

## MSAT-G2 Mobile Satellite Radio – FAQ

### A. Installation

#### Ignition Sense Wiring

- The ignition sense line (orange wire) can be used to switch the radio on and off. It is typically connected to the ignition switch on a vehicle. If a switched source is not used then it must be connected to +12 VDC.
- If the radio is turned on without +12 VDC applied to the ignition sense line the radio will automatically power down after approximately 30 seconds.
- If the radio is turned off using the handset power key then the ignition sense line will be ignored. The radio must then be turned on using the power key.

#### Current Consumption

- The maximum current draw for the radio is 3 Amps. This can occur when the unit is transmitting, the antenna is rotating (vehicle moving), transceiver heaters are on, etc.
- The radio requires input voltage between 11.5 and 15.6 VDC. If the voltage drops below that range the radio will automatically power off. If this happens ensure that the power source is providing adequate voltage during the extra current draw that occurs when the radio is transmitting.
- The following are typical current values when the antenna is not rotating (radio is stationary) and the transceiver heaters are off:
  - Radio Idle or Receiving Call: 0.9 Amps
  - Radio Transmitting: 2.2 Amps

#### Handset Cable Extension

- The handset cable can be extended with standard CAT-5E cable and RJ-45 couplers up to 25 feet. Longer cables may be used but the specific installation should be tested to ensure that audio quality is not affected. If a long cable extension is required or if the extension is in an electrically noisy environment then the Link Communications Handset Extension Adapter should be used.

#### Lightning Arrestor/Protector

- Applicable electrical code(s) may require that lightning arrestors/protectors capable of supporting L-band transmissions be installed on all cabling between the fixed-site antenna and the structure in which the equipment is housed. It is the professional installer's responsibility to determine all such requirements with the customer. The equipment installation must comply with all applicable standards.

The following are the general requirements for a lightning protector:

- 50 ohm impedance
- Frequency: Low insertion loss for the L-Band and ASK Modem frequencies L-band frequency: 1552-1559 and 1626-1660 MHz
- ASK Modem frequency: 4.096 Mhz
- Allow +12VDC voltage to pass (up to 2 amps)

## B. Operation

### Radio Startup

- With clear line of sight, satellite acquisition typically takes 30 seconds following power up.

### Volume Control

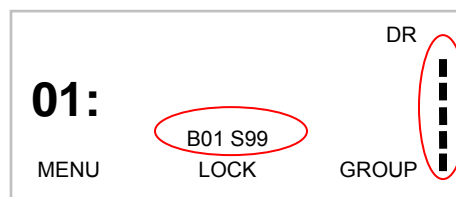
- The UP ARROW KEY and DOWN ARROW KEY can be used to adjust the received volume level while in a call or in a vacant state (talk group still active but between speakers). The radio will adjust the volume for the current selected receive destination (handset speaker, external speaker, or external headset). When the radio is in an idle state the user can access the ADMIN → VOLUME menu to adjust the volume.

### Crossband Operation

- The crossband mode of operation is used when the radio is connected to external interface equipment through the radio's DB-9 multi-purpose serial port. The crossband mode is selected through the ADMIN → SERIAL PORT menu.
- It is important that equipment be connected to the DB-9 serial port when crossband mode is enabled. Otherwise the radio may spontaneously key up (PTT) if there is no equipment connected. If the external equipment is to be removed the radio should be powered off or crossband mode should be turned off.

### Beam and Signal Strength Indicators

- The radio provides beam and received signal strength indicators via the user interface. The current satellite beam and received signal strength appear on the bottom portion of the handset display screen. In addition corresponding received signal strength bars appear on the right side of the handset display screen.



- Received Signal Strength Value Scale:

Signal Value	Number of Bars	Service Level
0-35	0	Poor (too weak for a call)
36-45	1	Poor
46-55	2	Marginal
56-65	3	Marginal
66-75	4	Acceptable
76-99	5	Excellent

## C. GPS

### Performance

- The GPS receiver typically acquires a location fix (latitude and longitude) within one minute.
- The accuracy of the GPS location depends on many conditions such as number and location of GPS satellites in view. Under ideal conditions the GPS receiver specification is 2.5m CEP (Circular Error of Probable). This means that 50% of the positions will be accurate to a circle radius of 2.5m.

### GPS Position Not Available

- “GPS Position Not Available” will be displayed on the handset when an accurate GPS position can't be determined. It is possible to have good line-of-site to the MSAT satellites, but poor view of enough GPS satellites.

Examples: vehicle is parked along side a building or the radio is pointed through a window.

- If the radio never receives a GPS position then it is possible that the GPS receiver in the antenna did not initialize properly during power up. Power cycling the radio should correct this. If this occurs frequently then the power wiring should be checked (powering the radio through a cigarette lighter may occasionally cause this condition).

### GPS Info from Serial Port

- Standard NMEA-0183 formatted GPS data can be obtained from the multi-purpose DB-9 serial port. GPS mode can be enabled from the ADMIN → SERIAL PORT menu.
- The NMEA-0183 data rate is fixed at 4800 bps and the DB-9 serial port can be connected to a PC running a mapping application with a serial cable.
- Several types of NMEA-0183 sentences are provided:
  - RMC latitude, longitude, time, speed, direction, etc
  - GLL latitude, longitude, time
  - VTG direction, speed
  - ZDA Date and time

- GSV satellites in view and their location
- GGA latitude, longitude, time, altitude, DOP (accuracy), number of satellites
- GSA GPS DOP (accuracy)

## D. External Interfaces

### Transceiver External Speaker Port - Audio Isolation Transformer

- The external speaker output of the transceiver is a balanced audio output. An external speaker (non-powered type) may be directly connected to this port. If an unbalanced device is directly connected to this port such as an amplified (12V powered) speaker then unwanted noise may be heard. If this occurs, a (1:1) audio isolation transformer can be used to eliminate noise.

### RJ-45 Handset Port Audio Interface

- Audio is available from the RJ-45 Handset Port and can be used to interface with external customer equipment (PA System, intercomm system, dispatch console, etc).

#### Transmit Audio (Microphone):

- Impedance: 10 k  $\Omega$ .
- Level to give max PCM code: 2.83V p-p AC coupled
- Pin 1 Audio TX +
- Pin 2 Audio TX -

#### Receive Audio (Speaker):

- Impedance 8  $\Omega$
- Maximum output power 160 mW (8 $\Omega$ )
- Volume adjustable by 14 dB in 6 steps through the "ADMIN - VOLUME" Menu
- Pin 7 Audio RX +
- Pin 8 Audio RX -

The complete pin-outs for the Handset Port can be found in the MSAT-G2 Installation Guide.



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