Globalstar Modem

with

GS1 Control Board

Operating Manual

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REVISION HISTORY

Revision #	Date	Description
1	June 30, 2003	Original issue.
2	May 3, 2004	GS1 Control Board description added.
3	April 20, 2005	Updates for GS1 firmware as well as FWP, Toolbox and GSNet configurations.

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OPERATION

GENERAL DESCRIPTION

FTS Globalstar Transceivers are designed to provide Globalstar satellite network data communication capability for existing FTS data loggers. The transceivers combine Qualcomm's GSP-1620 Satellite Data Modem with a custom designed FTS GS1 Control Board to ensure reliable communications. In addition to providing modem watchdog capability, the GS1 Control Board seamlessly operates in Globalstar 'Asynchronous' and 'Direct Internet' mode. In 'Asynchronous' mode the transceivers act as conventional dial-up modems. In 'Direct Internet' mode the transceivers receive coded SMS e-mail commands, compile the requested data, and then send the data back to the host by establishing an internet connection to the host computer. The advantage of 'Direct Internet' mode over 'Asynchronous' mode is that 'Direct Internet' mode can have lower airtime costs; however, unlike answering the phone in 'Asynchronous' mode, 'Direct Internet' mode does not provide immediate connection feedback. Irrespective of the operating mode, each transceiver is assigned a unique 10 digit telephone number which is used by FTS software to request stored data or other information from the remote station.

Three models of the FTS Globalstar Transceivers are available: Fixed Site (FS), Quick Deploy (QD) and GS-4000. Fixed Site transceivers are housed in a standard FTS keyhole mounting, waterproof module and mount directly in an FTS cabinet. Normally the antenna mounts directly to the enclosure lid; however, to prevent snow from accumulating on the antenna, the antenna can be mounted on top of an optional extension post (see Figure 1).

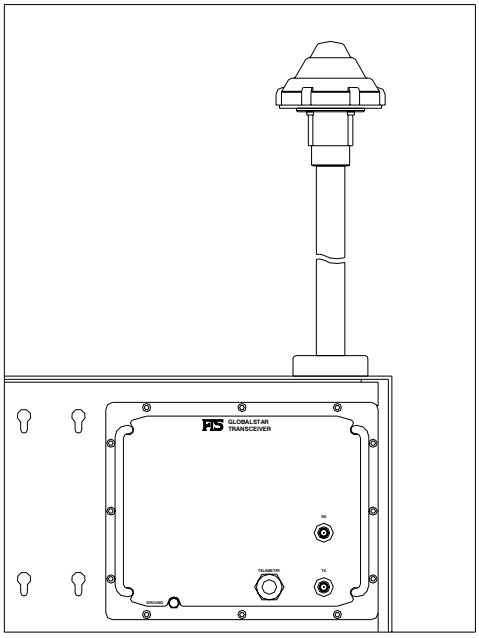


Figure 1. Fixed Site FTS Globalstar Transceiver
(shown with optional antenna extension)

Quick Deploy transceivers are designed for use in the FTS Quick Deploy Station. The transceiver is mounted directly in the QD station housing while the antenna is mounted directly to the top of the QD cabinet (see Figure 2).

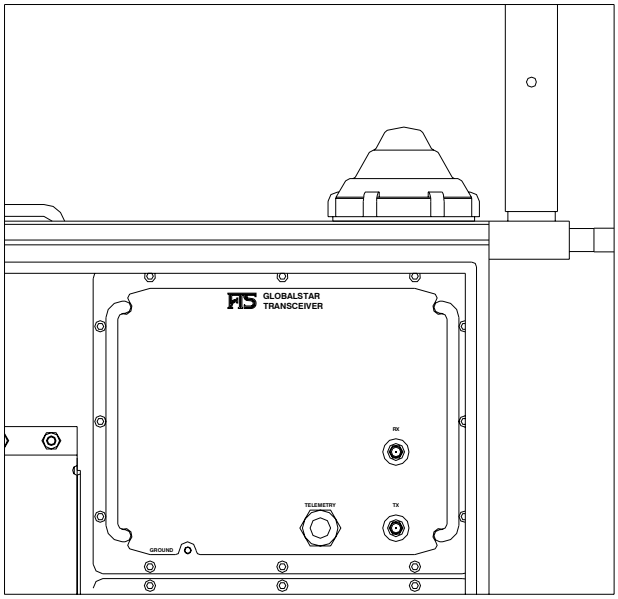


Figure 2. Quick Deploy FTS Globalstar Transceiver

GS-4000 transceivers are designed for use external to FTS weather stations. The transceiver is packaged in a rugged aluminum weatherproof housing with an integrated Globalstar antenna and can be pole mounted, external to weather station cabinets, as shown in Figure 3.

