government agencies save money and be positioned to take full advantage of technologies that help first responders work with enhanced safety and impact in the field.

ASTRO 25 CORE – FLEXIBLE, SCALABLE, SIZED RIGHT

RADIO ACCESS	▪ ANALOG CONVENTIONAL ▪ P25 PHASE 1 DIGITAL CONVENTIONAL OR TRUNKING ▪ P25 PHASE 2 TDMA TRUNKING ▪ INTEGRATED DATA ▪ MUTUAL AID
INTEROPERABILITY	▪ P25 MULTI-NETWORK CONNECTIVITY VIA ISSI ▪ MULTI-BAND RADIOS ▪ MULTI-MODE RADIOS
COMMAND AND CONTROL	▪ MCC 7500 IP WIRELINE CONSOLE

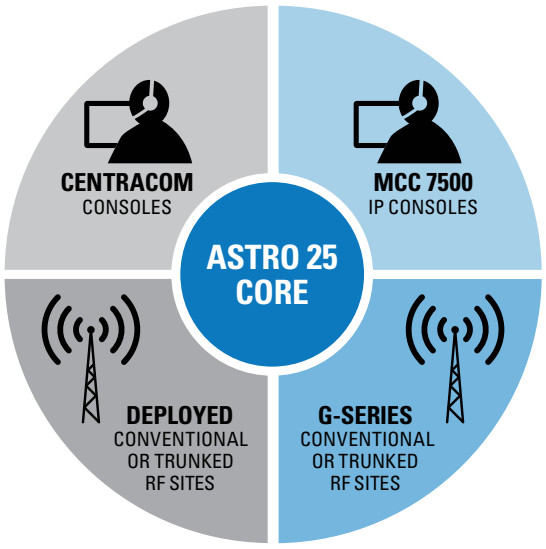
THE ASTRO 25 CORE

Designed for maximum availability and dependability, the core is the central source of network services and control. Depending on the system configuration, it can support:

- Voice call processing designed for mission critical group communications
- Mobility management to allow users to roam seamlessly throughout the system
- Integrated Data and HPD call processing
- Radio System Management for centralized radio user and system configuration, fault monitoring and control
- Enterprise IT management for centralized management of user accounts to prevent unauthorized access and ensure prompt notification and resolution of events
- Ease of connectivity to other ASTRO 25 cores for regional and statewide expanded coverage

A VIRTUALIZED CORE MAXIMIZES YOUR INVESTMENT

Motorola leverages the latest virtualization technology to achieve flexibility with core system design. Server consolidation, along with higher utilization, results in a scalable ASTRO 25 core that takes up less physical space and reduces energy consumption. Most importantly, agencies can meet their current functional requirements with the fewest IT resources and be confident their investment can evolve to meet future needs.



CONFIGURATIONS SIZED RIGHT FOR YOUR ORGANIZATION

To simplify system design for new installations, Motorola offers core configurations for conventional, trunked and mixed conventional/trunked systems. ASTRO 25 features scale across these configurations. K1 and K2 cores support single and multi-channel conventional systems. L1 and L2 cores support single zone trunked systems with up to 5 repeater sites or 10 simulcast sub-sites. M1 and M2 configurations are designed to support single zone systems with up to 24 sites. M3 configurations are designed for users with higher capacity needs or multi-zone requirements.

The following site types can be connected to the applicable scalable core configuration:

- RF repeater sites
- Simulcast subsites
- HPD sites
- Console sites
- System Management sites
- Conventional sites
- SmartZone™ sites through a SmartX converter
- Other Project 25 systems through an ISSI.1 Network Gateway Subsystem

Other design considerations in choosing the right solution are the number of channels, talkgroups, individual IDs, console operator positions, and network management application licenses as required.

SCALABLE IN SIZE AND FEATURES	Modular, scalable solution from voice only to full system capability, single site to multi site.
PROVEN CAPABILTY AND FEATURE SET	With over 300 trunked systems and thousands of conventional sites used by public safety agencies around the world, the ASTRO 25 system is a proven system with advanced features.
INTEGRATED SOLUTION	ASTRO 25 is a complete end-to-end system designed and engineered by the leading supplier of P25 communication equipment.

