FLEXIBLE DESIGN – SOFTWARE CONFIGURABLE

G-SERIES SITE EQUIPMENT FOR ASTRO® 25 SYSTEMS

Motorola's ASTRO 25 networks are designed to meet the current and future requirements for Project 25 (P25) solutions. Our G-series portfolio of RF stations, receivers, site controllers and comparators is designed to maximize channel up-time, simplify system technology refresh, enable smaller, more efficient site design and minimize the cost of ownership.

Our G-series equipment is designed so that many upgrades, migrations, and conversions can be completed with only software installations, allowing new features to be quickly added to your existing system with a simple download. You can easily add P25 TDMA and Dynamic Channel Assignment; Information Assurance, Network Security and system release updates. Furthermore, you can migrate from conventional to trunking, 3600 to P25 trunking and from 12.5 kHz P25 FDMA to 6.25e kHz P25 TDMA.

Designed to carry your needs into the future, the G-series hardware platform has built-in functionality and flexibility with an AC/DC - 48VDC power supply and two-branch receive diversity capacity, as well as a linear power amplifier for improved coverage in P25 FDMA Simulcast systems.

GTR 8000 Expandable Site Subsystem

SIMULCAST

Motorola is an industry leader in simulcast system solutions with more mission critical systems fully operational in the field than any other LMR systems provider. The G-series site equipment is designed with simulcast system design and functionality in mind. GTR 8000 Base Radios feature a linear modulation (LSM) that provides industry-leading P25 coverage in VHF, UHF, 700/800 MHz and 900 MHz. LSM enables simulcast systems to be deployed with greater site spacing without sacrificing coverage or capability, resulting in fewer sites to build and maintain. It also allows current systems to deploy IP-based simulcast without the need to add fill-in sites.

SERVICING MADE EASY

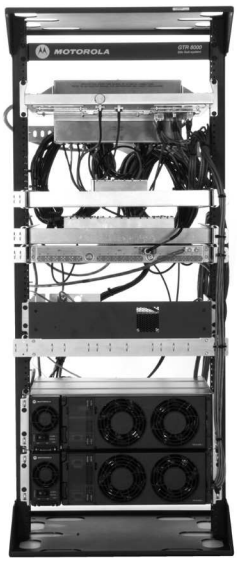
G-series site equipment has many features built in to support ease of service. Six basic modules create the entire G-series platform resulting in reduced spare parts inventory. Modules have front access to improve serviceability with hot-swap support to ensure channels are back on the air in minimum possible time. Standard Battery Revert and Charging capability is built into every G-series power supply. Integrating these capability eliminates the need for a large uninterrupted power supply and saves valuable site space.

A built-in GPS with frequency reference distribution is optionally available on the GTR 8000 Expandable Site Subsystem, which can significantly reduce or eliminate site visits.

Software upgrades are more stable and performed with less downtime in the GTR 8000 base radio. One version of software can run actively while another version is downloading. Using a remote IP connection, the user can decide when to switch between the two versions of software allowing the system manager to prepare for software downloads.

OPTIMIZED NETWORK SECURITY

Information Assurance capabilities are standard with G-series equipment and can be configured or disabled depending on your specific system maintenance and security requirements. G-series products provide the necessary boundary defense capabilities required in mission critical infrastructure today including local user accounts and password controls, user privilege model support (two levels), local and remote access services controls, secure shell services support, SNMPv3, central authentication, general operating system and network services hardening, and device test services controls.



GTR 8000 Site Subsystem

SYSTEM CONFIGURATIONS

ASTRO 25 TRUNKING

GTR 8000 Base Radios, GPW 8000 Receivers, GCP 8000 Site Controllers, and GCM 8000 Comparators are the building blocks of an ASTRO® 25 trunking system. Site repeater and simulcast system architectures in P25 FDMA and P25 TDMA offer the flexibility to deliver communications that fit user requirements.

G-series equipment is capable of both Project 25 FDMA and Project 25 TDMA in ASTRO 25 trunking systems. Dynamic Channel Assignment is optional for GTR 8000 Base Radios as part of the ASTRO 25 Dynamic Dual Mode system option, and offers seamless interoperability between P25 FDMA and P25 TDMA users, dynamically allocating a call based on available resources without any user intervention or awareness. The P25 TDMA trunking features are offered across the complete trunking portfolio to address the needs of users ranging from single site to statewide radio systems.

ASTRO 25 trunking is a fully scalable solution from as small as a single trunking site to large statewide systems that include a mix of site repeater and simulcast operation as well as additional data and mutual aid overlays. G-series sites support tri-band operation utilizing APX™ 8000 all-band P25 portable radios. This will allow a talkgroup to operate across all three bands at a single RF site. The trunking RF site tri-band configuration can be deployed in any multi-site or repeater RF site configuration that uses G-Series equipment.

G-series equipment configured for trunking supports both V.24 circuit-based architectures as well as state-of-the-art IP-based system designs. GPW 8000 Receivers and GCM 8000 Comparators improve the in-bound subscriber signal coverage and re-broadcast a quality improved composite signal respectively in simulcast or receiver voting systems.