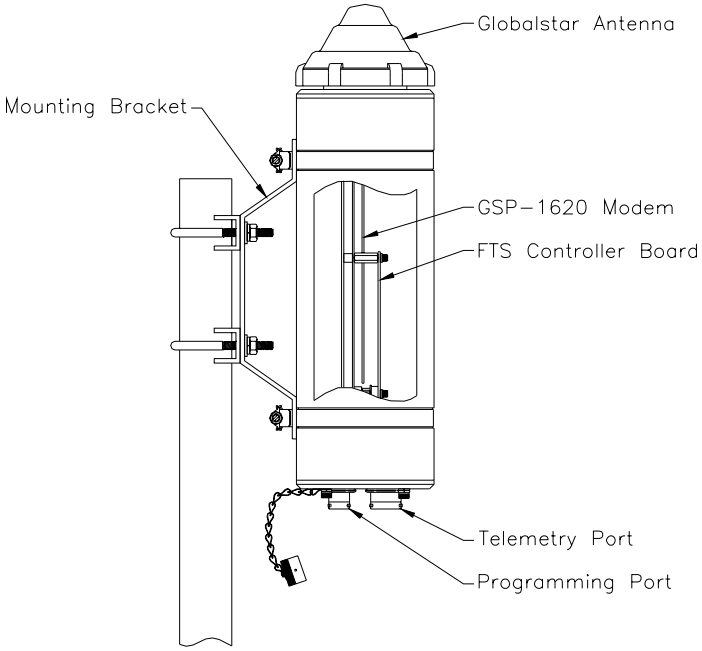


Figure 3. GS-4000 FTS Globalstar Transceiver

FTS Globalstar Transceiver electronics consists of a Qualcomm GSP-1620 modem and a custom designed FTS GS1 Control Board. Figure 4 illustrates the relationship between the GS1 Control Board and the Qualcomm GSP-1620 modem.

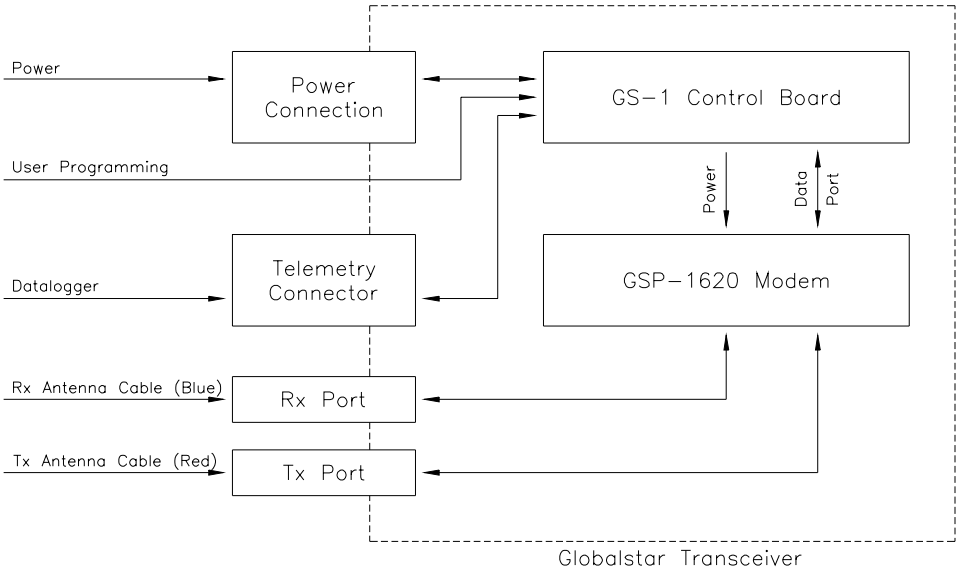


Figure 4. FTS Globalstar Transceiver Topology

The GS1 Control Board is used for power distribution as well as modem initialization and control. Upon power-up, and at programmed intervals, the GS1 Control Board initializes the GSP-1620 modem and then continually monitors the modem for proper operation. All GS1 parameters (including modem initialization strings) are configured through the User Programming Port (operator port P5 on the printed circuit board) and are stored in the control board's non-volatile memory.

