

Inmarsat Fleetbroadband FB250 Class Terminal



■ Product Description

The Glocom's **GX-9** is an Inmarsat Fleetbroadband, FB-250 class, user terminal designed to support a variety of broadband global area network services including IP packet data (up to 384 kbps in shared channel), Streaming (8,16, 32, 64, and 128 kbps), 3.1KHz audio for fax and secured voice, and low-rate AMBE telephony circuit-switched voice services. **GX-9** operates under the Inmarsat 4th generation satellites on global coverage. **GX-9** consists of two separate modules: ADE (Above Deck Equipment) and BDE (Below Deck Equipment) and connected by a coaxial cable. The ADE features a helical antenna, a 3-axis stabilizer with automatic satellite tracking, a GPS receiver, and a front end RFU. The BDE contains an enhanced FB250 core module with crystal oscillator durable for the marine shock/vibration environment, a wide-range (11 to 32 vdc) DC/DC Power Module and an Interface Module housed in a ruggedized chassis shock mount for desk top or rack installation. The **GX-9** ADE is shielded in a compact, fiberglass cylindrical dome roughly 27 cm in height and 33 cm in base.

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■ Typical Applications

- IP packet data accessing web, email, corporate server/database, and VoIP
- ISDN voice and fax (3.1KHz audio)
- PSTN telephony voice (4.0 AMBE codec)
- Compressed video via IP streaming (128 kbps)
- Short messaging services (SMS)
- High quality audio (3.1khz ISDN)
- Secure voice and data

■ Typical Vessel Fitting

With ADE weighing less than 3.7 kg and dome size smaller than a 2-gallon slow cooker, GX-9 can be fitted to any sizes of vessel with 25 feet in overall length and up. The GX-9 BDE is measured about 25 x 28 x 5 cm (not counting the WiFi antenna) and it needs just a very small space to fit inside the cabin. GX-9 is a FB-250 class design with transceiver that is capable for most of FB-500 services except the 256kbps streaming and fax below 15° elevation angle.

■ GX-9 Product Uniqueness

- Industrial grade crystal oscillator with high G-sensitivity (0.7 ppb) durable for rough sea conditions.
- Built-in wireless LAN for multiple workstations or wifi handset communications.
- Adjustable cable length between ADE and BDE for large ship installation.
- Multi-language man-machine interface on wireless PDA accessing GX-9 terminal operational data thru built-in web server.
- Rugged, aluminum extruded BDE with water and dust protection IP-54 certified.



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■ Service Capabilities

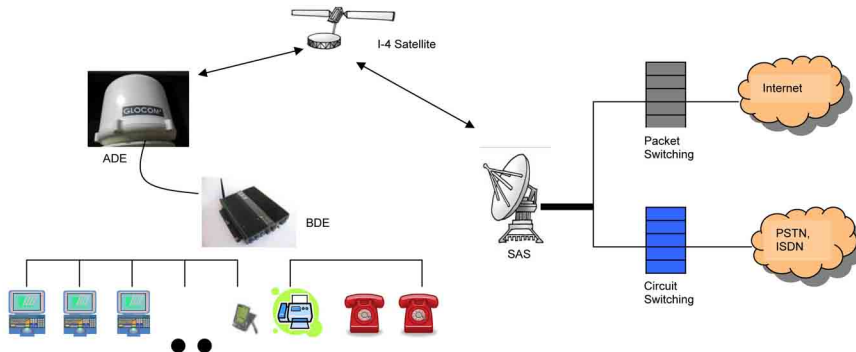
Circuit switched:

- Telephony: 4 kbps AMBE voice codec (PSTN)
3.1KHz audio voice and fax (ISDN over 15° elevation angle)

Packet switched:

- Broadband Streaming: 8, 16, 32, 64, 128kbps in reserved channel
- IP Data (Non QoS): Up to 239 kbps transmit and 384 kbps receive in shared channel
- Short Messaging (SMS)

■ BGAN System Overview



■ Physical Characteristics

Above Deck Antenna Unit (ADE)

- Housing: Fiberglass Dome
- Dimension: 330 mm (Diameter) x 270 mm (H)
- Weight: 3.6 kg
- Mounting: Bolt
- Ingress Protection: IP55
- Components:
 - Antenna: 2-element Helix
 - RF Units: HPA, Diplexer, LNA
 - Stabilizer: 3-axis design with antenna control unit (ACU) for auto satellite tracking
 - 12-channel GPS receiver
 - Cable to IDU: RG-223 coaxial cable (15 m standard), TNC connector (male)

Below Deck Console Unit (BDE)

