MOTOROLA

ASTRO 25 G-series Ordering Guidelines

GTR 8000 Base Radio
GTR 8000 Expandable Site Subsystem
GTR 8000 Site Subsystem
GPW 8000 Receiver
GCP 8000 Site Controller
GCM 8000 Comparator
GPB 8000 Reference Distribution Module
G-Series Software Upgrades
G-series Hardware Upgrades

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PURPOSE AND SCOPE

This document defines the ordering instructions for the GTR 8000 Base Radio, the GPW 8000 Base Radio, the GTR 8000 Site Subsystem, GTR 8000 Expandable Site Subsystem, the GPB 8000 Reference Distribution Module, the GCP 8000 Site Controller, and the GCM 8000 Comparator. This document will be replaced by ECAT once the product is ship accepted. Prices are subject to change without notice.

ACRONYMS

ENH	Enhanced (Data)
HPD	High Performance Data
IR	Intellirepeater
IV&D	Integrated Voice & Data
RFDS	Radio Frequency Distribution System
RMC	Receiver Multicoupler
RX	Receive
TX	Transmit

CONFIGURATIONS

HPD: In High Performance Data, the GTR 8000 Site Subsystem is the ONLY configuration that will provide coverage equal to voice. Other configurations can be ordered, but the outbound coverage will be reduced. The GTR 8000 Site Subsystem is only available with HPD software. Also, HPD is only available in 700 and 800 MHz systems.

CONVENTIONAL IV&D, ANALOG, AND MIXED MODE: In a conventional configuration, standalone base radios, GPW 8000 Receivers and GTR 8000 Expandable Site Subsystems can be ordered. GCM 8000 Conventional Comparators support IP transport links and connect via IP to the ASTRO 25 Core. The MLC 8000 provides a companion device for analog and mixed mode comparator operation, and provides a circuit to IP interface converter for connecting the GCM 8000 to V.24 stations equipment.

3600 TRUNKING SIMULCAST: Introduces 3600-based trunking simulcast functionality in the GTR 8000 station (ESS or Standalone model). This feature is only supported on ASTRO 25 systems with SmartX. The 3600 GTR is not being developed to operate on fielded SMARTNET or SmartZone systems.

3600 INTELLIREPEATER: Introduces 3600-based trunking intellirepeater functionality in the GTR 8000 station (ESS model only). This feature is only supported on ASTRO 25 systems with SmartX. The 3600 GTR is not being developed to operate on fielded SMARTNET or SmartZone systems.

SITE REPEATER: Trunking Site Repeater sites are available with GTR 8000 Expandable Site Subsystems or Standalone GTR 8000 Base Radios/GCP 8000 Site Controllers. The Standalone GTR 8000 Base Radio is also available with Site Repeater Software when being ordered to retrofit into an existing 700/800 MHz site with QUANTARs or STR 3000s.

ASTRO 25 Express: The Standalone GTR 8000 Base Radio/GCP 8000 Site Controller and GTR 8000 Expandable Site Subsystem (ESS) configurations are available for ASTRO 25 Express sites. ASTRO 25 Express Sites are limited to 18 channels maximum for the ESS configuration and 6 channels maximum for the Standalone configuration.

TRUNKING SIMULCAST (MULTISITE SIMULCAST/VOTING**):** In a Simulcast configuration, standalone base radios, standalone site controllers and GTR 8000 Expandable Site Subsystems can be ordered. GCM 8000 Comparators must be ordered for IP simulcast operation.

HIGH-AVAILABILITY TRUNKING SIMULCAST (MULTISITE SIMULCAST/VOTING**):** Only the GTR 8000 Expandable Site Subsystem supports High Availability Simulcast Remote Sites. GPB 8000 Reference Distribution Modules (CA01536AA) and High Availability XHUBs (CA00885AA) enable this capability. GCM 8000 Comparators must be ordered for IP simulcast operation.

"WHAT TO BUY" HPD CONFIGURATION MATRIX
Please reference the matrix in the G-series Product Planner and Ordering Guide available on the Literature Distribution Site for information on what configuration is recommended for your specific HPD needs.

ORDERING GUIDELINES FOR GTR 8000 BASE RADIO

1. Main Model

The following main model must be ordered for a GTR 8000 Base Radio.

T7039A	GTR 8000 BASE RADIO

Ordering Note: Only order a quantity of one of the T7039A per line item. This model number will automatically generate internally added options for all hardware components that are not part of an orderable option (such as cabling).

2. Frequency Band and Power Level

Enter the Frequency Band option:

CA00855AA	ADD : 700/800 MHZ MID POWER
X640AL	ADD : UHF R2 MID POWER (435-524)
X530BG	ADD : VHF MID POWER (136-174)
X448AA	ADD : UHF R1 MID POWER (380-435)

Ordering Note: One TX and one RX frequency must be specified and will be collected at the main model level.

700/800 MHz: Frequency Rules for CA00855AA
RX Range: 794.00625 - 824.99375 MHz.
TX Range: 764.00625 - 775.99375 MHz and 851.00625 - 869.99375 MHz

If Freq (TX) is 764.00625 - 775.99375 MHz, then Freq (Rx) = TX + 30
If Freq (TX) is 851.00625 - 869.99375 MHz, then Freq (Rx) = TX – 45
All frequencies must be divisible by 2.5 or 3.125 kHz.
Note: Currently, 796.09375, 806.88125, 808.31875, and 822.375 are not supported for Rx.

UHF R2: Frequency Rules for X640AL
RX Range: 435.0000-524.0000 MHz.
TX Range: 435.0000-524.0000 MHz

If Freq (TX) is 435-524 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 2.5 or 3.125 kHz.
Note: Currently, 454.500, 474.6375, 494.05625, and 511.3125 are not supported for Rx. When ordering conventional software (option CA01949AA or CA01948AA), TX and RX frequencies can be equal when the antenna relay option CA01504AA is ordered.

UHF R1: Frequency Rules for X448AA
RX Range: 380.0000 – 435.0000 MHz.
TX Range: 380.0000 – 435.0000 MHz

If Freq (TX) is 380-435 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 2.5 or 3.125 kHz.
Note: Currently, 380.250 and 416.925 MHz are not supported for Rx. When ordering conventional software (option CA01949AA or CA01948AA), TX and RX frequencies can be equal when the antenna relay option CA01504AA is ordered.

VHF: Frequency Rules for X530BG
RX Range: 136.0000 – 174.0000 MHz.
TX Range: 136.0000 – 174.0000 MHz

If Freq (TX) is 136 - 174 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 2.5 or 3.125 kHz.
Note: When ordering conventional software (option CA01949AA or CA01948AA), TX and RX frequencies can be equal when the antenna relay option CA01504AA is ordered.

3. 150W High Power 800MHz PA

   Enter the following option if 150W 800MHz PA is required:

CA02478AA	ADD: 800MHZ 150W HI POWER

This option is compatible with the following BR software:
X591AE, CA02207AA, CA02209AA, CA01948AA, CA01949AA

4. Base Radio Software

One base radio software option must be ordered.

HPD
Provides the station with HPD software. HPD is compatible only with the 700 & 800 MHz frequency bands.

CA00294AA	ADD : 25 KHZ HIGH PERFORMANCE DATA BASE RADIO SOFTWARE

P25 Trunking
Trunking base radio software is P25 Phase 1 compliant (CA00025AF, CA01193AA, X591AE, CA01430AA).

CA00025AF	ADD : CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE

CA01193AA	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE
X591AE	ENH : ASTRO 25 SITE REPEATER SOFTWARE
CA01430AA	ADD: ASTRO 25 EXPRESS SYSTEM SINGLE SITE BASE RADIO SOFTWARE

CA01430AA: **ASTRO 25 Express Systems** are a specific configuration of the GTR 8000 Base Radios that are certified to operate in a single-site mode without a separate Master Site. This configuration is supported with a maximum of 6 stand alone base radios.

3600 Trunking
* Only supported on systems with SmartX

CA02207AA	ADD : 3600 TRUNKING SIMULCAST

Replacement FRUs: When ordering spare transceiver FRUs for 3600 Trunking base radios, FRUs with Option Cards must be ordered

CA02207AA (3600 Trunking Simulcast) software enabled GTR 8000 base radios require specific networking equipment to be present at the site. Please note additional equipment listed below that may need to be ordered. Refer to the "*Quick Guide for Replacing a Trunked 3600 QUANTAR with a GTR 8000 Base Radio*" manual for more details on site architecture and installation.
1. REQUIRED if 3600 Trunking Simulcast software is present at a site - **HP2620 Network Switch (Qty 1 for 1-13 base radios; Qty 2 for 13+base radios)**
    * Order Model CLN1856A
    * Updated OS software may be required. Refer to FSB 10744 for more details.
2. OPTIONAL if IP connectivity to the base radios is desired - **GGM 8000 (Qty 1 per site)**
    * Order Standalone Model SQM01SUM0205
    * Software patches may be required. Contact Christy Garippo (Christy.Garippo@motorolasolutions.com) for more details.

Conventional
Conventional is incompatible with all TDMA capability options (CA01376AA and CA01842AA).

An internal frequency reference option card is automatically included when any of the conventional software options are ordered below (formerly available as optional feature CA01506AA). The GTR 8000 cannot synthesize transmit and receive frequencies without this option card. When ordering replacement FRUs for a conventional GTR, be sure to order a transceiver with option card.

See additional sections below to add options for simulcast and voting capabilities.

CA01948AA	ADD: CONVENTIONAL SOFTWARE
CA01949AA	ADD: ANALOG ONLY CONV SW

Replacement FRUs: When ordering spare transceiver FRUs for Conventional base radios, FRUs with Option Cards must be ordered

CA01948AA provides a similar feature set to the QUANTAR conventional base radio. Configurable for digital Project 25 FDMA operation, analog conventional operation, and mixed mode (digital P25 and analog) operation. Supports IP, digital V.24, analog 4wire and mixed mode 4-wire/V.24 hybrid circuit wireline link interfaces. 16 programmable channel personalities. Each channel personality can be configured for base station, repeater, simplex, or receive only operation. Supports multi-channel operation. Multi-NAC and Wildcard options are supported with purchase of additional licenses. The CSS (Configuration Service Software) install disc is included with this option.

CA01949AA provides a circuit analog conventional base radio. *Digital and mixed mode operation is not supported by this software*. This base radio software supports 2wire, 4wire, and 8wire circuit analog wireline links. 16 programmable channel personalities. Each channel personality can be configured for base station, repeater, simplex, or receive only operation. TRC wireline keying is supported, with a full complement of programmable function tones. The CSS (Configuration Service Software) install disc is included with this option.

5. Energy Efficiency Options

This optional feature provides hardware and software for reduced power consumption to accommodate needs at sites without grid power or that are driven off alternative energy sources.

CA01953AA	ADD : POWER EFFICIENCY PACKAGE

Replacement FRUs: Order **DLN6793A** (FRU: PWR EFF POWER SUPPLY AC/48VDC) as spare power supply FRU for products with the G-Series Power Efficiency Package

6. CE Label

Add this option if the CE mark needs to be included on the product label for shipment to the European Union.

NOTE: Ordering restrictions apply. The following orderable options must be included to meet CE requirements.
    Frequency Band: UHFR2 (X448AA), UHF R1 (X640AL), or VHF (X530BG)
    Base Radio Software: Digital Conventional (CA01948AA)
    Energy Efficiency: Power Efficiency Package (CA01953AA)
    RFDS Peripherals are not supported

CA02310AA	ADD: R&TTE CERTIFICATION

7. Two-slot TDMA Enhancements

P25 Phase 2 TDMA Software
Choose the appropriate two-slot TDMA enhancement option to provide the radio with additional talkpaths/call capacity and functionality. CA01842AA is optional.

Dynamic Channel Assignment Software
Order this option to add the capability of Dynamic Channel Assignment between P25 FDMA and P25 TDMA to the base radio. CA01902AA is optional, but requires that CA01842AA also be ordered.

CA01842AA	ADD : P25 TDMA SOFTWARE
CA01902AA	ADD : DYNAMIC CHANNEL ASSIGNEMENT SOFTWARE

CA01842AA provides the base radio with the ability to operate in P25 TDMA Compliant 6.25e kHz two-slot TDMA mode. This provides two TDMA talkpaths per base radio on a 12.5 kHz channel. This option is not available in ASTRO 25 Conventional operation.

CA01902AA provides the base radio with the ability to switch between transmitting in 12.5 kHz FDMA mode or in 6.25e kHz TDMA mode. The base radio will dynamically change modes depending on the nature of the subscribers in the assigned talkgroup. This option is only available when P25 Phase 2 TDMA Software (CA01842AA) is also ordered.

8. Conventional Software System Configuration

Choose the appropriate optional conventional software system configuration if required.

CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
CA01502AA	ADD : ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
CA01505AA	ADD : ASTRO 25 CONVENTIONAL VOTING SOFTWARE
CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
CA01951AA	ADD: ANALOG CONVENTIONAL VOTING SOFTWARE

CA01502AA provides P25 digital-only simulcast conventional operation. The GTR 8000 can be configured for P25 C4FM modulation, or Motorola's P25-compatible LSM (Linear Simulcast Modulation) for extended outbound coverage when compared to P25 C4FM. The GTR 8000 can be configured to operate with the GCM 8000 Comparator, using IP network transports in an ASTRO 25 network. The GTR 8000 can also be configured to operate with the ASTRO-TAC 3000, with V.24 circuit transport connectivity. It is not recommended to mix GTR 8000 and QUANTAR digital simulcast stations on the same simulcast channel/frequency. Consult the G-Series Product Planner for more details.

CA01505AA provides P25 digital-only or mixed analog/digital voting conventional operation. The GTR 8000 can be configured for P25 C4FM modulation, or Motorola's P25-compatible LSM (Linear Simulcast Modulation) for extended outbound coverage when compared to P25 C4FM. The GTR 8000 can be configured to operate with the GCM 8000 Comparator, using IP network transports in an ASTRO 25 network. The GTR 8000 can also be configured to operate with the ASTRO-TAC 3000, with V.24 circuit transport connectivity. Consult the G-Series Product Planner for more details.

CA01952AA provides the analog conventional base radio with the Gen Tx Data and E&M keying interface to a DSM channel bank card. The base radio must be provided with a 5MHZ/1PPS composite reference to ensure the timing and signal integrity required for analog simulcast. The GTR 8000 base radio cannot be mixed with QUANTAR analog simulcast stations on the same simulcast channel/frequency.

CA01951AA supports analog transmit and receive operation when connected to SpectraTAC, DIGITAC, and other TRC comparators in a voting channel configuration.

 CA01946AA, CA01502AA and **CA01505AA** are only available when ordered with **CA01948AA**

CA01952AA and **CA01951AA** are only available when ordered with **CA01949AA**

9. Conventional Features

Choose the appropriate optional system feature options if required.

CA01504AA	ADD : ANTENNA RELAY
CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST
CA01947AA	ADD: RECEIVER SCAN OPERATION
CA01950AA	ADD: CONV MULTI-NAC MULTI-PL
CA01954AA	ADD: WILDCARD w/GPIO
CA01955AA	ADD: MAIN/STANDBY OPERATION
CA02680AA	ADD: CONVENTIONAL TALKGROUPS

CA01504AA required for base stations with a single antenna and allows one antenna to be used for both transmit and receive signals.

CA01503AA enables the station to continue to receive and transmit when communication with the comparator is lost.

CA01947AA provides the ability to scan for qualified activity on up to 16 receive frequencies. The receive frequencies are assigned in the 16 programmable channel personalities. Scan operation can be suspended and resumed by TRC WildCard programming.

CA01950AA enables multiple PL tones (analog) or multiple NACs (digital P25 Network Access Codes) to be detected on a single channel. Each of the 16 channel personalities can be configured with a list of PL tones and NACs to use for receiver qualifiers.

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom base radio interface applications.

CA01955AA provides WildCard programming presets and cabling for a side-by-side base radio main/standby configuration.

CA02680AA enables conventional talkgroups. Order Qty 1 per base radio. (Requires 7.15+ software release version). NOTE: For QUANTARs, this option is not required. Simply order a QUANTAR software upgrade to 7.15.

10. 3600 Trunking Features

Choose the appropriate optional system features.

CA01954AA	ADD: WILDCARD w/GPIO
CA01955AA	ADD: MAIN/STANDBY OPERATION
CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom base radio interface applications.

CA01955AA provides WildCard programming presets and cabling for a side-by-side base radio main/standby configuration.

CA01503AA enables the station to continue to receive and transmit when communication with the comparator is lost.

11. Peripherals

9.1 Tx Filters and Duplexers: Tx Filters are not compatible with Duplexers. In circuit or IP simulcast configurations the PMU on the TX filters are not functional.

700/800 MHz: If the customer frequencies are in the 700 MHz frequency range (Tx: 764.00625 - 775.99375 MHz), the customer must order X182BW or CA00882AA per FCC licensing rules. If the customer frequencies are in the 800 MHz frequency range (Tx: 851.00625 - 869.99375 MHz), the following peripherals are optional.

UHF (R1 380-435 MHz, R2 435-524 MHz): The following peripherals are optional.

VHF (136-174 MHz): The following peripherals are optional. TX and RX frequencies must be at least 1.5 MHz apart if peripherals are desired.

X182BW	ADD : DUPLEXER, 700 MHZ
X182BX	ADD : DUPLEXER, 800 MHZ
X182BZ	ADD : DUPLEXER, UHF 380-512 MHz
X182CC	ADD : DUPLEXER 136-146 MHZ
X182CB	ADD : DUPLEXER 144-160 MHZ
X182CA	ADD : DUPLEXER 158-174 MHZ
CA00882AA	ADD : 700 MHz TX FILTER w/PMU
CA00883AA	ADD : 800 MHz TX FILTER w/PMU

X182BW provides the option of using the same antenna for receive and transmit in the 700 MHz standalone base radio configuration. This option provides the filtering required by the FCC for 700 MHz.

X182BX provides the option of using the same antenna for receive and transmit in the 800 MHz standalone base radio configuration.

