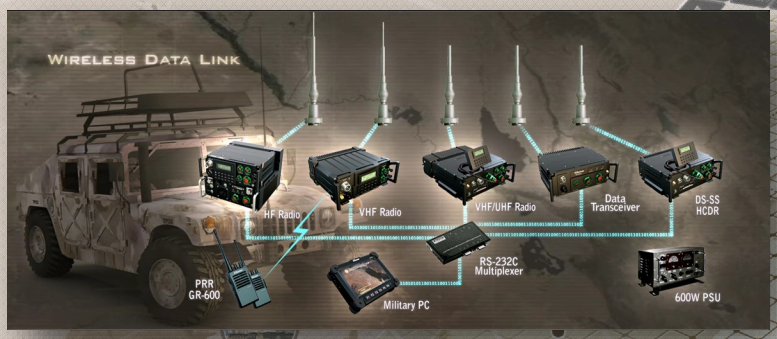
Global Communications Co.,





***Anywhere, Anytime in Battlefield***

Helping you
<u>focus where it counts</u>
in military communication and C4ISR

# About Glocom


Glocom was established in 1996. is a technology-oriented company that develops, manufactures and supplies various kinds of radio and wire communication equipment, navigation equipment, command and control equipment and other customized equipment for military and para-military organizations, secret service and security organizations and specially authorized civilian organizations at home and abroad.

Currently Glocom provides customers with hi-tech voice and data communication equipment, navigation equipment, IFF interrogators/transponders, air-traffic control equipment, reconnaissance receivers, ultra-high speed parallel processors, various kinds of software, as well as complete sets of integrated systems such as a battle management system.

In 1997 Glocom developed a VHF ECCM radio that could be used for anti-aircraft early warning system, and began its serial production the next year.

Since then Glocom has focused on developing various kinds of HF, VHF, and UHF radio communication equipment, which play a pivotal role in C4ISR systems, as well as integrating various systems as required by customers. So far Glocom has supplied thousands of radio communication equipment for customers at home and abroad.

At the same time Glocom has been developing a variety of applications software such as an integrated tactical data system (ITDS), a wireless gateway system (WGS), and an integrated tactical command and control system (ITCCS), with a view to creating a new battle management system. It has also making active efforts to develop customized C4ISR systems for individual soldiers, mobile, airborne, shipborne and stationary.

By actively promoting the transfer of technology, Glocom has exported to some countries whole manufacturing plants, which are now turning out products with the same quality as those produced in the home country.

Recently Glocom has stepped up efforts to improve the quality of it after-sales service.

Glocom

24th, January 2017

# Table of Contents

Global Communications Co.,

# GR-150 HF Tactical Manpack/Mobile Radio

## Frequency Hopping, Digital Secure EPM

## Software Defined Radio

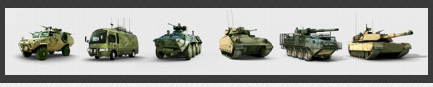

### [Key features]

■1.6~30MHz ■CW/voice/data/SMS ■Digital frequency hopping ■MELP1000 ■AES256 digital encryption ■20W RF power ■3G ALE ■NVIS antenna compatible ■VHF-HF relay function ■Remote control function (2Km) ■Wireless fill-gun(OTAR) ■Built-in GPS ■Advanced calling modes

The GR-150 is a rugged fully featured tactical transceiver solution delivering reliable field deployable communications with unparalleled value. ■**[Lightweight and Compact Design]**-Using the latest lightweight alloys the GR-150 weight 4kg(4.9kg with 11Ah/12V, Lithium Ion battery pack). Its small physical size makes it comfortable to wear and operate when deployed as a tactical manpack. Designed for the harshest field environments, the GR-150 complies with MIL-STD-810G and is fully immersible to a depth of one meter ■**[Advanced calling feature]**-The GR-150 radio supports advanced selective calling, banish calling, Automatic mode exchange, 5 digit SMS, Beacon, GPS tracking which are included as standard ■**[Remote control]**-The GR-150 radio has full operation access to the radio with remote control unit up to 2Km. ■**[Enhanced DSP noise reduction]**-MELP1000 vocoder system provides outstanding voice quality by reducing radio frequency interference (RFI), and the effects of electrical interference by enhancing audio signals to provide easier listing. The level of noise reduction can be easily selected to suit prevailing conditions. ■**[Automatic antenna tuner]**-Whips and untuned wire antennas are simply deployed using the inbuilt, fully automatic antenna tuner. For temporary fixed station and tunable tactical antennas are available. ■**[Intuitive operation]**-Glocom's well known intuitive operator interface ensures that operating the GR-150 very simple. Principal key functions are performed using a keyboard array mounted on the front panel. The operator is guided by 128x32 LCD graphics display. The display has adjustable backlighting, allowing maintenance of night vision or high levels of luminescence in poor visibility. Network station addresses and radio numbers are stored in easily accessible address books and as little as two key strokes will initiate a call. ■**[Extended operation time]**-The low current consumption of the GR-150 radio enables it to operate for over 20 hours on one battery pack. Spare quick change battery packs are small and lightweight. The battery packs contains the charger management system and can be charged when connected to the radio or separately with charger including grid charger, solar charger. ■**[Automatice Link Establishment(ALE)]**-The GR-150 is available with full MIL-STD-188B ALE. When selected, the radio searches and selects the best channels. ■**[Digital Encryption and scrambling]**-The GR-150 can be fitted with a variety of scrambling and digital encryption functions for voice and data security. The GR-150 includes secure calling(an innovative narrow band voice scrambler providing secure point to point or point to multipoint communication), AES 256 bit digital encryption assuring secure voice and data operation ■**[Frequency Hopping]**-The unique, easy to use frequency hopping function requires no central synchronization station, has short entry or late entry time delay and requires no hopping handshakes. Hopping rate of 10 hops per second, using 25 digit hopping encryption key, and user selectable hopping bandwidth to suit the antenna type in use, the system provides excellent protection against Electronic Warfare (EW) attacks. ■**[Modem]**-The GR-150 fitted with STANAG 5066 internal data modems supporting high speed data and email transmission, with effective data rates up to 4800bps. Data modems are supplied with PC software which provides email, file transfer and short text message functions.

# GR-150 HF Tactical Manpack/Mobile Radio

## Digital Frequency Hopping, Digital Secure EPM Software Defined Radio



**[Operation mode]** ■[Clear mode]-CW, voice, SMS ■[Secure mode]-CW, encrypted digital voice/data, SMS ■[FH mode]-CW, encrypted digital voice/dada, SMS

## General specifications

| | |
|---|---|
| Frequency range | 1.6~30MHz |
| Fine tuning | 10Hz |
| Preset channels | 100 channels |
| Modulation | SSB, AME, BPSK, QPSK |
| Data rate | 110bps~4800bps |
| TRANSEC(FH) | 10hps (Digital Frequency Hopping) |
| COMSEC (Encryption) | AES256, customized algorithm |
| Vocoder | MELP 1000 |
| Link Establishment | MIL-STD-188-141B 3G ALE |
| Frequency stability | ±1ppm |
| RF impedance | 50Ω |
| Power supply | 10~15VDC, Over-voltage, polarity protection |
| Data interface | RS-232C, Bluetooth |
| Remote control | PC, Tablet (Android), RCU |
| Programming | PC, wireless fill-gun (OTAR), KB |
| Dimension | 230mm x 90mm x 230mm |
| Weight | ≤4Kg (4.9Kg with battery) |

## Receiver

| | |
|---|---|
| Sensitivity | -113dBm @ 10dB SINAD |
| Image & IF rejection | ≥85dB |
| Adjacent channel rejection | ≥45dB |
| Non-linear distortion | ≤5% |

## Transmitter

| | |
|---|---|
| RF power | 100mW~20W |
| Harmonic suppression | ≥50dBc |
| Spurious outputs | ≤-60dBc typical |

## Environment

| | |
|---|---|
| Operating temperature | -30°C~+60°C |
| Storage temperature | -50°C~+70°C |
| Humidity | 95% |

## GR-150/GR-150 Available options

- Remote control unit GA-153A
- External speaker with cable GA-40A
- 100W power supply unit GA-33A
- 320W power supply unit GA-34A
- NVIS Roof rack antenna GA-114A
- ITCCS Software GS-930

## GR-150 HF Tactical Manpack Set

The Glocom GR-150 HF Tactical Manpack Set is ideal for extended portable field operations providing the tactical user with effective, secure and comprehensive communications with remote sited command locations. It includes all necessary handset, headset, antennas, batteries and rucksack carrying system. The standard set comprises:-

- HF 20W EPM SDR GR-150E
- Officer handset GA-10A
- Tactical headset GA-11A
- HF 2.4m whip antenna GA-111A
- HF 15m line antenna GA-112A
- HF 20m x 2 dipole antenna GA-113A
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- CW key GA-121A
- Rucksack GA-122A
- User Manual GA-131A

## GR-150VH HF Tactical Mobile Set

The Glocom GR-150 HF Tactical Mobile Set upgrades the GR-150 by providing a convenient vehicle installation kit and transmitter power amplification to 100W PEP. With options for power supply system and the flexibility of dismounted use of GR-150 radio when not in the vehicle (additional accessories may be required), the GR-150VH HF Tactical Mobile Set can be installed in a wide range of vehicle types with antenna options to suit. The standard set comprises:-

- HF 20W EPM SDR GR-150E
- Officer handset GA-10A
- Tactical headset GA-11A
- HF 2.4m whip antenna GA-111A
- HF 15m line antenna GA-112A
- HF 20m x 2 dipole antenna GA-113A
- HF 4.2m mobile antenna GA-115B
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- CW key GA-121A
- Rucksack GA-122A
- User Manual GA-131A
- HF 100W Amplifier with cables GR-151C
- HF 100W ATU with cables GR-152C
- Mobile installation kit GR-101C10-ITK

Global Communications Co.,

# GA-160 Crypto Speaker Microphone (Modem)

## *For Old Generation of HF Radios*

## [Key features]

■Secure voice communication between old generation HF radios ■MIL-STD-188-110A Compatible ■Easy to operate ■Compact & light weight design ■Digital encryption AES (Rijndael) or customized ■Excellent voice quality (MELP 1200)

## Overview

Glocom's modem for HF data and voice communications complies with MIL-STD-188-110A (serial tone) standard and supports data rates from 75 to 2400 bps (coded rates) and 4800 bps (uncoded) with 3 possible interleaves - from zero to 4.8 seconds.

The modem is intended for communication over HF channels under severe conditions in the multi-ray and fading environment. It can be used both in tactical and civil applications.

The modem incorporates powerful equalization, tracking and forward-error-code correction schemes to work in severely degraded HF environment with fast fading (up to 10Hz), big multi-path spread and big number of rays. Extended channel quality information makes easier proper selection of the data rates. Modem enables to use power effective nonlinear schemes in the radios.

## Applications

- Secure communication with old generation HF radios
- Low cost upgrading for high capacitance (Error free digital communications)
- Low cost upgrading for ECCM (data encryption)

## General specifications

| | |
|---|---|
| Data rates | 75bps, 150bps, 300bps, 600bps, 1200bps, 2400bps(coded), 4800bps (uncoded) |
| Interleaves | 0, 0.6 and 4.8sec |
| Multipath tolerance | 12msec @ 75bps<br>8msec @ 150~1200bps<br>6msec @ 2400bps |
| Acceptable fading bandwidth | 50Hz @ 75bps<br>10Hz @ 150...1200bps<br>6Hz @ 1200/2400bps |
| Frequency correction | ±75Hz |
| Frequency drift | 3.5Hz/sec slope |
| Bandwidth | 3kHz ( Option 2.7KHz) |
| Vocoder | MELP1200 |
| Encryption | AES256, Customized algorithm |
| Speaker Output | 0.5W |
| Dimension | 68mm x 100mm x 40mm |
| Weight | ≤150g |

## Operation

| | |
|---|---|
| Keypad | PTT |
| Status | Power/Mode/Warning |

## Environment

| | |
|---|---|
| Operating temp. | -30℃ ~ +70℃ |
| Storage temp. | -50℃ ~ +80℃ |
| Humidity | 95% |

## GA-160 Crypto speaker microphone

- External Encryption Mic/Speaker GA-160
  *Plug pin configuration of the encryption mic/speaker can be different according to the customer's radio.,*
  User's Manual

Global Communications Co.,

# GR-150BS HF 1KW Stationary Set

## Strategic/Tactical Radio

### [Key Features]

■HF Transmitter exciter/receiver with 1KW amplifier in a single cabinet ■All solid state ■1.6 to 30 MHz in 10Hz steps ■Instantaneous frequency changes ■No tuning adjustments ■1KW PEP & average output power ■CW, Secure Voice and Data, Digit Direction ■Remote control (Up to 100Km) ■Built-In-Test -Equipment (BITE) ■110~220VAC±10%, 50/60Hz

### [Working mode]

■**[Clear mode]**-CW, voice, command, message, beacon and ALE in SSB (USB/LSB), CW & voice in AM ■**[Secure mode]**-CW, voice, command, message, data, beacon and ALE ■**[FH mode]**-CW, voice, command, message, data ■**[IFH mode]**-CW, voice, command, message, data ■**[Tx/Rx mode]**-Tx/Rx frequency separation ■**[Monitor mode]**-2 channels automatic monitoring ■**[Others]**-Automatic Link Establishment (ALE) ■Built-In-Test-Equipment (BITE)

The Glocom GR-150BS HF 1000W Transceiver is a complete rack mounted unit developed for stationary/shipborne applications in large HF networks. The transmitter comes as a complete package with exciter, power supply, RF power amplifier, interconnected cables and all rack mount hardware. The exciter is a GR-100 HF radio with a 100 channel capacity and all mode capability.

The RF power amplifier is a rugged solid sate unit with a comprehensive LCD displays the amplifier operating parameters. No tuning adjustments are required and the amplifier's ALC system protects the unit from severe mismatches. The separate switch model power supply operates over a range of voltage from 110 to 220VAC and is fully protected against overloads.