Motorola offers industry-leading channel resiliency in trunking systems with the GTR 8000 Expandable Site Subsystem. The architecture ensures that no single point of failure can remove more than one channel from service at the RF sites. Plus, the sites are simultaneously simplified through the integration of base station frequency references, Ethernet LAN switches and network gateways.

Motorola also offers a turn-key P25 trunking site with the ASTRO 25 Express system, a GTR 8000 Expandable Site Subsystem designed to operate as a single-site solution. Stations, site controllers, Ethernet switches, RF combiners and multicouplers are all integrated into a single rack or cabinet. If more capacity is required, additional cabinets can be added to the site.

ASTRO 25 CONVENTIONAL

ASTRO® 25 Conventional is a feature-rich conventional system solution on the common-hardware G-series platform. The GTR 8000 Base Radios, GPW 8000 Receivers, and GCM 8000 Comparators can be used together or separately to build everything from a small, single repeater site to a large, countywide or statewide receiver-voting or simulcast conventional system.

The hardware will support IP-only circuit system design while connectivity with consoles can be either IP-based or 4-wire depending on migration plans and system specific operational requirements. GTR 8000 can be configured for either base station or standalone repeater operation. GPW 8000 Receivers and GCM 8000 Comparators improve the in-bound subscriber signal coverage and re-broadcast a quality improved composite signal respectively in simulcast or receiver voting systems.

Sixteen configurable channel personalities enable the station to change channel bandwidth and frequency setting via IP or v.24 commands. General purpose I/O offers 12 logic inputs and 12 logic outputs that can be programmed via the user-friendly GTR 8000 Configuration Service Software (Windows® application) for a highly customized alarm reporting solution and station operation.

ASTRO 25 Conventional can also be deployed as a system overlay with ASTRO 25 Trunking systems by adding a GTR 8000 Base Radio configured for conventional operation to an existing trunking GTR 8000 Expandable Site Subsystem and sharing the common wide-area network connections as well as RF cavity combiners and receiver multicouplers.

ANALOG CONVENTIONAL

The GTR 8000 and GPW 8000 products support analog conventional operation in 800 MHz, UHF 380-524 MHz and VHF 136-174 MHz. Analog standalone repeater, receiver voting and simulcast capabilities are available and include a 100 ppb/2 year internal frequency reference for optimal audio performance on 12.5 KHz analog channels.

The G-series equipment provides full support for analog 4-wire circuit connectivity. Over an IP network, technicians can remotely adjust line level settings and tone remote operational modes. 16 configurable analog personalities enable the station to change channel bandwidth and frequency settings via TRC (tone remote control) or WildCard general purpose I/O. The general purpose I/O offers 12 logic inputs and 12 logic outputs, which can be programmed via the user friendly Configuration Service Software (Windows® application) for a highly customized alarm-reporting solution and station operation.

MIXED ANALOG/DIGITAL CONVENTIONAL

G-Series site equipment can be configured to simultaneously support both analog and digital communication. This mixed mode form of operation allows the system to support a mixed fleet of analog and digital subscribers as a flexible long term solution, or as part of a gradual migration path from analog to digital. Mixed mode operation is supported on conventional standalone repeaters, receiver voting and simulcast systems.

ASTRO 25 DATA

ASTRO 25 trunking and conventional systems can be enabled with P25 Integrated Data functionality so users can leverage their investment in voice infrastructure for basic data needs. Enhanced Data is a software feature in systems with Integrated Data. Enhanced Data optimizes the data channels in an ASTRO 25 system for data applications that require short inbound data messages like location, telemetry and biometrics, and can improve data efficiency by 12x. For example, with Enhanced Data, customers can set quicker location polling rates for a larger number of users on their system, therefore providing better real-time view to resource locations. Based on customer requirements, ASTRO 25 Enhanced Data allows for data to be prioritized over voice, protecting channels for data use and enabling agency shared data channels. If higher data throughput is a requirement, Motorola offers HPD as an overlay on ASTRO 25 trunking systems to provide the same coverage footprint for both systems.

3600 TRUNKING

The GTR 8000 base radio supports 3600 trunking operation, enabling new future-ready base radios to be added to existing SmartZone systems with SmartX. The GTR 8000 is software upgradeable to P25 trunking when the time is right to migrate to P25. 3600 trunking operation is available on both simulcast and intellirepeater systems, in either analog or digital mode.

The GTR 8000 supports WildCard general purpose I/O with 12 logic inputs and 12 logic outputs, which can be programmed via the user friendly Configuration Service Software (Windows application) for a highly customized alarm-reporting solution and station operation.

Using an IP connection, the GTR 8000 can be monitored, configured and software updated from a convenient, remote location.