X182BZ provides the option of using the same antenna for receive and transmit in the UHF standalone base radio configuration. If the X182BZ is ordered, X265AP (ADD: NARROW PRESELECTOR, 380-512 MHz) is required. The transmit frequencies must fall within one of the following subbands: 380-403, 403-435, 435-470, 470-494, and 494-512 MHz. Also, above 470 MHz, the Tx and Rx frequency separation should be at least 3.0 MHz for best performance. Below 470 MHz, the Tx and Rx frequency separation should be at least 5.0 MHz for best performance.

X182CC provides the option of using the same antenna for receive and transmit in the VHF (136-146 MHz) standalone base radio configuration. If the X182CC is ordered, the X265AN (ADD: NARROW PRESELECTOR, 136-154) is required. The Tx and Rx frequency separation must be at least 1.5 MHz for best performance.

X182CB provides the option of using the same antenna for receive and transmit in the VHF (144-160 MHz) standalone base radio configuration. If the X182CB is ordered, the X265AN (ADD: NARROW PRESELECTOR, 136-154) or X265AM (ADD: NARROW PRESELECTOR, 150-174) are required. The Tx and Rx frequency separation must be at least 1.5 MHz for best performance.

X182CA provides the option of using the same antenna for receive and transmit in the VHF (158-174 MHz) standalone base radio configuration. If the X182CA is ordered, the X265AM (ADD: NARROW PRESELECTOR, 150-174) is required. The Tx and Rx frequency separation must be at least 1.5 MHz for best performance.

CA00882AA provides the TX filtering of up to 12 combined 700 MHz transmitters. The Tx filter can be added after the cavity combiner.

CA00883AA provides the required TX filtering of up to 12 combined 800 MHz transmitters. The Tx filter can be added after the cavity combiner.

9.2 Narrow Preselector: The Base Radio Preselector rejects unwanted signals including the transmitter signals from overloading the receiver. If TIA102-CAAB Class A spurious response rejection (90 dB) specification is required, the Base Radio Preselector must be ordered. The Narrow Preselector is optional.

If a Duplexer is to be ordered also, a Narrow Preselector is required for UHF (X448AA or X640AL) or VHF (X530BG) systems.

Compatibility: The preselectors are not compatible with P25 Phase 2 TDMA (CA01842AA) software and with HPD operation (CA00294AA).

X265AJ	ADD : BASE RADIO PRESELECTOR, 700 MHz
X265AH	ADD : BASE RADIO PRESELECTOR, 800 MHz
X265AN	ADD : BASE RADIO PRESELECTOR, (136 – 154 MHZ)
X265AM	ADD : BASE RADIO PRESELECTOR, (150 – 174 MHZ)
X265AP	ADD : BASE RADIO PRESELECTOR, (380 – 512 MHZ)

X265AJ provides RX filtering in the 700 MHz standalone base radio configuration and is attached to the back side of the base radio.

X265AH provides RX filtering in the 800 MHz standalone base radio configuration and is attached to the back side of the base radio.

X265AN provides RX filtering in the VHF subband 136 - 154 MHz for the standalone base radio configuration and is attached to the back side of the base radio. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz.

X265AM provides RX filtering in the VHF subband 150 – 174 MHz for the standalone base radio configuration and is attached to the back side of the base radio. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz.

X265AP provides RX filtering in the UHF subband 380-512 MHz for the standalone base radio configuration and is attached to the back side of the base radio. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz.

9.3 Dual Circulator: If an external dual circulator is needed, order quantity one of X676BF, X676BG, X676BJ, X676BI or X676BH based on the frequency of the system.

> **NOTE: The dual circulator is not compatible when the base radio ordered is using Linear Simulcast Modulation (LSM) in the UHF (X640AL or X448AA) or the VHF frequency band (X530BG).**

X676BF	ADD : 700/800 MHZ EXTERNAL DUAL CIRCULATOR
X676BG	ADD : UHF EXTERNAL DUAL CIRCULATOR (380-512 MHZ)
X676BJ	ADD : EXT DUAL CIRCULATOR, 136 – 146 MHZ
X676BI	ADD : EXT DUAL CIRCULATOR, 144 – 160 MHZ
X676BH	ADD : EXT DUAL CIRCULATOR, 158 – 174 MHZ

X676BF adds 2 circulators and a low pass filter that are mounted on a 2 rack unit tray for the 700/800 MHz band. Since the power amplifier has one circulator, this option brings the total number of circulators to three.

X676BG adds 2 circulators and a low pass filter that are mounted on a 2 rack unit tray for the UHF band (380 – 524 MHz). Since the power amplifier has one circulator, this option brings the total number of circulators to three. All Tx frequencies must fall within one of the following subbands: 380-403, 403-470, or 470-512 MHz.

X676BJ adds 2 circulators and a low pass filter that are mounted on a 2 rack unit tray for the VHF band (136 – 146 MHz). Since the power amplifier has one circulator, this option brings the total number of circulators to three.

X676BI adds 2 circulators and a low pass filter that are mounted on a 2 rack unit tray for the VHF band (144 – 160 MHz). Since the power amplifier has one circulator, this option brings the total number of circulators to three.

X676BH adds 2 circulators and a low pass filter that are mounted on a 2 rack unit tray for the VHF band (158 – 174 MHz). Since the power amplifier has one circulator, this option brings the total number of circulators to three.

9.4 Optional Conventional Hardware Kits
The following kits provide add-on hardware (including associated cables and fasteners) with installation instructions for specialized Conventional base radio solutions.

CA01958AA	ADD: T2-2R RECEIVER MUTE

CA01959AA	ADD: T3-3R RECEIVER MUTE
CA01960AA	ADD: T4-4R RECEIVER MUTE
CA01961AA	ADD: RCVR SOFT NO SPLITTER
CA01957AA	ADD: T1-2R W/ TALKAROUND
CA01962AA	ADD: T2-2R DUPLEXER & TRPL RELAY

12. Cables

A 12 foot AC power cable will come standard with the base radio. If a DC power cable is required, order option CA01400AA and a DC cable will be shipped in addition to the AC cable. If a region-specific AC power cable is required for international applications, please order one of the following power cables and it will be shipped instead of the domestic North America power cable.

A Battery Temperature Sensor and a 40 foot long cable are included when CA01400AA option is ordered.

The CA00975AA option offers an extension cable that provides a 50 foot extension. Up to 3 extensions can be ordered.

CA01400AA	ADD : POWER CABLE, DC
X187AK	ADD : POWER CABLE, EUROPE
X162AE	ADD : POWER CABLE, UK
X191AF	ADD : POWER CABLE, AUSTRALIA
CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

13. Rack Mount Hardware

Choose rack mount hardware, if required.

X153AW	ADD : RACK MOUNT HARDWARE

X153AW provides rack mount hardware for the base radio as well as any associated optional/peripheral equipment. It should be selected if the base radio will be installed in standard 19-inch relay racks or if it is being installed into an existing Quantar rack.

14. Cabinets

Choose cabinet if required.
When cabinet option is ordered with a base radio, the radio will be mounted into the cabinet. Additional base radios will need to be mounted into the cabinet in the field.

CA02446AA	ADD: G-SERIES INDOOR CABINET 15RU
CA02447AA	ADD: G-SERIES INDOOR CABINET 24RU

15. Retrofit Kits

If the GTR 8000 is being added to an existing Quantar or STR 3000 site, one of the following options must be ordered.

CA00951AA	ADD : STR 3000 RETROFIT HARDWARE
CA00952AA	ADD : QUANTAR RETROFIT HARDWARE

CA00951AA is available for 700 and 800 MHz Simulcast Sites and for 700 MHz Site Repeater Sites.

CA00952AA is available for Quantar sites operating in UHF 435-524 MHz Site Repeater and Simulcast Sites, VHF 136-174 MHz Site Repeater and Simulcast Sites and 800 MHz Site Repeater Sites.

ORDERING GUIDELINES FOR GPW 8000 RECEIVER

1. Main Model
The following main model must be ordered for a GPW 8000 Receiver.

T7540A	GPW 8000 RECEIVER

Ordering Note: Only order a quantity of one of the T7540A per line item. This model number will automatically generate internally added options for all hardware components that are not part of an orderable option (such as cabling).

2. Receiver Modules
Order the number of receiver modules per chassis.

X301AR	ADD: QTY 1 GPW 8000 RECEIVER
X302AR	ADD: QTY 2 GPW 8000 RECEIVER

3. Frequency Band and Power Level

Enter the Frequency Band option. Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

X302AR supports dual band in a single chassis. For example: 1 X530BH can be ordered for one module and X640AN can be ordered for the other module.

CA00855AB	ADD : 700/800 MHZ MID POWER
X640AN	ADD : UHF R2 MID POWER (435-524)
X530BH	ADD : VHF MID POWER (136-174)
X448AB	ADD : UHF R1 MID POWER (380-435)
CA01821AB	ADD: 900 MHZ HIGH POWER

Ordering Note: RX frequencies must be specified and will be collected at the main model level.

700/800 MHz: Frequency Rules for CA00855AB
RX Range: 794.00625 - 824.99375 MHz.

All frequencies must be divisible by 2.500 or 3.125 KHz.
   Note: Currently, 796.09375, 806.88125, 808.31875, 822.375 MHZ are not supported for Rx.

UHF R2: Frequency Rules for X640AN
RX Range: 435.0000-524.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125. KHz
    Note: Currently, 454.500, 474.6375, 494.05625, 511.3125 MHZ are not supported for Rx.

UHF R1: Frequency Rules for X448AB
RX Range: 380.0000 – 435.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125. KHz
    Note: Currently, 380.250, 416.925 MHz are not supported for Rx.

VHF: Frequency Rules for X530BH
RX Range: 136.0000 – 174.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125.KHz.
Note: Currently the following frequencies are not supported for Rx: 160.000 and 161.925 MHz.

4. Operational Software

Choose the appropriate system software option to provide the satellite receiver with system software. Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

Two different applications can be in a single chassis. For example, one receiver module can be Conventional and the other can be Trunking.

Conventional Software:

CA01948AB	ADD: CONVENTIONAL SOFTWARE R/X ONLY
CA01949AB	ADD: ANALOG ONLY CONV SW R/X ONLY

    Replacement FRUs: When ordering spare transceiver FRUs for Conventional receivers, FRUs with Option Cards must be ordered

CA01948AB* provides a similar feature set to the QUANTAR conventional receiver. Configurable for digital Project 25 FDMA operation, analog conventional operation, and mixed mode (digital P25 and analog) operation. Supports IP, digital V.24, analog 4wire and mixed mode 4-wire/V.24 hybrid circuit wireline link interfaces. 16 programmable channel personalities. Supports multi-channel operation. Multi-NAC and Wildcard options are supported with purchase of additional licenses. The CSS (Configuration Service Software) install disc is included with this option.

CA01949AB* provides a circuit analog conventional receiver. *Digital and mixed mode operation is not supported by this software*. This receiver software supports 2wire, 4wire, and 8wire circuit analog wireline links. 16 programmable channel personalities. TRC wireline keying is supported, with a full complement of programmable function tones. The CSS (Configuration Service Software) install disc is included with this option.

* An internal frequency reference option card is automatically included when any of the conventional software options are ordered above (formerly available as optional feature CA01506AB). The GPW 8000 cannot synthesize receive frequencies without this option card. When ordering replacement FRUs for a conventional GPW 8000, be sure to order a transceiver with option card.

Trunking Software:

Trunking Simulcast software is P25 Phase 1- FDMA compliant, and Phase 2 - TDMA compliant when ordered with TDMA Enhancement software option **CA01842AB**. Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

CA00025AH	ADD: CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) RCVR SOFTWARE
CA01193AB	ADD: IP BASED MULTISITE (SIMULCAST/VOTING) RCVR SOFTWARE

Note: RDM standalone model needs to be ordered for Trunking GPW 8000 for frequency reference. For sites that have greater than six channels, a standalone X-Hub model needs to be ordered. Refer to the section under Model T7038A (GCP 8000/GPB 8000/XHUB) for ordering information.

5. Energy Efficiency Options

This optional feature provides hardware and software for reduced power consumption to accommodate needs at sites without grid power or that are driven off alternative energy sources.

CA01953AA	ADD : POWER EFFICIENCY PACKAGE

Replacement FRUs: Order **DLN6793A** (FRU: PWR EFF POWER SUPPLY AC/48VDC) as spare power supply FRU for products with the G-Series Power Efficiency Package

6. CE Label

Add this option if the CE mark needs to be included on the product label for shipment to the European Union.

NOTE: Ordering restrictions apply. The following orderable options must be included to meet CE requirements.
Frequency Band: UHFR2 (X448AA), UHF R1 (X640AL), or VHF (X530BG)
Base Radio Software: Digital Conventional (CA01948AA)
Energy Efficiency: Power Efficiency Package (CA01953AA)
RFDS Peripherals are not supported

CA02310AA	ADD: R&TTE CERTIFICATION

7. Two-slot TDMA Enhancements

P25 Phase 2 TDMA Software:
Choose the appropriate two-slot TDMA enhancement option to provide the receiver with additional talkpaths/call capacity and functionality. CA01842AB is optional.

Dynamic Channel Assignment Software
Order this option to add the capability of Dynamic Channel Assignment between P25 Phase 1 and P25 Phase 2 to the receiver. CA01902AB is optional, but requires that CA01842AB also be ordered.

Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

CA01842AB	ADD : P25 TDMA RCVR SOFTWARE
CA01902AB	ADD : DYNAMIC CHANNEL ASSIGNEMENT RCVR SOFTWARE

CA01842AB provides the receiver with the ability to operate in P25 TDMA Compliant 6.25e kHz two-slot TDMA mode. This provides two TDMA talk-in paths per receiver on a 12.5 kHz channel. This option is not available in ASTRO 25 Conventional operation.

CA01902AB provides the receiver with the ability to switch between transmitting in 12.5 kHz FDMA mode or in 6.25e kHz TDMA mode. The receiver will dynamically change modes depending on the nature of the subscribers in the assigned talkgroup. This option is only available when P25 Phase 2 TDMA Receiver Software (CA01842AB) is also ordered.

8. Conventional Features

Choose the appropriate optional system feature options if required. Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

CA01946AB	ADD: CONV MIXED MODE OPERATION
CA01950AB	ADD: CONV MULTI-NAC MULTI-PL
CA01954AB	ADD: WILDCARD w/GPIO
CA01955AB	ADD: MAIN/STANDBY OPERATION

CA01950AB enables multiple PL tones (analog) or multiple NACs (digital P25 Network Access Codes) to be detected on a single channel. Each of the 16 channel personalities can be configured with a list of PL tones and NACs to use for receiver qualifiers.

CA01954AB provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom receiver interface applications.

CA01955AB provides WildCard programming presets and cabling for a side-by-side receiver in a main/standby configuration.

CA01946AB enables analog and digital P25 mixed mode operation when the receiver is ordered with CA01948AB digital P25 software.

9. Peripherals

8.1 Narrow Preselector: The Preselector rejects unwanted signals including the transmitter signals from overloading the receiver. If TIA102-CAAB Class A spurious response rejection (90 dB) specification is required, the Preselector must be ordered. If a narrow preselector is required, order X265AJ, X265AH, X265AM, X265AN, X265AW, X265AY or X265AZ based on the frequency band of the system. Preselector is attached to the back side of the Receiver model. Only one preselector option can be ordered per chassis.

X465AB enables one antenna to be used for both receiver modules. This option works with any band combination if no BR preselector is ordered.

If a BR preselector is ordered all frequencies must fall within the pass band of the preselector (VHF and UHF =< 4 MHz and 7/800 MHz can use any spacing).

X265AJ	ADD : BASE RADIO PRESELECTOR, 700 MHz
X265AH	ADD : BASE RADIO PRESELECTOR, 800 MHz
X265AN	ADD : BASE RADIO PRESELECTOR, (136 – 154 MHZ)
X265AM	ADD : BASE RADIO PRESELECTOR, (150 – 174 MHZ)
X265AW	ADD: NARROW PRESELECTOR 380-435 MHZ
X265AY	ADD: NARROW PRESELECTOR 435- 470 MHZ
X265AZ	ADD: NARROW PRESELECTOR 470-512 MHZ

RX Splitter:

X465AB	ADD : RX SPLITTER

X265AJ provides RX filtering in the 700 MHz GPW 8000 Receiver.

X265AH provides RX filtering in the 800 MHz GPW 8000 Receiver.

X265AN provides RX filtering in the VHF subband 136 - 154 MHz for the GPW 8000 Receiver. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz. Also, all Rx frequencies must fall within the following subband: 136 - 154 MHz.

X265AM provides RX filtering in the VHF subband 150 – 174 MHz for the GPW 8000 Receiver. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz. Also, all Rx frequencies must fall within the following subband: 150 - 174 MHz.

X265AW provides RX filtering in the UHF subband 380-435 MHz for the GPW 8000 Receiver. When ordering this option, the frequency separation between the highest Rx frequency and the lowest Rx frequency can be no more than 4 MHz. Also, all Rx frequencies must fall within the following subband: 380-435 MHz.

X265AY provides RX filtering in the UHF subband 435 - 470 MHZ GPW 8000 Receiver. When ordering this option, the frequency separation between the highest RX frequency and the lowest RX frequency can be no more than 4 MHz. Also, all RX frequencies must fall within the following subband: 435 – 470 MHz.

X265AZ provides RX filtering in the UHF subband 470 - 512 MHZ GPW 8000 Receiver. When ordering this option, the frequency separation between the highest RX frequency and the lowest RX frequency can be no more than 4 MHz. Also, all RX frequencies must fall within the following subband: 470 - 512 MHz.

10. Cables

A 12 foot AC power cable will come standard with the base radio. If a DC power cable is required, order option CA01400AA and a DC cable will be shipped in addition to the AC cable.

If a region-specific AC power cable is required for international applications, please order one of the following power cables and it will be shipped instead of the domestic North America power cable.