ASTRO 25 CORE CONFIGURATIONS

ASTRO 25 systems have multiple core configurations sized right for each user.

K1 Core Configuration

Project 25 (P25) compliant single zone conventional configuration without high availability.

The K1 core supports conventional system configurations with up to 25 remote sites, 50 RF channels, and up to 75 IP devices. It provides a wireline interface to an MCC 7500 IP-based console with up to 20 operator positions. Product level fault management and configuration is available. The configuration utilizes a single GCP 8000 site controller and transport equipment to support call processing. With a K1 core, organizations have the option to expand system capacity or connect to a regional system. The configuration is available in either a single open rack or an enclosed cabinet.

K2 Core Configuration

Project 25 (P25) compliant single zone conventional configuration with high availability.

The K2 core supports the same features and system capacities as a K1 Core. A redundant GCP 8000 site controller and additional network transport equipment is added to this configuration to support redundant call processing. Similar to the K1 core, organizations with a K2 core have the option to expand system capacity or connect to a regional system. The configuration is completely contained in either a single open rack or an enclosed cabinet.

L1 Core Configuration

Project 25 (P25) compliant single zone trunked configuration without high availability.

The L1 core supports trunked system configurations with up to 5 RF sites, 10 simulcast subsites, and up to 150 base repeaters. Up to 4 analog or digital conventional mutual aid channels can be used at each site. A single Sun SPARC server supports all call processing within the zone. Centralized system management applications also reside on this platform. A single HP ProLiant DL120 server provides Active Directory functionality and can be used for the backup of databases at the core. The servers and the necessary transport equipment are all contained within a single open rack or enclosed cabinet.

L2 Core Configuration

Project 25 (P25) compliant single zone trunked configuration with high availability.

The L2 core supports the same features and system capacities as an L1 core. This core configuration adds one additional Sun SPARC server for redundant call processing capability and additional network transport equipment. An additional HP ProLiant DL120 server is added for high availability Active Directory functionality. This design is also completely contained within a single open rack or enclosed cabinet.

M1 Core Configuration

Project 25 (P25) compliant single zone trunked and/or conventional configuration without high availability.

The M1 core supports trunked, conventional, or mixed system configurations with up to 24 remote sites. A single Sun SPARC server supports all call processing within the zone. Centralized system management applications also reside on this same platform. A single HP ProLiant DL360 server provides Active Directory functionality and can be used for the backup of databases at the core. The servers and necessary network transport equipment are all contained within a single open rack.

M2 Core Configuration

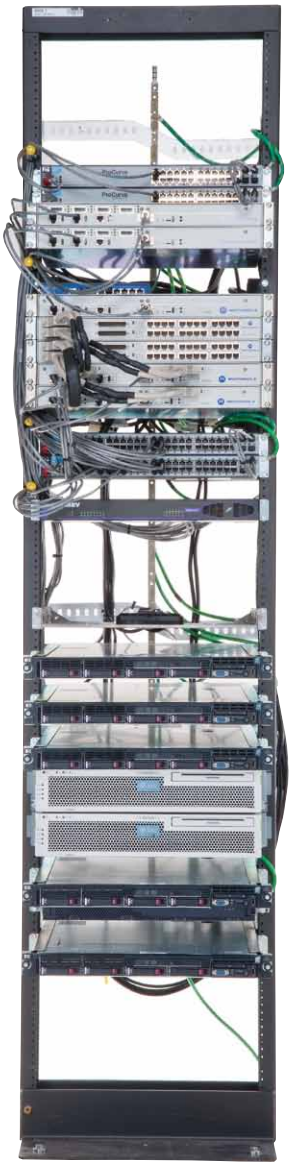
Project 25 (P25) compliant single zone trunked and/or conventional configuration with high availability.

Based on the M1 design, this configuration adds one additional Sun SPARC server for redundant call processing capability and additional network transport equipment. An additional HP ProLiant DL360 server is added for high availability Active Directory functionality. This design is also contained within a single open rack.