G-SERIES SITE EQUIPMENT PRODUCTS

GTR 8000 EXPANDABLE SITE SUBSYSTEM

A space-efficient, single rack design, the GTR 8000 Expandable Site Subsystem (ESS) integrates up to six GTR 8000 Base Radios, redundant GCP 8000 Site Controllers or GPB 8000 Reference Distribution Modules, redundant Ethernet LAN switches, redundant network gateways, transmit combiners, and receiver multicouplers. This enables a highly resilient architecture that provides industry-leading protection against single points of failure at the RF sites while providing a turn-key site solution that minimizes site cabling connections and installation effort.

It supports ASTRO 25 simulcast and site repeater trunking operation, 3600 simulcast and intellirepeater trunking operation with SmartX, HPD, and P25 digital and analog conventional operation. When ordered as an ASTRO 25

Express System, the GTR 8000 Expandable Site Subsystem is the industry's only turn-key, single-site Project 25 trunking solution.

GTR 8000 BASE RADIO

Designed to support ASTRO 25 trunking simulcast, 3600 trunking simulcast with SmartX, HPD, and P25 and analog conventional operation, GTR 8000 Base Radios offer additional design flexibility for infrastructure sites where equipment may have to be interchanged individually during a technology refresh or when used as a station replacement for QUANTAR™ or STR 3000 stations.

GPW 8000 RECEIVER

In conventional and trunking voting or simulcast voting applications, the GPW 8000 Receiver increases in-bound signal coverage for subscribers. Physical space is optimized at receive-only sites with the GPW 8000 space efficient dual receive module design.

GTR 8000 SITE SUBSYSTEM

This configuration supports HPD with the redundant site controllers and GTR 8000 Base Radio configured for data operation. The specially designed low-loss RF system ensures that HPD signal coverage equals the coverage available from the integrated voice and data solution allowing complete data coverage in an ASTRO® 25 system without the inconvenience of fill-in sites for coverage holes.

GCP 8000 SITE CONTROLLER

The GCP 8000 Site Controller is used at an ASTRO 25 trunking site to assign voice and data channels, manage and report alarms on site resources, provide Ethernet switching capability, and provide a frequency reference to GTR 8000 Base Radios. The frequency reference is provided either via a GPS receiver or an ultra high stability oscillator. The nature of these frequency references eliminates or minimizes site visits for frequency tuning servicing.

GCM 8000 COMPARATOR

The GCM 8000 Comparator supports up to 32 trunking sub-sites and up to 64 conventional sites for simulcast or receiver voting. It performs frame-by-frame voting on multiple received signals and recombines the frames to produce a signal with the best possible audio quality. GPS launch-delay timing ensures seamless broadcast of the voted frames from multiple voice signals into one high-quality transmit signal. GPS launch-delay timing ensures seamless broadcast of data packets from multiple voice signals into one high-quality transmit signal.

GTR 8000 EXPANDABLE SITE SUBSYSTEM (SQM01SUM7054A)

GENERAL PERFORMANCE

	HPD	INTEGRATED VOICE & DATA				
	700/800 MHz	**900 MHz**	**700/800 MHz**	**UHF: 380-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Number of Channels	1-5	1-6	1-6	1-6	1-6	2-6
Height with 7.5 ft Rack	90.4 in (230 cm)	90.4 in (230 cm)	90.4 in (230 cm)	90.4 in (230 cm)	90.4 in (230 cm)	90.4 in (230 cm)
Footprint (W x D) with 7.5 ft Rack	20.5 x 23.5 in (52 x 60 cm)	20.5 x 23.5 in (52 x 60 cm)	20.5 x 23.5 in (52 x 60 cm)	20.5 x 23.5 in (52 x 60 cm)	20.5 x 23.5 in (52 x 60 cm)	20.5 x 23.5 in (52 x 60 cm)
Weight (fully configured) with 7.5 ft Rack	520 lbs (235 kg)	575 lbs (260 kg)	520 lbs (235 kg)	UHF 380-435 MHz: 475 lbs (215 kg) UHF 450-512 MHz: 565 lbs (260 kg)	475 lbs (215 kg)	538 lbs (246 kg)
Temperature Range	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)
Power Requirements	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC
Power Consumption (fully configured)*						
Power Efficiency Package	2200 W	C4FM: 3700 W LSM, H-DPQSK: 4100 W	C4FM, FM: 2755 W LSM, H-DPQSK: 2900 W	C4FM, FM: 2325 W LSM, H-DPQSK: 2500 W	C4FM, FM: 2500 W LSM, H-DPQSK: 2100 W	C4FM, FM: 4310 W
Standard	2400 W	C4FM: 3700 W LSM, H-DPQSK: 4100 W	C4FM, FM: 2900 W LSM, H-DPQSK: 3100 W	C4FM, FM: 2500 W LSM, H-DPQSK: 2700 W	C4FM, FM: 2650 W LSM, H-DPQSK: 2200 W	C4FM, FM: 4580 W
Antenna Connectors	TX: 7/16 Female RX: N Female	TX: 7/16 or N Female RX: N Female	TX: 7/16 Female RX: N Female	TX: 7/16 Female RX: N Female	TX: N Female RX: BNC Female	TX: N Female RX: N Female
Channel Spacing	25 kHz	12.5 kHz	12.5/25 kHz	12.5/25 kHz	12.5/15/25/30 KHz	12.5/25 kHz
Transmit Combiner Spacing	150 kHz	12.5 kHz (Hybrid) 150 kHz (Cavity)	150 kHz	150 kHz (450 - 512 MHz) N/A (380-450, 512-524 MHz)	N/A	N/A
Modulation	TX: 64QAM, 16QAM, QPSK RX: 64QAM, 16QAM, QPSK	TX: C4FM, LSM, H-DQPSK RX: C4FM, H-CPM	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: FM, C4FM RX: C4FM, H-CPM, FM
Frequency Stability	GPS synchronized	Repeater Site: 100 ppb/2 yr Simulcast (Multisite): GPS synchronized	Repeater Site: 100 ppb/2 yr Simulcast (Multisite): GPS synchronized	Repeater Site: 100 ppb/2 yr Simulcast (Multisite): GPS synchronized	Repeater Site: 100 ppb/2 yr Simulcast (Multisite): GPS synchronized	Repeater Site: 100 ppb/2 yr Simulcast (Multisite): GPS synchronized