A Battery Temperature Sensor and a 40 foot long cable are included when CA01400AA option is ordered.

The CA00975AA option offers an extension cable that provides a 50 foot extension. Up to 3 extensions can be ordered.

CA01400AA	ADD : POWER CABLE, DC
X187AK	ADD : POWER CABLE, EUROPE
X162AE	ADD : POWER CABLE, UK
X191AF	ADD : POWER CABLE, AUSTRALIA
CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

11. Rack Mount Hardware

Choose rack mount hardware, if required.

X153AW	ADD : RACK MOUNT HARDWARE

X153AW provides rack mount hardware for the base radio as well as any associated optional/peripheral equipment. It should be selected if the base radio will be installed in standard 19-inch relay racks or if it is being installed into an existing QUANTAR rack.

12. Cabinets

Choose cabinet if required.
When cabinet option is ordered with a receiver, the receiver will be mounted into the cabinet. Additional receivers will need to be mounted into the cabinet in the field.

CA02446AA	ADD: G-SERIES INDOOR CABINET 15RU
CA02447AA	ADD: G-SERIES INDOOR CABINET 24RU

ORDERING GUIDELINES FOR GTR 8000 SITE SUBSYSTEM

This configuration is for High Performance Data only and was designed to **provide equal coverage** to existing voice systems. Order this configuration ONLY if separate antennas are being installed and existing RFDS from the IV&D site is NOT being used. If existing antennas are being used, the GTR 8000 Base Radios and GCP 8000 Site Controllers or a GTR 8000 Expandable Site Subsystem should be ordered instead.

NOTE: This configuration will come prepackaged in a half-height open rack with a duplexer, site preselector and receiver multicoupler. This configuration requires 2 RX antennas.

1. Main Model

The following main model must be ordered for a GTR 8000 Site Subsystem.

T7133A	GTR 8000 SITE SUBSYSTEM

Ordering Note: Only order a quantity of one per line item. This model number will automatically generate internally added options for all hardware components that are not part of an orderable option (such as cabling, duplexer, site preselector and receiver multicoupler).

2. Frequency Band and Power Level

Order quantity one (1) of the frequency band and power level option:

CA00855AA	ADD : 700/800 MHZ MID POWER

A TX/RX frequency must be specified for each GTR 8000 Base Radio and will be collected at the main model level.

RX Range: 794.00625 - 824.99375 MHz.
TX Range: 764.00625 - 775.99375 MHz and 851.00625 - 869.99375 MHz

If Freq (TX) is 764.00625 - 775.99375 MHz, then Freq (Rx) = TX + 30
If Freq (TX) is 851.00625 - 869.99375 MHz, then Freq (Rx) = TX – 45

The frequency must be divisible by 2.5 kHz or 3.125 kHz.

Note: Currently, 800.000 MHz and 820.000 MHz are not supported.

3. Base Radios

Add quantity one (1) of the option for the base radio. Only one base radio is compatible with this configuration.

X301AE	ADD : QTY (1) BASE RADIO

4. Base Radio Software

Order quantity one (1) of the following software.

CA00294AA	ADD : 25 KHZ HIGH PERFORMANCE DATA SOFTWARE

5. Site Controller

Redundant site controllers are required for High Performance Data operation. Order quantity two (2) of this option.

CA00303AA	ADD : SITE CONTROLLER

6. Site Controller Software

Site Controller software is required for each site controller ordered. Order quantity two (2) of this option.

CA00294AB	ADD : 25 KHZ HPD SITE CONTROLLER SOFTWARE

7. Cables

The standard Battery Temperature Sensor is 40 feet long. The CA00975AA option offers an extension cable that provides a 50 foot extension. Up to 3 extensions can be ordered.

CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

ORDERING GUIDELINES FOR GTR 8000 EXPANDABLE SITE SUBSYSTEM

1. Main Model

The following main model must be ordered for a GTR 8000 Expandable Site Subsystem.

SQM01SUM7054A	GTR 8000 EXPANDABLE SITE SUBSYSTEM

Ordering Note: Only quantity of one of the GTR 8000 Expandable Site Subsystem can be ordered per order line.

2. Frequency Band and Power Level

Enter the Frequency Band option:

CA01821AA	ADD : 900 MHZ HIGH POWER
CA00855AA	ADD : 700/800 MHZ MID POWER
X640AL	ADD : UHF R2 MID POWER (435-524)
X448AA	ADD : UHF R1 MID POWER (380-435)
X530BG	ADD : VHF MID POWER (136-174)

One TX and one RX frequency must be specified for each base radio/channel ordered in the GTR 8000 Expandable Site Subsystem. Frequencies will be collected at the main model level. Accurate frequencies are strongly recommended as some equipment configured in the factory is dependent on frequencies.

900 MHz: Frequency Rules for CA01821AA
RX Range: 896– 902 MHz.
TX Range: 935– 941MHz

If Freq (TX) is 935 – 941 MHz, then Freq (Rx) = TX - 39
All frequencies must be divisible by 6.25 or 5 kHz.
Note: Currently, 900.000 MHz is not supported for Rx.

700/800 MHz: Frequency Rules for CA00855AA
RX Range: 794.00625 - 824.99375 MHz.
TX Range: 764.00625 - 775.99375 MHz and 851.00625 - 869.99375 MHz

If Freq (TX) is 764.00625 - 775.99375 MHz, then Freq (Rx) = TX + 30
If Freq (TX) is 851.00625 - 869.99375 MHz, then Freq (Rx) = TX – 45
All frequencies must be divisible by 6.25 kHz.
Note: Currently, 796.09375, 800.000, 806.88125, 808.31875, 810.000, 813.975, 820.000, 822.375 are not supported for Rx.

UHF R2: Frequency Rules for X640AL
RX Range: 435.0000-524.0000 MHz.
TX Range: 435.0000-524.0000 MHz

If Freq (TX) is 435-524 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 6.25 or 5 kHz.
>   **Note:** Currently, 440.000, 454.500, 460.000, 474.6375, 479.99375, 480.000, 480.00625, 494.05625, 500.000, 511.3125, 519.5125, 519.51875, 519.99375, 520.000, 520.00625, 520.48125, 520.4875

are not supported for Rx.

UHF R1: Frequency Rules for X448AA
RX Range: 380.0000 – 435.0000 MHz.
TX Range: 380.0000 – 435.0000 MHz

If Freq (TX) is 380-435 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 6.25 or 5 kHz.
>   **Note:** Currently, 350.000, 360.000, 380.250, 396.000, 416.925, 420.000, 425.0125 MHz are not supported for Rx.

VHF: Frequency Rules for X530BG
RX Range: 136.0000 – 174.0000 MHz.
TX Range: 136.0000 – 174.0000 MHz

If Freq (TX) is 136 - 174 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX
All frequencies must be divisible by 3.125, or 2.500 kHz.
Note: Currently the following frequencies are not supported for Rx: 140.000, 160.000 and 161.925 MHz

3. 150W High Power 800MHz PA

Enter the following option if 150W 800MHz PA is required:

CA02478AA	ADD: 800MHZ 150W HI POWER

Enter quantity of option CA02478AA equal to the number of channels. This option is compatible with the following BR software:
X591AE, CA02207AA, CA02209AA, CA01948AA, CA01949AA

4. Base Radios

A Base Radio quantity must be ordered.

Site Repeater, ASTRO 25 Express: Primary control cabinets (with redundant site controllers) must have a minimum of two (2) GTR 8000 Base Radios. Expansion cabinets (with XHUBs) may be ordered with 1-6 GTR 8000 Base Radio.

High Performance Data: An HPD cabinet may be ordered with 1-5 base radios.

High Availability Simulcast: Primary control cabinets (with redundant GPB 8000 Reference Distribution Modules) must have a minimum of two (2) GTR 8000 Base Radios. Expansion cabinets (with XHUBs) may be ordered with 1-6 GTR 8000 Base Radio.

Standard Simulcast: A simulcast cabinet may be ordered with 1-6 base radios.

Conventional: A conventional-only cabinet may be ordered with 1-6 base radios. If the conventional channels are collocated in a cabinet with trunking stations, only four (4) may be ordered.

3600 IR: Primary control cabinets must have a minimum of two (2) GTR 8000 Base Radios. Expansion cabinets (with XHUBs) may be ordered with 1-6 GTR 8000 Base Radio.

3600 Simulcast: A simulcast cabinet may be ordered with 1-6 base radios.

X301AE	ADD : QUANTITY (1) GTR 8000 BASE RADIO
X302AE	ADD : QUANTITY (2) GTR 8000 BASE RADIOS
X303AE	ADD : QUANTITY (3) GTR 8000 BASE RADIOS
X304AE	ADD : QUANTITY (4) GTR 8000 BASE RADIOS
X305AC	ADD : QUANTITY (5) GTR 8000 BASE RADIOS
X306AC	ADD : QUANTITY (6) GTR 8000 BASE RADIOS

5. Base Radio Software

One base radio software option must be ordered for each base radio ordered.

P25 Trunking

CA00025AF	ADD : CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE
CA01193AA	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE
X591AE	ENH : ASTRO 25 SITE REPEATER SOFTWARE
CA01430AA	ADD : ASTRO 25 EXPRESS SYSTEM SINGLE SITE BASE RADIO SOFTWARE

3600 Trunking
* Only supported on systems with SmartX

CA02207AA	ADD: 3600 TRUNKING SIMULCAST
CA02209AA	ADD: 3600 INTELLIREPEATER SOFTWARE

    Replacement FRUs: When ordering spare transceiver FRUs for 3600 Trunking base radios, FRUs with Option Cards must be ordered

CA02207AA (3600 Trunking Simulcast) software enabled GTR 8000 base radios require specific networking equipment to be present at the site. Please note additional equipment listed below that may need to be ordered. Refer to the "*Quick Guide for Replacing a Trunked 3600 QUANTAR with a GTR 8000 Base Radio*" manual for more details on site architecture and installation.

3. REQUIRED if more than 1 GTR ESS (7+ base radios) with 3600 Trunking Simulcast software is present at a site - **HP2620 Network Switch (Qty 1 per site)**
   - Order Model CLN1856A
   - Updated OS software may be required. Refer to FSB 10744 for more details.
4. OPTIONAL if IP connectivity to the base radios is desired - **GGM 8000 (Qty 1 per site)**
   - Order Standalone Model SQM01SUM0205 or Integrated in the GTR ESS with option CA01706AA
   - Software patches may be required. Contact Christy Garippo (Christy.Garippo@motorolasolutions.com) for more details.

CA02209AA (3600 Intellirepeater) software enabled GTR 8000 base radios require specific networking equipment to be present at the site. Please note additional equipment listed below that may need to be ordered. Refer to the "*Quick Guide for Replacing a Trunked 3600 QUANTAR with a GTR 8000 Base Radio*" manual for more details on site architecture and installation.

1. OPTIONAL if IP connectivity to the base radios is desired - **GGM 8000 (Qty 1 per site)**
   - Order Standalone Model SQM01SUM0205 or Integrated in the GTR ESS with option CA01706AA
   - Software patches may be required. Contact Christy Garippo (Christy.Garippo@motorolasolutions.com) for more details.

Conventional

Conventional operation is not currently supported on 900 MHz frequency band. Check with system planning regarding future availability.

Conventional-only: Up to 6 base radio software options can be ordered.

Conventional Collocated with Trunking: Conventional and Trunking channels can be co-located in the same GTR 8000 Expandable Site Subsystem. The total number of base radio software options must equal the number of base radios ordered. Collocated conventional channels MUST be located in the primary control rack/cabinet as designated by the presence of GCP 8000 Site Controllers or GPB 8000 Reference Distribution Modules.

CA01948AA	ADD: CONVENTIONAL SOFTWARE
CA01949AA	ADD: ANALOG ONLY CONV SW

    Replacement FRUs: When ordering spare transceiver FRUs for Conventional base radios, FRUs with Option Cards must be ordered

CA01948AA provides a similar feature set to the QUANTAR conventional base radio. Configurable for digital Project 25 FDMA operation, analog conventional operation, and mixed mode (digital P25 and analog) operation. Supports IP, digital V.24, analog 4wire and mixed mode 4-wire/V.24 hybrid circuit wireline link interfaces. 16 programmable channel personalities. Each channel personality can be configured for base station, repeater, simplex, or receive only operation. Supports multi-channel operation. Multi-NAC and Wildcard options are supported with purchase of additional licenses. The CSS (Configuration Service Software) install disc is included with this option.

CA01949AA provides a circuit analog conventional base radio. *Digital and mixed mode operation is not supported by this software*. This base radio software supports 2wire, 4wire, and 8wire circuit analog wireline links. 16 programmable channel personalities. Each channel personality can be configured for base station, repeater, simplex, or receive only operation. TRC wireline keying is supported, with a full complement of programmable function tones. The CSS (Configuration Service Software) install disc is included with this option.

High Performance Data (HPD)

25 kHz High Performance Data (HPD) is only available in the 700 and 800 MHz frequency bands.

CA00294AA	ADD : 25 KHZ HPD BASE RADIO SOFTWARE

6. Power Distribution Unit

Select one of the following required power distribution options:

CA02684AA	ADD: AC ONLY POWER DISTRIBUTION
CA02686AA	ADD: AC DC POWER DISTRIBUTION

CA02684AA provides standard AC connectors that do not require an electrician to be present for site installation (no DC connectivity available). Order this option if the GTR ESS will ALWAYS be AC powered.

CA02686AA provides both DC and AC connectivity. AC connections must be hard wired and may require an electrician to be present for site installation. Order this option if the GTR ESS will ever be DC powered, or leverage DC battery backup.

7. Energy Efficiency Options

This optional feature provides hardware and software for reduced power consumption to accommodate needs at sites without grid power or that are driven off alternative energy sources.

Order quantity 1 per Base Radio.

CA01953AA	ADD : POWER EFFICIENCY PACKAGE

Replacement FRUs: Order **DLN6793A** (FRU: PWR EFF POWER SUPPLY AC/48VDC) as spare power supply FRU for products with the G-Series Power Efficiency Package

8. Two-slot TDMA Enhancements

All TDMA software options are optional. Order only when required. These options should not be ordered for the control channel.

P25 Phase 2 TDMA Software
CA01842AA adds P25 TDMA software capability to the existing P25 FDMA software.
Receive diversity (CA01943AA) is available for systems where it is required to maintain the same coverage footprint as P25 FDMA. The orderable option is listed below.

CA01842AA	ADD : P25 TDMA SOFTWARE

CA01842AA provides the base radio with the ability to operate in P25 TDMA Compliant 6.25e kHz two-slot TDMA mode. This option is not available for ASTRO 25 Conventional operation.

Dynamic Channel Assignment Software
CA01902AA is optional, but requires that CA01842AA also be ordered.

CA01902AA	ADD : DYNAMIC CHANNEL ASSIGNEMENT SOFTWARE

CA01902AA provides the base radio with the ability to switch between transmitting in 12.5 kHz FDMA mode or in 6.25e kHz TDMA mode. This option is only available when P25 TDMA Software (CA01842AA) is also ordered.

Receive Diversity for P25 Phase 2 TDMA
Order quantity one (1) of this option if your system designs include receive diversity to improve inbound call coverage for P25 TDMA or Enhanced Data.

CA01943AA	ADD : P25 TDMA 2nd Branch RX Diversity

CA01943AA provides the GTR 8000 Expandable Site Subsystem with connections for a second RX path to the base radios. If the RMC options CA00861AA, CA00862AA, or CA00877AA are ordered, this option will add as necessary the following for a second RX branch: RMC or pass-through module components and preselectors necessary to support IV&D 2nd Branch RX Diversity. For UHF, when a preselector (CA01091AA-CA01108AA) is ordered, this option will add a second preselector. This option is not compatible with X2-TDMA, Conventional, or HPD operation. HPD configurations automatically include the required 2nd receive branch.

9. Conventional Software System Configuration

Choose the appropriate optional conventional software system configuration if required. These options are mutually exclusive and only available with conventional configurations.

CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
CA01502AA	ADD : ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
CA01505AA	ADD : ASTRO 25 CONVENTIONAL VOTING SOFTWARE
CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
CA01951AA	ADD: ANALOG CONVENTIONAL VOTING SW

CA01946AA, CA01502AA and CA01505AA are only available when ordered with CA01948AA.

CA01951AA and **CA01952AA** are only available when ordered with CA01949AA. .

10. Conventional Features

Order these optional base radio features as necessary. These options are incompatible with trunking & HPD system software.

CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST
CA01947AA	ADD: RECEIVER SCAN OPERATION
CA01950AA	ADD: CONV MULTI-NAC MULTI-PL
CA01954AA	ADD: WILDCARD w/GPIO
CA01955AA	ADD: MAIN/STANDBY OPERATION
CA02680AA	ADD: CONVENTIONAL TALKGROUPS

CA01503AA enables the station to continue to receive and transmit when communication with the comparator is lost.

CA01947AA provides the ability to scan for qualified activity on up to 16 receive frequencies. These receive frequencies are assigned in the 16 programmable channel personalities. Scan operation can be suspended and resumed by TRC WildCard programming.

CA01950AA enables multiple PL tones (analog) or multiple NACs (digital P25 Network Access Codes) to be detected on a single channel. Each of the 16 channel personalities can be configured with a list of PL tones and NACs to use for receiver qualifiers.

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom receiver interface applications.

CA01955AA provides WildCard programming presets and cabling for a side-by-side receiver in a main/standby configuration.

CA02680AA enables conventional talkgroups. Order Qty 1 per base radio. (Requires 7.15+ software release version). NOTE: For QUANTARs, this option is not required. Simply order a QUANTAR software upgrade to 7.15.

11. 3600 Trunking Features

Order these optional base radio features as necessary. These options are incompatible with P25 trunking & HPD system software.

CA01954AA	ADD: WILDCARD w/GPIO

CA01955AA	ADD: MAIN/STANDBY OPERATION
CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom receiver interface applications. *This option is NOT compatible with 3600 Simulcast.*

CA01955AA provides WildCard programming presets and cabling for a side-by-side receiver in a main/standby configuration.