M3 Core Configuration

Project 25 (P25) compliant single or multi-zone trunked and/or conventional configuration with high capacity and availability.

The M3 core can be utilized in a trunked, conventional, or mixed system configuration. Up to five Sun SPARC servers provide centralized system management and redundant call processing capability. Two HP ProLiant DL360 servers provide high availability Active Directory functionality. All the servers are mounted in a high quality enclosed cabinet. High capacity, dual network transport equipment resides in a separate open rack. Systems with this configuration can initially be installed as single zone systems and later expand to multiple zone systems.



M2 Configuration

ASTRO 25 Integrated voice and data plus HPD Data

SELECTING THE RIGHT CONFIGURATION

Motorola design engineers can assist you in identifying the configuration that best aligns with the goals of your organization. Consider your current and projected capacity requirements and the functions you want your system to support. Because of the inherent flexibility of the architecture and the ability to add new equipment to the core as needed, you can be confident that the configuration you select now will adapt and grow with your needs.

HIGH LEVEL COMPARISON	K1 / K2	L1 / L2	M1 / M2	M3
CAPABILITY	Conventional voice or integrated data	Trunked voice or integrated voice and data	Conventional and trunked voice or integrated voice and data HPD	Conventional and trunked voice or integrated voice and data HPD
CAPACITY	50 channels 75 IP devices	150 channels system Wide 1-5 sites	300 channels per zone 1-24 sites	700 channels per zone 100 sites
FREQUENCY BANDS	700 MHz, 800 MHz, UHF (380 to 520 MHz), VHF (136 to 174 MHz)	700 MHz, 800 MHz, UHF (380 to 520 MHz), VHF (136 to 174 MHz)	700 MHz, 800 MHz, UHF (380 to 520 MHz), VHF (136 to 174 MHz)	700 MHz, 800 MHz, UHF (380 to 520 MHz), VHF (136 to 174 MHz)
TOPOLOGIES SUPPORTED	Repeater, simulcast, multicast, voting Analog 4-wire, mixed mode, v.24, IP digital	Repeater, IP simulcast Digital trunking Analog or digital conventional for Mutual Aid	Repeater, simulcast, multicast, voting Analog 4-wire, mixed mode, v.24, IP digital SmartX	Repeater, simulcast, multicast, voting Analog 4-wire, mixed mode, v.24, IP digital SmartX
DISPATCH SOLUTIONS	CENTRACOM™ Gold Elite and MCC 7500	MCC 7500	CENTRACOM Gold Elite and MCC 7500	CENTRACOM Gold Elite and MCC 7500
STATIONS SUPPORTED	QUANTAR™, G-series, MTR series, other analog 4-wire conventional stations	G-Series Expandable Site Subsystem configuration	QUANTAR, G-series, MTR series, other analog 4-wire conventional stations	QUANTAR, G-series, MTR series, other analog 4-wire conventional stations

CORE COMPONENTS

ASTRO 25 core configurations utilize powerful hardware combined with Motorola's proven software applications for high level mission critical communication reliability.

- Sun™ SPARC™ Enterprise servers host radio call management and system management applications. They are designed to provide the highest possible throughput, capacity, and scalability. The SPARC servers use the Solaris™ Operating System, which sets the standard in UNIX® operating systems for performance stability and security. Used in L1/L2 and M1/M2/M3 ASTRO 25 core designs.
- HP® ProLiant® servers offer enterprise level performance and reliability. These servers provide Active Directory® functionality by hosting a central database used to confirm the identity of users as well as to control access to objects on the system and the operations that may be performed. It allows network administrators to effectively enforce security policies and enable remote administration of the network. These servers can also be used for backups of the zone controller and system management databases. Used in L1/L2 and M1/M2/M3 ASTRO 25 core designs.
- GCP 8000 Site Controller utilized in conventional ASTRO 25 K1 and K2 cores, provide mission critical call processing and mobility throughout the system. It interfaces via multiple Ethernet LAN switches, and provides access to the packet switched network via the core gateways. It is capable of supporting the full set of dispatch consoles, archiving interface servers, and conventional gateways.
- Gateway appliances, utilized in all ASTRO 25 cores, control communications between the core and remote sites and perform the routing of audio, data, and system management traffic in the system.
- Optional service hardware provides an access point for the administration of system devices for maintenance purposes.
- A combination Virtual Private Network (VPN) router and firewall protects the system from unauthorized access and allows technicians with the appropriate security credentials and a corresponding VPN client to access the system through an internet connection for troubleshooting and optimization.