*Power consumption shown reflects fully configured subsystems. Actual power consumption may be lower based on your configuration. Refer to your Motorola Solutions sales and engineering team for the power consumption of your specific configuration.

Specifications subject to change without notice.

GTR 8000 EXPANDABLE SITE SUBSYSTEM (SQM01SUM7054A) CONTINUED

TRANSMITTER (CABINET OUTPUT)*

	HPD	INTEGRATED VOICE & DATA				
	700/800 MHz	**900 MHz**	**700/800 MHz**	**UHF: 380-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Frequency Range	764-776, 851-870 MHz	935-941 MHz	764-776, 851-870 MHz	380-435, 435-524 MHz	136-174 MHz	851-870 MHz
Average Power output per channel	1-20 W	2-way Hybrid: 1-37 W 3-way Hybrid: 1-22 W 4-way Hybrid: 1-17 W 5-way Hybrid: 1-12 W 6-way Hybrid: 1-10 W	1-40 W	C4FM, FM: 2-110 W (380-450, 512-524 MHz) LSM, H-DQPSK: 2-100 W (380-450, 512-524 MHz) C4FM, FM: 1-33 W (450-512 MHz) LSM, H-DQPSK: 1-30 W (450-512 MHz)	C4FM, FM: 2-100 W LSM, H-DQPSK: 2-60 W	13-134 W
Modulation Fidelity	N/A	5%	5%	5%	5%	5%
EVM	10%	N/A	N/A	N/A	N/A	N/A
Intermodulation Attenuation	80 dB	80 dB	80 dB	80 dB (450-512 MHz) 65 dB (380-450, 512-524 MHz)	55 dB	55 dB
Spurious and Harmonic Emissions Attenuation	90 dB	90 dB	90 dB	90 dB	90 dB	90 dB
Analog FM Hum and Noise						
12.5 kHz	N/A	N/A	45 dB	45 dB	45 dB	
25 kHz	N/A	N/A	50 dB	50 dB	50 dB	
Analog Audio Distortion	N/A	N/A	Less than 2% at 1000 Hz	Less than 2% (1% typical) at 1000 Hz	Less than 2% (1% typical) at 1000 Hz	Less than 2% at 1000 Hz
Emissions Designators	17K7D7D	8K70D1E, 8K70D1D 8K70D1W, 8K10F1E 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D 9K80D7W, 10K0F1D 11K0F3E, 16K0F1D 16K0F3E	8K70D1E, 8K70D1D 8K70D1W, 8K10F1E 8K10F1D, 8K10F1W 10K0F1E, 10K0F1D 10K0F1W, 9K80D7E 9K80D7D, 9K80D7W 17K7D7D, 16K0F1D 16K0F3E, 11K0F3E 14K0F1D, 14K0F3E 21K7D7E, 21K7D7D 21K7D7W	8K70D1E, 8K70D1D 8K70D1W, 8K10F1E 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D 9K80D7W, 10K0F1D 11K0F3E, 16K0F1D 16K0F3E	8K70D1E, 8K70D1D 8K70D1W, 8K10F1E 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D 9K80D7W, 10K0F1D 11K0F3E, 16K0F1D 16K0F3E	8K10F1E, 8K10F1D, 8K10F1W, 10K0F1E10K0F1D, 10K0F1W16K0F1D, 16K0F3E11K0F3E, 14K0F1D14K0F3E

RECEIVER (TOP OF CABINET)