CA01503AA enables the station to continue to receive and transmit when communication with the comparator is lost.

12. Receiver Multicouplers

* One of the options below must be ordered on a 700/800/900 MHz and UHF R2 ESS.

700/800/900 MHz: This option will provide the necessary cabling, low-noise amplifier(s) and 6-way splitter that must be used within the cabinet.

UHF R2 (435-524 MHz): This option will provide the necessary cabling, low-noise amplifier(s) and 6-way splitter that must be used within the cabinet. If either CA00861AA or CA00862AA is ordered, one of the preselectors from SECTION 7: UHF Preselectors must be ordered.

Options CA00861AA, CA00862AA, and CA00877AA are incompatible with VHF (X530BG) and UHF R1 (X448AA).

Receive Diversity for P25 Phase 2 TDMA (CA01842AA) and 25 kHz High Performance Data: See P25 Phase 2 information in section 6 for two-brand receive diversity information.

CA00861AA*	ADD : CABINET RMC W/CAPABILITY OF 6 BASE RADIOS
CA00862AA*	ADD : SITE & CABINET RMC W/CAPABILITY OF 7-24 BASE RADIOS
CA00877AA*	ADD : CABINET RMC FOR EXPANSION RACK

* Incompatible with X448AA (UHFR1) and X530BG (VHF).

CA00861AA provides basic RMC functionality within a single cabinet. It should be selected for stand-alone RF cabinets that are hooked directly to the RX antenna with never more than six (6) radios. This RMC option will not support additional GTR 8000 Expandable Site Subsystems.

CA00862AA includes an additional Site RMC tray with the ability to support expansion of up to 24 radios on a single RX antenna (up to four GTR 8000 Expandable Site Subsystems). This option should be selected for the cabinet that connects directly to the Rx antenna (Rx primary cabinet).

CA00877AA is similar to CA00861AA but is intended for use in expansion cabinets that are wired to the primary RX cabinet through the junction panel. Cables and hardware vary from the basic (CA00861AA) RMC option. The CA00877AA option should also be ordered in situations where other RMC site equipment will be used. Cables to connect the primary cabinet to the expansion cabinet are not included.

13. UHF Preselectors

Choose one of the following preselectors. A preselector is required if **CA00861AA** or **CA00862AA** is ordered with X640AL. Also, the following frequency separation rules apply to the following band splits:

450-470 MHz
   a. The lowest Tx and the highest Rx freq. separation must be greater than or equal to 1.5 MHz.
   b. The highest Tx and the lowest Rx freq. separation must be greater than or equal to 1.5 MHz.
470-512 MHz
   a. The lowest Tx and the highest Rx freq. separation must be greater than or equal to 1.0 MHz.
   b. The highest Tx and the lowest Rx freq. separation must be greater than or equal to 1.0 MHz.

CA02702AA	ADD: UHF Site Preselector, 450-453.5
CA01091AA	ADD:UHF Site Preselector, 455-458.5
CA01092AA	ADD:UHF Site Preselector, 456.5-460
CA01093AA	ADD:UHF Site Preselector, 465-468.5
CA01094AA	ADD:UHF Site Preselector 466.5-470
CA01095AA	ADD: UHF Site Preselector, 473-475
CA01096AA	ADD: UHF Site Preselector, 474-476
CA01097AA	ADD: UHF Site Preselector, 479-481
CA01098AA	ADD: UHF Site Preselector, 480-482
CA01099AA	ADD: UHF Site Preselector, 485-487
CA01100AA	ADD: UHF Site Preselector, 486-488
CA01101AA	ADD: UHF Site Preselector, 491-493
CA01102AA	ADD: UHF Site Preselector, 492-494
CA01103AA	ADD: UHF Site Preselector, 497-499
CA01104AA	ADD: UHF Site Preselector, 498-500
CA01105AA	ADD: UHF Site Preselector, 503-505

CA01106AA	ADD: UHF Site Preselector, 504-506
CA01107AA	ADD: UHF Site Preselector, 509-511
CA01108AA	ADD: UHF Site Preselector, 510-512

14. Cavity Combiners

For 7/800 MHz configurations the cavity combiner is optional. One antenna supports a maximum of two cabinets/12 channels. For HPD, one TX antenna will support a maximum of 5 base radios. Factory integrated cavity combiner is not supported for 150W 800MHz (CA02478AA). When ordering CA00879AA or CA00880AA, the correct combiner (700 MHz or 800 MHz) will be added to the order based on the frequencies associated with the order.

UHF R2 435-524 MHz: For UHF 450-512 MHz IV&D systems, one antenna supports a maximum of 6 radios in one cabinet. The CA01180AA option will generate the appropriate cavity combiner based on the frequencies associated with the order.

UHF R1 380-425 MHz & VHF 136-174 MHz: Integrated cavity combiners are not available.

CA00879AA	ADD : 700/800 MHz PRIMARY 6 PORT CAVITY COMBINER
CA00880AA	ADD : 700/800 MHz EXPANSION 6 PORT CAVITY COMBINER
CA01180AA	ADD: UHF PRIMARY 6 PORT CAV COMBINER

CA00879AA adds a 6 channel cavity combiner to a primary rack/cabinet for combining up to six 100W channels into one TX antenna. A Tx filter (CA00882AA, CA00883AA) or a diplexer (CA00881AA) must be ordered with this cavity combiner.

CA00880AA adds a 6 channel cavity combiner to an expansion transmit rack/cabinet. Output of the expansion cavity combiner is combined with the output of the primary transmit cavity combiner (CA00879AA) using a phasing harness or diplexer extension cable, providing up to 12 channels on the same TX antenna. A phasing harness (CA01058AA) or a diplexer extension cable (CA01059AA) must be ordered with the expansion 6 port cavity combiner.

CA01180AA adds a 6 channel cavity combiner to the primary rack/cabinet for combining up to six UHF (450-512 MHz) channels into one TX antenna. A Tx filter (CA01073AA – CA01090AA) must be ordered with this combiner. All TX frequencies must fall within one of the following subbands: 450-465, 470-491, or 494-509.

15. Hybrid Combiners for 900 MHz

Hybrid combiners are offered with either single output or dual output.

Single output: The single output hybrid combiner is for configurations only one TX antenna is available or desired. For the same number of channels, single output hybrid combiners incur higher losses than dual output hybrid combiners. Single output hybrid combiners are available for combining up to 6 channels onto a single TX antenna.

Dual output: The dual output hybrid combiner is for configurations where two TX antennas are available or desired. For the same number of channels, dual output hybrid combiners incur lower losses than single output hybrid combiners. Dual output hybrid combiners are available to combine up to 6 channels on to 2 TX antennas with 3 channels per TX antenna.

Hybrid Combiner Ordering Note: Order the hybrid combiner configuration for the maximum number of channels that will ever need to be deployed in that rack/cabinet. It will be difficult to add capacity once fielded. For example, on <u>single output hybrid combiners</u>, if the customer is deploying only three channels (ordering X303AE) now, but plans to deploy an additional two channels in the future, order the 5-way hybrid combiner (CA01828AA) so that the RFDS is in place for the future channel deployments. Whereas on <u>dual output hybrid combiners</u>, if the customer is deploying only three channels (ordering X303AE) now, but plans to deploy an additional two channels in the future, order the dual output 3-way hybrid combiner (CA01830AA) so that the RFDS is in place for the future channel deployments.

<u>Special Low-loss 3-channel-only configuration</u>: for systems that will only ever deploy three channels, the lowest loss configuration available is a single output 2-way hybrid combiner (CA01824AA) ordered with the Dual Duplexer option CA01833AA.

CA01824AA	ADD: 900 HYBRID SINGLE OUTPUT 2-WAY
CA01825AA	ADD: 900 HYBRID SINGLE OUTPUT 3-WAY
CA01826AA	ADD: 900 HYBRID SINGLE OUTPUT 4-WAY
CA01827AA	ADD: 900 HYBRID SINGLE OUTPUT 5-WAY
CA01828AA	ADD: 900 HYBRID SINGLE OUTPUT 6-WAY
CA01829AA	ADD: 900 HYBRID DUAL OUTPUT 2-WAY
CA01830AA	ADD: 900 HYBRID DUAL OUTPUT 3-WAY

CA01824AA adds a 2 channel hybrid combiner that will combine 2 channels onto a single TX antenna.

CA01825AA adds a 3 channel hybrid combiner that will combine up to 3 channels onto a single TX antenna.

CA01826AA adds a 4 channel hybrid combiner that will combine up to 4 channels onto a single TX antenna.

CA01827AA adds a 5 channel hybrid combiner that will combine up to 5 channels onto a single TX antenna.

CA01828AA adds a 6 channel hybrid combiner that will combine up to 6 channels onto a single TX antenna.

CA01829AA adds a 4 channel hybrid combiner that will combine up to 4 channels onto 2 TX antennas with up to 3 channels on each antenna.

CA01830AA adds a 6 channel hybrid combiner that will combine up to 6 channels onto 2 TX antennas with up to 3 channels on

16. TX Filters, Diplexers, or 900 MHz Duplexers

Choose a diplexer, TX filter, or 900 MHz duplexer option as required by the site design. PMUs built into the TX filters are not currently functional.

900MHz: If a hybrid combiner has been ordered, either a TX filter or a duplexer option must be ordered. Furthermore, TX filter/duplexer can only be ordered when a hybrid combiner is also ordered. CA08133AA (ADD: 900 MHz Dual Duplexer) is only available when a two-output hybrid combiner has also been ordered.

700/800 MHz: One of the following options is *required* if a cavity combiner is ordered for 700/800 MHz (CA0855AA) systems. In 700 MHz, a TX filter and combiner are always required. For 800 MHz, if a cavity combiner is not ordered, the following options cannot be ordered.

UHF R2 (435-524 MHz): One of the following options is *required* if a cavity combiner is ordered for UHF 435-524 MHz (CA01180AA) systems. If a cavity combiner is not ordered, the following options cannot be ordered.

The following frequency separation rules apply to the following band splits for UHF R2 (X640AL):
    450-470 MHz
        a. The lowest Tx and the highest Rx frequency separation must be greater than or equal to 1.5 MHz.
        b. The highest Tx and the lowest Rx frequency separation must be greater than or equal to 1.5 MHz.
    470-512 MHz
        a. The lowest Tx and the highest Rx frequency separation must be greater than or equal to 1.0 MHz.
        b. The highest Tx and the lowest Rx frequency separation must be greater than or equal to 1.0 MHz.
NOTE: Power Monitor Unit functionality is software disabled until further notice.

CA01831AA	ADD : 900 MHz TX FILTER
CA01834AA	ADD : 900 MHz SINGLE DUPLEXER

CA01833AA	ADD : 900 MHz DUAL DUPLEXER
CA00881AA	ADD : 700 MHz + 800 MHz DIPLEXER w/PMU
CA00882AA	ADD : 700 MHz TX FILTER w/PMU
CA00883AA	ADD : 800 MHz TX FILTER w/PMU
CA01058AA	ADD : 700/800 MHz PHASING HARNESS
CA01059AA	ADD : DIPLEXER EXPANSION CABLE
CA01073AA	ADD: UHF Tx Filter w/PMU 450-453.5
CA01074AA	ADD: UHF Tx Filter w/PMU 451.5-455
CA01075AA	ADD: UHF Tx Filter w/PMU 460-463.5
CA01076AA	ADD: UHF Tx Filter w/PMU 461.5-465
CA01077AA	ADD: UHF Tx Filter w/PMU 470-472
CA01078AA	ADD: UHF Tx Filter w/PMU 471-473
CA01079AA	ADD: UHF Tx Filter w/PMU 476-478
CA01080AA	ADD: UHF Tx Filter w/PMU 477-479
CA01081AA	ADD: UHF Tx Filter w/PMU 482-484
CA01082AA	ADD: UHF Tx Filter w/PMU 483-485
CA01083AA	ADD: UHF Tx Filter w/PMU 488-490
CA01084AA	ADD: UHF Tx Filter w/PMU 489-491
CA01085AA	ADD: UHF Tx Filter w/PMU 494-496
CA01086AA	ADD: UHF Tx Filter w/PMU 495-497
CA01087AA	ADD: UHF Tx Filter w/PMU 500-502
CA01088AA	ADD: UHF Tx Filter w/PMU 501-503
CA01089AA	ADD: UHF Tx Filter w/PMU 506-508
CA01090AA	ADD: UHF Tx Filter w/PMU 507-509

CA01831AA provides the required TX filtering for up to 6 combined 900 MHz transmitters. The TX filter can only be ordered if a hybrid combiner has been ordered. Depending on the configuration, the TX filter may be replaced by either a single duplexer or with a dual duplexer. The use of a TX filter requires that separate antennas be used for TX and RX.

CA01834AA provides the required filtering for 900 MHz TX and also enables the use of the same antenna for both TX and RX. This option requires a single output hybrid combiner.

CA01833AA provides the required filtering for 900 MHz TX and also enables the use of the same antenna for both RX and TX. The dual duplexer requires that two antennas be used with 1-3 radios on each antenna and with each antenna supporting both TX and RX. This option also supports the low-loss 3-channel-only configuration when ordered with a single output 2-way hybrid combiner (CA01824AA) and three channels (X303AE) which provides two channels hybrid combined onto one antenna and the other channel connected directly to the second antenna through a duplexer.

CA00881AA adds a diplexer in the primary transmit rack/cabinet. The diplexer can combine the output of a 700 MHz 6-channel cavity combiner with the output of an 800 MHz 6-channel cavity combiner onto one TX antenna. The diplexer requires the primary cavity combiner (CA00879AA).

CA00882AA provides the TX filtering for 700 MHz for up to 12 combined 700 MHz transmitters. This TX filter is not required if the CA00881AA diplexer option is used. The TX filter is only compatible with the primary cavity combiner (CA00879AA).

CA00883AA provides the required TX filtering of up to 12 combined 800 MHz transmitters. This TX filter is not required if the CA00881AA diplexer option is used. The TX filter is only compatible with the primary cavity combiner (CA00879AA).

CA01058AA provides a phasing harness to connect 2 cavity combiners onto one antenna. The phasing harness requires the expansion cavity combiner (CA00880AA) to also be ordered. Ordering system provide a 700 MHz or 800 MHz phasing harness depending on the frequencies ordered.

CA01059AA provides a cable that connects the expansion combiner (CA00880AA) to the diplexer in the primary transmit cabinet/rack. The diplexer expansion cable should be ordered with the expansion cabinet. If a diplexer was not originally ordered with the primary Tx cabinet/rack then it must be ordered then through RPSD using part number 9184680Y03. The diplexer extension cable is only compatible with the expansion cavity combiner (CA00880AA).

CA01073AA – CA01090AA provides the required TX filtering of up to 6 combined UHF 450-512 MHz transmitters. When ordering this TX filter option, all the radios within the GTR 8000 Expandable Site Subsystem must fall within the same TX subband.

17. Site Controller, Reference Distribution Module, Expansion Hubs

Conventional-Only:

Two expansion hubs must be used in all racks at the site. GPB 8000 Reference Distribution Modules are not supported.

High Availability Remote Sites (IP simulcast):

Primary Reference Rack/Cabinet
High Availability Simulcast Remote Site capability requires two (2) GPB 8000 Reference Distribution Modules to be ordered in the primary reference rack at the site. These modules provide the frequency reference distribution and redundant LAN switching functionality. Order two (2) of CA01536AA for the first rack. This option requires software – see Site Controller and Reference Distribution Module Software.

Expansion Reference Rack/Cabinet
For all expansion racks a quantity of two (2) High Availability Expansion Hubs (CA00885AA) are required.

Multisite/Simulcast (non-High Availability):

For circuit-based Multisite and IP-based Multisite systems without High Availability Remote Site configuration, two expansion hubs are used in all racks at the site. This allows each site to have up to 30 base radios for Multisite systems.

High Performance Data:

For HPD systems redundant site controllers are required so two (2) of CA00303AA must be ordered.

Site Repeater:

For site repeater systems, site controllers are used in the 1st rack at the site and expansion hubs are used in the 2nd, 3rd, 4th, 5th and 6th rack(s) at the site. This allows each Site Repeater site to have up to 28 base radios. In the 1st rack, redundant site controllers are required so two (2) of CA00303AA must be ordered. For expansion racks, two expansion hubs are required so two (2) of CA00884AA must be ordered. Site Controllers require software – see Site Controller and Reference Distribution Module Software.

3600 Simulcast:

Primary Reference Rack/Cabinet
For all primary racks/cabinets, a quantity of two (2) Expansion Hubs (CA00884AA) are required.

Expansion Reference Rack/Cabinet
For all expansion racks a quantity of two (2) Expansion Hubs (CA00884AA) are required.

3600 Intellirepeater:

Primary Reference Rack/Cabinet
For all primary racks/cabinets, a quantity of two (2) GPB 8000 Reference Distribution Modules are required.

Expansion Reference Rack/Cabinet
For all expansion racks a quantity of two (2) High Availability Expansion Hubs (CA00885AA) are required.

Quantity 2 of one of the following must be ordered:

CA00303AA	ADD : GCP 8000 SITE CONTROLLER
CA01536AA	ADD : GPB 8000 REFERENCE DISTRIBUTION MODULE
CA00884AA	ADD : QTY 1 EXPANSION HUB
CA00885AA	ADD: REDUNDANT XHUBS

18. Site Controller and Reference Distribution Module Software

If Site Controllers or Reference Distribution Modules are ordered:

Order quantity two (2) of a site controller software type below because the modules are always redundant. The software ordered for the site controller must match the software ordered for the base radios.

If XHUBs were ordered:

Expansion hubs are used for all expansion racks and do not require software. None of the below are compatible with XHUBs.