As previously mentioned, the GS1 Control Board seamlessly operates in Globalstar 'Asynchronous' and 'Direct Internet' mode. The GS1 switches to 'Direct Internet' mode when the GS1 detects an SMS message has been sent to the transceiver. When in "Direct Internet' mode the GS1 performs the following series of tasks:

- the GS1 interprets the coded SMS e-mail command received by the GSP-1620 modem,
- the GS1 collects the requested information from the data logger,
- the GS1 establishes an internet connection to the requesting host,
- the GS1 sends the host the requested data in UDP packets and terminates the connection.

The GS1 switches to 'Asynchronous' mode when the GS1 detects a ring signal from the GSP-1620 modem. When in 'Asynchronous' mode, the GS1 merely relays RS-232 signals between the GSP-1620 and the data logger without interpreting the information.

UNPACKING

The following is what you should have received:

Fixed Site Globalstar Transceiver

1.	Globalstar Satellite Transceiver.	FTS Part Number: GLOBALSTAR
2.	Globalstar Modem Operating Manual.	FTS Part Number: 700-GLOBALSTAR
3.	Globalstar Antenna Extension Post (optional).	FTS Part Number: GLS-ANT-EXT
4.	Globalstar Programming Cable (optional).	FTS Part Number: CBL-GS1-OPER-PC

Quick Deploy Globalstar Transceiver

1.	Globalstar Satellite Transceiver for QD Station.	FTS Part Number: GLBSTAR-QD
2.	Globalstar Modem Operating Manual.	FTS Part Number: 700-GLOBALSTAR
3.	Globalstar Antenna Extension Post (optional).	FTS Part Number: GLS-ANT-EXT
4.	Globalstar Programming Cable (optional).	FTS Part Number: CBL-GS1-OPER-PC

GS-4000 Globalstar Transceiver

1.	GS-4000 Robust Globalstar Modem.	FTS Part Number: GS-4000
2.	GS-4000 Operating Manual.	FTS Part Number: 700-GLOBALSTAR
3.	GS-4000 Telemetry Cable for FTS data loggers.	FTS Part Number: CBL-GS4000-TLM
4.	GS-4000 Hardware Kit for Mast (optional).	FTS Part Number: GS-4000-MKIT
5.	GS-4000 Programming Cable (optional).	FTS Part Number: CBL-FWS-LDS-PC

INSTALLATION

General

When mounted, the Globalstar antenna must have a clear view of the sky so that there is a direct line of sight to the Globalstar satellites. The antenna's view of the sky should be unimpeded by tall obstacles such as buildings or trees that would cause signal degradation. It is important to note that the location of the Globalstar satellites cannot be predicted as the 48 low-earth-orbit Globalstar satellites follow different paths across the sky.

CAUTION: The Globalstar antenna must be installed in a configuration that ensures a minimum line-of-sight separation distance of 21 centimeters (8.5 inches) is maintained at all times between the antenna and any personnel.

If installing a Globalstar transceiver in a snowy location, provisions must be made to prevent snow build-up on the antenna as Globalstar frequencies are attenuated by wet snow and ice. To ensure proper system operation, wet snow or ice on the antenna must be restricted to a maximum thickness of 20 centimeters (8 inches).

To ensure compatibility between the Globalstar and GPS satellite systems, the Globalstar antenna must be mounted a minimum distance of 80 centimeters (30 inches) from a GPS antenna.

Fixed Site Transceiver

Perform the following steps to retrofit an existing Fixed Site Station with a Globalstar transceiver (see Figure 1):

Step 1. Remove power from the Fixed Site Station.