	HPD	INTEGRATED VOICE & DATA				
	700/800 MHz	**900 MHz**	**700/800 MHz**	**UHF: 380-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Frequency Range	792-825 MHz	896-902 MHz	792-825 MHz	380-435, 435-524 MHz	136-174 MHz	806-825 MHz
Analog Sensitivity 12 dB SINAD	N/A	N/A	12.5 kHz: –123 dBm 25 kHz: -122 dBm	12.5 kHz: -117 dBm (380-450, 512-524 MHz) 12.5 kHz: –121.5 dBm (450-512 MHz) 25 kHz: -116 dBm (380-450, 512-524 MHz) 25 kHz: –120.5 dBm (450-512 MHz)	12.5/15 kHz: –118 dBm 25/30 kHz: -117 dBm	12.5 kHz: –123 dBm 25 kHz: -122 dBm
Digital Sensitivity 1% Bit Error Rate Static (BER)						
64 QAM	–101 dBm	N/A	N/A	N/A	N/A	N/A
16 QAM	–108 dBm	N/A	N/A	N/A	N/A	N/A
QPSK	–115 dBm	N/A	N/A	N/A	N/A	
Digital Sensitivity 5% Bit Error Rate Static (BER)						
C4FM	N/A	–123 dBm	–123 dBm	–117 dBm (380-450, 512-524 MHz) –121.5 dBm (450-512 MHz)	–118 dBm	–123 dBm
H-CPM	N/A	–118.5 dBm	–121 dBm	–115 dBm (380-450, 512-524MHz) –119.5 dBm (450-512 MHz)	–116 dBm	N/A
Intermodulation Rejection	75 dB**	80 dB	80 dB	80 dB	80 dB	80 dB
Digital Adjacent Channel Rejection	50 dB**	60 dB	60 dB	60 dB	60 dB	60 dB

* Includes Transmitter RF Distribution System for 900 MHz, 700/800 MHz, and UHF 450-512 MHz. Does not include Transmitter RF Distribution System for VHF, UHF 380-450, 512-524 MHz and High Power 800 MHz.
** Reference signal is QPSK

Specifications subject to change without notice.

GTR 8000 EXPANDABLE SITE SUBSYSTEM (SQM01SUM7054A) CONTINUED

RECEIVER (TOP OF CABINET)

	HPD	INTEGRATED VOICE & DATA				
	700/800 MHz	**900 MHz**	**700/800 MHz**	**UHF: 380-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Analog Adjacent Channel Rejection (EIA603)						
Analog 12.5 kHz	N/A	N/A	75 dB	75 dB	75 dB	75 dB
Analog Adjacent Channel Rejection (TIA603D)						
Analog 12.5 kHz	N/A	N/A	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)
Analog 25 kHz	N/A	N/A	80 dB	80 dB	80 dB	80 dB
Spurious and Image Response Rejection	90 dB**	100 dB	100 dB	85 dB (380-435 MHz) 100 dB (450-512 MHz)	90 dB	100 dB
Analog Audio Response	N/A	N/A	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output
Analog Audio Distortion	N/A	N/A	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)
Analog FM Hum and Noise						
12.5 kHz	N/A	N/A	45 dB	45 dB	45 dB	45 dB
25 kHz	N/A	N/A	50 dB	50 dB	50 dB	50 dB
Intermediate Frequency	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 44.85 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz

TRANSMITTER RF DISTRIBUTION SYSTEM

	700/800 MHz Cavity	**900 MHz Hybrid**	**UHF: 450-512 MHz Cavity**
Frequency Range	764-776, 851-870 MHz	935-941 MHz	450-512 MHz
Insertion Loss (150 kHz spacing)	3.1 dB typ	2-way loss: 4.4 dB typ 3-way loss: 6.3 dB typ 4-way loss: 7.6 dB typ 5-way loss: 8.8 dB typ 6-way loss: 9.7 dB typ	4.5 dB typ
Tx-Tx Isolation (150 kHz spacing)	32 dB	20 dB	32 dB

RECEIVER RF DISTRIBUTION SYSTEM

	700/800/900 MHz		**UHF: 450-512 MHz**	
Frequency Range	792-825 MHz or 896-902 MHz		450-512 MHz	
	Typical	**Limit**	**Typical**	**Limit**
Noise Figure	3.8 dB	5 dB	4.6 dB	5.5 dB
Gain	13 dB	–16 to 24 dB adjustable	10 dB	–16 to 24 dB adjustable
3rd Order Output Intercept	21 dBm		19 dBm	
Amplifier Intercept		35 dBm		40 dBm
Preselector Bandwidth	792-825 MHz or 896-902 MHz		2 or 3.5 MHz	
RF Input Connector Type	N		N	
RF Output Connector Type	BNC		BNC	

* Includes Transmitter RF Distribution System for 900 MHz, 700/800 MHz, and UHF 450-512 MHz. Does not include Transmitter RF Distribution System for VHF, UHF 380-450, 512-524 MHz and High Power 800 MHz.
** Reference signal is QPSK

Specifications subject to change without notice.