CA00294AB	ADD : 25 KHZ HPD SITE CONTROLLER SOFTWARE
CA03001AA	ADD:P25 SITE RPTR SW IV&D+ENH DATA
CA02219AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – IV&D
CA02212AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – VOICE ONLY
CA01431AA	ADD : ASTRO 25 EXPRESS SYSTEM SITE CONTROLLER SOFTWARE – VOICE ONLY
CA01537AA	ADD : REFERENCE DISTRIBUTION SOFTWARE

CA03001AA provides IV&D plus Enhanced Data. Receive diversity (CA01943AA) may be required for systems where it is required to maintain the same coverage footprint as P25 FDMA Voice. This needs to be evaluated on case-by-case basis. Use HYDRA tool for evaluation.

19. Integrated GGM 8000 Gateway

A site gateway can be factory integrated with your GTR 8000 Expandable Site Subsystem when ASTRO Trunking Site Repeater or High Availability IP Simulcast is ordered.

GGMs cannot be factory integrated when an ESS is ordered with XHUBs, however the integration kits below enable easy field install of a GGM in an ESS.

The gateway provides a number of functions including call signal processing and also provides a direct connection to the customer's larger Wide Area Network (WAN).

Encryption:
Gateway encryption is optional. If encryption is desired, order all GGM 8000 Gateways with the encryption capability (CA01708AA and CA01709AA).

Use the table below to determine the appropriate type and quantity of GGM 8000 Gateways to order.

		No Encryption	Encryption
Single Gateway	No Conventional Channels	(1) GGM 8000 Gateway	(1) GGM 8000 Gateway & Encryption
	Co-located IP Conventional Channels*	(1) GGM 8000 Gateway	(1) GGM 8000 Gateway & Encryption
	Co-located Analog, V.24 Digital, or Mixed Mode Analog/Digital**	(1) GGM 8000 Gateway & Analog V.24 Card	(1) GGM 8000 Gateway & Analog V.24 Card & Encryption
Redundant Gateways	No Conventional Channels	(2) GGM 8000 Gateways	(2) GGM 8000 Gateway & Encryption
	Co-located IP Conventional Channels*	(3) GGM 8000 Gateways	(3) GGM 8000 Gateway & Encryption
	Co-located Analog, V.24 Digital, or Mixed Mode Analog/Digital**	(2) GGM 8000 Gateways (1) GGM 8000 Gateway & Analog V.24 Card	(2) GGM 8000 Gateway & Encryption (1-3) GGM 8000 Gateway & Analog V.24 Card & Encryption

*Co-located IP Conventional Channels Note: The configuration above will support up to 10 conventional channels co-located at the Trunking site. If 11 to 30 co-located conventional channels are required, 1 or 2 additional GGM 8000 must be ordered as standalone units. See GGM 8000 Gateway quotation planner for ordering information (http://compass.mot.com/go/329040674).

**Co-located Analog, V.24 Digital, or Mixed Mode Analog/Digital Note:
GGM's in this configuration must be ordered separately via standalone units (http://compass.mot.com/go/329040674) and optionally integrated into the ESS in the field. If GGMs intend to be field integrated into the ESS, be sure to order DC powered GGMs, along with the appropriate ESS integration kit below (CA02224AA for CCGW/LD CCGW) on the GTR ESS to ensure all necessary cabling is provided.
The configurations above will support up to four 4-wire or V.24 connections. If additional 4-wire or V.24 connections are required, additional GGM 8000 Gateway's must be ordered as standalone units. See GGM 8000 Gateway quotation planner for ordering information (http://compass.mot.com/go/329040674). The maximum number of 4-wire or V.24 connections supported for conventional channels at a Trunking site is 12.

CA01706AA	ADD : GGM 8000 GATEWAY
CA02154AA	ADD: 7.12+ GGM 8000 GATEWAY W/ ENCRYPTION
CA01708AA	ADD: 7.9/7.11 GGM 8000 GATEWAY W/ ENCRYPTION
CA02224AA	ADD : GTR ESS INTEGRATION KIT FOR EXTERNAL GGM 8000 GATEWAY WITH CCGW/LD CCGW
CA02225AA	ADD : GTR ESS INTEGRATION KIT FOR EXTERNAL GGM 8000 GATEWAY

CA02154AA includes a GGM Gateway with encryption functionality that is supported on 7.12 and later systems only.
CA01708AA includes a GGM Gateway with encryption functionality that is supported on 7.9 and later systems.
CA02224AA includes the necessary cables and sub panels required to integrate a GGM 8000 for CCGW/LD CCGW into an ESS. Note this kit only includes the cables. The GGM must be installed in the field.
CA02225AA includes the necessary cables to integrate a GGM 8000 (non CCGW) into an ESS. Note this kit only includes the cables. The GGM must be installed in the field.

20. Cabinets and Racks

Order either a cabinet or rack. Option CA01402AA is not compatible if UHF R2 (435-524 MHz) RFDS is ordered.

CA00293AA	ADD : 43 RU SCHROFF CABINET
X882AH	ADD : 7.5 FT OPEN RACK
CA01402AA*	ADD : 7.0 FT OPEN RACK

  *Not compatible with UHF R2 Cavity Combiner (CA01180AA).

21. Additional Enhancements

Order any additional enhancements, if desired.

Cabinet Doors

Louvered doors are for the front and back of the 43 RU Schroff Cabinet to allow for cooling air to pass through. Solid doors are for the sides of the Schroff Cabinet. The maximum orderable quantity of each door is two (2) unless CA01058AA or CA01059AA is ordered. If CA01058AA or CA01059AA are on the order only one of option CA00027AB ADD: CABINET DOOR, SOLID can be ordered.

Battery Temperature Sensor

The standard Battery Temperature Sensor is 40 feet long. The CA00975AA option offers an extension cable that provides a 50 foot extension. Up to 3 extensions can be ordered.

CA00027AB	ADD : CABINET DOOR, SOLID
CA00027AC	ADD : CABINET DOOR, LOUVERED
CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

ASTRO 25 Express Configuration Manager

If ASTRO 25 Express Configuration Manager is desired with the ASTRO 25 Express system, order the model below on a **separate order line**. Configuration Manager provides the capability for a system manager to configure radio users and talkgroups in a Subscriber Access Control Database in the system site controller. In an ASTRO 25 Express system, the integrated GCP 8000 Site Controller functions as the system site controller. Configuration Manager can be installed on a service laptop or a customer provided workstation.

T7555A	ASTRO 25 Express Trunking Configuration Manager

22. ASTRO 25 Project 2-4-1

ASTRO 2-4-1 is an RF Site configuration that doubles the capacity of a P25 digital 800MHz 25 kHz channel. See the ASTRO 2-4-1 Design Guide for more information (http://compass.mot-solutions.com/go/469574389).

ASTRO 2-4-1 is available in two configurations: one configuration for sites that have only one transmit antenna and another configuration for sites that have two transmit antennas.

One Transmit Antenna Configuration

Please contact the GTR 8000 Product Owners to obtain specific ordering guidelines and to discuss critical design restrictions for this configuration.

This configuration requires special ordering/handling of a GTR 8000 ESS and must be routed through CCSi staging to install hybrid combiners and complete the build.

In addition to ordering a GTR 8000 ESS, specific parts must be ordered to support the integration of hybrid combiners.

Additional heat generated by the hybrid combining requires that the GTR 8000 ESS be deployed in an open rack configuration. Furthermore, the number of channels installed in the GTR 8000 ESS may be restricted (contact GTR 8000 Product Owners for more detail).

Two Transmit Antenna Configuration

For this configuration, order two separate 800 MHz GTR 8000 ESS's (model SQM01SUM7054), each with an 800 MHz Cavity Combiner (CA00879AA/ CA00880AA) and TX filter (CA00883AA). Any number of channels (from 1 to 6) can be ordered per ESS.

When entering the frequencies for each ESS, make sure to enter frequencies for channel 1-6a in the first ESS, and frequencies for channel 1-6b in the second ESS.

For example:

25 kHz Licensed Channel (Centered at This Frequency)	ESS #1 Frequencies (Licensed Frequency – 6.25 kHz)	ESS #2 Frequencies (Licensed Frequency + 6.25 kHz)
855.0125	855.00625	855.01875
855.0375	855.03125	855.04375
855.0625	855.05625	855.06875
855.0875	855.08125	855.09375
855.1125	855.10625	855.11875
855.1375	855.13125	855.14375

ORDERING GUIDELINES FOR GCP 8000 SITE CONTROLLER

1. Main Model

The following main model must be ordered for a GCP 8000 Site Controller OR Reference Distribution Module (RDM)/XHubs (for For Remote sites with Trunking GPW 8000 Receivers). Skip to Section 5 for ordering RDM/XHub.

T7038A	GCP 8000 / GPB 8000 / XHUB

NOTE: Only order a quantity of one of T7038A per line item. This model number will automatically generate internally added options for all hardware components that are not part of an orderable option (such as cabling).

2. Site Controllers

Redundant site controllers are required for P25 Trunking Simulcast 'prime' sites and HPD sites.

High Performance Data: When ordering for HPD order a quantity of two of CA00303AA.

Multisite (simulcast) Prime Sites: In Multisite (SIMULCAST/VOTING) sites, order 2 separate T7038A models with 1 site controller module (CA00303AA) in each and daisy chain them for redundancy OR order 2 site controller modules (CA00303AA) with 1 T7038A model and daisy chain the power supplies of the site controller with the GCM 8000 comparators at the prime site. Ordering 2 separate models with one site controller module in each model is highly recommended to eliminate any single point of failure.

ASTRO 25 Site Repeater: In single site (non-simulcast/voting), order 2 site controller modules (CA00303AA) with 1 T7038A model.

ASTRO 25 Express: order 2 site controller modules (CA00303AA) with 1 T7038A model.

CA00303AA	ADD : GCP 8000 SITE CONTROLLER

3. Site Controller Software

Choose a software type and order the appropriate software option in the same quantity as CA00303AA.

CA00294AB	ADD : 25 KHZ HPD SITE CONTROLLER SOFTWARE
CA00025AG *	ADD: CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) SITE CONTROLLER SW
CA01194AA *	ADD: IP BASED MULTISITE (SIMULCAST/VOTING) SITE CONTROLLER SW
CA03001AA	ADD:P25 SITE RPTR SW IV&D+ENH DATA

CA02219AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – IV&D
CA02212AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – VOICE ONLY
CA01431AA	ADD : ASTRO 25 EXPRESS SYSTEM SITE CONTROLLER SOFTWARE – VOICE ONLY

* CA00025AG and CA01194AA: To enable data or voice operation for the system, a site license must be ordered for each remote site governed by the Site Controller. See Remote Site Licenses section below.

CA03001AA provides IV&D + ENH Data. Receive diversity (CA01943AA) may be required for systems where it is required to maintain the same coverage footprint as P25 FDMA Voice. This needs to be evaluated on case-by-case basis. Use HYDRA tool for evaluation.

CA01431AA: **ASTRO 25 Express Systems** are a specific configuration of the GTR 8000 Base Radios that are certified to operate in a single-site mode without a separate Master Site. This configuration is supported with a maximum of 6 stand alone base radios.

4. Remote Site Licenses

One of the following options must be ordered for each remote site associated with a multisite simulcast/voting TRUNKING Site Controller to enable data and/or voice operation at the remote site. These Remote Site Licenses do not apply to Conventional systems.

NOTE: Order 1 license for each Site Controller. For example, if there are 10 remote sites, order 10 licenses for the primary Site Controller, and 10 licenses for the redundant Site Controller.

CA03004AA	ADD:SMLCST RMT ST LIC– IV&D+ENH DATA
CA02206AA	ADD: SIMULCAST REMOTE SITE LICENSE – IV&D
CA02214AA	ADD: SIMULCAST REMOTE SITE LICENSE – VOICE ONLY
CA03005AA	ADD:SMLCST RX RMT ST LIC– IVD+E/DATA
CA03006AA	ADD:SMLCST RXO RMT SITE LIC– IV&D

CA03007AA	ADD:SMLCST RX RMT ST LIC– VOICE ONLY

When ordering Enhanced Data (ENH DATA), note that Receive diversity (CA01943AA) may be required for systems where it is required to maintain the same coverage footprint as P25 FDMA Voice. This needs to be evaluated on case-by-case basis. Use HYDRA tool for evaluation.

Note: When ordering the Geo-Redundant Trunked Simulcast Back-up Site Controller (3rd site controller) remote site licenses in the table above do not apply. Refer to the section below:

Geo-Redundant Trunked Simulcast Back-up Site Controller:

Select below remote site license when ordering the Geo-Redundant Trunked Simulcast Back-up Site Controller (3rd site controller).

Order Qty 1.

CA02474AA	ADD:GEO-REDUN BACK-UP SC LIC

5. Reference Distribution Modules/Expansion Hub Modules – For Remote sites with Trunking GPW 8000 Receivers

Redundant reference distribution modules are required for P25 Trunking receive-only sites.

P25 Trunking Receive-Only Sites: Two Reference Distribution Modules (RDMs) are required at every receiver site in a P25 Trunking Simulcast or Non-Simulcast voting subsystem. The RDMs provide up to six channels of GPW 8000 receiver capacity. Order a quantity of two CA01536AA options in a single T7038A chassis.

For sites with more than 6 channels, a pair of expansion hub (XHUB) modules provide support for and additional 6 channels of capacity to the receiver site.   Order a quantity of two of CA00884AB in a single T7038A chassis.

The RDMs and XHUBS need to be ordered along with the trunked GPW 8000s for the remote sites. Order RDM and XHUB under separate T7038A model.

CA01536AA	ADD: GPB 8000 REFERENCE DISTRIBUTION MODULE
CA00884AB	ADD : XHUB STANDALONE

6. Reference Distribution Modules Software

Order the same quantity of software as CA01536AA for Reference Distribution

CA01537AC	ADD: STANDALONE REF DISTRIBUTION SW

Note: X-HUBS do not require any software.

7. Power Cables

A 12 foot AC power cable will come standard with the site controller. If a DC power cable is required, order option CA01400AA. If a region-specific AC power cable is required for international applications, please order one of the following power cables and it will be shipped instead of the domestic AC power cable.

A Battery Temperature Sensor and a 40 foot long cable are included when CA01400AA option is ordered.

The CA00975AA option offers an extension cable that provides a 50 foot extension. Up to 3 extensions can be ordered.

CA01400AA	ADD : POWER CABLE, DC
X187AK	ADD : POWER CABLE, EUROPE
X162AE	ADD : POWER CABLE, UK
X191AF	ADD : POWER CABLE, AUSTRALIA
CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

8. Rack Mount Hardware

Choose rack mount hardware, if required.

X153AW	ADD : RACK MOUNT HARDWARE

X153AW provides rack mount hardware for the base radio as well as any associated optional/peripheral equipment. It should be selected if the base radio will be installed in standard 19-inch relay racks.

ORDERING GUIDELINES FOR GCM 8000 COMPARATOR

1. Main Model

The following main model must be ordered for a GCM 8000 Comparator.

T7321A	GCM 8000 COMPARATOR CHASSIS

NOTE: Only order a quantity of one of the GCM 8000 per line item. This model number will automatically generate internally added options for all hardware components that are not part of an orderable option (such as cabling).

2. Comparators

Choose the quantity of comparators per chassis (T7321A). Comparators can be ordered one (1) or two (2) per chassis. Comparator power supplies can be wired together to provide redundant power supply operation.

The comparator chassis can hold two separate comparators to support two different channels. If two comparators are desired, order a quantity two (2) of CA01183AA. If only one comparator per chassis is desired order quantity one (1) of CA01183AA.

NOTE: Redundant comparators supporting the same channel should NOT be located in the same chassis.

CA01183AA	ADD : GCM 8000 COMPARATOR MODULE

3. Comparator Software

Order one comparator software option per comparator module ordered. The quantity of CA01185AA or CA01484AC must match the quantity of the CA01183AA option.

CA01185AA	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) OPERATION
CA01484AC	ADD : ASTRO 25 CONVENTIONAL SOFTWARE

4. Comparator Redundancy

In an IP Based Multisite (Simulcast/Voting) configuration, two (2) comparator modules can be configured to support the same channel for redundancy – the primary module will be active and the backup module will be in standby mode. Order CA01974AA option with EACH of the two (2) CA01183AA modules (i.e. you need to order CA01974AA on both the primary and backup comparator modules. For a 2 channels system with redundant comparators, a total quantity of 4 CA01183AA and 4 CA01974AA options are required.). Furthermore, all software options/licenses must be ordered on both primary and backup comparators (e.g. Trunking software, TDMA, etc.)

CA01974AA	ADD: TRUNKING REDUNDANT COMPRTR SW

5. 2-slot TDMA Functionality

TDMA capability is only available on trunking IV&D systems.

P25 TDMA Software

Order TDMA signal processing capability as necessary. CA01901AA is optional.

CA01901AA	ADD : P25 TDMA SOFTWARE

CA01901AA provides the comparator with the ability to process P25 TDMA signals from the GTR 8000 Base Radios. If the GTR 8000 Base Radios in the system are configured for P25 TDMA, this option must be ordered for the comparator to provide the correct functionality.

6. Conventional Software System Configuration

Simulcast or Voting

Order one software system configuration option per comparator module ordered. The quantity of the CA01484AC must match the quantity of the CA01502AC or CA01505AC option.

CA01502AC	ADD : ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
CA01505AC	ADD : ASTRO 25 CONVENTIONAL VOTING SOFTWARE

7. Subsite Licenses

17-64 Conventional Subsite Support

Option CA01484AC provides up to 16 subsites of voting or simulcast capability. To support additional subsites, order quantity one (1) CA01914AA (ADD: Software License Single Expansion Port) for EACH addition subsite that is required. Up to 64 subsites can be supported per board. If ordering one comparator in the chassis, up to 48 additional licenses can be purchased. If ordering two comparators in the chassis, up to 96 additional licenses can be purchased.

If subsites are added to the conventional system later, additional licenses can be purchased for a fielded comparator under the G-series Software Upgrades model (T7140A).