Step 2. Prepare the cabinet for the antenna or antenna extension arm. If the station has been ordered with a Globalstar transceiver the cabinet will be pre-drilled. For a retrofit, the mounting holes will need to be drilled. For Drilling dimensions contact FTS for drawing number 03-WP-ENCL-GS-1 (antenna extension arm) or 03-WP-ENCL-GS-2 (antenna only).

Step 3. Install the antenna assembly. Be sure that the surface for the antenna o-ring is clean and flat.

IMPORTANT – ensure that the blue RF cable is on the antenna RX port and the red RF cable is on the antenna TX port. These cables connect directly to the GSP-1620 modem and if the Rx and Tx ports are reversed the modem will be irreparably damaged.

Step 4. Install the transceiver in the upper right hand corner of the cabinet by engaging the shoulder bolts on the back of the transceiver in the keyholes in the back panel of the cabinet. Slide the transceiver down ½" (1cm) to lock it to the panel.

Step 5. Connect the antenna cables on the faceplate of the Globalstar transceiver. Again, ensure that the blue RF cable is on the RX port and the red RF cable is on the TX port.

Step 6. Connect the transceiver telemetry cable to the telemetry connector on the FTS data logger.

Step 7. If you have a Power Manager in the cabinet, plug the transceiver power connector into one of the 3 interruptible power connectors on the Power Manager front panel (continuous or switched power depending on the application).

Step 8. If you are not using a Power Manager, connect the supplied battery harness to the battery terminals directly: red to positive, black to negative, and plug the transceiver power connector into it.

Step 9. Reconnect power for the Fixed Site station.

Quick Deploy Transceiver

Normally the Quick Deploy Globalstar Transceiver and antenna are installed in a Quick Deploy station at the factory so no field installation is required during set up (see Figure 2). To retrofit an existing QD Station with a Globalstar transceiver, perform the following steps:

Step 1. Disconnect power for the QD station.

Step 2. Drill the top of QD Station Housing with antenna pattern and deburr the holes (contact FTS for drawing number 03-WP-ENCL-GS-3 for drilling dimensions).

Step 3. Install the antenna assembly. Be sure that the surface for the antenna o-ring is clean and flat.

IMPORTANT – ensure that the blue RF cable is on the antenna RX port and the red RF cable is on the antenna TX port. These cables connect directly to the GSP-1620 modem and if the Rx and Tx ports are reversed the modem will be irreparably damaged.

Step 4. In order for the antenna cables to reach the Globalstar transceiver, the transceiver must be mounted in the upper of the 3 module openings of the inner electrical housing. Ensure the transceiver faceplate gasket is in place and then connect the topmost power harness to P10 (continuous power) or P11 (switched power) on the transceiver GS1 board.

Step 5. Check that the gasket is properly installed and then secure the transceiver to the housing with 12 socket cap 10-32 screws.

Step 6. Connect the antenna cables on the faceplate of the Globalstar transceiver. Again, ensure that the blue RF cable is on the RX port and the red RF cable is on the TX port.

Step 7. Connect the transceiver telemetry cable to the data logger telemetry connector.

Step 8. Reconnect power for the QD station.

GS-4000 Transceiver

Perform the following steps to connect a GS-4000 to an FTS Data logger.

Step 1. Mount the GS-4000 to a mast or pole so that the general installation requirements are met.

Step 2. Connect the GS-4000 telemetry cable to the telemetry connector on the FTS data logger. Note that for an FWS-12S data logger, the telemetry port must be set to FTS Telemetry mode.

Step 3. Connect the power connections of the GS-4000 telemetry cable directly to the battery terminals (red to positive, black to negative).

CONNECTIONS

POWER

Fixed Site Transceiver Power Connector

Power is applied on the power cable protruding through the front panel. Depending on the sites configuration, this cable may be connected to an FTS power manager or directly to battery terminals.

Quick Deploy Transceiver Power Connector

Power is supplied by the QD station wire harness. The harness connector is connected to the GS1 Control Board on either P10 (for continuous power) or P11 (for switched power).