GCP 8000 SITE CONTROLLER (T7038A)

GENERAL PERFORMANCE

	HPD	INTEGRATED VOICE & DATA
Channel Capacity	5	Repeater Site: 28 Simulcast (Multicast): 30
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	5.25 x 19 x 18 in (133 x 483 x 457 mm)
Weight	40 lbs (18 kg)	40 lbs (18 kg)
Temperature Range	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)
Rack Option	19 in standard rack mountable	19 in standard rack mountable
Frequency Stability	GPS Synchronized	Simulcast (Multisite): External
ELECTRICAL		
Power Requirements	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC
Power Consumption	AC: 160 W DC: 80 W	AC: 130 W DC: 60 W

GCM 8000 COMPARATOR (T7321A)

GENERAL PERFORMANCE

	INTEGRATED VOICE & DATA
Channel Capacity	1 or 2
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)
Weight	40 lbs (18 kg)
Temperature Range	–22 to 140 °F (–30 to 60°C)
Rack Option	19 in standard rack mountable
Time Stability	External Reference
ELECTRICAL	
Power Requirements	AC: 90-264 VAC 47-63Hz DC: 43.2-60 VDC
Power Consumption	AC: 1 module 130 W AC: 2 modules 160 W DC: 1 module 60 W DC: 2 modules 80 W

GTR 8000 BASE RADIO (T7039A)

GENERAL PERFORMANCE

	HPD	INTEGRATED VOICE & DATA			
	700/800 MHz	**700/800 MHz**	**UHF: 380-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	5.25 x 19 x 18 in (133 x 483 x 457 mm)
Weight	46 lbs (21 kg)	46 lbs (21 kg)	46 lbs (21 kg)	46 lbs (21 kg)	48 lbs (22 kg)
Temperature Range	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)	–22 to 140 °F (–30 to 60°C)
Power Requirements	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC
Power Consumption Power Efficiency Package Standard	 325 W 325 W	 C4FM, FM: 405 W LSM, H-DPQSK: 425 W C4FM, FM: 430W LSM, H-DPQSK: 470 W	 C4FM, FM: 410 W LSM, H-DPQSK: 445 W C4FM, FM: 435 W LSM, H-DPQSK: 455 W	 C4FM, FM: 405 W LSM, H-DPQSK: 315 W C4FM, FM: 435 W LSM, H-DPQSK: 345 W	 C4FM, FM: 700 W C4FM, FM: 725 W
Antenna Connectors TX	N female	N female	N female	N female	N female
Antenna Connectors RX	BNC female	BNC female N female **	BNC female N female **	BNC female N female **	BNC female N female **
Channel Spacing	25 kHz	12.5/25 kHz	12.5/25 kHz	12.5/15/25/30 kHz	12.5/25 kHz
Modulation	TX: 64QAM, 16QAM, QPSK RX: 64QAM, 16QAM, QPSK	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: C4FM, LSM, H-DQPSK, FM RX: C4FM, H-CPM, FM	TX: FM, C4FM RX: C4FM, H-CPM, FM
Frequency Stability	External Reference	100 ppb/2 yr or External Reference	100 ppb/2 yr or External Reference	100 ppb/2 yr or External Reference	100 ppb/2 yr or External Reference

TRANSMITTER

	700/800 MHz	**700/800 MHz**	**UHF: 380-435 MHz UHF: 435-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Frequency Range	764-776, 851-870 MHz	764-776, 851-870 MHz	380-435, 435-524 MHz	136-174 MHz	851-870 MHz
Power Output	2-50 W	2-100 W	C4FM, FM: 2-110 W H-DQPSK, LSM: 2-100 W	C4FM, FM: 2-100 W H-DQPSK, LSM: 2-60 W	15-150W
Electronic Bandwidth	Full Bandwidth	Full Bandwidth	Full Bandwidth	Full Bandwidth	Full Bandwidth
Modulation Fidelity	N/A	5%	5%	5%	5%
EVM	10%	N/A	N/A	N/A	N/A
Intermodulation Attenuation	80 dB	80 dB	65 dB	55 dB	55 dB
Spurious and Harmonic Emissions Attenuation	90 dB	90 dB	90 dB	90 dB	90 dB
Analog FM Hum and Noise 12.5 kHz 25 kHz	 N/A N/A	 45 dB 50 dB	 45 dB 50 dB	 45 dB 50 dB	 45 dB 50 dB
Analog Audio Distortion	N/A	Less than 2% at 1000 Hz	Less than 2% (1% typical) at 1000 Hz	Less than 2% (1% typical) at 1000 Hz	Less than 2% at 1000 Hz
Emissions Designators	17K7D7D	8K70D1E, 8K70D1D, 8K70D1W 8K10F1E, 8K10F1D, 8K10F1W 10K0F1E, 10K0F1D, 10K0F1W 9K80D7E, 9K80D7D, 9K80D7W 17K7D7D, 16K0F1D, 16K0F3E 11K0F3E, 14K0F1D, 14K0F3E 21K7D7E, 21K7D7D, 21K7D7W	8K70D1E, 8K70D1D, 8K70D1W 8K10F1E, 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D, 9K80D7W 10K0F1D, 11K0F3E, 16K0F1D 16K0F3E	8K70D1E, 8K70D1D, 8K70D1W 8K10F1E, 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D, 9K80D7W 10K0F1D, 11K0F3E, 16K0F1D 16K0F3E	8K10F1E, 8K10F1D, 8K10F1W 16K0F1D, 16K0F3E, 11K0F3E 14K0F1D, 14K0F3