- Housing: Aluminum alloyed
- Dimensions: 44 x 210 x 260 mm (H x W x D)
- Weight: 2.4 kg
- Mounting: Bolt with mounting brackets
- Ingress Protection: IP54
- Components:
 - Core module: BGAN Class 9 modem
 - Interface and Power module
 - Simcard
 - Wireless LAN antenna

■ Operational Characteristics

- Power supply: Wide-range DC Input (10.8 to 31.2 vdc) /120 watts
- Power consumption: Total 100W
- Transmit frequency: 1626.5 - 1660.5 MHz
- Transmit power at antenna: 14 dBW EIRP
- Receive frequency: 1525.0 - 1559.0 MHz
- Receive G/T: > - 15.5 dB/K

■ Environmental Characteristics

- Operating Temperature: -25° to +55°C
- Relative Humidity: Up to 95% at 40°C
- Precipitation: Up to 100 mm/hr
- Wind Velocity : Up to 100 knots under normal operation
- Icing (ADE): Up to 25 mm of ice (survival only)
- Spray (ADE): Solid droplets from all directions
- Vibration

| Frequency Range (Hz) | Peak Amplitude (mm) | Frequency Range (Hz) | Peak Amplitude (mm) |
|----------------------|---------------------|----------------------|---------------------|
| (ADU) 4-10 | 2.54 | (BDE) 4-15 | 0.76 |
| 10-15 | 0.76 | 15-25 | 0.40 |
| 15-25 | 0.40 | 25-33 | 0.23 |
| 25-33 | 0.23 | 33-40 | 0.13 |
| | | 40-50 | 0.07 |
- Ship Motions:

| Motion | Amplitude | Period | Maximum induced acceleration for ADU |
|---------------|-----------|--------|--------------------------------------|
| Roll: | ±30 deg | 8 s | 0.5 g, tangential |
| Pitch: | ±10 deg | 6 s | 0.5 g, tangential |
| Yaw: | ±8 deg | 50 s | |
| Surge: | ±0.2 deg | | |
| Sway: | ±0.2 deg | | |
| Heave: | ±0.5 deg | | |
| Turning Rate: | ±40 deg/s | | 1 deg/s ² |

■ External Interfaces

| Interface Type | Standard | Connector Type | Service Types |
|----------------|---|------------------|---|
| ISDN | Euro-ISDN S/T interface (ISO/IEC 8877:1992, ITU-T Recommendation I.430) | RJ-45 | - 64kbps UDI - 3.1 kHz - HQ Speech |
| Ethernet | ISO/IEC 8877:1992, IEEE Std 802.3 1998 ed | RJ-45 | - IP Packet Data |
| USB | Version 1.1 or later | Type-B Connector | - IP Packet Data |
| Voice | 2-wire Analog | RJ-11 | - 4 kbps AMBE voice; - ISDN 3.1KHz audio fax |
| Wireless LAN | IEEE 802.11b | | - IP Packet Data |

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■ GX-9 Standard Package

- Above Deck Antenna Unit (ADE) (1)
- Below Deck Console Unit (BDE) (1)
- ADE/BDE Coaxial Cable 15m (1)
- DC Power Cable 5m (1)
- Operating Manual CD (1)
- 2-channel iMUST IP-voice & IP-fax (1)

■ GX-9 Optional Accessories

- ADE/BDE Extended Coax Cable (LMR-400 50m)
- Wireless LAN PDA
- ADE Post Mount Kit

■ GX-9 Certifications

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|-----------------|--|
| EN 300 328 | Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive |
| EN 301 444 | Satellite Earth Stations and Systems (SES); Harmonized EN for Land Mobile Earth Stations (LMES) Operating in the 1,5 GHz and 1,6 GHz Bands Providing Voice and/or Data Communications Covering Essential Requirements under Article 3.2 of the R&TTE Directive |
| EN 301 489-1 | Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements |
| EN 301 489-17 | Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific Conditions for 2,4 GHz Wideband Transmission Systems and 5 GHz High Performance RLAN Equipment |
| EN 301 489-20 | Electromagnetic Compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 20: Specific Conditions for Mobile Earth Stations (MES) Used in the Mobile Satellite Services (MSS) |
| IEC 60945 | Marine safety, EMC Section9.; Electromagnetic emission-Methods of testing and required test results. Section10: Immunity to electromagnetic environment-Methods of testing and required test results. |
| FCC Part 15 | Radio Frequency Devices |
| FCC Part 15.247 | Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz. |
| FCC Part 25 | Satellite Communications |



■ Inmarsat Type Approval Certificate No: Pending