### Receiver

| | |
|---|---|
| Sensitivity | -116dBm @ 10dB SINAD (except dead-points) |
| Image & IF rejection | ≥80dB |
| Non-linear distortion | ≤5% in SSB(When RF input is greater than 20EMFdBμ) |

### Transmitter

| | |
|---|---|
| RF power | <50W, 500W±1dB, 1KW±1.5dB |
| Spurious of unwanted sideband | ≥50dB below PEP |
| Spurious emission | ≥50dB |
| Intermodulation distortion | ≥35dB below PEP |

### Environment

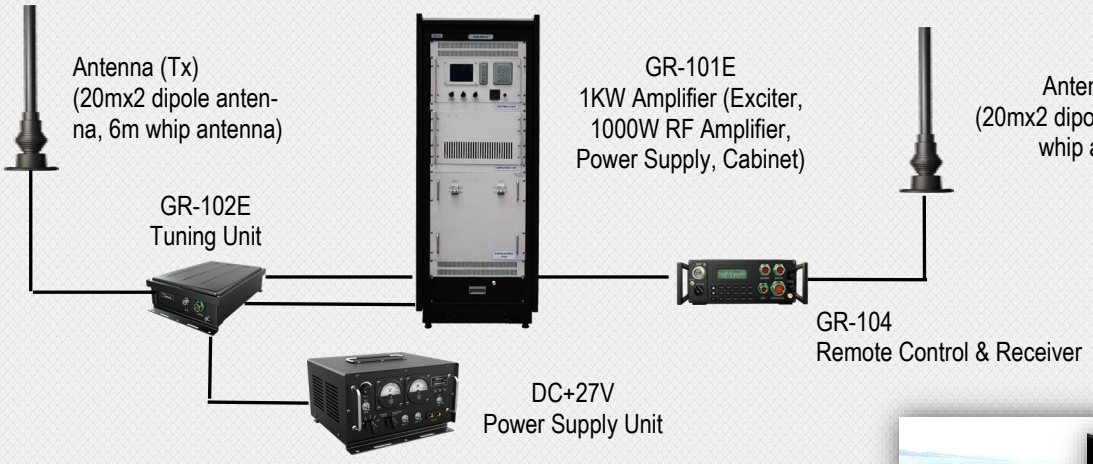
| | |
|---|---|
| Operating temperature | -10ºC~+50ºC |
| Storage temperature | -30ºC~+70ºC |
| Humidity | MIL-STD-810E |
| Vibration | MIL-STD-810E |
| Shock | MIL-STD-810E |
| EMC/EMI | MIL-STD-461/462 |

### General specifications

| | |
|---|---|
| Frequency range | 1.6~30MHz |
| Fine tuning | 10Hz step |
| Preset channels | 100 channels |
| Modulation | SSB, AME, BPSK, QPSK |
| Data rate | 110bps~4800bps |
| Vocoder | MELP 1000 |
| TRANSEC (FH) | 10hps Random FH/Intelligent FH |
| FH bandwidth | 64kHz,128kHz,256kHz, 512kHz, 1Mhz (according to frequency) |
| ALE | 10 channels |
| Beacon | 10 channels from the starting channel |
| 2 ch automatic monitoring | Alternative monitoring of any 2 channels at 10s interval |
| Relay | Message automatic relay |
| COMSEC | AES256, customized algorithm |
| Waveform (Option) | MIL-STD-188-110B, MIL-STD-188-141B, MIL-STD-188-203, STANAG 4285, 4538, 5066 |
| Network | Automatic mode exchange |
| Frequency stability | ±1ppm |
| RF impedance | 50Ω |
| Power supply | 110~220VAC±10%, 47-60Hz |
| Power consumption | Receiver <150W, Transmitter <3KW |
| | Protection, Under-voltage protection, Over-voltage protection, Over-current protection, Over-Temperature protection, Protection against open and short antenna |
| Data interface | RS-232C |
| Remote control | Up to 2Km, 2 wire circuit test, intercom, full compatible with GR-100 radio functions |
| MITE | Automatic testing in module level |
| MTBF/MTTR | 80,000 hours/0.5 hours |
| Programming | PC, Keyboard |
| Dimension (mm) | 19" rack, H1300 x W615 x L605mm |
| Weight | ≤120Kg |

# GR-150BS HF 1KW Stationary Set

## Digital Encryption, Frequency Hopping EPM Strategic/Tactical Radio




## GR-102E HF 1KW Tuning Unit

### Specifications

| | |
|---|---|
| RF power input | 1000W, PEP or average |
| Duty cycle | All modes includes data operation, within constraints of internal temperature (see temperature spec) |
| Frequency range | 1.6~30MHz |
| Fine tuning | 10Hz fine seting step, 100Hz seting step |
| Antenna | 6m vehicle-mounted whip antenna, 15m slopping antenna, 20m dipole Antenna |

*Note: Effective tuning requires the installation of an efficient grounding system in conjunction with the antenna.*

| | |
|---|---|
| RF tune power required | 10W |
| Tune time | 3-5S, 1st tune (typical), <20ms, memory tune |
| Input impedance | 50Ω |
| Input power | 27VDC |
| Tuning accuracy | 1.5:1 VSWR, typical |
| Memory channel | 100 channels |

### Environment

| | |
|---|---|
| Operating temperature | -5ºC to +55ºC |
| Storage temperature | -30ºC to +70ºC |

*Note: This temperature can easily be exceed if the case is exposed to direct sunlight. For FSK operation, it is important that the tuner is installed so that the case is not exposed to direct sunlight.*

| | |
|---|---|
| Humidity | MIL-STD-810 |
| Shock/vibration | MIL-STD-810 |
| Immersion | Waterproof; immersion to 1m |
| EMC/EMI | MIL-STD-461/462 |

### Controls and Indicators

| | |
|---|---|
| Connectors | RF input, control input, RF output, grounding plug |
| Control interface | Specific to Glocom GR-150 HF radios |

## GR-150BS HF 1KW Stationary Set

*Included the following items:-*

| | |
|---|---|
| • Cabinet for 1KW HF transceiver | GR-101E |
| • Exciter unit | GR-101E-EXT |
| • Power amplifier unit | GR-101E-PAU |
| • Power supply unit | GR-101E-PSU |
| • Tuning unit | GR-102E |
| • DC27V power supply unit | GR-102E-PSU |
| • Remote controller and receiver | GR-104 |

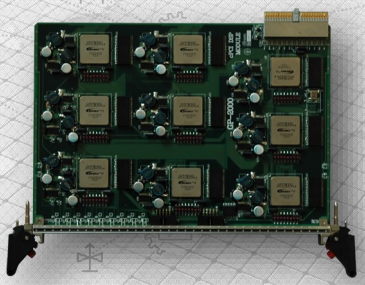
**ACCESSORIES**

| | |
|---|---|
| • Officer handset (2pcs) | GA-10A |
| • CW key | GA-121A |
| • Clone cable | GA-21A |
| • 37 way control cable | 101E-C1 |
| • Exciter RF cable | 101E-C2 |
| • DC12V power cable | 101E-C3 |
| • DC50V power cable | 101E-C4 |
| • Input power supply cable | 101E-C5 |
| • RF power output cable | 101E-C6 |
| • Remote cable | 101E-C7 |
| • Input power cable for tuning unit | 101E-C8 |
| • Control cable for tuning unit | 101E-C9 |
| • Output power cable for tuning unit | 101E-C10 |
| • RF output cable for tuning unit | 101E-C11 |
| • 20m x 2 dipole line antenna | GA-113A |
| • 4.2m mobile antenna | GA-115 |
| • User manual | GA-132B |

Global Communications Co.,

# GR-120 Reconnaissance Receiver

## LF/HF/VHF/UHF Receiver



### [Key Features]

■Frequency range 100kHz~3.6GHz ■Software Define Receiver (SDR) ■Wideband operation (LF/HF/VHF/UHF) ■Working Mode: Fixed Frequency, Memory Scan, Frequency Scan, Replay Mode ■AGC or MGC ■AM, FM, USB, LSB, CW, ISB Compatible ■Ultra Low Cost Maintenance ■Very Small Installation Space ■Very Rugged Contraction (cPCI Technology & Module) ■Built-In Test Equipment Functions ■Remote control by PC or network

### General specifications

| | |
|---|---|
| Frequency range | 100kHz~3.6GHz |
| Frequency step | 10Hz |
| Tuning time | <10ms |
| Preset Channel | 1000 channels |
| Frequency Stability | 1 x $10^{-6}$ |
| Digital IF filter | 70 bandwidth from 53Hz~20kHz |
| Output | Digital I/Q, Analog, AF analog |
| Demodulation | AM/FM/LSB/USB/CW/ISB |
| Gain control | AGC or MGC |
| ADC | 14bits 76.8M sample/s |
| DSP | 1.8Gflops, 32bits, 300Mcycle/s |
| DDC | Glocom DDC |
| Maintenance | Built-In Test Function |

### Receiver

| | |
|---|---|
| AM | 1~3uV |
| FM | 0.5~1.5uV |
| PM | 0.2~1uV |

### Electrical specifications

| | |
|---|---|
| Input Voltage | AC100~240V, 50/60Hz |
| Power Supply | Maximum 1000W |
| Voltage of Module | +5VDC,+12VDC,+3.3VDC,-12VDC |
| Protection | Over/Low-Voltage, Polarity Protection |

### Mechanical specifications

| | |
|---|---|
| 14-slot frame size | 484mm x 398mm x 295mm |
| Weight | 23Kg |
| Module Size | 233.35mm x 160mm |
| Frame Size | 19” rack-mount |

### Environmental specifications

| | |
|---|---|
| Operating Temperature | -10°C~45°C |
| Storage Temperature | -40°C~75°C |
| Relative Humidity | 95% |
| Shock | 15G PTP, 11ms duration |
| Operation | 5~500Hz, 0.5Gram (each axis) |
| Non-operation | 5~500Hz, 1.88Gram (each axis) |

### [Working mode]

■Fixed Frequency Mode (FFM) ■Memory Scan Mode (MSM) ■Frequency Scan Mode (FSM) ■Panorama Scan Mode (PSM) ■Test Mode (TM)

### GR-120 Reconnaissance Receiver

- **Frame and Controller**
  - Mainframe System
  - Controller PC with Platform Software
- **Module & Accessories**
  - LF/HF receiver PXI Module
  - Wideband ADC PXI Module
  - DDC/DSP PXI Module
  - 20mx2 Dipole Antenna
  - 5m Whip Antenna
  - Network Cables
- **Firmware**
  - Tuner Controls
  - Demodulation and Decoding
  - Spectral Zoom
  - Detection of Fixed Frequency Signal
  - Detection of Short Time (LPI) Signals
  - Receiver Controls
  - Interception of Voice with real-time IF Spectrum

Global Communications Co.,

# GA-114A HF NVIS Antenna

## HF Radio Antenna for Mobile/Shipborne Communication

### [Key features]

■ Near Vertical Incidence Skywave (NVIS) Propagation ■ All terrain coverage - no skip zone in HF band ■ High efficient ATU with minimum VSWR ■ Rugged construction - easy to installation ■ Flexible mounting options ■ Compatibility with GR-100 & GR-150 HF radio ■ Folding antenna structure - compact size

### [Applications]

■ Humanitarian & peacekeeping ■ Police & customs Drug enforcement & private security ■ Military & paramilitary ■ Border patrol ■ Mining, oil & gas ■ National guard ■ Public & commercial ■ Aid & relief, emergence service ■ Forestry & transportation ■ Deep sea fishery

### General specifications

| | |
|---|---|
| Frequency range | 3.7MHz~13MHz |
| Power rating | Up to 125W PEP |
| Power supply | 12VDC (24VDC Option) |
| Radiation pattern | Omni directional at high radiation angles, NVIS optimized |
| VSWR | ≤1.3:1@50Ohm |
| Tune control | Control signal from radio, Customizable to suit 3rd party radios |
| Tune time | Approximately 3 seconds |
| Tuning method | Continuously variable tuning capacitor |
| Drive method | Microprocessor controlled precision stepper motor |
| Tune point | Peak antenna current |
| Receive bandwidth | Variable from 40kHz at 3.7MHz to 280kHz at 13MHz |
| Gain | +8dB to +22dB @ 0-300Km distance (vs typical 1.8m mobile whip) |
| Dimension | 1700 x 1256 x 795mm<br>Folding: 1700 x 1256 x 140mm |
| Weight | 45Kg (w/o mounting bracket) |
| Environmental | IP67 for outdoor and indoor modules, MIL-STD-461, MIL-STD-810F (Clauses 516.5 for shock, 514.f for vibration, 510.4 for dust |
| Operating temperature | -40°C to +70°C |
| Humidity | 95% |

### NVIS propagation

Propagation refers to the path a radio frequency signal travels when radiated from antenna. There are three main types of propagation commonly used in vehicle HF SSB systems:

- Skywave - the signal radiates at a low angle towards the horizon and is refracted by the ionosphere to return back to earth at a long distance away from the source
- Groundwave - the signal radiates along the ground directly from the radiating antenna following the contour of the earth
- NVIS - the signal radiates at a high angle towards the ionosphere and is refracted to return at a close to medium distance from the source.