16-32 Trunking Subsite Support (Supported on A7.13 and later systems only)

Option CA01185AA provides up to 15 subsites of trunking simulcast capability. To support additional subsites, order quantity one (1) CA01914AA (ADD: Software License Single Expansion Port) for EACH addition subsite that is required. Up to 32 subsites can be supported per board. If ordering one comparator in the chassis, up to 17 additional licenses can be purchased. If ordering two comparators in the chassis, up to 34 additional licenses can be purchased.

If subsites are added to the trunking system later, additional licenses can be purchased for a fielded comparator under the G-series Software Upgrades model (T7140A).

CA01914AA	ADD: SW LIC SINGLE EXPANSION PORT

CA01914AA can only be ordered if CA01484AC or CA01185AA is ordered.

8. Power Cables

A 12 foot AC power cable will come standard with the comparator. If a DC power cable is required, order option CA01400AA. If a region-specific AC power cable is required for international applications, please order one of the following power cables and it will be shipped instead of the domestic power cable.

A Battery Temperature Sensor and a 40 foot long cable are included when CA01400AA option is ordered.

The CA00975AA option is for a 50 foot extension cable. Up to 3 extensions can be ordered.

CA01400AA	ADD : POWER CABLE, DC
X187AK	ADD : POWER CABLE, EUROPE
X162AE	ADD : POWER CABLE, UK
X191AF	ADD : POWER CABLE, AUSTRALIA
CA00975AA	ADD : BATTERY TEMPERATURE SENSOR EXTENSION CABLE

9. Rack Mount Hardware

Choose rack mount hardware, if required.

X153AW	ADD : RACK MOUNT HARDWARE

X153AW provides rack mount hardware for the comparator. It should be selected if the comparator will be installed in standard 19-inch relay racks.

ORDERING GUIDELINES FOR G-SERIES SOFTWARE UPGRADES

1. Main Model

The following main model must be ordered for a GTR 8000, GCP 8000 or GCM 8000 software upgrade.

T7140A	G-SERIES SOFTWARE UPGRADES

NOTE: Only order quantity one (1) of T7140A per line item.

2. Base Radio Software

Choose the appropriate system software to upgrade the base radios. One option must be ordered for each base radio being upgraded (this is for licensing and also applies to internal orders). On a TDMA system, TDMA software upgrade should be ordered in addition to BR software upgrade below if upgrading the system to a newer software version.

For example, if upgrading an ASTRO 7.11 system with 50 FDMA Simulcast base radios (10 sites, five channels each) to an ASTRO 7.14 system, then order quantity of 50 of CA01115AA. If upgrading an ASTRO 7.11 system with 50 TDMA Simulcast base radios to ASTRO 7.14 release, order quantity of 50 of CA01195AA and 50 CA01905AA (See TDMA upgrade section below).

CA01114AA	ADD : 25 KHZ HPD BR SW UPGRADE
CA01115AA	ADD : CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) BR SW UPGRADE
CA01195AA	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) BR SW UPGRADE
CA01116AA	ADD : SITE REPEATER BR SW UPGRADE
CA01430AB	ADD : ASTRO 25 EXPRESS BASE RADIO SOFTWARE UPGRADE
CA01615AA	ADD : ASTRO 25 CONVENTIONAL BASE RADIO SOFTWARE UPGRADE
CA01995AA	ADD: ANALOG CONVENTIONAL BASE RADIO SOFTWARE UPGRADE
CA02333AA	ADD: 3600 SIMULCAST SW UPGRADE
CA02336AA	ADD: 3600 IR SW UPGRADE

If upgrading from Analog Conventional to either Digital Conventional or Trunking, you must order one of the following options below for each BR. If upgrading to a newer system version at the same time, please order the appropriate option above in addition. For example, if upgrading one site with five 7.13 Analog Conventional Base Radios to 7.15 Digital Conventional Base Radios, order quantity 5 CA02211AA and quantity 5 CA01615AA.

CA02211AA	ADD : ANALOG CONV TO DIGITAL CONV BR SW UPGRADE
CA02216AA	ADD : ANALOG CONV TO ASTRO 25 SITE REPEATER BR SW UPGRADE
CA02217AA	ADD : ANALOG CONV TO ASTRO 25 CIRCUIT SIMULCAST BR SW UPGRADE
CA02218AA	ADD : ANALOG CONV TO ASTRO 25 IP SIMULCAST BR SW UPGRADE

If upgrading from Digital Conventional to P25 Trunking, it is required to order the following option along with the appropriate BR software upgrade option above to ensure appropriate licenses are distributed. For example, to upgrade from Digital Conventional to P25 Site Repeater, order **CA02524AA** (ADD: DIG CONV to P25 TRNKNG UPGRADE) along with **CA01116AA** (ADD: SITE REPEATER BR SW UPGRADE).

CA02524AA	ADD: DIG CONV to P25 TRNKNG UPGRADE

If upgrading from 3600 to P25, it is required to order the following option along with the appropriate BR software upgrade option above. For example, to upgrade from 3600 IR to P25 Site Repeater, order CA02335AA (ADD: 3600 to P25 UPGRADE) along with CA01116AA (ADD: SITE REPEATER BR SW UPGRADE).

CA02335AA	ADD: 3600 to P25 UPGRADE

3. Base Radio 2-slot TDMA Functionality

Choose the 2-slot TDMA upgrade option that provides the correct functionality and software licenses for your needs or configuration. TDMA is an optional feature.

P25 Phase 2 TDMA Software

Order one of the following options for each base radio being upgraded to ensure the stations are licensed correctly. See the G-series Hardware Upgrade section of this ordering guide for the necessary kits to add the 2nd RX branch to a fielded GTR 8000 Expandable Site Subsystem.

CA01903AA	ADD : P25 FDMA to P25 TDMA SOFTWARE UPGRADE
CA01904AA	ADD : X2-TDMA to P25 TDMA SOFTWARE UPGRADE
CA01905AA	ADD : P25 TDMA SOFTWARE UPGRADE

CA01903AA should be ordered when converting a base radio from P25 FDMA operation to P25 TDMA capability. This option only needs to be ordered the first time the station is converted to P25 TDMA operation.

CA01904AA should be ordered when converting a base radio from Motorola's X2-TDMA operation to P25 TDMA capability. This option only needs to be ordered the first time the station is converted to P25 TDMA operation.

CA01905AA should be ordered when migrating P25 TDMA software on the base radio from one ASTRO 25 system release to a newer ASTRO 25 system release. This option should be ordered in addition to the correct operational system software. For example, when upgrading 5 ASTRO 7.11 IP Simulcast TDMA base radios to ASTRO 7.14 IP Simulcast TDMA base radios, order qty 5 of option CA01905AA and qty 5 of option CA01195AA.

Dynamic Channel Assignment Software

If ordering an upgrade to a station and Dynamic Channel Assignment functionality is required, order one of the options below. Dynamic Channel Assignment functionality is optional, but requires that P25 TDMA software has also been ordered (on same order, or on a previous order).

CA01966AA	ADD : Dynamic Channel Assignment Software
CA01967AA	ADD : DDM to Dynamic Channel Assignement Software Upgrade
CA01968AA	ADD : Dynamic Channel Software Upgrade

CA01966AA should be ordered when converting a base radio from P25 FDMA operation to P25 TDMA w/Dynamic Channel assignment capability OR when adding Dynamic Channel assignment to a P25 TDMA base radio for the first time. This option only needs to be ordered the first time the station is enabled with Dynamic Channel Assignment.

CA01967AA should be ordered when converting a base radio from Motorola's X2-TDMA w/Dynamic Dual Mode operation to P25 TDMA w/Dynamic Channel Assignment capability. This option only needs to be ordered the first time the station is converted to P25 TDMA operation. This option should be ordered in addition to the CA01904AA ADD: X2-TDMA to P25 TDMA Software Upgrade for each base radio that is being upgraded.

CA01968AA should be ordered when migrating P25 TDMA software on the base radio from one ASTRO 25 system release to a newer ASTRO 25 system release (such as from ASTRO 25 release 7.11 to ASTRO 25 release 7.12). This option should be ordered in addition to the CA01905AA ADD: P25 TDMA Software Upgrade for each base radio that is being upgraded.

4. Conventional Base Radio Software System Configuration & Optional Features

Choose the appropriate optional conventional software system configuration if required.

Please refer to the Hardware Upgrade ordering instructions to order Wildcard or Main/Standby Operation features.

CA01947AA	ADD : BASE RADIO RECEIVER SCAN OPERATION
CA01950AA	ADD : BASE RADIO CONVENTIONAL MULTI-NAC MULTI-PL OPERATION
CA01946AA	ADD : BASE RADIO ANALOG/ DIGITAL MIXED MODE
CA01503AA	ADD : BASE RADIO FALL-BACK IN-CABINET REPEAT
CA02208AA	ADD : DIGITAL CONV BR VOTING TO SIMULCAST UPGRADE
CA01502AA	ADD: ASTRO 25 CONV SIMULCAST SW
CA01505AA	ADD: ASTRO 25 CONV VOTING SW
CA02680AA	ADD: CONVENTIONAL TALKGROUPS

CA02208AA should be ordered when converting a digital conventional Base Radio from Voting to Simulcast configuration.

CA01502AA should be ordered when adding Simulcast capability to an existing digital conventional Base Radio.

CA01505AA should be ordered when adding voting capability to an existing digital or mixed analog/digital conventional Base Radio.

CA02680AA enables conventional talkgroups. Order Qty 1 per base radio. (Requires 7.15+ software release version). NOTE: For QUANTARs, this option is not required. Simply order a QUANTAR software upgrade to 7.15.

5. Site Controller Software

P25 Trunking & HPD Site Controller Software Version Upgrade:

Order these software options to upgrade a site controller to a newer software version (for example to upgrade from ASTRO 7.13 to ASTRO 7.15).

Order quantity one per site controller module. For example, if the system has 2 Circuit Simulcast cells there are redundant site controllers at each cell, so a quantity of four (4) CA01118AA options must be ordered.

CA01117AA	ADD : 25 KHZ HPD SC SW UPGRADE
CA01118AA *	ADD : CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) SC SW UPGRADE
CA01196AA *	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) SC SW UPGRADE
CA03008AA	ADD: SITE RPTR SC SW UPGRD – IV&D + ENH DATA
CA02219BA	ADD: SITE RPTR SC SW UPGRD – IV&D
CA02212BA	ADD: SITE RPTR SC SW UPGRD – VOICE
CA01431AB	ADD : ASTRO 25 EXPRESS SC SOFTWARE UPGRADE

* CA01118AA and CA01196AA: To enable data or voice operation for the system, a site upgrade license must be ordered for each remote site governed by the Site Controller. See Remote Site Licenses section below.

When ordering Enhanced Data (ENH DATA) note that Receive diversity may be required for systems where it is required to maintain the same coverage footprint as P25 FDMA Voice. This needs to be evaluated on case-by-case basis. Use HYDRA tool for evaluation

Data Expansions:

Order below options when expanding data functionality at an existing site repeater site. For example, if adding enhanced data to a voice-only site repeater site, order option CA03003AA (ADD:STRPTR SC SW UPGR VC–IVD+ENDATA)

Order one upgrade per Site Controller (i.e. Both primary and redundant Site Controllers require an upgrade).

CA02205AA	ADD: SITE RPTR SC EXPAND – VOICE TO IV&D
CA03002AA	ADD:SITE RPTR SC EXP IV&D- ENH DATA
CA03003AA	ADD:STRPTR SC SW UPGR VC–IVD+ENDATA

CA02205AA expands a Voice-Only site to support IV&D.

CA03002AA expands an IV&D site to support Enhanced Data.

CA03003AA expands a Voice-Only site to support Enhanced Data.

Conventional Site Controller Software Version Upgrade:

Order (one per site controller) when upgrading the GCP 8000 as a conventional site controller for the MCC 7500 console.

CA01246AA	ADD: MCC 7500 CONV SITE UPGRADE

6. Remote Site Licenses

Order one of the following options when adding a new remote site, or upgrading an existing site associated with a multisite simulcast/voting TRUNKING Site Controller to enable data and/or voice operation at the remote site. These Remote Site Licenses do not apply to Conventional systems.

NOTE: Order 1 license for each Site Controller. For example, if 10 remote sites are being added, order a total of 20 licenses (10 licenses for the primary Site Controller, and 10 licenses for the redundant Site Controller).

TX/RX Remote Site Licenses:

Order the following licenses to upgrade an existing TX/RX remote site to a newer software version. For example, if upgrading 5 Simulcast sites with IV&D on ASTRO 7.11 to ASTRO 7.14, order quantity 5 of CA02206BA for the primary Site Controller, and quantity 5 of CA02206BA for the redundant Site Controller.

CA03017AA	ADD: SIMUL REM SITE UPGRD LIC– IV&D + ENH DATA
CA02206BA	ADD: SIMUL REM SITE UPGRD LIC– IV&D
CA02214BA	ADD: SIMUL REM SITE UPGRD LIC– VOICE

CA03017AA upgrades an Enhanced Data site to a newer software release version.

CA02206BA upgrades an IV&D site to a newer software release version.

CA02214BA upgrades a Voice-Only site to a newer software release version.

Order the following licenses to add a new TX/RX remote site to an existing system. For example, if adding 2 new TX/RX Simulcast Remote Sites with IV&D to an existing system, order qty 2 of CA02206AA for the primary site controller, and order qty 2 of CA02206AA to the redundant site controller.

CA03009AA	ADD: SIMULCAST REMOTE SITE LICENSE – IV&D + ENH DATA
CA02206AA	ADD: SIMULCAST REMOTE SITE LICENSE – IV&D
CA02214AA	ADD: SIMULCAST REMOTE SITE LICENSE – VOICE ONLY

CA03009AA adds a new Enhanced Data site.

CA02206AA adds a new IV&D site.

CA02214AA adds a new Voice-Only site.

Order the following licenses to add data expansions to existing TX/RX remote sites. For example, when adding IV&D feature to a remote site with voice only feature, order option CA02206AA for primary as well as redundant site controller.

CA02206AA	ADD: SIMULCAST REMOTE SITE LICENSE – IV&D
CA03011AA	ADD: SIMUL REM SITE LIC EXPAND VOICE TO IV&D +ENH DATA

CA03010AA	ADD:SIMUL REM ST LC EXP IV&D-ENDATA

CA02206AA expands a Voice-Only site to support IV&D.

CA03011AA expands a Voice-Only site to support Enhanced Data.

CA03010AA expands an IV&D site to support Enhanced Data.

RX Only Remote site Licenses:

Order the following licenses to upgrade an existing RX ONLY Remote site. For example, if upgrading 5 Simulcast sites with IV&D on ASTRO 7.14 to ASTRO 7.15, order quantity 5 of CA03018AA for the primary Site Controller, and quantity 5 of CA03018AA for the redundant Site Controller.

CA03019AA	ADD: SIMULRX ONLY REM SITE UPGRD LIC–IV&D + ENH DATA
CA03018AA	ADD: SIMUL RX ONLY REM SITE UPGRD LIC–IV&D
CA03020AA	ADD: SIMUL RX ONLY REM SITE UPGRD LIC–VOICE

CA03019AA upgrades an RX-Only Enhanced Data site to a newer software release version.

CA03018AA upgrades an RX-Only IV&D site to a newer software release version.

CA03020AA upgrades a RX-Only Voice-Only site to a newer software release version.

Order the following licenses to add a new RX ONLY Remote Site. For example, if adding 2 new RX Only Simulcast Remote Sites with IV&D to an existing system, order qty 2 of CA03013AA for the primary site controller, and order qty 2 of CA03013AA to the redundant site controller.

CA03012AA	ADD: SIMUL RX RM ST LC–IVD+ENH DATA
CA03013AA	ADD: SIMUL RXO REMOTE ST LIC – IV&D
CA03014AA	ADD:SIMUL RX REM ST LIC – VOICE ONLY

CA03012AA adds a new RX-Only Enhanced Data site.

CA03013AA adds a new RX-Only IV&D site.

CA03014AA adds a new RX-Only Voice-Only site.

Order the following licenses to add data expansions to existing RX only remote sites. For example, when adding IV&D feature to an RX only Simulcast remote site with voice only feature, order option CA03013AA for primary as well as redundant site controller.

CA03013AA	ADD: SIMUL RXO REMOTE ST LIC – IV&D
CA03015AA	ADD:SIM RX RM ST LC EXP– IV&D+ENDATA
CA03016AA	ADD:SM RX REM ST LC EXP IV&D-ENDATA

CA03013AA expands a RX-Only Voice-Only site to support IV&D.

CA03015AA expands a RX-Only Voice-Only site to support Enhanced Data.

CA03016AA expands an RX-Only IV&D site to support Enhanced Data.

7. GPB 8000 Reference Distribution Module Software Version Upgrade:

For GTR 8000 ESS:

Order the option below (one per module) to upgrade the Reference Distribution Module software to a newer system release or to convert a site controller to a Reference Distribution Module. NOTE: If converting from an X-HUB, this option is not applicable. The GPB 8000 High Availability Upgrade must be ordered via the Hardware Upgrade Model instead.

CA02210AA	ADD: REDUNDANT DISTRIBUTION MODULE SOFTWARE UPGRADE

For Standalone Reference Distribution Module for RX only Sites:

Order the option below (one per module) to upgrade the Reference Distribution Module software for RX only site to a newer system release:

CA02458AC	ADD: RDM SW FOR RX ONLY UPGRADE

8. Comparator Software

Order one of the software options below to upgrade the comparators. For example, if the system has Simulcast system has 12 channels, order quantity 12 of CA01197AA (there is one comparator module per channel). See section 6 to upgrade comparators to X2-TDMA operation.

CA01197AA	ADD: IP BASED MULTISITE OPERATION UPGRADE
CA01799AA	ADD: GCM 8000 CONVENTIONAL SOFTWARE
CA02213AA	ADD: CONV COMPARATOR VOTING TO SIMULCAST UPGRADE
CA01502AC	ADD: ASTRO 25 CONV SIMULCAST SW
CA01505AC	ADD: ASTRO 25 CONV VOTING SW

CA01197AA should be ordered when upgrading a GCM 8000 Comparator configured for ASTRO 25 Trunking.