RECEIVER

	700/800 MHz	**700/800 MHz**	**UHF: 380-435 MHz UHF: 435-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Frequency Range	792-825 MHz	792-825 MHz	380-435, 435-524 MHz	136-174 MHz	806-825 MHz
Analog Sensitivity (12 dB SINAD)	N/A	12.5 kHz: –118 dBm 25 kHz: -117 dBm	12.5 kHz: –118 dBm 25 kHz: -117 dBm	12.5 kHz: –119 dBm 25/30 kHz: -118 dBm	12.5 kHz: –118 dBm 25 kHz: -117 dBm
Digital Sensitivity 1% Bit Error Rate Static (BER) 64 QAM 16 QAM QPSK	 –98 dBm –104 dBm –111 dBm	 N/A N/A N/A	 N/A N/A N/A	 N/A N/A N/A	 N/A N/A N/A
Digital Sensitivity 5% Bit Error Rate Static (BER) C4FM H-CPM	 N/A N/A	 –118 dBm –116 dBm	 –118 dBm –116 dBm	 –119 dBm –117 dBm	 –118 dBm –116 dBm

* Reference signal is QPSK ** Optional Preselector
Specifications subject to change without notice.

GTR 8000 BASE RADIO (T7039A) CONTINUED

RECEIVER

	HPD	INTEGRATED VOICE & DATA			
	700/800 MHz	**700/800 MHz**	**UHF: 380-435 MHz UHF: 435-524 MHz**	**VHF: 136-174 MHz**	**High Power 800 MHz**
Intermodulation Rejection	75 dB*	85 dB	85 dB	85 dB	85 dB
Digital Adjacent Channel Rejection	50 dB*	60 dB	60 dB	60 dB	60 dB
Analog Adjacent Channel Rejection (EIA603) Analog 12.5 kHz	N/A	75 dB	75 dB	75 dB	75 dB
Analog Adjacent Channel Rejection (TIA603D)					
Analog 12.5 kHz	N/A	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)
Analog 25 kHz	N/A	80 dB	80 dB	80 dB	80 dB
Spurious and Image Response Rejection	85 dB*	85 dB 100 dB**	85 dB 100 dB**	90 dB 95 dB**	85 dB 100 dB**
Analog Audio Response	N/A	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output
Analog Audio Distortion	N/A	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)
Analog FM Hum and Noise					
12.5 kHz					
25 kHz	N/A	45 dB	45 dB	45 dB	45 dB
	N/A	50 dB	50 dB	50 dB	50 dB
Intermediate Frequency	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 44.85 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz

GPW 8000 RECEIVER (T7540A)

GENERAL PERFORMANCE

	INTEGRATED VOICE & DATA					
	700/800 MHz		**UHF: 380-435 MHz UHF: 435-524 MHz**		**VHF: 136-174 MHz**	
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)		5.25 x 19 x 18 in (133 x 483 x 457 mm)		5.25 x 19 x 18 in (133 x 483 x 457 mm)	
Weight	36 lbs (16 kg)		36 lbs (16 kg)		36 lbs (16 kg)	
Temperature Range	–22 to 140 °F (–30 to 60°C)		–22 to 140 °F (–30 to 60°C)		–22 to 140 °F (–30 to 60°C)	
Power Requirements						
AC	90-264 VAC, 47-63 Hz		90-264 VAC, 47-63 Hz		90-264 VAC, 47-63 Hz	
DC	43.2-60 VDC		43.2-60 VDC		43.2-60 VDC	
Power Consumption	1 Module	2 Module	1 Module	2 Module	1 Module	2 Module
AC – Power Efficiency Package	40 W	65 W	40 W	65 W	40 W	65 W
DC – Power Efficiency Package	30 W	50 W	30 W	50 W	30 W	50 W
AC	80 W	105 W	80 W	105 W	80 W	105 W
DC	50 W	75 W	50 W	75 W	50 W	75 W
Antenna Connectors RX	BNC female N female **		BNC female N female **		BNC female N female **	
Channel Spacing	12.5/25 kHz		12.5/25 kHz		12.5/15/25/30 kHz	
Modulation	C4FM, FM		C4FM, FM		C4FM, FM	
Frequency Stability	Conventional: 100 ppb/2 yr		Conventional: 100 ppb/2 yr		Conventional: 100 ppb/2 yr	

* Reference signal is QPSK ** Optional Preselector

Specifications subject to change without notice.