**[High Efficient]** Radiates 10dB to 14dB more than a whip antenna, Equivalent to a 500W transmitter with a whip antenna **[Simple Installation]** Does not require welding or mounting plates, No separate antenna tuner to install, Fast & inexpensive installation, Easily moved between vehicles **[Integrated Roof Rack]** Conventional roof rack for storing tents, boxes, Additional storage w/o compromising performance **[No Skip Zone]** Eliminates or minimizes skip zones, Virtually continuous HF coverage from 0~1000Km+ **[Noise Reduction]** Increased immunity to ignition & power line noise **[Simple Design]** Mechanically simple & robust folding mechanism, Low risk of failure [**Covert]** Easily disguised for covert applications, Not immediately recognizable as an antenna, No unwanted attention in areas of conflict

### Continues coverage & no skip zone

Glocom's GA-114A NVIS antenna is a technological breakthrough in vehicle based HF radio communications. It is without doubt the best type of antenna for vehicular NVIS operations and is effective in overcoming the skip zone common in whip based antenna systems. GA-114A is a magnetic half loop antenna which predominantly radiates RF energy towards the ionosphere, making it ideal for NVIS propagation, with the correct selection of frequency, is virtually continuous from 0 to 1000Km or more. Glocom's GA-114A antenna system also provides highly effective medium range communications, reducing the skip zone traditionally found between 30-150Km. The skip zone refers to the area where groundwave propagation ends and skywave propagation begins. Between these two points, HF coverage using a whip antenna is very limited or non existent. GA-114A overcomes this by using NVIS propagation, providing continuous coverage for up to 1000Km or more. Whip antennas, which are usually vertically polarized, radiate most of their RF signal radiates towards the horizon. As a result, very little signal radiates towards the zenith, which is required to facilitate NVIS propagation.

Global Communications Co.,

# GR-250 VHF Tactical Manpack/Mobile Radio

## Tactical Manpack/Mobile Radio
## Software Defined Radio

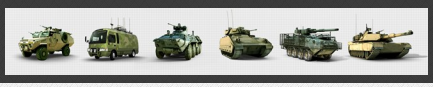

### [Key features]

■30~88MHz ■Voice/data/SMS ■Digital frequency hopping ■MELP1000 ■AES256 digital encryption ■10W RF power ■VHF-HF relay function ■Remote control function (2Km) ■Wireless fill-gun(OTAR) ■Builtin GPS ■Advanced calling modes

The GR-250 is a rugged fully featured tactical transceiver solution delivering reliable field deployable communications with unparalleled value. ■**[Lightweight and Compact Design]**-Using the latest lightweight alloys the GR-250 weight 4kg(4.9kg with 11Ah/12V, Lithium Ion battery pack). Its small physical size makes it comfortable to wear and operate when deployed as a tactical manpack. Designed for the harshest field environments, the GR-250 complies with MIL-STD-810G and is fully immersible to a depth of one meter ■**[Advanced calling feature]**-The GR-250 radio supports advanced selective calling, banish calling, Automatic mode exchange, 5 digit SMS, Beacon, GPS tracking which are included as standard ■**[Remote control]**-The GR-250 radio has full operation access to the radio with remote control unit up to 2Km. ■**[Enhanced DSP noise reduction]**-MELP1000 vocoder system provides outstanding voice quality by reducing radio frequency interference (RFI), and the effects of electrical interference by enhancing audio signals to provide easier listing. The level of noise reduction can be easily selected to suit prevailing conditions. ■**[Intuitive operation]**-Glocom's well known intuitive operator interface ensures that operating the GR-250 very simple. Principal key functions are performed using a keyboard array mounted on the front panel. The operator is guided by 128x32 LCD graphics display. The display has adjustable backlighting, allowing maintenance of night vision or high levels of luminescence in poor visibility. Network station addresses and radio numbers are stored in easily accessible address books and as little as two key strokes will initiate a call. ■**[Extended operation time]**-The low current consumption of the GR-250 radio enables it to operate for over 20 hours on one battery pack. Spare quick change battery packs are small and lightweight. The battery packs contains the charger management system and can be charged when connected to the radio or separately with charger including grid charger, solar charger. ■**[Digital Encryption and scrambling]**-The GR-250 can be fitted with a variety of scrambling and digital encryption functions for voice and data security. The GR-250 includes secure calling(an innovative narrow band voice scrambler providing secure point to point or point to multipoint communication), AES 256 bit digital encryption assuring secure voice and data operation ■**[Frequency Hopping]**-The unique, easy to use frequency hopping function requires no central synchronization station, has short entry or late entry time delay and requires no hopping handshakes. Hopping rate of 100 hops per second, using 25 digit hopping encryption key, and user selectable hopping bandwidth to suit the antenna type in use, the system provides excellent protection against Electronic Warfare (EW) attacks. ■**[Modem]**-The GR-250 fitted with internal data modems supporting high speed data and email transmission, with effective data rates up to 9600bps. Data modems are supplied with PC software which provides email, file transfer and short text message functions.

# GR-250 VHF Software Defined Radio (SDR) EPM

## Digital Frequency Hopping, Digital Secure EPM
## Tactical Manpack/Mobile Radio



**[Operation mode]** ■[Clear mode]-Voice, SMS ■[Secure mode]-Encrypted digital voice/data, SMS ■[FH mode]-Encrypted digital voice/dada, SMS

## General Specifications

| | |
|---|---|
| Frequency range | 30~88MHz |
| Channel spacing | 25kHz |
| Channels | 2,320 channels |
| Preset channels | 8 channels |
| Modulation | FM, FSK |
| Data rate | 600bps~14400bps |
| Vocoder | MELP 1000 |
| Frequency stability | ±2.5ppm (option ±1ppm) |
| RF impedance | 50Ω |
| Power supply | 10~15VDC |
| | Over-voltage, polarity protection |
| Data interface | RS-232C |
| TRANSEC(FH) | 100, 400hps |
| | Narrow band 6.4MHz x 9 band |
| | Wide band 58MHz |
| | 4/16/256 dedicated FH |
| | 256 orthogonal FH set |
| COMSEC | AES256, customized algorithm |
| Remote control | PC, RCU |
| Programming | PC, wireless fill-gun (OTAR), KB |
| Dimension | 230mm x 90mm x 230mm |
| Weight | ≤4Kg (4.9Kg with battery) |

## Receiver

| | |
|---|---|
| Sensitivity | -113dBm @ 10dB SINAD |
| Image & IF rejection | ≥80dB |
| Adjacent channel rejection | ≥45dB |
| Non-linear distortion | ≤5% |

## Transmitter

| | |
|---|---|
| RF power | 100mW~10W |
| Harmonic suppression | ≥50dBc |
| Spurious outputs | ≤-60dBc typical |

## Environment

| | |
|---|---|
| Operating temperature | -30°C~+70°C |
| Storage temperature | -50°C~+75°C |
| Humidity | 95% |
| Immersible | 1 hour @ 1m |
| MTBF | 8,000 hours |
| MTTR | 30 minutes |
| EMC/EMI | MIL-STD-461/462 |

## GR-250/GR-250VH Available options

- Remote control unit GA-253A
- External speaker with cable GA-40A
- 100W power supply unit GA-33A
- 320W power supply unit GA-34A
- ITCCS Software GS-930

## GR-250 VHF Tactical Manpack Set

The Glocom GR-250 VHF Tactical Manpack Set is ideal for extended portable field operations providing the tactical user with effective, secure and comprehensive communications with remote sited command locations. It includes all necessary handset, headset, antennas, batteries and rucksack carrying system. The standard set comprises: -

- VHF 10W EPM SDR GR-250LE
- Officer handset GA-10A
- Tactical headset GA-11A
- VHF 2.4m whip antenna GA-211A
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- Rucksack GA-122A
- User Manual GA-131A

## GR-250VH VHF Tactical Mobile Set

The Glocom GR-250 VHF Tactical Mobile Set upgrades the GR-250 by providing a convenient vehicle installation kit and transmitter power amplification to 50W PEP. With options for power supply system and the flexibility of dismounted use of GR-250 radio when not in the vehicle (additional accessories may be required), the GR-250VH VHF Tactical Mobile Set can be installed in a wide range of vehicle types with antenna options to suit. The standard set comprises:-

- VHF 10W EPM SDR GR-250E
- Officer handset GA-10A
- Tactical headset GA-11A
- VHF 2.4m whip antenna GA-211A
- VHF 3.8m mobile antenna GA-212A
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- Rucksack GA-122A
- User Manual GA-131A
- VHF 50W Amplifier with cables GR-201B
- Mobile installation kit GR-101C10-ITK

Global Communications Co.,

# GR-310 VHF/UHF Tactical SATCOM Manpack/Mobile Radio

## Frequency Hopping, Digital Secure EPM

## Software Defined Radio

### [Key Features]

■30MHz ~ 512MHz ■Fully software defined radio, Extended use of DSP, DDS technology for maximum flexibility ■Breakthrough wide-band data performance ■Several options for channel spacing ■Cockpit control via dedicated control panel or remote control via RS-485 interface ■Preset channel operation ■AES256 or Customer oriented EPM capability by FH and digital encryption ■Built-in GPS for position reporting in situation awareness ■Wireless fill-gun (OTAR)

### [Operation mode]

■Clear mode(voice, SMS) ■Secure mode(encrypted digital voice, SMS, data) ■FH mode(encrypted digital voice, SMS, data) ■SATCOM (encrypted digital voice, SMS, data)

The GR-310 is a rugged fully featured tactical Satcom radio solution delivering reliable field deployable communications with unparalleled value. ■**[Wideband frequency band operation]**-The GR-310 supports in wideband frequency band from 30MHz to 512MHz, so it is possible to use in land force, navy and air force in manpack/mobile conditions. ■**[Lightweight and Compact Design]**-Using the latest lightweight alloys the GR-310 weight 4kg(4.9kg with 11Ah/12V, Lithium Ion battery pack). Its small physical size makes it comfortable to wear and operate when deployed as a tactical manpack. Designed for the harshest field environments, the GR-310 complies with MIL-STD-810G and is fully immersible to a depth of one meter ■**[Advanced calling feature]**-The GR-310 radio supports advanced selective calling, banish calling, Automatic mode exchange, 5 digit SMS, Beacon, GPS tracking which are included as standard ■**[Remote control]**-The GR-310 radio has full operation access to the radio with remote control. ■**[Enhanced DSP noise reduction]**-MELP1000 vocoder system provides outstanding voice quality by reducing radio frequency interference (RFI), and the effects of electrical interference by enhancing audio signals to provide easier listing. The level of noise reduction can be easily selected to suit prevailing conditions. ■**[Automatic antenna tuner]**-Whips and untuned wire antennas are simply deployed using the inbuilt, fully automatic antenna tuner. For temporary fixed station and tunable tactical antennas are available. ■**[Intuitive operation]**-Glocom's well known intuitive operator interface ensures that operating the GR-310 very simple. Principal key functions are performed using a keyboard array mounted on the front panel. The operator is guided by 128x32 LCD graphics display. The display has adjustable backlighting, allowing maintenance of night vision or high levels of luminescence in poor visibility. Network station addresses and radio numbers are stored in easily accessible address books and as little as two key strokes will initiate a call. ■**[Extended operation time]**-The low current consumption of the GR-310 radio enables it to operate for over 20 hours on one battery pack. Spare quick change battery packs are small and lightweight. The battery packs contains the charger management system and can be charged when connected to the radio or separately with charger including grid charger, solar charger. ■**[SATCOM function]**-The GR-310 supports military tactical Satcom functionality, so it makes possible to communicate in beyond horizon condition. It is possible to communicate in worldwide in anytime, anywhere. ■**[Digital Encryption and scrambling]**-The GR-310 can be fitted with a variety of scrambling and digital encryption functions for voice and data security. The GR-310 includes secure calling(an innovative narrow band voice scrambler providing secure point to point or point to multipoint communication), AES 256 bit digital encryption assuring secure voice and data operation ■**[Frequency Hopping]**-The unique, easy to use frequency hopping function requires no central synchronization station, has short entry or late entry time delay and requires no hopping handshakes. Hopping rate of 10 hops per second, using 25 digit hopping encryption key, and user selectable hopping bandwidth to suit the antenna type in use, the system provides excellent protection against Electronic Warfare (EW) attacks.

# GR-310 VHF/UHF Tactical Manpack/Mobile Radio

**Frequency Hopping, Digital Secure EPM**
**Software Defined Radio**

## General specifications

Frequency bands & modulations

| | |
|---|---|
| VHF-FM | 30MHz to 88MHz |
| VHF-AM | 108MHz to 116MHz (Rx only) |
| VHF-FM/AM | 116MHz to 156MHz |
| UHF-FM | 156MHz to 174MHz |
| UHF-FM/AM | 225MHz to 512MHz |
| SATCOM | 243-270MHz & 292-318MHz |
| Preset channels | 100 channels |
| Channel spacing | 8.33kHz, 12.5kHz, 25kHz |
| SATCOM (spacing) | 5kHz, 25kHz |
| Emergency frequency | 243.0MHz (121.5MHz option) |
| Frequency stability | ±1ppm |
| Channel changing time | 1ms |
| Duty cycle | 1 min x Tx, 5 min x Rx without forced air cooling |

## Receiver

| | |
|---|---|
| Sensitivity | 0.6μV(FM), 1.5μV(AM) |
| SATCOM | –120 dBm for 10 dB SINAD |
| AM modulation index | 80% to 100% |
| Audio output distortion | 5% |
| Spurious rejection | 70dB |
| Squelch | Operates both on output signal-to-noise ratio and input carrier level, thresholds adjustable |
| IF interface characteristics | Frequency: 70MHz, impedance: 50Ohm unbalanced |

## Transmitter

| | |
|---|---|
| Output power | 10W(Peak) in AM, 10W in FM |
| SATCOM | 10W |
| Spurious emissions | 50dB below carrier level |
| IF interface frequency | 70MHz |
| Impedance | 50Ohm unbalance |

## Power supply

| | |
|---|---|
| Power input configuration | DC12V |
| Power consumption | < 180W (in Tx), <40W (in Rx) |

## Environmental

| | |
|---|---|
| Operating temperature | -30°C to + 70°C |
| Storage temperature | -40°C to + 75°C |
| Shock | MIL-STD-810E |
| Humidity | 90% relative |
| EMC | MIL-STD-461D |

## Physical

| | |
|---|---|
| Dimension | 230mm x 90mm x 230mm |
| Weight | ≤4Kg (4.9Kg with battery) |