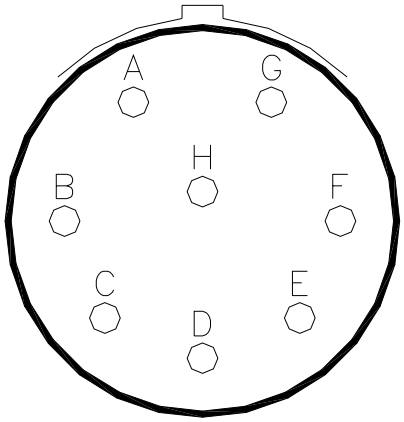
GS-4000 Transceiver Power Connection

Power is applied on the GS-4000 Telemetery cable. For most sites, the GS-4000 telemetry cable power connections attached directly to the battery terminals.

TELEMETRY

Fixed Site and Quick Deploy Transceiver Telemetry Connector

The Telemetry Connector is an 8 pin, female, military bayonet style connector which provides an RS-232 interface to the Globalstar Transceiver for the FTS data logger. Power for the data logger is also available on the Telemetry connector. The transceiver is configured as the Data Communications Equipment (DCE) while the connecting device is assumed to be the Data Terminal Equipment (DTE). The baud rate for the Telemetry Port is factory set at 9600 bps; however, the baud rate is user configurable through the Programming Port. Telemetry connections are given in Figure 5.

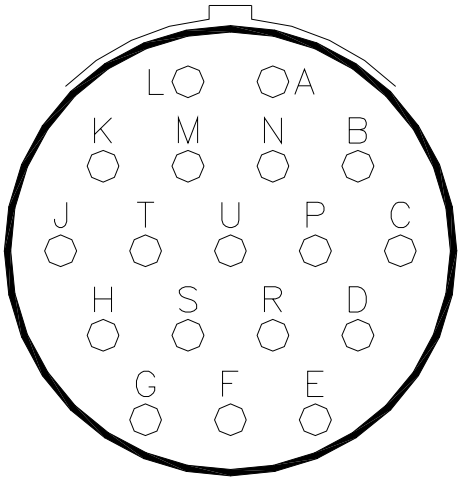


A	**CTS**
B	**CHASSIS GND**
C	**RxD** (data from transceiver)
D	**TxD** (data to transceiver)
E	**RTS**
F	**GROUND**
G	**POWER (**to data logger)
H	no connect

Figure 5. Fixed Site and Quick Deploy Transceiver Telemetry Connector

GS-4000 Transceiver Telemetry Connector

The Telemetry Port on the GS-4000 provides an RS-232 interface to the GSP-1620 modem and power for the GS-4000 through an 18 pin, male, military bayonet style connector. FTS GS-4000 telemetry cable CBL-GS4000-TLM can be used to connect the GS-4000 to an FTS data logger. The GS-4000 Telemetry Port is configured as the Data Communications Equipment (DCE) while the connecting data logger is assumed to be the Data Terminal Equipment (DTE). The baud rate for the GS-4000 Telemetry Port is factory set at 9600 bps; however, the baud rate is user configurable through the GS-4000 Programming Port. GS-4000 Telemetry Port connections are given in Figure 6.



A	SHIELD
B	TxD
C	RxD
D	RTS
E	CTS
F	DSR
G	GROUND
H	DTR
J	DCD
K	RI
L	POWER
M	*not used*
N	GROUND
P	*not used*
U	*not used*
T	no connect
R	*not used*
S	*not used*

Figure 6. GS-4000 Transceiver Telemetry Port Connections

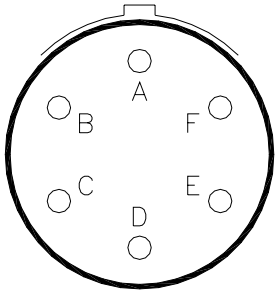
PROGRAMMING

Fixed Site and Quick Deploy Transceiver Programming Port (internal connection only)

Fixed Site and Quick Deploy transceivers are configured via an internal programming port. The programming port provides an RS-232 interface (9600 bps, no parity, 8 data bits, 1 stop bit and no flow control) to the GS1 Control Board. FTS cable CBL-GS1-OPER-PC can be used to connect GS1 Control Board connector P5 to a standard pc COM port. GS1 commands are detailed later in this document.