CA01799AA should be ordered when upgrading a GCM 8000 Comparator configured for Conventional operation. This upgrade option supports conventional operation for both simulcast and voting configurations.

CA02213AA should be ordered when converting a conventional Comparator from Voting to Simulcast configuration.

CA01502AC should be ordered when adding Simulcast capability to an existing conventional Comparator.

CA01505AC should be ordered when adding Voting capability to an existing conventional Comparator.

9. Comparator Redundancy

In an IP Based Multisite (Simulcast/Voting) configuration, two (2) comparator modules can be configured to support the same channel for redundancy – one module will be active and the other will be in standby mode. Order CA01974AA option to add redundant capability to an existing Comparator.

NOTE: A redundant comparator license must be purchased for EACH of the two (2) CA01183AA modules that are redundant to each other.

CA01974AA	ADD: TRUNKING REDUNDANT COMPRTR SW

10. Comparator Subsite Licenses

17-64 Conventional Subsite Support

For conventional systems, the base comparator software option (CA01484AC) provides up to 16 subsites of voting or simulcast capability.

To add the capability of up to 48 additional subsites to an already fielded comparator, order CA01914AB (ADD: Software License Single Expansion Port). CA01914AB must be ordered in a quantity equal to the number of subsites that are being added to the cell. For example, if 10 sites are being added to a 22 site simulcast cell, order quantity ten (10) of CA01914AB.

16-32 Trunking Subsite Support (Supported on A7.13 and later systems only)

For trunking systems, the base comparator software option (CA01185AA) provides up to 15 subsites of voting or simulcast capability.

To add the capability of up to 17 additional subsites to an already fielded comparator, order CA01914AB (ADD: Software License Single Expansion Port). CA01914AB must be ordered in a quantity equal to the number of subsites that are being added to the cell. For example, if 10 sites are being added to a 5 site simulcast cell, order quantity ten (10) of CA01914AB.

CA01914AB	ADD: SW LIC SINGLE EXPANSION PORT

To upgrade to a newer system version of comparator software at the same time as expanding subsite support, order CA01914AB in addition to **CA01799AA** (ADD: GCM 8000 CONVENTIONAL SOFTWARE) or **CA01197AA** (ADD: IP BASED MULTISITE OPERATION UPGRADE).

11. Comparator Two-slot TDMA Functionality

Choose the 2-slot TDMA upgrade option that provides the correct functionality and software licenses for your needs or configuration. One option must be ordered for each comparator board being upgraded to ensure the comparators are licensed correctly.

P25 Phase 2 TDMA Software

CA01910AA	ADD : COMPARATOR P25 FDMA to P25 TDMA SOFTWARE UPGRADE
CA01911AA	ADD : COMPARATOR X2-TDMA to P25 TDMA SOFTWARE UPGRADE
CA01912AA	ADD : COMPARATOR P25 TDMA SOFTWARE UPGRADE

CA01910AA should be ordered when converting a comparator from P25 FDMA-only operation to P25 TDMA capability. This option only needs to be ordered the first time the comparator is converted to P25 TDMA operation.

CA01911AA should be ordered when converting a comparator from Motorola's X2-TDMA operation to P25 TDMA capability. This option only needs to be ordered the first time the comparator is converted to P25 TDMA operation.

CA01912AA should be ordered when migrating P25 TDMA software on the comparator from one ASTRO 25 system release to a newer ASTRO 25 system release (such as from ASTRO 25 release 7.11 to ASTRO 25 release 7.12).

12. GPW 8000 Receiver Software Upgrades

Order the following software upgrade if upgrading an existing GPW 8000 Receiver to a newer software release.

CA01797AA	ADD : GPW 8000 CONVENTIONAL SOFTWARE UPGRADE
CA01995AB	ADD: ANALOG CONVENTIONAL GPW 8000 SOFTWARE UPGRADE
CA03021AB	ADD: CIRCUIT BASED MS RCVR SW UPGRADE
CA03022AB	ADD: IP BASED MS RCVR SW UPGRADE

If upgrading from Analog Conventional to either Digital Conventional or Trunking, you must order one of the following options below for each Receiver. If upgrading to a newer system version at the same time, please order the appropriate option above in addition.

CA02453AB	ADD: ANALOG ONLY CONV TO 3.1 CONV RX/O
CA02454AB	ADD: ANALOG ONLY CONV TO CIRC SIMUL RX/O
CA02455AB	ADD: ANALOG ONLY CONV TO IP SIMUL RX/O
CA02456AB	ADD: CONV TO CIRC SIMUL RX/O
CA02457AB	ADD: CONV TO IP SIMUL RX/O

13. Conventional Receiver Software System Configuration

Choose the appropriate optional conventional software system configuration if required.

Please refer to the hardware upgrade ordering instructions to order the wildcard or the main standby operation features.

CA01950AB	ADD : GPW 8000 CONVENTIONAL MULTI-NAC MULTI-PL OPERATION
CA01946AB	ADD : GPW 8000 ANALOG/DIGITAL MIXED MODE

Choose the 2-slot TDMA upgrade option that provides the correct functionality and software licenses for your needs or configuration. TDMA is an optional feature.

14. GPW 8000 RECEIVER 2-slot TDMA Functionality

Choose the 2-slot TDMA upgrade option that provides the correct functionality and software licenses for your needs or configuration. TDMA is an optional feature.

P25 Phase 2 TDMA Software for GPW 8000 Receiver

Order one of the following options for each receiver module being upgraded to ensure the stations are licensed correctly.

CA02449AB	ADD : RX/O P25 FDMA - P25 TDMA SW UPGRADE
CA02450AB	ADD : RX/O P25 TDMA SW UPGRADE

CA02449AB should be ordered when converting a receiver from P25 FDMA operation to P25 TDMA capability. This option only needs to be ordered the first time the receiver is converted to P25 TDMA operation.

CA02450AB should be ordered when migrating P25 TDMA software on the receiver from one ASTRO 25 system release to a newer ASTRO 25 system release (such as from ASTRO 25 release 7.14 to ASTRO 25 release 7.14). This option should be ordered in addition to the correct operational system software.

Dynamic Channel Assignment Software for GPW 8000 Receiver

Dynamic Channel Assignment functionality is optional, but requires that P25 TDMA software has also been ordered (on same order, or on a previous order).

CA02452AB	ADD : RX/O Dynamic Channel Assignement SW
CA02451AB	ADD : RX/O Dynamic Channel SW Upgrade

CA02452AB should be ordered when converting a receiver from P25 FDMA operation to P25 TDMA w/Dynamic Channel assignment capability (along with CA03023AA) OR when adding Dynamic Channel assignment to a P25 TDMA receiver for the first time. This option only needs to be ordered the first time the receiver is enabled with Dynamic Channel Assignment.

CA02451AB should be ordered when migrating P25 TDMA software on the receiver from one ASTRO 25 system release to a newer ASTRO 25 system release (such as from ASTRO 25 release 7.14 to ASTRO 25 release 7.15). This option should be ordered in addition to the CA03024AA (ADD : RX/O P25 TDMA SW UPGRADE) for each receiver that is being upgraded.

ORDERING GUIDELINES FOR G-SERIES HARDWARE UPGRADES

1. Main Model

The following main model must be ordered in quantity one (1) for any G-series hardware upgrade.

T7614A	G-SERIES HARDWARE UPGRADES

2. GTR 8000 Expandable Site Subsystem Upgrade to High Availability Simulcast

Choose the hardware upgrade option.

CA01782AA	ADD: GPB 8000 HIGH AVAILABILITY UPGRADE

CA01782AA provides the hardware and software necessary to upgrade an existing GTR 8000 Expandable Site Subsystem configured for IP-based simulcast to the High Availability Simulcast Remote Sites configuration. This kit includes two (2) GPB 8000 Reference Distribution Modules, GPB 8000 Reference Distribution Module software and licenses, and Junction Panel subpanels and cabling. One of these options must be ordered per simulcast remote site being re-configured.

3. GTR 8000 Expandable Site Subsystem X-Hub to GCP 8000 Site Controller Upgrade

This applies when converting from a GTR 8000 ESS with X-hubs to a primary ASTRO 25 Trunking Site Repeater ESS with GCP 8000.

Choose the hardware option:

Quantity 2 of one of the following must be ordered:

CA00303AA	ADD : GCP 8000 SITE CONTROLLER

Choose one the following software options:

Quantity 2 of one of the following must be ordered:

CA03001AA	ADD:P25 SITE RPTR SW IV&D+ENH DATA
CA02219AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – IV&D
CA02212AA	ADD : ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE – VOICE ONLY

4. GTR 8000 Expandable Site Subsystem Dual-brand Receive RFDS Upgrade

Choose the hardware upgrade option to add receive diversity.

These upgrade kits are designed to work with P25 IV&D Phase 2 TDMA in order to provide improved inbound coverage.

CA01915AA	ADD: 7/800 MHz Dual RX Kit 6 BRs
CA01916AA	ADD: 7/800 MHz Dual RX Kit 7-24 BRs
CA01923AA	ADD: 7/800 MHz Dual RX Kit Exp RMC
CA01918AA	ADD: UHF R2 Dual RX Kit 6 BRs
CA01919AA	ADD: UHF R2 Dual RX Kit 7-24 BRs
CA01920AA	ADD: UHF R2 Dual RX Kit Exp RMC
CA01921AA	ADD: UHF R1/VHF Dual RX Kit

CA01915AA provides the hardware necessary to convert an existing 700 MHz or 800 MHz GTR 8000 Expandable Site Subsystem that is currently configured with CA00861AA (ADD: Cabinet RMC w/Capability of 6 Base Radios) to a receive-side configuration with 2-branch diversity. This upgrade kit does not add the ability to connect to additional GTR 8000 Expandable Site Subsystems.

CA01916AA provides the hardware necessary to convert an existing 700 MHz or 800 MHz GTR 8000 Expandable Site Subsystem that is currently configured with CA00862AA (ADD: Site RMC w/Capability of 7-24 Base Radios) to a receive-side configuration with 2-branch diversity.

CA01923AA provides the hardware necessary to convert an existing 700 MHz or 800 MHz GTR 8000 Expandable Site Subsystem that is currently configured with CA00877AA (ADD: Cabinet RMC for Expansion Rack) to a receive-side configuration with 2-branch diversity that will accept diversity-receive signals from the cabinet or rack outfitted with CA00862AA (ADD: Site RMC w/Capability of 7-24 Base Radios) configured for diversity-receive.

CA01918AA provides the hardware necessary to convert an existing UHF R2 GTR 8000 Expandable Site Subsystem that is currently configured with CA00861AA (ADD: Cabinet RMC w/Capability of 6 Base Radios) to a receive-side configuration with 2-branch diversity. This upgrade kit does not add the ability to connect to additional GTR 8000 Expandable Site Subsystems. When ordering this upgrade kit, an appropriate UHF R2 Preselector must also be selected from the list below.

CA01919AA provides the hardware necessary to convert an existing UHF R2 GTR 8000 Expandable Site Subsystem that is currently configured with CA00862AA (ADD: Site RMC w/Capability of 7-24 Base Radios) to a receive-side configuration with 2-branch diversity. When ordering this upgrade kit, an appropriate UHF R2 Preselector must also be selected from the list below.

CA01920AA provides the hardware necessary to convert an existing UHF R2 GTR 8000 Expandable Site Subsystem that is currently configured with CA00877AA (ADD: Cabinet RMC for Expansion Rack) to a receive-side configuration with 2-branch diversity that will accept diversity-receive signals

from the cabinet or rack outfitted with CA00862AA (ADD: Site RMC w/Capability of 7-24 Base Radios) configured for diversity-receive.

CA01921AA provides the hardware necessary to convert an existing VHF or UHF R1 GTR 8000 Expandable Site Subsystem that is currently configured for single receive branch to a receive-side configuration with 2-branch diversity.

For UHF R2 GTR 8000 Expandable Site Subsystems

CA01091AA	ADD:UHF Site Preselector, 455-458.5
CA01092AA	ADD:UHF Site Preselector, 456.5-460
CA01093AA	ADD:UHF Site Preselector, 465-468.5
CA01094AA	ADD:UHF Site Preselector 466.5-470
CA01095AA	ADD: UHF Site Preselector, 473-475
CA01096AA	ADD: UHF Site Preselector, 474-476
CA01097AA	ADD: UHF Site Preselector, 479-481
CA01098AA	ADD: UHF Site Preselector, 480-482
CA01099AA	ADD: UHF Site Preselector, 485-487
CA01100AA	ADD: UHF Site Preselector, 486-488
CA01101AA	ADD: UHF Site Preselector, 491-493
CA01102AA	ADD: UHF Site Preselector, 492-494
CA01103AA	ADD: UHF Site Preselector, 497-499
CA01104AA	ADD: UHF Site Preselector, 498-500
CA01105AA	ADD: UHF Site Preselector, 503-505
CA01106AA	ADD: UHF Site Preselector, 504-506
CA01107AA	ADD: UHF Site Preselector, 509-511
CA01108AA	ADD: UHF Site Preselector, 510-512

CA01091AA – CA01108AA must be ordered with kits CA01918AA (ADD: UHF R2 Dual RX Kit 6 BRs) or CA01919AA (ADD: UHF R2 Dual RX Kit 7-24 BRs) to provide the second receive branch with preselector filtering.

5. **Base Radio Conventional Hardware Upgrades**

Choose the appropriate conventional options below. These options include necessary cables to enable the software features.

CA02220AA	ADD: BASE RADIO WILDCARD W/GPIO
CA02221AA	ADD: BASE RADIO MAIN/STANDBY OPERATION

6. **GPW Receiver Conventional Hardware Upgrades**

Choose the appropriate conventional options below. These options include necessary cables to enable the software features.

CA02220AB	ADD: BASE RADIO WILDCARD W/GPIO
CA02221AB	ADD: BASE RADIO MAIN/STANDBY OPERATION

7. **GCM 8000 Comparator Channel Add**

Choose the appropriate GCM 8000 channel add option to add the second comparator module.

CA01752AA	ADD:GCM 8000 CONVENTIONAL CHANNEL ADD
CA01780AA	ADD: GCM 8000 TRUNKING CHANNEL ADD

ORDERING GUIDELINES FOR ADDING CHANNELS TO THE GTR 8000 EXPANDABLE SITE SUBSYSTEM

1. Main Model

The following main model must be ordered to add channels to an existing GTR 8000 Expandable Site Subsystem.

T7071A	GTR 8000 EXPANDABLE SITE SUBSYSTEM CHANNEL ADDITION UPGRADE

2. Frequency Band and Power Level

Enter the Frequency Band option:

CA01821AA	ADD : 900 MHZ HIGH POWER
CA00855AA	ADD : 700/800 MHZ MID POWER
X640AL	ADD : UHF R2 MID POWER (435-524)
X530BG	ADD : VHF MID POWER (136-174)
X448AA	ADD : UHF R1 MID POWER (380-435)

One TX and one RX frequency must be specified and will be collected at the main model level.

900 MHz: Frequency Rules for CA01821AA
RX Range: 896– 902 MHz.
TX Range: 935– 941MHz

If Freq (TX) is 935 – 941 MHz, then Freq (Rx) = TX - 39
All frequencies must be divisible by 2.5 kHz or 3.125 kHz.
Note: Currently, 900.000 MHz is not supported for Rx.

700/800 MHz: Frequency Rules for CA00855AA

RX Range: 794.00625 - 824.99375 MHz.

TX Range: 764.00625 - 775.99375 MHz and 851.00625 - 869.99375 MHz

If Freq (TX) is 764.00625 - 775.99375 MHz, then Freq (Rx) = TX + 30

If Freq (TX) is 851.00625 - 869.99375 MHz, then Freq (Rx) = TX - 45

All frequencies must be divisible by 2.5 kHz and 3.125 kHz.

Note: Currently, 796.09375, 800.000, 806.88125, 808.31875, 810.000, 813.975, 820.000, 822.375 are not supported for Rx.

UHF R2: Frequency Rules for X640AL
RX Range: 435.0000-524.0000 MHz.
TX Range: 435.0000-524.0000 MHz

RX Range: 435.0000 - 524.0000 MHz.

TX Range: 435.0000 - 524.0000 MHz

If Freq (TX) is 435-524 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX

All frequencies must be divisible by 2.5 kHz or 3.125 kHz.

Note: Currently, 440.000, 454.500, 460.000, 474.6375, 479.99375, 480.000, 480.00625, 494.05625, 500.000, 511.3125, 519.5125, 519.51875, 519.99375, 520.000, 520.00625, 520.48125, and 520.4875 are not supported for Rx.

UHF R1: Frequency Rules for X448AA

RX Range: 380.0000 - 435.0000 MHz.

TX Range: 380.0000 - 435.0000 MHz

If Freq (TX) is 380-435 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX

All frequencies must be divisible by 2.5 kHz or 3.125 kHz.

Note: Currently, 350.000, 360.000, 380.250, 396.000, 416.925, 420.000, and 425.0125 MHz are not supported for Rx

<u>**VHF: Frequency Rules for X530BG**</u>

RX Range: 136.0000 - 174.0000 MHz.

TX Range: 136.0000 - 174.0000 MHz

If Freq (TX) is 136 - 174 MHz, then Freq (Rx) $\geq \pm$ .25 MHz TX

All frequencies must be divisible by 2.5 kHz or 3.125 kHz.

Note: Currently the following frequencies are not supported for Rx: 140.000, 160.000 and 161.925 MHz

3. Base Radios

Choose the quantity of base radios that are desired.

<u>Site Repeater & Multisite (simulcast):</u> For Site Repeater and simulcast systems, the total number of channels in a GTR 8000 Expandable Site Subsystem cannot exceed six; therefore the maximum additional channels that may be ordered is five.

<u>High Performance Data:</u> For HPD systems, the total number of channels in a GTR 8000 Expandable Site Subsystem must not exceed five; therefore the maximum additional channels that may be ordered is four.

<u>Conventional:</u> ASTRO 25 Conventional channels can be added to a trunking GTR 8000 Expandable Site Subsystem, but in that configuration, the quantity of conventional channels at a site cannot exceed 4.