Other components can also be added to the core based on user needs for integrated data and HPD, plus additional functional and security services.

ASTRO 25 CORE SERVER HARDWARE CONFIGURATION

CORE CONFIGURATION	SUN SPARC NETRA™ T5220 SERVER	HP PROLIANT DL360 SERVER	HP PROLIANT DL120 SERVER	GCP 8000 SITE CONTROLLER
K1 CORE				•
K2 CORE				•
L1 CORE	•		•	
L2 CORE	•		•	
M1 CORE	•	•		
M2 CORE	•	•		
M3 CORE	•	•		

ASTRO CORE SERVER HARDWARE SPECIFICATIONS

	SUN SPARC NETRA™ T5220 SERVER	HP PROLIANT DL360 SERVER	HP PROLIANT DL120 SERVER	GCP 8000 Site Controller
Height	8.71 cm (3.43 in.) 2 RU	4.32 cm (1.70 in.) 1 RU	4.32 cm (1.70 in.) 1 RU	13.3 cm (5.25 in.) 3 RU
Width	44.5 cm (17.52 in.)	42.62 cm (16.78 in.)	44.81 cm (17.64 in.)	48.3 cm (19 in.)
Depth	50.1 cm (19.72 in.)	69.22 cm (27.75 in.)	70.0 cm (27.6 in.)	45.7 cm (18 in.)
Depth (including power supply handles)	526 mm (20.71 in.)			
Weight	17.5 kg (38.5 lbs.)	17.9 kg (39.5 lbs.)	14.3 kg (31.49 lbs.)	18 kg (40 lbs.)
Operating temperature	5°C to 40°C (41°F to 104°F), short term –5°C to 55°C (23°F to 131°F)	10°C to 35°C (50°F to 95°F)	10° to 35°C (50° to 95°F)	–30° to 60°C (–22° to 140°F)
Non-operating temperature	–40°C to 70°C (–40°F to 158°F)	–40°C to 70°C (–40°F to 158°F)	–30° to 65°C (–22° to 149°F).	
Operating relative humidity	5-85%, non-condensing	10-90%, non-condensing	10 to 90% relative humidity (Rh), 28°C (82.4°F) non-condensing	50°C 122°F 90% humidity
Operating altitude	Up to 3,000 m (9,850 ft.) at 40°C	Up to 3,050 m (10,000 ft.)	Up to 3050 m (10,000 ft.)	Up to 5000 m (16,400 ft.)
Non-operating altitude	Up to 12,000 m (40,000 ft.)	Up to 9,144 m (30,000 ft.)	Up to 9144 m (30,000 ft.)	
Operating input voltage range	100-240 V AC	100-240 V AC	90-132 V AC	90-264 V AC
AC power	100-240 V AC, 50-60 Hz	90-264 V AC, 50-60 Hz	90-132 V AC, 47 to 63 Hz	90-264 V AC, 47 to 63 Hz
Power consumption	346 watts, Max @ 110 V	460 watts @120 V 460 watts @ 220 V	400 watts @ 100 V 400 watts @ 200 V	Single controller: 150 watts @ 100 V Dual controller: 180 watts @ 100 V
Input current drain	4.5 A @ 100-120 V 2.25 A @ 200-240 V	4.5 A @ 120 V 2.2 A @ 240 V	6 A @ 100 V 3 A @ 200 V	

For more information about ASTRO 25 solutions and the scalable core configurations, please contact your Motorola representative or visit www.motorola.com/ASTRO25

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