GS-4000 Transceiver Programming Port

The GS-4000 Programming Port is used exclusively to monitor and configure the GS-4000. The Programming Port provides an RS-232 interface (9600 bps, no parity, 8 data bits, 1 stop bit and no flow control) to the Control Board through a 6 pin, female, military bayonet style connector. FTS cable CBL-FWS-LDS-PC can be used to connect the GS-4000 to a standard pc COM port. GS-4000 commands are detailed later in this document. Programming Port connections are given in Figure 7.



A	TxD from GS-4000
B	SIGNAL GROUND
C	SHIELD
F	RxD to GS-4000

(1) pins not shown are not used

Figure 7. GS-4000 Transceiver Programming Port Connections

ANTENNA

Fixed Site and Quick Deploy Transceiver Antenna Ports

The Globalstar Transceiver front panel receive (Rx) and transmit (Tx) ports connect directly to the RX and Tx ports on the Globalstar antenna. Antenna cable length is limited by the maximum allowable signal loss of 0.6 dB @ 1.6 GHz for transmit and 3.0 dB @ 2.5 GHz for receive. The Rx and Tx cables connect directly to the GSP-1620 modem Rx and Tx ports. **IMPORTANT!** - If the connections are reversed the modem may be irreparably damaged. The cables are colour coded to help avoid incorrect connections. Ensure that the blue RF cable is on the antenna RX port and the red RF cable is on the antenna TX port.

CAUTION: The Globalstar antenna connections must not be reversed. Ensure that the blue RF cable is on the antenna RX port and the red RF cable is on the antenna TX port.

GS-4000 Transceiver Antenna Ports

GS-4000 antenna connections are internal to the transceiver; consequently, the GS-4000 antenna connections should not need to be altered. In the event the Globalstar antenna needs to be serviced, follow the same precautions as for Fixed Site and Quick Deploy transceivers when making the connections.

OPERATION

When power is first applied to the Globalstar Transceiver a power-up sequence is performed. Operation after the power-up sequence has completed is determined by the GS1 configuration parameters. The transceiver power-up sequence is given below in Figure 8.

STEP	RESULT
1	Simultaneously the control board processor and the GSP-1620 processor boot-up.
2	Control board waits for the GSP-1620 to acquire the Globalstar satellite signals.
3	Control board initializes the GSP-1620 with the user defined AT command strings after the specified 'Initialization Delay'.
4	60 seconds after power-up, the Control board will synchronize to the Globalstar network time.
5	Control Board will periodically reinitialize/reset/power cycle the GSP-1620 based on the GS1 parameter settings.

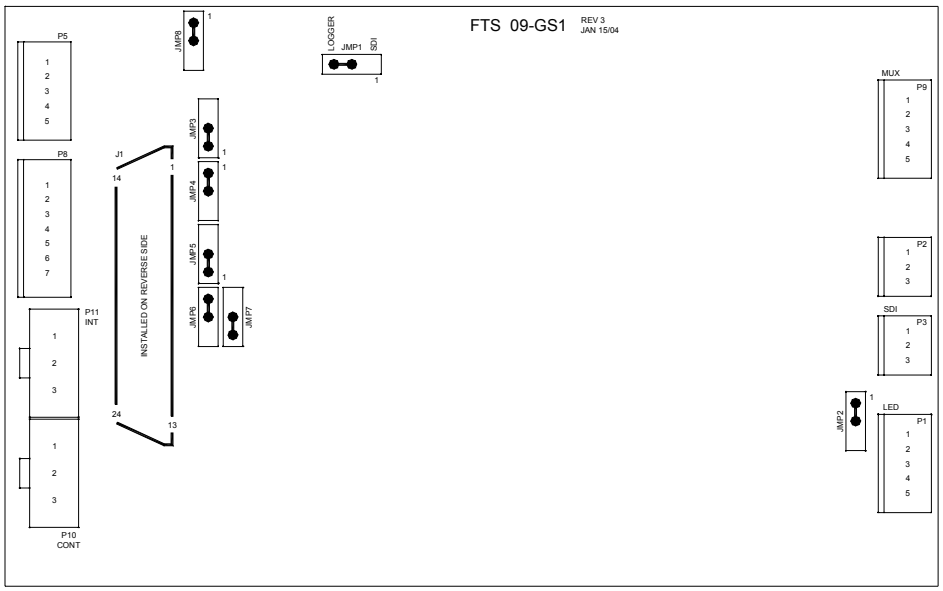
Figure 8. Globalstar Transceiver Power-Up Sequence

MAINTENANCE

The only field maintenance required by the Globalstar transceiver is a periodic check of the power and telemetry connector cables for deterioration and excess snow removal from the antenna. Please contact FTS technical support if the unit ceases to operate properly.