GPW 8000 RECEIVER (T7540A) CONTINUED

RECEIVER

	INTEGRATED VOICE & DATA - CONVENTIONAL		
	700/800 MHz	**UHF: 380-435 MHz UHF: 435-524 MHz**	**VHF: 136-174 MHz**
Frequency Range	792-825 MHz	380-435 MHz, 435-524 MHz	136-174 MHz
Analog Sensitivity 12 dB SINAD	12.5 kHz: –118 dBm 25 kHz: -117 dBm	12.5 kHz: –118 dBm 25 kHz: -117 dBm	12.5/15 kHz: –119 dBm 25/30 kHz: -118 dBm
Digital Sensitivity 5% Bit Error Rate Static (BER)			
C4FM	–118 dBm	–118 dBm	–119 dBm
H-CPM	–116 dBm	–116 dBm	–117 dBm
Intermodulation Rejection	85 dB	85 dB	85 dB
Digital Adjacent Channel Rejection	60 dB	60 dB	60 dB
Analog Adjacent Channel Rejection (EIA603)			
Analog 12.5 kHz Analog 25 kHz	75 dB	75 dB	75 dB
Analog Adjacent Channel Rejection (TIA603D)			
Analog 12.5 kHz	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)
Analog 25 kHz	80 dB	80 dB	80 dB
Spurious and Image Response Rejection	85 dB 100 dB*	85 dB 100 dB*	90 dB 95 dB*
Analog Audio Response	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output
Analog Audio Distortion	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)
Analog FM Hum and Noise			
Analog 12.5 kHz	45 dB	45 dB	45 dB
Analog 25 kHz	50 dB	50 dB	50 dB
Intermediate Frequency	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 73.35 MHz 2nd: 2.16 MHz	1st: 44.85 MHz 2nd: 2.16 MHz

* Optional Preselector.

Specifications subject to change without notice.

GTR 8000 SITE SUBSYSTEM (T7133A)

GENERAL PERFORMANCE

	HPD
	700/800 MHz
Number of Channels	1
Height	27 RU, 50.4 in (128 cm)
Footprint (W x D)	20.9 x 25.4 in (53 x 64.5 cm)
Weight	225 lbs (102 kg)
Temperature Range	–22 to 140 °F (–30 to 60°C)
Power Requirements	AC: 90-264 VAC, 47-63 Hz DC: 43.2-60 VDC
Power Consumption (fully configured)	AC: 615 W DC: 495 W
Antenna Connectors TX	N Female
Antenna Connectors RX	N Female
Channel Spacing	25 kHz
Modulation	TX: 64QAM, 16QAM, QPSK RX: 64QAM, 16QAM, QPSK
Frequency Stability	GPS synchronized

TRANSMITTER INCLUDING RFDS

	HPD
	700/800 MHz
Frequency Range	764-776, 851-870 MHz
Average Power output per channel	1-27 W
Electronic Bandwidth	Full Bandwidth
Error Vector Magnitude	10%
Spurious and Harmonic Emissions Attenuation	90 dB
Emissions Designators	17K7D7D

RECEIVER INCLUDING RFDS

	HPD
	700/800 MHz
Frequency Range	792-825 MHz
Sensitivity 1% Bit Error Rate Static (BER)	
64 QAM	–101 dBm
16 QAM	–108 dBm
QPSK	–115 dBm
Intermodulation Rejection	75 dB*
Adjacent Channel Rejection	50 dB*
Spurious and Image Response Rejection	90 dB*
Intermediate Frequency	
1st	73.35 MHz
2nd	2.16 MHz
Preselector Bandwidth	792-825 MHz

* Reference signal is QPSK.

Specifications subject to change without notice.

FCC TYPE ACCEPTANCE

FCC DESIGNATION

Frequency Range	Type	Power Output	Type Acceptance Number
136-174 MHz	Transmitter	2-100 W	ABZ89FC3790B, ABZ89FC3799B
136-174 MHz	Receiver	N/A	ABZ89FR3791B
406-435 MHz	Transmitter	2-110 W	ABZ89FC4821B
406-435 MHz	Receiver	N/A	ABZ89FR4822B
435-512 MHz	Transmitter	2-110 W	ABZ89FC4819B
435-512 MHz	Receiver	N/A	ABZ89FR4820B
764-776 MHz	Transmitter	2-100 W 2-50 W (HPD)	ABZ89FC5812B
851-870 MHz	Transmitter	2-100 W 2-50 W (HPD)	ABZ89FC5810B
792-825 MHz	Receiver	N/A	ABZ89FR5811B
935-941 MHz	Transmitter	2-120 W	ABZ89FC5823B
896-902 MHz	Receiver	N/A	ABZ89FR5824B
851-870 MHz	Transmitter	15-150W	ABZ89FC5825B

EU REGULATORY COMPLIANCE

CE mark is available on the GCM 8000 Comparator (T7321A), GCP 8000 Site Controller (T7038A), GTR 8000 Base Radio (T7039A) and GPW 8000 Receiver (T7540A) in the following frequency ranges: UHF 380-525 MHz and VHF 136-174 MHz.

Specifications subject to change without notice.

Motorola Solutions, Inc. 1301 E. Algonquin Road, Schaumburg, Illinois 60196 U.S.A. **motorolasolutions.com/ASTRO25**

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