## GR-310/GR-310VH Available options

- HG SATCOM antenna(240-400MHz) GA-310-AT-05
- X-wing SATCOM antenna GA-310-AT-06
- Aircraft antenna(108-137MHz) GA-310-AT-07
- Aircraft antenna(220-400MHz) GA-310-AT-08
- 100W power supply unit GA-33A
- 320W power supply unit GA-34A
- External speaker with cable GA-40A

## GR-310 VHF/UHF Tactical/Satcom Manpack Set

The Glocom GR-310 VHF/UHF Tactical Satcom Manpack Set is ideal for extended portable field operations providing the tactical user with effective, secure and comprehensive communications with remote sited command locations. It includes all necessary handset, headset, antennas, batteries and ruck sack carrying system. The standard set comprises:-

- VHF/UHF 10W EPM SDR GR-310LE
- Remote control unit (For only GR-310R) GR-313
- Officer handset GA-10A
- Tactical headset GA-11A
- VHF 2.4m whip antenna(30-88MHz) GA-211A
- Whip antenna(100-400MHz) GA-310-AT-02
- SATCOM antenna(240-400MHz) GA-310-AT-04
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- Rucksack GA-122A
- User Manual GA-131A

## GR-310VH VHF/UHF Tactical/Satcom Mobile Set

The Glocom GR-310VH VHF/UHF Tactical Satcom Mobile Set upgrades the GR-310 by providing a convenient vehicle installation kit and transmitter power amplification to 50W PEP. With options for power supply system and the flexibility of dismounted use of GR-310 radio when not in the vehicle (additional accessories may be required), the GR-310VH VHF/UHF Tactical Satcom Mobile Set can be installed in a wide range of vehicle types with antenna options to suit. The standard set comprises:-

- VHF/UHF 10W EPM SDR GR-310LE
- Remote control unit (For only GR-310R) GR-313
- Officer handset GA-10A
- Tactical headset GA-11A
- VHF 2.4m whip antenna(30-88MHz) GA-211A
- Whip antenna(100-400MHz) GA-310-AT-02
- SATCOM antenna(240-400MHz) GA-310-AT-04
- GPS antenna GA-50A
- Clone cable GA-21A
- Li-Ion battery pack(2pcs) GA-31D
- Battery charger GA-32D
- Rucksack GA-122A
- User Manual GA-131A
- VHF/UHF 50W amplifier GR-301B
- Mobile antenna(100-400MHz) GA-310-AT-03
- 3.8m VHF antenna GA-212A
- Mobile installation kit GR-311B-ITK

Global Communications Co.,

# GR-400 UHF Data Radio

## Frequency Hopping, Digital Secure EPM, TDMA
## Time Division Multiple Access



### [Key Features]

■430MHz ~ 480MHz ■Data/SMS ■Fully software defined radio, Extended use of DSP, DDS technology for maximum flexibility ■Frequency hopping rate 100 hop per second ■RF power amplifier 20W ■Built-in GPS ■Full duplex using TDMA functions ■Individual/ Group/System code identification functions ■1:N communication mode (TDMA)

### [Applications]

■Remote control system ■Remote data Tx/Rx system ■Moving target status analysis system ■Security data network system ■C4ISR system

### General specifications

| | |
|---|---|
| Frequency range | 430~480MHz |
| Channel spacing | 100kHz, 150kHz, 200kHz |
| Modulation | FSK, ASK |
| Data rate | 1200bps~115200 bps |
| Preset channels | 16 channels |
| Frequency stability | ±2ppm (option ±1ppm) |
| RF impedance | 50Ω |
| Power supply | 10~36VDC |
| | Over-voltage, polarity protection |
| Data interface | RS-232C |
| ECCM(FH) | 100hps (NB 6.4MHz, WB 35MHz) |
| ECCM(COMSEC) | AES256, customized algorithm |
| Remote control | PC, RCU, KDU |
| Programming | PC, wireless fill-gun (OTAR), KDU |
| Dimension | 230mm x 90mm x 230mm |
| Weight | ≤2.8Kg |

### Receiver

| | |
|---|---|
| Sensitivity | -116dBm @ FSK, 1kbps |
| AFC | ±50kHz |
| Current consumption | ≤300mA |

### Transmitter

| | |
|---|---|
| RF power | 50mW~20W |
| Harmonic suppression | ≥50dBC |
| Current consumption | ≤6A |

### Environment

| | |
|---|---|
| Operating temp. | -30°C~+60°C |
| Storage temp. | -50°C~+70°C |
| Humidity | 95% |

### GR-400VH UHF Mobile Data Radio Set

The Glocom GR-400 UHF Mobile Data Radio Set is ideal for extended mobile field operations providing the tactical user with effective, secure and comprehensive data communications with remote sited command locations. It includes all necessary antennas and batteries. The standard set comprises:-

| | |
|---|---|
| • UHF 20W data radio | GR-400B |
| • Clone cable(10Way-9Way) | GA-21B |
| • PSU, 12VDC/100W & cable | GA-33A |
| • Mobile antenna with cable | GA-413B |
| • Li-Ion 12V/12000mA battery | GA-31D |
| • Battery charger | GA-32D |
| • User manual | GA-431B |
| • GR-400B management software | GR-400B-SET |

### GR-400VH Available options

| | |
|---|---|
| • DC/DC converter(12/24)(Airborne) | GA-42A |
| • Airborne antenna (Airborne) | GA-411B |
| • Arrester | CA-25RP |
| • ITDS software (Windows) | GR-910 |

Global Communications Co.,

# GR-520 High Capacity Data Radio (HCDR)

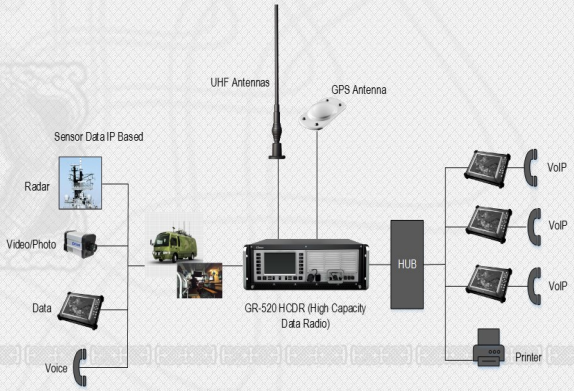
## *Intelligent, Self-managing, Mobile, Ad-Hoc networking, data radio*

New technology creates new age. Direct Sequence – Spread Spectrum (DS-SS) technology opens up new age of military communication technology with high capacity data transmission of LPI/LPD in EW age. Glocom's slogan is to support the real-time exchange of necessary military information like voice, data, images, video for all military units at any time and any place. For it, GR-520 HCDR which supports high speed data rate with DS-SS technology is a suitable mean. GR-520 works in frequency range from 225MHz to 450MHz. This radio is a multi-function software defined radio system, so usable in all military units. The defecto-standard encryption algorithm AES256 guarantees the loss of information during transmission. The standard interface like RS-232/485, IP, Bluetooth ensure easy installation and use of radio system. According to the customer's requirements, the user interface can be multi-languages and multi-language short message service is available.

### [Key Features]

■ 225MHz to 450MHz ■ Wideband 5MHz DS-SS ■ Data rate up to 8Mbps ■ Encryption 256-bits AES or customization ■ Low probability of interception (LPI) ■ Low probability of detection (LPD) ■ Self-forming, self-healing network ■ Voice-Over-IP ■ Adaptive transmit power ■ Adaptive data rate ■ Unicast IP-based or multicast capability

The GR-520 HCDR is a tactical IP radio delivering high-speed broadband communications to the battlefield. The GR-520 HCDR supports ultra-high speed data rates of up to 8Mbps for the transmission of high-resolution voice, video and embedded Blue Force Tracking (BFT) over a truly decentralized mobile ad-hoc network (MANET). With frequency coverage from 225 to 400MHz, the GR-520 HCDR offers a modular range of configurations geared to match the specific operational requirements of any mission, including vehicle configurations, as well as both airborne and marine radio sets. Featuring an SDR design that supports various waveforms, the GR-520 HCDR wireless resources are dynamically utilized between the network members, providing end-to-end IP connectivity for voice, video and data. ■ **[Modern warfare]**-With its small form-factor, ultra-high bandwidth and advanced capabilities, the GR-520 HCDR radio serves as the backborne for secure data network and Ethernet services in the modern battlefield. The solution is ideal for deployment and maneuvering tactical platforms throughout multiple echelons, from Brigade level down to platoon level. ■ **[Vast data distribution]**-As requirements for data dissemination continue to rise, GR-520 HCDR has emerged as a powerful C4I enabler, with capabilities for voice, BFT, IP data and live milticast video. The GR-520 HCDR expedites military missions by ensuring agile and secured MANET without hindering tactical operations. ■ **[Network-centric communications]**-The GR-520 HCDR employs advanced algorithms and ultra-high bandwidth to maximize performance throughout the 150-member network. ■ **[Digital Encryption and scrambling]**-The GR-520 can be fitted with a variety of scrambling and digital encryption functions for voice and data security. The GR-520 includes secure calling(an innovative narrow band voice scrambler providing secure point to point or point to multipoint communication), AES 256 bit digital encryption assuring secure voice and data operation ■ **[Video and voice streaming]**-The GR-520 HCDR supports video/data and voice simultaneously, highly effective mulicast transmission of high definision live video, multi-hop capabilities for all devices ■ **[MANET]**-Up to 150 members, implements a fully decentralized IP MANET, delivering CNR-like voice, IP data and video to the network, Fully automated self-forming, self-healing network, No single point of failure, No reliance on GPS or master station for synchronization, Automatic relay formations for effective multi-hop voice, data and video communications, Smart data link: Link establishment and maintenance is made possible by manipulating both transmission power and modulations as per data type. ■ **[IP routing/gateway]**-Embedded IP router/gateway.



# GR-520 UHF High Capacity Data Radio

**PXI/cPXI Compatible**

**Intelligent, Self-managing, MANET, IP Data**

## General specifications

| | |
|---|---|
| Frequency bands | 225MHz to 450MHz |
| Channel bandwidth | 125kHz, 5.5MHz |
| Output power | Adaptive transmission power up to 20W |
| Modulation | FSK, OFDM |
| DS-SS gain | 18 to 27dB |
| User Data rate | Up to 8Mbps |
| Data interface | Ethernet |
| GPS | Built-In |
| Encryption | AES 256 |
| Networking | Mobile Ad-Hoc(self-forming, self-healing), support unitcast, multi-unicast, multicast and broadband |
| Relay support | Automatic formation up to 6 hops |

## Power supply

| | |
|---|---|
| Input voltage | 24VDC, polarity protection, surge protection |

## Environmental

| | |
|---|---|
| Operating altitude | Up to 70,000 feet |
| Operating temperature | -30°C to + 70°C |
| Storage temperature | -40°C to + 75°C |
| Shock | MIL-STD-810E |
| Humidity | 90% relative |
| EMC/EMI | MIL-STD-461D |

## Maintenance

| | |
|---|---|
| MTBF | > 2000 hours |
| MTTR | < 20 minutes |

## Physical

| | |
|---|---|
| Dimension | 19” Rack mount, PXI-3U |
| Weight | ≤19Kg |

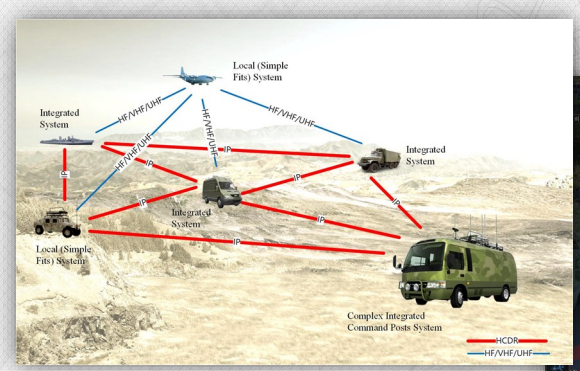
## GR-520 High Capacity Data Radio Set

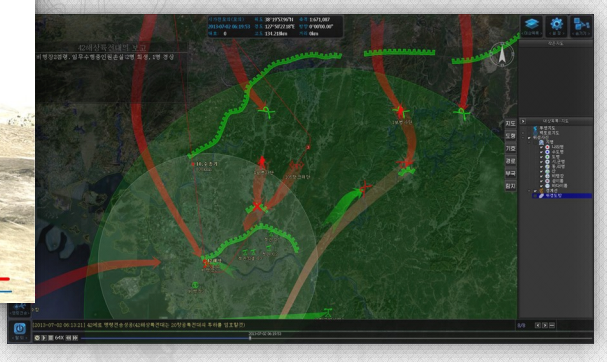
The Glocom GR-520 High Capacity Data Radio (HCDR) Set is a tactical IP radio delivering high speed broadband communications to the battlefield. The GR-520 HCDR supports ultra-high data rate of up to 8Mbps for the transmission of high-resolution voice, video and embedded Blue Force Tracking (BFT) over a truly decentralized mobile ad-hoc network (MANET). The GR-520 is ideal for extended mobile field operations providing the tactical user with effective, secure and comprehensive IP communications with remote sited command locations. It includes all necessary accessories. The standard set comprises:-

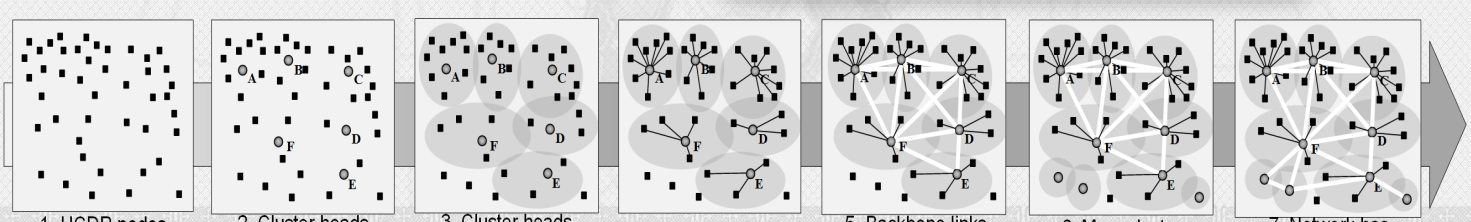
| | |
|---|---|
| • VHF/UHF DS-SS/HCDR | GR-520 |
| • Notebook PC/Windows 7/8.1 (1set) | Commercial |
| • Ethernet switching bub (1set) | Commercial |
| • Ethernet cables (3m, 5pcs) | Commercial |
| • IP Phone (2sets) | (Commercial) |
| • GPS antenna | GA-50 |
| • Whip antenna(225 to 450MHz) | GA-310-AT-03 |
| • Setup and operation applications | GS-520-SETUP |
| • User manual | GA-531A |

## GR-520 Available Options

| | |
|---|---|
| • 19” Rack-mount box | Commercial |
| • 300W power supply unit(27VDC) | GA-34A |
| • Mobile installation kit | GR-311B-ITK |



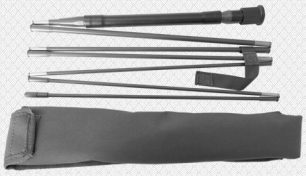


### GA-10A Officer Handset

Officer handset can be used as the audio terminal for Glocom radio sets. The product has the rugged structure, and it is easy to operate, it also has the better performance of water-proof and moisture-proof.