CONTROL BOARD CONFIGURATION

Various jumpers on the GS1 Control Board are used to determine the overall operation of the Globalstar Transceiver. All circuit board jumpers, jumper functions and factory default positions are shown below in Figure 9.



Default Jumper Position

JMP1	Interface Selection		JMP5	Modem DSR Select
pin 1 to pin 2	SDI interface		pin 1 to pin 2	Modem Data Port <***default***>
pin 2 to pin 3	RS-232 interface <***default***>		pin 2 to pin 3	Modem Control Port
JMP2	**SDI Operation**		**JMP6**	**Modem DTR Select**
pin 1 to pin 2	Normal Operation <***default***>		pin 1 to pin 2	Modem Data Port <***default***>
pin 2 to pin 3	Test Mode		pin 2 to pin 3	Modem Control Port
JMP3	**Modem TxD Select**		**JMP7**	**Modem DTR Enable**
pin 1 to pin 2	Modem Data Port <***default***>		pin 1 to pin 2	CPU controlled
pin 2 to pin 3	Modem Control Port		pin 2 to pin 3	Always enabled <***default***>
JMP4	**Modem RxD Select**		**JMP8**	**RS-232 Handshaking**
pin 1 to pin 2	Modem Data Port <***default***>		pin 1 to pin 2	Normal Operation <***default***>
pin 2 to pin 3	Modem Control Port		pin 2 to pin 3	RTS jumpers to CTS

Figure 9. GS1 Control Board Jumper Settings

COMMANDS

General
Commands for configuring the GS1 are issued on the Programming Port with communications software such as HyperTerminal. Communication port settings of 9600 bps, no parity, 8 data bits, 1 stop bit with no flow control are required.

Configuration data is entered on a simple command line basis with basic editing (backspace only). The maximum line length is 40 characters, all characters beyond that will be ignored and all lines must end in <CR>.

Normally the ">" prompt will be displayed; however, if the Switching Interval parameter is not 00:00:00 and the optional Multiplexer Board is installed, then the prompt will display "A>" or "B>" depending on which RS-232 port is currently selected.

A command without anything following will display the current value of that parameter on the next line.

Example:

>1<enter>
ATZ
>

A command with an equals sign following will set the value of that parameter.

Example:

>ID=10<enter>
>

IMPORTANT: Changed values are not permanently saved in the Control Board's eeprom until the 'save' command is issued. When a value is changed, the current working value is updated, but the eeprom copy is not. This allows multiple changes without the delays involved in updating the eeprom each time. Current working values can be viewed with the 'everything' command.

Timekeeping
The GS1 sets its time from the UTC referenced Globalstar system time. Users may account for their local time zone by correctly setting the Time Zone Offset parameter.

Interval and Offset Parameters

This paragraph applies for the following parameter pairs: Initialization Interval & Initialization Offset; Reset Interval & Reset Offset; Power Cycle Interval & Power Cycle Offset; and Switch Interval & Switch Offset. When the Interval parameter of the parameter pair is set to 00:00:00, the function of the parameter pair is disabled (i.e. If Reset Interval is set to 00:00:00, the modem will not be periodically reset). Intervals and offsets are performed on a daily basis with the cycle always starting at 00:00:00 (midnight).