X301AE	ADD : QUANTITY (1) GTR 8000 BASE RADIO
X302AE	ADD : QUANTITY (2) GTR 8000 BASE RADIOS
X303AE	ADD : QUANTITY (3) GTR 8000 BASE RADIOS
X304AE	ADD : QUANTITY (4) GTR 8000 BASE RADIOS
X305AC	ADD : QUANTITY (5) GTR 8000 BASE RADIOS

4. Base Radio Software

Add a System Software option for each base radio ordered.

<u>Conventional:</u> ASTRO 25 Conventional channels can be added to a trunked GTR 8000 Expandable Site Subsystem and the TX signals can be routed through the same cavity combiner.

Conventional operation is not currently supported on 900 MHz frequency band. Check with system planning regarding future availability.

CA00294AA	ADD : 25 KHZ HIGH PERFORMANCE DATA BASE RADIO SOFTWARE
CA00025AF	ADD : CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE
CA01193AA	ADD : IP BASED MULTISITE (SIMULCAST/VOTING) BASE RADIO SOFTWARE
X591AE	ENH : ASTRO 25 SITE REPEATER SOFTWARE
CA01430AA	ADD : ASTRO 25 EXPRESS SYSTEM BASE RADIO SOFTWARE
CA02207AA	ADD: 3600 TRUNKING SIMULCAST
CA02209AA	ADD: 3600 INTELLIREPEATER SOFTWARE
CA01948AA	ADD: CONVENTIONAL SOFTWARE
CA01949AA	ADD: ANALOG ONLY CONV SW

Replacement FRUs: When ordering spare transceiver FRUs for 3600 Trunking or Conventional base radios, FRUs with Option Cards must be ordered.

5. Conventional System Software Configuration

Choose the appropriate optional conventional software system configuration if required. These options are mutually exclusive and only available with conventional configurations.

CA01502AA	ADD : ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
CA01946AA	ADD : CONVENTIONAL MIXED MODE OPERATION
CA01505AA	ADD : ASTRO 25 CONVENTIONAL VOTING SOFTWARE
CA01952AA	ADD : ANALOG CONVENTIONAL SIMULCAST SOFTWARE
CA01951AA	ADD : ANALOG CONVENTIONAL VOTING SOFTWARE

CA01946AA, CA01502AA and **CA01505AA** are only available when ordered with CA01948AA. **CA01952AA** and **CA01951AA** are only available when ordered with CA01949AA.

6. Conventional Optional Features

Choose the appropriate optional system feature options if required. These options are available for addition only to base radios configured for conventional operation.

CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST
CA01947AA	ADD : RECEIVER SCAN OPERATION
CA01950AA	ADD: CONV MULTI-NAC MULTI-PL
CA01954AA	ADD: WILDCARD w/GPIO
CA01955AA	ADD: MAIN/STANDBY OPERATION
CA02680AA	ADD : CONVENTIONAL TALKGROUPS

CA01503AA enables in-cabinet repeat for when the base station loses communication with the comparator.

CA01947AA provides the ability to scan for qualified activity on up to 16 receive frequencies. The receive frequencies are assigned in the 16 programmable channel personalities. Scan operation can be suspended and resumed by TRC WildCard programming.

CA01950AA enables multiple PL tones (analog) or multiple NACs (digital P25 Network Access Codes) to be detected on a single channel. Each of the 16 channel personalities can be configured with a list of PL tones and NACs to use for receiver qualifiers.

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom base radio interface applications.

CA01955AA provides WildCard programming presets and cabling for a side-by-side base radio main/standby configuration.

CA02680AA enables conventional talkgroups. Order Qty 1 per base radio. (Requires 7.15+ software release version). NOTE: For QUANTARs, this option is not required. Simply order a QUANTAR software upgrade to 7.15.

7. 3600 Trunking Features

Order these optional base radio features as necessary. These options are incompatible with P25 trunking & HPD system software.

CA01954AA	ADD: WILDCARD w/GPIO
CA01955AA	ADD: MAIN/STANDBY OPERATION
CA01503AA	ADD : FALL BACK IN CABINET REPEAT- SIMULCAST

CA01954AA provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom receiver interface applications. *This option is NOT compatible with 3600 Simulcast.*

CA01955AA provides WildCard programming presets and cabling for a side-by-side receiver in a main/standby configuration.

CA01503AA enables the station to continue to receive and transmit when communication with the comparator is lost.

8. Energy Efficiency Options

This optional feature provides hardware and software for reduced power consumption to accommodate needs at sites without grid power or that are driven off alternative energy sources.

CA01953AA	ADD : POWER EFFICIENCY PACKAGE

Replacement FRUs: Order **DLN6793A** (FRU: PWR EFF POWER SUPPLY AC/48VDC) as spare power supply FRU for products with the G-Series Power Efficiency Package

9. Two-slot TDMA Functionality

All TDMA software options are optional. Order only when required. These options should not be ordered for the control channel.

P25 TDMA Software
CA01842AA adds P25 TDMA software capability to the existing P25 FDMA software.
Receive diversity (CA01943AA) is available for systems where it is required to maintain the same coverage footprint as P25 FDMA. The orderable option is listed below.

CA01842AA	ADD : P25 TDMA SOFTWARE

CA01842AA provides the base radio with the ability to operate in P25 TDMA Compliant 6.25e kHz two-slot TDMA mode. This option is not available for ASTRO 25 Conventional operation.

Dynamic Channel Assignment Software
CA01902AA is optional, but requires that CA01842AA also be ordered.

CA01902AA	ADD : DYNAMIC CHANNEL ASSIGNEMENT SOFTWARE

CA01902AA provides the base radio with the ability to switch between transmitting in 12.5 kHz FDMA mode or in 6.25e kHz TDMA mode. This option is only available when P25 TDMA Software (CA01842AA) is also ordered.

ORDERING GUIDELINES FOR ADDING CHANNELS TO THE GPW 8000

1. Main Model

The following main model must be ordered to add channels to an existing GPW 8000 Receiver

T7071A	GTR 8000 EXPANDABLE SITE SUBSYSTEM CHANNEL ADDITION UPGRADE

X301AR is a required option for adding one module to a dual slot receiver chassis.

X301AR	ADD: QTY 1 GPW 8000 RECEIVER

2. Frequency Band and Power Level

Enter the Frequency Band option Order for the receiver module

GPW 8000 will dual slot chassis can support dual band. For example, if the existing dual slot chassis contains a UHF module, a VHF module can be added.

CA00855AB	ADD : 700/800 MHZ MID POWER
X640AN	ADD : UHF R2 MID POWER (435-524)
X530BH	ADD : VHF MID POWER (136-174)
X448AB	ADD : UHF R1 MID POWER (380-435)
CA01821AB	ADD: 900 MHZ HIGH POWER

Ordering Note: One RX frequency must be specified and will be collected at the main model level.

700/800 MHz: Frequency Rules for CA00855AB
RX Range: 794.00625 - 824.99375 MHz.

All frequencies must be divisible by 2.500 or 3.125 KHz.
    Note: Currently, 796.09375, 806.88125, 808.31875, 822.375 MHZ are not supported for Rx.

UHF R2: Frequency Rules for X640AN
RX Range: 435.0000-524.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125. KHz
    Note: Currently, 454.500, 474.6375, 494.05625, 511.3125 MHZ are not supported for Rx.

UHF R1: Frequency Rules for X448AB
RX Range: 380.0000 – 435.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125. KHz
    Note: Currently, 380.250, 416.925 MHz are not supported for Rx.

VHF: Frequency Rules for X530BH
RX Range: 136.0000 – 174.0000 MHz.

All frequencies must be divisible by 2.500 or 3.125.KHz.
Note: Currently the following frequencies are not supported for Rx: 160.000 and 161.925 MHz.

3. Operational Software

Choose the appropriate system software option to provide the satellite receiver with system software.

Two different applications can be in a single chassis. For example, if an existing GPW 8000 chassis contains one Conventional module, a trunking module can be added to the chassis.

Conventional Software:

CA01948AB	ADD: CONVENTIONAL SOFTWARE R/X ONLY
CA01949AB	ADD: ANALOG ONLY CONV SW R/X ONLY

CA01948AB provides a similar feature set to the QUANTAR conventional receiver. Configurable for digital Project 25 FDMA operation, analog conventional operation, and mixed mode (digital P25 and analog) operation. Supports IP, digital V.24, analog 4wire and mixed mode 4-wire/V.24 hybrid circuit wireline link interfaces. 16 programmable channel personalities. Supports multi-channel operation. Multi-NAC and Wildcard options are supported with purchase of additional licenses. The CSS (Configuration Service Software) install disc is included with this option.

CA01949AB provides a circuit analog conventional receiver. *Digital and mixed mode operation is not supported by this software*. This receiver software supports 2wire, 4wire, and 8wire circuit analog wireline links. 16 programmable channel personalities. TRC wireline keying is supported, with a full complement of programmable function tones. The CSS (Configuration Service Software) install disc is included with this option.

Trunking Software:

Trunking Simulcast software is P25 Phase 1- FDMA compliant, and Phase 2 - TDMA compliant when ordered with TDMA Enhancement software option **CA01842AB**. Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

CA00025AH	ADD: CIRCUIT BASED MULTISITE (SIMULCAST/VOTING) RCVR SOFTWARE
CA01193AB	ADD: IP BASED MULTISITE (SIMULCAST/VOTING) RCVR SOFTWARE

4. Two-slot TDMA Enhancements

P25 Phase 2 TDMA Software:
Choose the appropriate two-slot TDMA enhancement option to provide the receiver with additional talkpaths/call capacity and functionality. CA01842AB is optional.

Dynamic Channel Assignment Software
Order this option to add the capability of Dynamic Channel Assignment between P25 Phase 1 and P25 Phase 2 to the receiver. CA01902AB is optional, but requires that CA01842AB also be ordered.

Order one per receiver module (i.e. if there is 1 module in the chassis, order Qty 1. If there are 2 modules in the chassis, order Qty 2).

CA01842AB	ADD : P25 TDMA RCVR SOFTWARE
CA01902AB	ADD : DYNAMIC CHANNEL ASSIGNEMENT RCVR SOFTWARE

CA01842AB provides the receiver with the ability to operate in P25 TDMA Compliant 6.25e kHz two-slot TDMA mode. This provides two TDMA talk-in paths per receiver on a 12.5 kHz channel. This option is not available in ASTRO 25 Conventional operation.

CA01902AB provides the receiver with the ability to switch between transmitting in 12.5 kHz FDMA mode or in 6.25e kHz TDMA mode. The receiver will dynamically change modes depending on the nature of the subscribers in the assigned talkgroup. This option is only available when P25 Phase 2 TDMA Receiver Software (CA01842AB) is also ordered.

5. Conventional Features
Choose the appropriate optional system feature options if required.

CA01946AB	ADD: CONV MIXED MODE OPERATION
CA01950AB	ADD: CONV MULTI-NAC MULTI-PL
CA01954AB	ADD: WILDCARD w/GPIO
CA01955AB	ADD: MAIN/STANDBY OPERATION

CA01950AB enables multiple PL tones (analog) or multiple NACs (digital P25 Network Access Codes) to be detected on a single channel. Each of the 16 channel personalities can be configured with a list of PL tones and NACs to use for receiver qualifiers.

CA01954AB provides configurable inputs and outputs with a programmable set of event/action tables for implementing custom receiver interface applications.

CA01955AB provides WildCard programming presets and cabling for a side-by-side receiver in a main/standby configuration.

CA01946AB enables analog and digital P25 mixed mode operation when the receiver is ordered with CA01948AB digital P25 software.

6. Energy Efficiency Options

CA01953AB	ADD: POWER EFFICIENCY PACKAGE

Replacement FRUs: Order **DLN6793A** (FRU: PWR EFF POWER SUPPLY AC/48VDC) as spare power supply FRU for products with the G-Series Power Efficiency Package

If the existing GPW 8000 module does not have CA01953AB and power efficiency is needed for the GPW 8000, it will require swapping out the existing power supply for a power efficient power supply FRU DLN6793A. The second module can be ordered with CA01953AB.

ORDERING GUIDELINES FOR GPS EQUIPMENT

High Availability Simulcast Remote Sites

The following ISPO (Dropship) equipment is required for GTR 8000 Expandable Site Subsystems configured for High Availability Simulcast Remote Sites. The GPS equipment should equal the number of site controllers at the site. Currently, redundant site controllers are required so each item must be ordered in a quantity of 2.

Incompatibilities

1) Simulcast remote sites configured with Non-High Availability GTR 8000 Expandable Site Subsystems

2) Site Repeater & ASTRO 25 Express GTR 8000 Expandable Site Subsystems

High Performance Data

The following ISPO (Dropship) equipment is required for GTR 8000 Site Subsystems and for GTR 8000 Expandable Site Subsystems configured for High Performance Data. The GPS equipment should equal the number of site controllers at the site. Currently, redundant site controllers are required so each item must be ordered in a quantity of 2.

1. GPS Antenna/Receiver

The following item is the remote GPS Antenna/Receiver. It includes the antenna and the receiver/modem.   Because the actual receiver is integrated with the antenna, the connection between the Remote GPS receiver and the Site Controller is now digital using a 5-pair twisted pair cable.

DS0900382702	GPS Timing Antenna/Receiver	Symmetricom, Inc.

2. Mounting Kit

This kit is needed to mount the GPS. There should be a quantity of one for each site controller at the site.

DS58534AAUB	Mounting Kit for GPS Timing Antenna	Symmetricom, Inc.

3. Surge Suppression

This primary surge suppression is used at the point where the cable enters the site building. There should be a quantity of one for each site controller at the site. The surge suppression is installed by cutting the cable at the point where the cable enters the site building and connecting both ends to the surge suppressor.

DSIX2L1M1DC48IG	HPD GPS Surge Protector 48VDC	Transtector

4. GPS Cables

Choose the cable length that is required for your site configuration. There should be a quantity of one for each site controller at the site. These cables have a Deutsch connector at one end that connects to the GPS receiver/antenna and a DB15 connector that plugs into the site controller.   The surge suppression is installed by cutting the cable at the point where the cable enters the site building and connecting both ends to the surge suppressor.

DS30C87465CO1	GPS ANTENNA/RECEIVER TO SITE CNTLR CABLE 125 FT	Anixter
DS30C87465CO2	GPS ANTENNA/RECEIVER TO SITE CNTLR CABLE 350 FT	Anixter
DS30C87465CO3	GPS ANTENNA/RECEIVER TO SITE CNTLR CABLE 500 FT	Anixter
DS30C87465CO4	GPS ANTENNA/RECEIVER TO SITE CNTLR CABLE 1,000 FT	Anixter
DS30C87465CO5	GPS ANTENNA/RECEIVER TO SITE CNTLR CABLE 2,000 FT	Anixter

5. TRAK Extended Time & Frequency Holdover (Optional)

A single TRAK 9100 or TRAK 8835-3M unit per GTR ESS can optionally be installed to provide extended time and frequency holdover (minimum 72 hr) should loss of GPS signal occur.

TOWER TOP AMPLIFIER

Although a Tower Top Amplifier is compatible with the GTR 8000, it is not offered as part of the overall solution. Motorola does have a recommended supplier set up in the ISPO organization. The part numbers vary based on band. For further details, please contact the ISPO organization.

ASTRO 25 MODEM II

The ASTRO-25 Modem II provides two functions: Modem (point-to-point connectivity) and Port Extender for analog connectivity in the GTR 8000 Base Radio and GPW 8000 Receiver. It is available with either AC or DC power. User guide is available on the G-Series Wiki Page.

DS01003200100	ASTRO 25 ANALOG MODEM II	Raymar Telenetics
DS01003200105	ASTRO 25 IP MODEM II	Raymar Telenetics
DS01003200110	Port Extender	Raymar Telenetics

FIELD REPLACEABLE UNITS

The following field replaceable units will have new orderable numbers starting in July 2013. Old numbers will be retired at the same time.

FRU	GEN 1 FRU # (retiring as of July 2013)	GEN 2 FRU # (available starting July 2013)
XCVR - 900 MHz	DLN6778A	DLN6882A*
XCVR - 900 MHz w/ Opt. Card	N/A	DLN6923A *
XCVR - 7/800 MHz	DLN6566A	DLN6885A *
XCVR - 7/800 MHz w/ Opt. Card	DLN1430A	DLN6883A *
XCVR - UHF R2	DLN1346A	DLN6884A *
XCVR - UHF R2 Pwr Eff	DLN6789A	DLN6884A *
XCVR - UHF R2 w/ Opt. Card	DLN1433A	DLN6886A *
XCVR - UHF R2 w/ Pwr Eff Opt. Card	DLN6790A	DLN6887A *
XCVR - UHF R1	DLN1395A	DLN6888A *
XCVR - UHF R1 Pwr Eff	DLN6786A	DLN6888A*
XCVR - UHF R1 w/ Opt. Card	DLN1432A	DLN6889A *
XCVR - UHF R1 w/ Pwr Eff Opt. Card	DLN6787A	DLN6890A *
XCVR - VHF	DLN1376A	DLN6892A *
XCVR - VHF w/ Opt. Card	DLN1431A	DLN6893A *
PA - 900 MHz	DLN6779A	DLN6894A
PA - 7/800 MHz	DLN6567A	DLN6895A
PA - UHF R2	DLN1347A	DLN6896A
PA - UHF R2 Pwr Eff	DLN6792A	DLN6896A
PA - UHF R1	DLN1396A	DLN6891A
PA - UHF R1 Pwr Eff	DLN6788A	DLN6891A
PA - VHF	DLN1377A	DLN6897A
PA - VHF 100W Linear	DLN6725A	N/A
FAN	DLN1338A	DLN6898A
FAN - Pwr Eff	DLN6804A	DLN6898A

*Not compatible on 7.6 and earlier systems, systems running X2 –TDMA or on GTR 8000 base radios with the VHF 100W Linear PA installed.