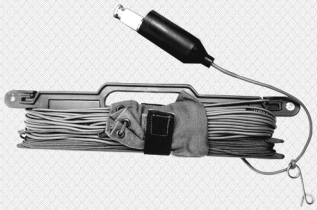
### GA-11A Tactical Headset

Tactical Headset adopts structure of head ring soft strap, it is audio terminal. It has the features of small in dimension, light in weight, good water proof performance, high environment adaptability.



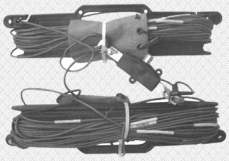
### GA-111A HF 2.4m Whip Antenna

1.6~30MHz, 40W, Impedance:50Ω, Contact resistance: ≤120mΩ, Length:2400mm, Draw back length: 365mm, ≤0.7Kg, Interface: BNC fixed with threading sheath.



### GA-112A HF 15m Line Antenna

This antenna can be used for communication on actual combat. This antenna is used for HF radio set or long distance emergency communication. It has the features of high radiation efficiency, easy carrying and installation.



### GA-113A HF 20m x 2 Dipole Antenna

This antenna can be used for communication on actual combat. This antenna is used for stationary HF radio set or long distance emergency communication.

### GA-50A GPS Antenna

This is high gain, low loss, active, extra low current consumption, small size GPS antenna. It supports SMA plug and magnetic mounting or screw mounting. It's useful for mobile application with GR series radios.

### GA-21A Clone Cable

This is RS-232C data communication cable for GR series radios. It is used for data communication, radio programming and radio control by computer etc.

### GA-31D Li-Ion Battery Pack

Capacity: 11.1VDC/10A, Weight: 0.9Kg, Size: 235mmx90mmx60mm, Working current: 6A, Peak current: 9A, Operating temperature: 0~45'C

### GA-32B Battery Charger

This is a Li-Ion battery charger. It is controlled by microcontroller and supports the fast charge function, regular charge function, overvoltage protection, automatic charge off function etc.

### GA-121A CW Key

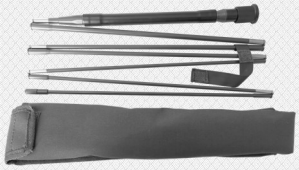
This is a morse code key for GR-100 series HF radios. It's designed to use in rigid environment, so very strong mechanically. It is very small and light for easy carrying.

### GA-122A Rucksack

This is a rucksack for GR series man-pack radio system. It is very compatible for soldier to carry radio with all accessories. It can keep antenna, batteries, handset, headset etc…

### GA-115A HF Mobile Antenna

This is HF vehicle communication antenna. The antenna is composed of three parts. The antenna is light weight, good flexibility, endurable for corrosion.



### GA-211A VHF 2.4m Manpack Antenna

This antenna is vertically polarized omnidirectional antenna. The antenna is composed of three parts as plug, direction changing parts, and antenna sections.

### GA-212A VHF 3.8m Mobile Antenna

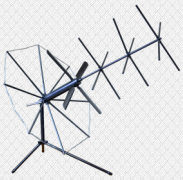
This is VHF vehicle borne communication antenna. The antenna section is made of fiberglass, thus the features of light weight, good flexibility, endurable for corrosion.

### GA-310-AT-02 Whip Antenna

This is 100MHz ~400MHz whip antenna. This is a 13-inch antenna with a swivel base for VHF/UHF Band.

### GA-310-AT-03 Mobile Antenna

This is 100MHz~400MHz whip antenna. The antenna is composed of three parts: antenna base, vibration absorbing device, antenna sections. It can be equipped with GR-310/350/510/520 radio sets.



### GA-310-AT-04 SATCOM antenna

The antenna(240MHz~400MHz) is a rapid deploy, high gain, crossed yagi antenna for SATCOM communications. Deployment time is less than one minute.

### GA-310-AT-06 X-WING SATCOM Antenna

The X-WING SATCOM antenna (240MHz~400MHz) allows bolt on for permanent installation onto vehicles, shelters and other metal objects.

### GA-310-AT-07 Aircraft Antenna

This airborne antnenna(108MHz-137MHz) allows to use in civil aircrafts for ATC. The rugged design allows the antenna to be used for any type of civil aircrafts.

### GA-310-AT-08 Aircraft Antenna

This airborne antnenna(220MHz-400MHz) allows to use in military aircrafts for ATC. The rugged design allows the antenna to be used for any type of rotary or fixed wing military aircrafts.

### GA-411B Airborne Antenna

This is airborne antenna which supports the frequency range from 430MHz to 480MHz. It's very rugged, so suitable to install on airplane. It supports very high gain and VSWR.

### GA-310-AT-03A Mobile Antenna

This is 30MHz~512MHz whip antenna. The antenna is composed of three parts: antenna base, vibration absorbing device, antenna sections. It can be equipped with GR-310/350/510/520 radio sets.

### GA-413B Mobile Antenna

This is UHF vehicle borne communication antenna. The antenna is composed of three parts: antenna base, vibration absorbing device, antenna sections. It can be equipped with GR-400 20W UHF EMP data radio sets.

### GA-114A NVIS Antenna

This is mobile antenna which radiates NVIS propagation. It is designed to realize the communication during movement and effectively solve the problem of "communication blind area" in near distance of HF band.

### GA-153A/203A Remote Control Unit

This is Remote Control Unit for GR-150. It can control GR-150 up to 2Km remotely. Radio and RCU is connected with twist-pair cable. It is easy to install in tunnel, mobile and ship.

### GA-40A External Speaker

This external speaker is suitable for special types of vehicles and other equipment for amplifying the sound and broadcasting.

### GA-33A 100W Power Supply Unit

This is 100W AC/DC converter to supply power into GR-150 system. It is very useful in stationary, mobile or ship environment.

### GA-34A 320W Power Supply Unit

This is 320W AC-DC/DC-DC converter to supply power into GR-series mobile radio system. It supports very high efficiency, over-voltage protection, polarity protection.

### GR-101C-ITK Mobile Installation Kit

This is a set of installation kit. It can be used to install GR series radio system into various kind of vehicles, ships or stationary. It is very simple to install or uninstall on the vehicles.

### Ethernet switching hub

The commercial Ethernet switching hub can be used to connect radio and PCs.


### Rugged PC

The commercial Notebook PC will be used for setup, control and communication.

Global Communications Co.,

# GR-452 ADS-B Receiver/Transmitter System

## Automatic Dependence Surveillance-Broadcast



### [GR-452A ADS-B Receiver Key Features]

■Frequency 1090MHz ■Complete ADS-B Data Processing – No Central Equipment needed ■Covers up to 250nm Range ■Compact, Easy to Install, Maintenance-Free, Robust Architecture ■Automatic Self Testing (BITE) ■Full Remote Control and Monitoring ■Secure Communication and Password Protection

### [GR-452B ADS-B Transmitter Key Features]

■ADS-B compatible signal (position, velocity, address) ■Parameter seting by keyboard & RS-232 interface ■Built-in LCD for status information display ■Built-in test equipment

**ADS-B -** Our comprehensive range of integrated products is a preferred solution for enhanced wide area surveillance of aircraft.

### Why ADS-B?

Airlines and air navigation service providers benefit from improved low cost surveillance leading to safety enhancement, reduced workload for both pilots and controllers and more efficient operations.

### Enablers for ADS-B

ADS-B used in air-to-ground applications provides support in all phases of flight and ground operations:

- En-route e.g. for radar-like separation in non-radar or low coverage airspace
- In TerMinal Areas (TMA) e.g. for precision approach monitoring
- At airport, e.g. within Advanced Surface Movement Guidance and Control Systems (A-SMGCS) including multilateration for surveillance and identification, and vehicle fleet management.

### DESCRIPTION

The ADS-B ground station system provides the means of identification of other civilian aircrafts which are equipped with a Mode S compatible transponder. The system confirms to the relevant requirements of ICAO Annex 10, Vol. IV and STANAG 4193, Part 1, Edition 2. Thus it is compatible with all other IFF and SSR systems meeting those requirements. The major equipment items are in service with our army, navy, air force and civil aviation and qualified to meet ground station and warship environment, while all other component units are designed to meet these requirements. All that is necessary is the insertion of the appropriate computers into the secure housing supplied. All cabling and necessary controls form part of the offered system. The system is also supplied with Mode S facilities. However, to make full use of these facilities will require Data Handling capabilities external to the offered IFF/SSR system in order to initiate/ receive the necessary digital communication messages.

### GR-452A General Specifications

| | |
|---|---|
| Range | >250nm |
| Sensitivity | - 91dBm |
| Dynamic Range | > 80dB |
| Mean Update Rate | 1/s (max. 2/s) |
| Capacity | > 300 targets/s |
| Output Formats | Asterix, Raw Data |
| Time of Arrival Resolution | 128MHz (7ns/2.4m) |
| Time Reference | 12 Channel GPS, RAIM/HPL Processing |
| Power Supply | 110V/220VAC, 47~63Hz, 18~36VDC |
| Power Consumption | <50W |
| Dimensions | 482.6 x 177.0 x 350.6 (mm) w/ Handle |
| Weight | ≤19.5Kg |

### Site Monitor

| | |
|---|---|
| Frequency | 1090MHz |
| RF Power | -30dBm |
| Input | Direct Antenna |
| Dimension | 482.6 x 43.9 x 302.7 (mm) |
| Weight | 6.5Kg |

### Environment

| | |
|---|---|
| Operating Temperature | 0°C~+60°C |
| Storage Temperature | -30°C~+70°C |
| Humidity | 95% |

### Handling

Local Integrity Monitoring by means of Site Monitor
Automatic Self Testing (BITE)
Periodic “Long Loop” Test using Site Monitor
Full Remote Control and Monitoring
Secure Communication and Protecting
Safe reboot and uploading of firmware

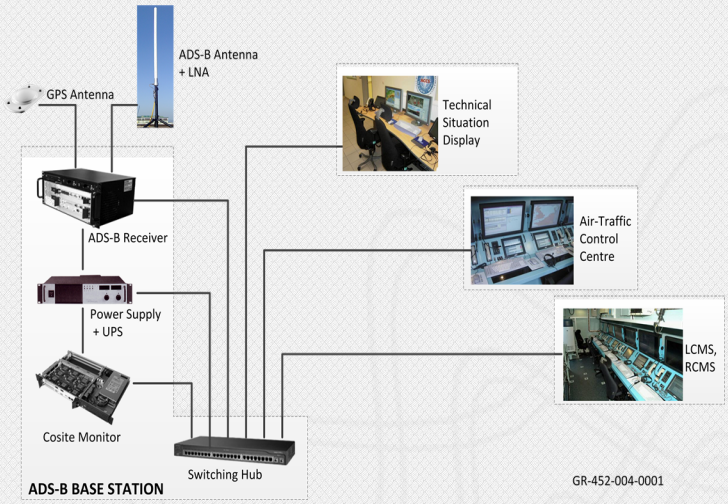
# GR-452A/B Automatic Dependence Surveillance-Broadcast

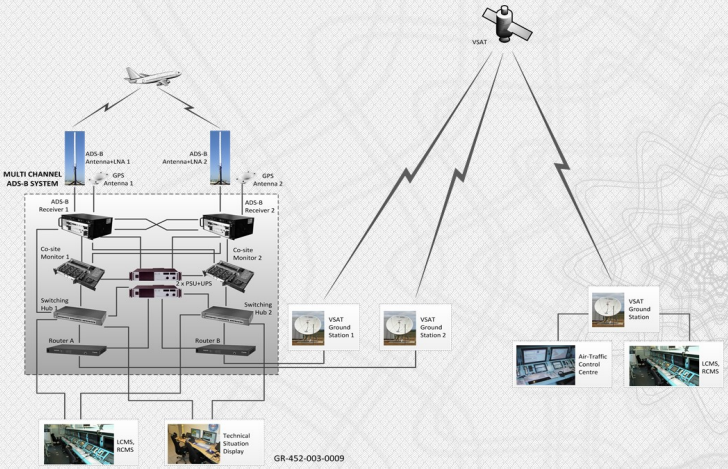
## Receiver/Transmitter System

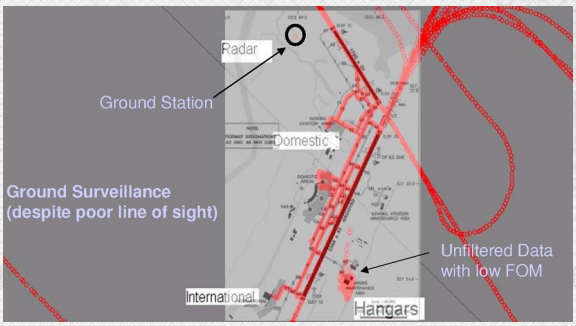
## Passive Surveillance System for Civil Airlines

### GR-452B General specifications

| | |
|---|---|
| Transmitter frequency | 1090 ± 0.01MHz |
| Bandwidth (3dB) | 3MHz@-3dB |
| RF power | Minimum peak 50W |
| Transmit cycle | 2 times per second |
| Power supply | DC10~DC14V |
| Power consumption | Lower than 15W |
| Dimensions | 90mm x 230mm x 210mm |
| Weight | 4.5Kg |
| EMC | MIL-STD-461 |
| Operating temperature | -30°C~+60°C |
| Storage temperature | -40°C~+70°C |
| Reliability | 4,175 hours MTBF |




### ADS-B Ground Station

Provides the ground segment of ADS-B air traffic control surveillance system for en-route, terminal area and surface movement control. Using 1090 Mode S Extended Squitter data link, the system outputs decoded data as Asterix category 21 to an attached network.

### Air Traffic Control

It displays ADS-B data fully integrated on the same screen as flight plan data, radar data & ADS-C data.

### A-SMGCS

Fuses data from multiple sensors, including ADS-B receiver and Mode S Airport Ground Sensor (MAGS) signal. Includes automatic provision of alerts and warnings, as well as traffic routing capabilities.

**Multilateration** - A passive co-operative sensor system, with full ADS-B capability, for surveillance and identification of suitably equipped aircraft and vehicles.

**Vehicle management** - A multi-link transmitter for vehicle management providing position and identification information to the airport's A-SMGCS through multiple signal outputs including Mode S.

### GR-452A ADS-B Receiver (In) Set

The GR-452A ADS-B ground station system provides the means of identification of other civilian aircrafts which are equipped with a Mode S compatible transponder. The system confirms to the relevant requirements of ICAO Annex 10, Vol. IV and STANAG 4193, Part 1, Edition 2.

- ADS-B Base System — GR-452A
- ADS-B Fully Redundant System — GR-452A-FR
- ADS-B Local Redundant System — GR-452A-LR
- ADS-B Multi Channel System — GR-452A-MC

### GR-452B ADS-B Transmitter (Out) Set

The GR-452B ADS-B out transmitter provides the means of identification and surveillance of vehicles in an airport environment. The vehicles which are equipped with GR-452B ADS-B out transmitter transmit the relevant information of Mode S compatible signals to A-SMGCS.

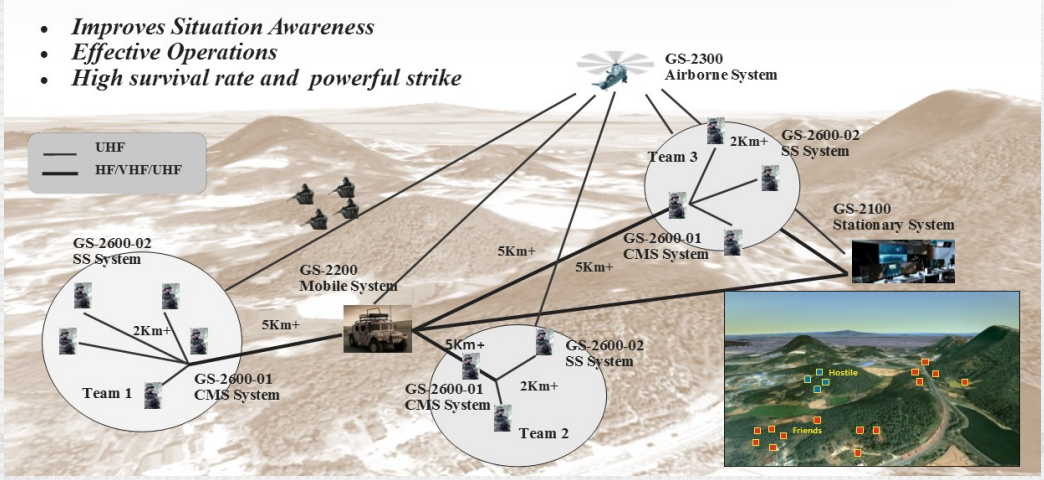
- ADS-B out transmitter — GR-452B
- 1090MHz Tx antenna — 452B-ANT
- N-BNC antenna cable — 452B-RC1
- GPS antenna — 452B-RC2
- Transmitter power cable — 452B-PC
- Vehicle installation kit — 452B-IK
- User manual — 452B-M

# GR-611 Secure Personal Radio

## *Full-Duplex, Soldier, Team Radio*


**[Key features]** ■Frequency range 350~450MHz ■Completely automatic & hands-free operation (VOX) ■Full-duplex up to 6 users, unlimited listeners ■256 channels - every team gets its own channel ■Embedded GPS - C4I compatible, search & rescue, navigation ■256-bits AES digital secure - secure voice & data ■RF Power 2W - short & mid range communication ■USB digital data interface - Android & Window CE terminal compatible ■Built-in wireless fill-gun (OTAR) - secure key distribution ■Compact & light weight design

The communication and situation awareness platform for the modernized soldier. The GR-611 SPR is designed specially to meet the unique demands of providing secure and reliable voice, data and situation awareness communication at soldier level. Optimized for maximum performance across the highly variable environments soldiers operate in, and enabling range extending networks, the GR-611 SPR provides continuous coverage in the 350 to 450MHz frequency range and ensures reliable connectivity between squad members and with command level intelligence. The GR-611 SPR has already been adopted as the standardized personal radio platform for multiple soldier modernization programs in local and some countries. The GR-611 SPR provides secure, digitized voice and data communications to soldiers without distracting their attention from the task at hand. The radio's small and light weight, and it powered by lithium-ion battery. A unique team-based waveform and digital wireless network allows reliable communications in situation where traditional backbone is not available or is out of range. The radio provides full-duplex, multi-group voice conferencing service, so it allows several simultaneous talkers on the net with an unlimited number of listeners - resulting in a more natural, dynamic operation environment, free from the constraints of traditional radio systems. The radio is data-enabled and incorporates a built-in GPS receiver, allowing easy-to-use situation awareness, position tracking and messaging services. A USB data interface allows connection of Android computing devices for enhanced data applications. All transmissions are secured by built-in 256-bit AES encryption algorithm. The SPR - reliable and secure connectivity for every soldier, assured by *Glocom*.



# GR-611 Secure Personal Radio (SPR)

## Full-Duplex, Soldier, Team Radio
## Soldier Radio System

### [Applications]

■ Front line soldiers ■ Special forces ■ Warships/Airborne landing control ■ VIP protection ■ Guards ■ Police

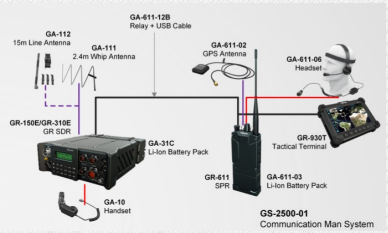
### General specifications

| | |
|---|---|
| Frequency range | 350~450MHz |
| Band width | 25KHz, 800KHz |
| Preset channels | 16 programmable presets with flexible groups |
| Modulation | FSK, GMSK |
| Position reporting | Automatic reporting by built-in GPS |
| Operation mode | Full-duplex up to 6 simultaneous talkers<br>Unlimited listeners<br>Priority break-in<br>Selectable VOX or PTT activation<br>Simultaneous data & voice |
| Range | Open terrain: 2-3Km (10Km @ LOS)<br>Urban: Up to 1000m<br>Jungle: 800m |
| Voice encoding | ADPCM 16kbps |
| Frequency stability | ±2ppm |
| RF Power | 2W, adjustable to 0.5W, 2W |
| Antenna | Whip antenna |
| RF interface | SMA, 50ohm nominal unbalanced |
| Encryption | 256-bit AES |
| Data rate | 4.8kbps, 9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps, 256kbps |
| Data interface | USB 2.0 multi-function (data, configuration/ control |
| Programming | Wireless fill-gun (OTAR), USB (Channel frequency and encryption code) |
| Battery | Rechargeable Li-Ion 3.7VDC |
| Current | 2.5A@Tx, 200mA@Rx |
| Battery duration | 24hours @ Tx(1):Rx(1):Stby(10) |
| Color | Black/Khaki |
| Dimension | 178mm x 78mm x 27mm with battery |
| Weight | ≤500g |
| Alerts | Audible status, language programmable |
| Software (Firmware) | Software-defined, Upgradable via USB port |
| Shock/Vibration | MIL-STD-810E |
| Operating temp. | -30°C~+60°C |
| Storage temp. | -45°C~+70°C |
| Humidity | 95% |
| Immersion | 30 minutes @ 2m |
| MTBF | 5000 hours |

### GS-2500-01/02 Available Option

| | |
|---|---|
| • 6 x Li-Ion battery charger (opt) | GA-611-05 |
| • Double PTT tactical headset (opt) | GA-611-07 |
| • Configuration kit (opt) | GA-611-11 |
| • Relay cable (opt) | GA-611-12 |

### GS-2500-01 Communication Man Set (CMS)




The Glocom GS-2500-01 Communication Man Set will provide dismounted soldiers the tactical information exchange and situation awareness with command & control unit and among each other in real-time on battlefield. The standard set comprises:-

| | |
|---|---|
| • Secure personal radio | GR-611 |
| • Antenna | GA-611-01 |
| • GPS antenna | GA-611-02 |
| • Rechargeable Li-Ion battery | GA-611-03 |
| • Single Li-Ion battery charger | GA-611-04 |
| • Single PTT tactical headset | GA-611-06 |
| • USB cable | GA-611-08 |
| • Carry pouch | GA-611-09 |
| • User manual | GA-611-10 |
| • HF/VHF/UHF tactical radio | GR-150/250/310 |

### GS-2500-02 Modern Soldier Set (MSS)


The Glocom GS-2500-02 Modern Soldier Set will provide dismounted soldiers the tactical information exchange and situation awareness with command & control unit and among each other in real-time on battlefield. The standard set comprises:-

| | |
|---|---|
| • Secure personal radio | GR-611 |
| • Antenna | GA-611-01 |
| • GPS antenna | GA-611-02 |
| • Rechargeable Li-Ion battery | GA-611-03 |
| • Single Li-Ion battery charger | GA-611-04 |
| • Single PTT tactical headset | GA-611-06 |
| • USB cable | GA-611-08 |
| • Carry pouch | GA-611-09 |
| • User manual | GA-611-10 |

### GA-611-01 UHF Whip Antenna

This UHF whip antenna is typically used with the GR-611 SPR. This antenna has wideband frequency range. 350~450MHz, Gain:≥-1dBi, VSWR: ≤1.5:1 Typical, Impedance:50Ω, Female SMA, 3W, Length: ≤21cm

### GA-611-02 GPS Antenna

A removable passive antenna designed for use with the GR-611. Center Frequency: 1575.42±1.023MHz, Bandwidth: 10MHz min, Gain at Zenith: 5.0dBic typ, Gain at 10° elevation: -1.0dBic min, Polarization: R.H.C.P, Axial Ratio: 1.0dB typ.

### GA-611-03 Li-Ion Battery

This rechargeable, high-capacity Li-Ion battery is typically used with the GR-611 SPR. Voltage: 3.3V~4.2V(3.7V Nominal), Capacity: 5000mAh, Max. load current: 1A, Charging time: Max. 360 minutes, Protection by enclosure Waterproof.

### GA-611-04 Single Li-Ion Battery Charger

This single battery charger is compatible with the GA-611-03 Li-Ion battery. Charging time: 6 hours. Input:100~240VAC/0.45A, 50~60Hz, Socket: USB, 103 x 46 x 39(mm)

### GA-611-06 Single PTT Headset

GA-611-06 single PTT headset is the head-mount, single left earphone, designed for extended wear in active environments. Its ultra lightweight frame offers superior comfort and fit.

### GA-611-08A Data/Fill USB Type A Cable

This cable connects the GR-611 data interface to a standard USB connector. The cable features a USB Type A connector (as found on most PC hosts). The cable supports both configuration of the radio and data operation.

### GA-611-08B Data/Fill USB Type Mini B5 Cable

This cable connects the GR-611 data interface to a standard USB. The cable supports both configuration of the radio and data operation.

### GA-611-08C RS232C Data Cable

This cable connects the GR-611 data interface to a RS-232C Interface. The cable supports both configuration of the radio and data operation. The cable length is 1m.

### GA-611-09 Carry Pouch

The lightweight radio holster is made of durable Cordura fabric and incorporates Molle straps for attachment to a variety of load-bearing vests and other gear. The radio is held securely in the holster to prevent accidental loss.

### GA-611-11 Configuration Kit

This kit contains the items necessary to program the GR-611 radio. Included in the kit is the radio programming software and the SPR Utility software for Android. Also included, instruction manual.

### GA-611-06C Speaker Microphone with Single PTT

Speaker: 8Ohm/85dB/mW@1kHz, Microphone: 2200Ohm, -45dB, 200~4kHz, Color: Black, Cable length: 57cm, Built-in Clip

Global Communications Co.,

# GR-621 Crypto Speaker Microphone

## For VHF/UHF Walkie-Talkie

### [Key Features]

■ Secure voice communication between walkie-talkies ■ Easy to operate ■ Compact & light weight design ■ Digital encryption AES (Rijndael) or customized ■ Excellent voice quality (MELP 2000)

### The communication and situation awareness platform for the modernized soldier

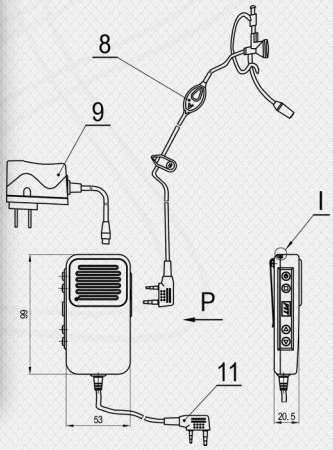
The GR-621 crypto speaker microphone is designed specially to meet the unique demands of providing secure and reliable voice, data and situation awareness communication at soldier level. Optimized for maximum performance across the highly variable environments soldiers operate in, and enabling range extending networks, the GR-621 crypto speaker microphone provides continuous coverage in the voice frequency band and ensures reliable connectivity between squad members and with command level intelligence. The GR-621 crypto speaker microphone has already been adopted as the standardized personal radio platform for multiple soldier modernization programs in local and some countries.

### [Applications]

■ Front line soldiers ■ Special forces ■ Warships ■ VIP protection ■ Guards ■ Police

### General Specifications

| | |
|---|---|
| Key management | Diffie-Hellman mode |
| ECCM | 256bit AES (Rijndael) |
| | Or customized algorithm |
| Interface | 2 holes walkie-talkie sockets |
| Voice encoder | MELP 2000 |
| Speaker Output | 0.5W |
| Keypad | PTT |
| Status | Power/Mode/Warning |
| Operating temp. | -10℃~+40℃ |
| Storage temp. | -50 ℃~ +70℃ |
| Humidity | 95% |
| Dimension | 99mm x 53mm x 20.5mm |
| Weight | ≤150g |


### GR-621E Crypto Speaker Mic Set

- Crypto Speaker Microphone GR-621
- Charger & Cable GA-621-01
- User's Manual GA-621-02

Glocom
Global Communications Co.,

# GS-2600-01 UAV/USV Video, Telemetry/Control System

## DS-SS/QPSK/H.264 Technology

### Multi-Channel, Full-Duplex data radio

GR-510G/M Transmitter/Receiver

GR-510G/M Transmitter

GR-510G/M Receiver

## [Key Features]

■Frequency range (Video: 935~955MHz, Control: 2120~2160MHz) ■Compatible with various kinds of UAVs/USVs ■Low probability of interception (LPI) ■Low probability of detection (LPD) ■H.264 technology ■Full-duplex mode compatible ■Telemetry/remote control ■Video data rate 2Mbps ■Control data rate 2400bps ■Light weight and compact Size ■256-bits AES digital secure

## Specifications

| | |
|---|---|
| Range | > 100Km @ height 1000m |
| Channel frequency | 2120-2160MHz (control), 935-955MHz (video & telemetry) |
| Channel number | 10 channels (control), 5 channels (video & telemetry) |
| Communication mode | FDMA, TDMA |
| Modulation | DSSS/QPSK, BPSK |
| FEC | 1/2 |
| Data rate | Video(2Mbps), Telemetry(115.2kbps), Control (2400bps) |
| ECCM | DS-SS/Encryption (256bit AES) |
| RF power | 5W |
| Receiver sensitivity | <- 95dBm@BER=$10^{-3}$) |
| Data interface | RS-232, RS-422, RS-485 |
| Power Supply | 10-14VDC, Over-voltage, polarity protection, open & short-circuit protection |
| Current Consumption | < 12V/3A(Tx), <12V/0.8(Rx) |
| Continue Work Time | 4 hours |
| Dimension | 165x115x40mm(transmitter), 165x115x20mm (receiver) |
| Weight | 0.9Kg(transmitter), 0.5Kg(receiver) |
| Vibration | Frequency 5~400Hz, amplitude 0.4~10mm, acceleration 4g |
| Shock | Acceleration 12g, duration 12ms |
| Operating temp. | -40°C~+60°C |
| Storage temp. | -50°C~+70°C |
| Humidity | 95% |
| Video compression | H.264 Compatible |
| Resolution | 720 x 576 pixel |
| Frame rate | 25 frame/second |
| Radiation pattern | 11°(Horizontal), 11°(Vertical) |
| Antenna tracking | 360°(Azimuth),±1°(angle Error) |

Traditional war-fighting strategies no longer apply in today's defense environments. Militaries are transforming into agile, network-centric, knowledge–based forces capable of conducting effective joint and combined military operations. Glocom are professional supplier for G4ISR system and necessary items for it. Specially, UAV/USV video control system is one of the main products, and have long history and experience. The GR-510 video transmission system supports the safe and high quality real-time video communication for UAV, USV, missile, remote sensing, telemetry/remote control etc. It uses high technology like DS-SS technology which is excellent for LPI & LPD, H.264 video processing technology, full-duplex communication technology etc.

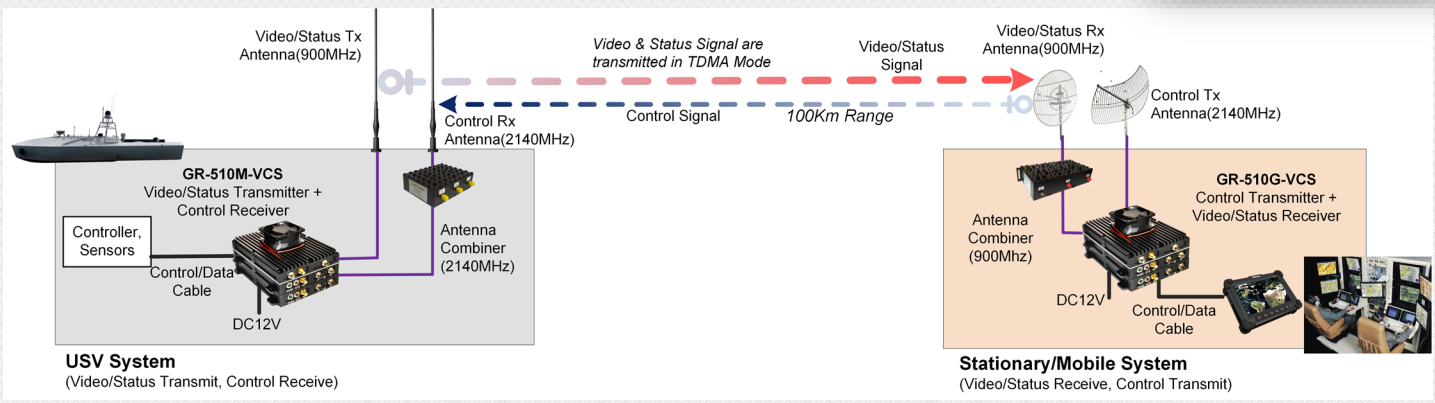
The mobile system is universal mobile control system for USV/UAV. It supports high survival, quick deployment in battlefield. It is equipped with video receiver, command & control transmitter, status receiver, display system, computer network system, power supply system, HF, VHF, UHF radio system, and C4ISR software system etc. All equipment are compatible with electronic warfare, and for it, they have ECCM functionality. It is compatible with UAV and USV.

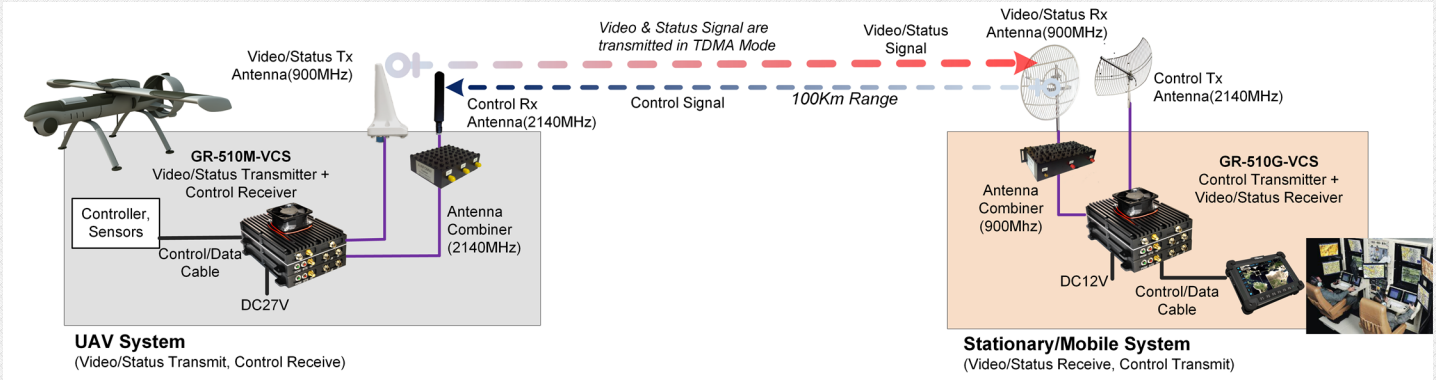
# GS-2600-01 Video, Telemetry/Control System for UAV/USV

## DS-SS/QPSK/H.264 Technology
## Multi-Channel/Full Duplex Radio

### GS-2600-01 Video, Telemetry/Control System for USV/UAV

GS-2600-01 Video, Telemetry/Control System would be installed into any USV/UAV system, and it works for coast surveillance and special military operation. This system is compatible with ECCM.




### GR-510M-VTC USV System:-

| | |
|---|---|
| • Video/Telemetry Transmitter | GR-510M-VTT |
| • Control Receiver | GR-510M-CR |
| • Antenna Combiner | 510M-AC01 |
| • RF Cable 1 (SMA, 10cm) | 510M-RF-C1 |
| • RF Cable 2 (SMA, 20cm) | 510M-RF-C2 |
| • RF Cable 3 (SMA, 2m) | 510M-RF-C3 |
| • RF Cable 4 (SMA, 2m) | 510M-RF-C4 |
| • Video/Telemetry Antenna (USV) | 510M-ANT01 |
| • Control Antenna (USV) | 510M-ANT02 |
| • Yagi Antenna w/ RF Cable (UAV) | GA-413C |
| • Multiband Antenna (UAV) | 510M-ANT04 |
| • 4 Way Power Cable | 510M-PW-C1 |
| • 2 Way Power Cable | 510M-PW-C2 |
| • Transmitter Control Cable | 510M-CON-C1 |
| • Control & Data Cable | 510M-CON-C2 |
| • Camera with Jimbal, Video server, Antenna Jimbal, GPS Receiver, GPS Antenna etc… | |

### GR-510G-VTC Stationary System

| | |
|---|---|
| • Video/Telemetry Receiver | GR-510G-VTR |
| • Control Transmitter | GR-510G-CT |
| • Antenna Combiner | 510G-AC01 |
| • RF Cable 1 (SMA, 10cm) | 510G-RF-C1 |
| • RF Cable 2 (SMA, 20cm) | 510G-RF-C2 |
| • RF Cable 3 (SMA, 2m) | 510G-RF-C3 |
| • RF Cable 4 (SMA, 2m) | 510G-RF-C4 |
| • Video/Telemetry Antenna | 510G-ANT01 |
| • Control Antenna | 510G-ANT02 |
| • 4 Way Power Cable | 510G-PW-C1 |
| • 2 Way Power Cable | 510G-PW-C2 |
| • Transmitter Control Cable | 510G-CON-C1 |
| • Control & Data Cable | 510G-CON-C2 |

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# GS-2600-04 Telemetry/Remote Control System

## One-time Use for Development Only


## [Applications of GS-2600-04]

■ Remote control system ■ Remote data Tx/Rx system ■ Moving target status analysis system ■ Security data network system ■ C4ISR system

The roles of the precision-guided weapon in modern war can't be disregarded anymore. Every countries and companies are competing to develop the new precision guided weapons, and to modernize the old generation weapons to precision guided weapon with low development cost and short period now. The most important technology in development stage is to telemetry and analysis the launched missiles and control them in real time. This technology makes the developers to save the development cost, and shorten the development period dramatically, and upgrades the safety of testing procedure of weapons.
Glocom is developing the data communication technology and supporting the developers of precision-guided weapon with the low cost, compact telemetry/remote controller for one-time use.

## [Key Features]

■ 430MHz ~ 470MHz ■ Data/RS232C Interface/Max 128kbps ■ RF power 10W ■ Full deplex with TDMA function(Option) ■ Individual/group/system code identification function ■ 1:N communication mode

## General Specifications (GR-422 Transceiver)

| | |
|---|---|
| Frequency range | 430~470MHz |
| Channel spacing | 100kHz, 150kHz, 200kHz |
| Modulation | FSK |
| Data rate | 1200bps~115.2kbps |
| Frequency stability | ±1ppm |
| RF impedance | 50Ω |
| Power supply | 11~14VDC |
| | Over-voltage, polarity protection |
| Data interface | RS-232C |
| Programming | PC |
| Dimension | 147.5mm x 110mm x 25mm |
| Weight | ≤800g |

### Receiver

| | |
|---|---|
| Sensitivity | -116dBm @ FSK, 1kbps, BER $10^{-3}$ |
| AFC | ±50kHz |
| Current consumption | ≤200mA |

### Transmitter

| | |
|---|---|
| RF power | 50mW~10W |
| Harmonic suppression | ≥50dBC |
| Current consumption | ≤4.5A |

### Environment

| | |
|---|---|
| Operating temp. | -40°C~+60°C |
| Storage temp. | -50°C~+70°C |
| Humidity | 95% |

## GS-2600-04 Telemetry/Remote Control System Set:

The Glocom GS-2600-04 Telemetry/Remote Control System is ideal f or telemetry and remote control operations providing the developers w ith effective, secure and comprehensive communications with remote sited command locations. It includes all necessary cables, converters, battery and charger, antennas. The standard set comprises:-

**GR-422G-TC Station System (2set)**

| | |
|---|---|
| • UHF Data Radio | GR-422E |
| • Clone cable | GA-21A |
| • RS232-USB Converter | USB-4604BM |
| • PSU, 12VDC/100W | GA-33A |
| • Li-Ion Battery Pack(2pcs) | GA-31D |
| • Battery Charger | GA-32D |
| • Yagi antenna | GA-413C |
| • Application Software | GS-930 |

**GR-422M-TC On-Board System (10sets)**

| | |
|---|---|
| • Telemetry/Controller | GR-422E |
| • Clone cable | GA-21A |
| • DC/DC converter(24/12) | GA-44A |
| • Li-Ion Battery Pack(2pcs) | GA-31D |
| • Battery Charger | GA-32D |
| • Fuselage antenna | GA-411B |

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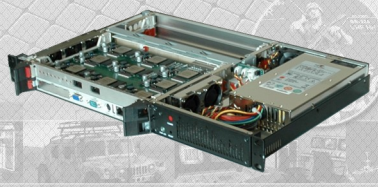
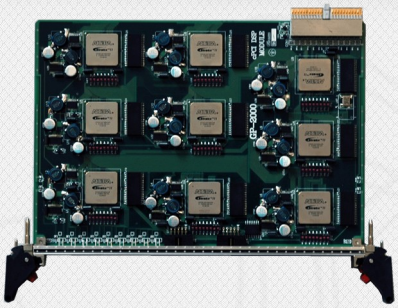
# GP-2000 Ultra High Speed Parallel Processor

## DNA, Weather Forecasts, Decryptions etc…





## [Key features]

■Ultra high speed processor ■Ultra low power consumption 3KW ■Ultra low cost maintenance ■Very small installation space

## Selection Guide

- **Development and Prove system**
  - Development and prove system, GP-2000A
  - Application server
  - Network Switching HUB
  - Router
  - Accessories
  - Processor Modules, GP-2000A-01
- **Ultra High-Speed Parallel Processor system**
  - UHSPP GP-2000B
  - Maintenance Computer
  - Application Server
  - Network Switching HUB
  - Router
  - Accessories
  - Processor Modules, GP-2000A-01
  - UPS 20KW
  - Generator 20KW

## General Specifications

| | |
|---|---|
| Main processor | FPGA GL2S15F484 |
| cPCI bus controller | FPGA GL1C6F256 |
| Boot memory | FlashMemory EEPROM GL4SI8 |
| Processors per module | 8 pcs |
| Processors per frame | 8 x 14 = 112 pcs |
| Processors per set | 8 x 14 x 9 = 1,008 pcs |
| Size | 233.35mm x 160mm |
| Data Process Speed | 516,096 times higher compare with PC P4(2GHz) |

## Electrical Specifications

| | |
|---|---|
| Input Voltage | AC100~240V, 50/60Hz |
| Power | Max. 1000W |
| Voltage of Module | +5VDC, +12VDC, +3.3VDC, -12VDC |

## Mechanical Specifications

| | |
|---|---|
| 14-slot frame size | 484mm x 398mm x 295mm |
| Weight | 23Kg |
| Module Size | 233.35mm x 160mm |
| Frame Size | 19” rack-mount |

## Cooling Capacity

| | |
|---|---|
| Front-access intake | 5 pcs, Dual baering, 48.2CFM |
| Blowers for ventilation | 5 pcs, Dual bearing, 48.2CFM |

## Environmental Specifications

| | |
|---|---|
| Operating Temperature | 0°C~450°C |
| Storage Temperature | -200°C~750°C |
| Relative Humidity | 10%~90% |
| Shock | 15G PTP, 11ms duration |
| Operation | 5~500Hz, 0.5Gram (each axis) |
| Non-operation | 5~500Hz, 1.88Gram (each axis) |

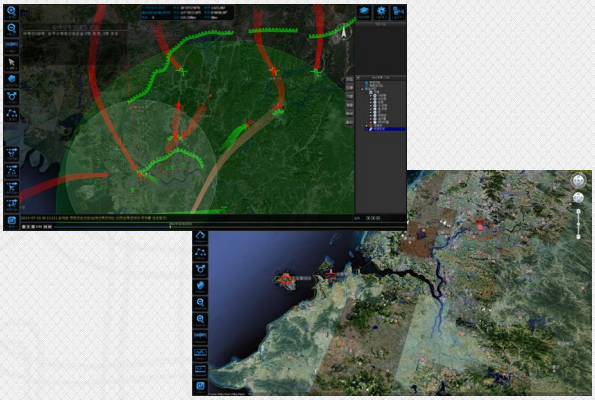
Global Communications Co.,

# GR-930 Battle Management System

## C4ISR System Applications

### [Key Features]

■ Good and Reliable COP ■ Effective Command & Control ■ Real-time Information Processing/Sharing, Interoperability ■ Integrated Management of Radio Network ■ Independence of Communication Devices ■ Scalability & Flexibility ■ Easy-to-use IP-based Client-Server System Design ■ Compatibility with Various Operating System



Future battle space necessitates improvements in the command, control and communications, battle space management and situation awareness. The GR-930 is ideal C4ISR software for application ranging from those requirements. GR-930 is a command and control system for accurate understanding of battlefield situations on the basis of various sensors and communication equipment, as well as rational decision-making, speedy transmission of order and mission management.

The GR-930 is a command and control system with extreme scalability and flexibility. It is deployable, mobile and scalable from large Joint HQs down to a single mobile system or soldier. The IP-based system is flexible enough to meet a variety of requirements, and is easily expandable for additional capability.

Today's military communications networks are not merely transmitting voice communications. They distribute video, images, dynamic maps, and enable advanced command and control applications. Glocom's state-of-the-art network-centric applications offer the most advanced solutions, designed as open, and adaptable applications, supporting commanders wherever they are - in the air or sea, in command post, inside the combat vehicle or individually, on dismounted operations. Such systems are providing fire-control solutions, processing intelligence information, assisting operational decision making and logistics management processes. They support advanced visualization in rich 3D geographically oriented graphics, tables and graphs, displaying intelligence, operational and logistical information, enabling commanders to improve assessment and gain combat awareness for superior decision making, while focusing on critical problems and opportunities in combat.

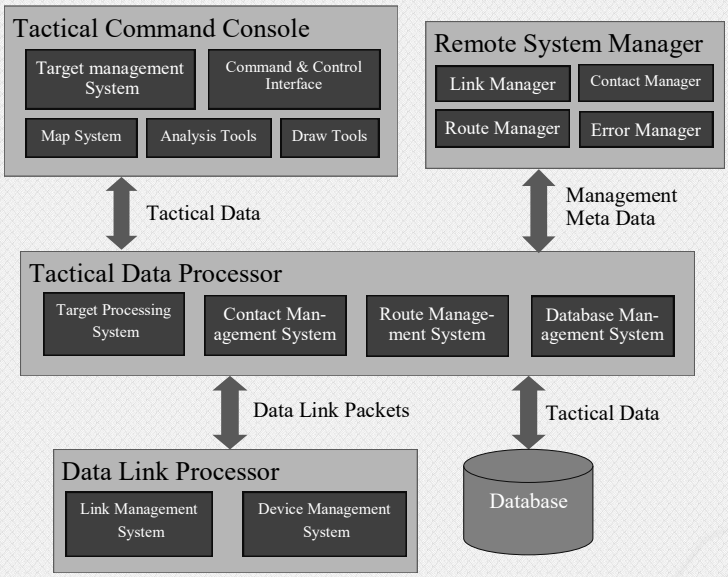
Military communications equipment currently offers more capabilities, higher reliability, and better utilization of the spectrum, at lower weight and a smaller form factor. Some systems are becoming multipurpose, with software defined radios (SDR), embedded communication security (COMSEC), GPS, and data transfer capabilities packed into a small, handheld device, or tactical terminal.

The military wireless networks of the 21st century, utilizing terrestrial, satellite, and data link systems, have also evolved in recent years into more flexible voice and data IP networks. Using Common-Off-The-Shelf (COTS), standard-based systems, such advanced networks maintain open and scalable design while offering unprecedented versatility, security, and reliability.

# GS-930 Integrated Tactical Command & Control System

## C4ISR Software System

## Battle Management System




## Core Components

Core Components contain the Tactical Command Console, Tactical Data Processor, Data Link Processor and Remote System Manager.

Tactical Command Console is user interface, displaying the situation of battlefield and receiving the user's control actions.

Tactical Data Processor and Data Link Processor is components of the Tactical Data Link, which is responsible for processing and communication of the tactical data.

Remote System Manager is used to manage the system.

Database is for storage and retrieval of the tactical data.

## Performance

- Target Process
  - Track 2000pcs
  - Military Symbol 3000pcs
  - Route 2000pcs
  - FPA/Operation Area 2000pcs
- Map
  - WGS1984 Datum by default
  - Several Map Projection available
  - 3D Visualization by DEM
  - Navy/Air symbols according to STANAG 4420, Army symbols according to APP6A and NTDS
- Navigation NMEA-0183 Format
- Target Display/Update 0.5s
- System Delay 0.1~0.5s

## Common Operational Picture (COP)

One of the main functional areas is the Common Operational Picture (COP), displaying land, maritime and airborne units/tracks on a map background. The data can be displayed both textually and graphically. The result is a common view of the battlefield among friendly forces. It also allows users to pinpoint enemy locations on their map.

## Command & Control/Joint operation

A good and reliable COP helps military commander to make effective decision and optimize force deployment. The commander can continuously command and control all the units under one's command using various communication functions.

The important tactical information is distributed to friendly units who are also using this application resulting in enhancement of the joint operation capability.

## Navigation

GS-930 acquires geo-position information from navigation data source such as GPS Receiver and displays on digital map. It also provides the several functions comfortable to navigate.

## GS-900 Applications

- Integrated Tactical Data System GS-910-Win
- Wireless eMail System GS-920
- Battle Management System GS-930-Win
- Battle Management System GS-930-Win(Lite)
- Battle Management System GS-930-Android
- Battle Management System GS-930-Android(Lite)

## Environment

- Operating system
  - Desktop system: Windows
  - PDA system: Android
- Hardware
  - CPU: Over 700MHz, recommended 2GHz
  - RAM/HDD: Over 256MB, recommended 1GB/20GB
  - VRAM: 256MB

## Configuration of the Tactical Data Link

Some components of the GR-930 provide the data exchanging protocols and management tools that is useful for configuration of the scalable tactical data link. The link can integrate several Glocom radios into a network.

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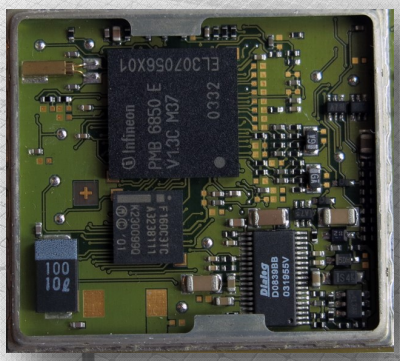
# GEM-2 Programmable Cryptographic Module

## [Key Features]

■Compatible with many cryptographic algorithm ■Easy key management ■High speed data rate up to 300Mbps ■FPGA/CPLD ■Full compatible with Glocom products

## [Target applications]

■All GR-Series Radios (e.g. Handheld, Man-pack, Vehicular, or Station Radio) ■Handheld & Mobile Law Enforcement (battery-powered) radios ■Telemetry and military sensor systems ■Network interface cards and IP security products ■Secure Wireless Networks ■Homeland Security applications ■Next Generation Key Management Modules



GEM-2 consists of a miniaturized printed wiring assembly, custom Application Specific Integrated Circuit (ASIC) and supporting software that is embedded in radios and other voice and data communications equipment to encrypt classified information prior to transmission and storage. GEM-2 is the second product in Glocom encryption family supporting all of the features of GEM-1. GEM-1 was installed on the DSP module in radio systems. GEM-2 encompasses a much broader range of functionality and offers data rates greater than 300 Mbps, low power consumption suitable for mobile (battery powered) applications, legacy and future algorithm support and advanced programmability. GEM-2 was developed by Glocom to meet all of the requirements of the Joint Tactical Radio Systems (JTRS) and other military or para-military communication , including the requirement for programmability. GEM-2' software programmability provides a low cost migration path for future upgrades to embedded communications equipment without the logistics and cost burden normally associated with upgrading hardware. GEM-2's small size, low power and high data rates make it an ideal choice for mobile (battery powered) applications. It is ideally suited for JTRS applications, military radios, wireless LAN's remote control/ remote sense/telemetry, guided munitions, UAV, USVs and other equipment requiring a low power, programmable solution.

## GEM-2 Encryption Module

| | |
|---|---|
| Data rates | Up to 300Mbps (dependent on mode) |
| Supply voltage | 3.3VDC |
| Programming | Field Software reprogrammable, Cryptographic bypass |
| Size | 35mm x 35mm |
| Type 1 | AES, DES, Triple DES |
| Type 2 | Digital Signature Standard (DSS)<br>Secure Hash Algorithm (SHA)<br>Customer Specific<br>Other Algorithms can be added later |
| Key Management | Processor-controlled or stand-alone operation, On-chip key storage |
| Interfaces | Standard 32-bit parallel interface for command and data , JTAG Interface |
| Operating temperature | -40℃~+85℃ |

## GEM-2EK Evaluation Kit

- USB/RS-232 Interface for Key Management and Data Encryption
- JTAG interface
- General Purpose Input/Output (GPIO) interface
- Supply voltage – 5VDC
- Various test points for hardware evaluation

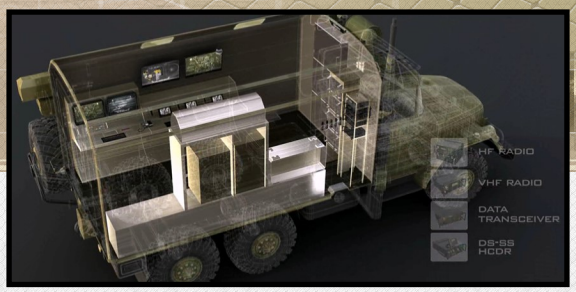
## Kit includes:

■Evaluation board ■User's Guide and Encryption Module documentation ■Encryption Module Terminal Program ■Evaluation kit software with GUI interface for entering commands and traffic ■5V AC adapter

Evolution Kit:GEM-2EK

# MEMO

# MEMO




- Tactical Manpack Radio System
- Tactical Handheld Radio System
- Mobile Systems
- Stationary Systems
- BMS Applications

## Communications solutions for anytime, anywhere in battlefield

Global Communications is a leading supplier of secure voice and data communications products, systems and networks to military, government and commercial organizations worldwide.

Glocom is an international communications and information technology company serving government and commercial markets in more than 50 countries. The company has annual revenue of over $10 million and 200 employees—including nearly 100 engineers and scientists. Glocom is dedicated to developing best-in-class communications products, systems and services. Additional information about Global Communications is available at Glocom website.