Example: If the Switch Offset is 06:15:00 and the Switch Interval is 8 hours (08:00:00), then the following are the switch times:

- Channel A from 00:00:00 to 06:15:00
- Channel B from 06:15:00 to 14:15:00
- Channel A from 14:15:00 to 22:15:00
- Channel B from 22:15:00 to midnight

The default values for the Interval and Offset (Initialization, Reset and Power Cycle) parameters mean that the GSP-1620 modem is: power cycled daily at midnight; reset daily at 11:30 am; and also reinitialized daily at 5:30 am and 5:30 pm. Power cycle events take precedence over reset events

which take precedence over initialization events. If an initialization event and a power cycle event are scheduled for the same time, only the power cycle event will occur as the modem is reinitialized as part of the power cycle event. In addition to these parameters, the GS1 software periodically (Negotiation Interval of 15 minutes) queries the GSP-1620 modem with an AT command for an appropriate response. If no response or an incorrect response is observed, then the GS1 will reset the GSP-1620 modem independent of the reset parameters. Also the control board continually monitors the modem DSR line for a reset condition and if a modem reset is detected, the control board will reinitialize the modem.

Switch Interval and Switch Offset parameters only become relevant (as indicated by the A> or B> prompt) when an optional multiplexer board is installed. Switch Interval and Offset operate independently from the Initialization, Reset and Power Cycle parameters.

COMMAND DESCRIPTION

A description for the each GS1 command is given below. Commands are not case sensitive. The shortest acceptable form of each command is listed for each parameter.

~~MODE~~ (OBSOLETE)
Command: m
Default Value: n/a – (factory set: application dependent)
Range: n/a 0 for 'Direct Internet' mode or 1 for 'Asynchronous' mode

The mode command shows the operating mode for the GS1 Control Board. When Mode is set to '1', the Control Board is placed in 'Asynchronous' mode. In 'Asynchronous' mode, signals on the Device Port are mimicked on the GSP-1620 port and vice-versa. Also, the Control Board DOES NOT buffer or interpret any of the communications between the connected device and the GSP-1620 modem. When Mode is set to '0', the Control Board is placed in 'Direct Internet' mode. 'Direct Internet' mode is only used when connected to an FTS data logger. In 'Direct Internet' mode, the Control board waits to receive an FTS format SMS message trigger from the GSP-1620. After the SMS message is received and the requested action is performed (ie: get current conditions), the Control Board will connect to the internet through the GSP-1620 (#777 command) to send back the requested information.

TIME ZONE OFFSET
Command: zo
Default Value: 00:00:00
Range: -24:00:00 to +24:00:00

This offset is added to the Globalstar system time (UTC) to set the GS1 time.

TIME
Command: t
Default Value: n/a
Range: 2000/01/01 00:00:00 to 2135/12/12 23:59:59

Set/get the time. When the unit is first powered-up, the GS1 time is set to 2000/01/01 00:00:00. In order to set the time, all time fields must be present in the correct format (example: 2003/08/21 10:45:00). When the Globalstar system time (UTC based) becomes available, the GS1 will override its existing time setting with the Globalstar system time modified by the Time Zone Offset parameter. After power-up or a Power Cycle command the GS1 will resynchronize its time to that of the Globalstar system.

NUMBER
Command: **n**
Default Value: **n/a**
Range: **n/a**

Returns the phone number of the GS1. This command does not allow the phone number to be changed.

VERSION
Command: **v**
Default Value: **n/a**
Range: **n/a**
Show the firmware version and serial number of the unit.

STATUS
Command: **st**
Default Value: **n/a**
Range: **n/a**

Issues an AT$QCSTATUS command to the Globalstar and reports the response directly without interpretation. This command allows the user to verify that a satellite connection is available.

AT
Command: **AT…**
Default Value: **n/a**
Range: **n/a**
Any command starting with "AT" is immediately passed directly to the GSP-1620 modem and the modem response is returned on the Program Port. If the modem is in low power mode, there may be a significant delay before a response occurs.

Example 1: AT$QCTOD=1 will return the Globalstar system time and date (UTC). This time may be different from the GS1 time.

> AT$QCTOD=1<enter>

02 01 2004 18:12:57

Example 2: AT+GSN will return the GSP-1620 modem's ESN number in hexadecimal.

> AT+GSN<enter>
+GSN: 74024136

HELP
Command: **h** or **?**
Default Value: **n/a**
Range: **n/a**
Display list of user commands.

DOWNLOAD
Command: **do**
Default Value: **n/a**
Range: **n/a**

Block read of the GS1 parameters.

NEGOTIATION INTERVAL
Command: **ni**
Default Value: **00:15:00**
Range: **00:00:00 to 24:00:00**

This parameter is the time between GSP-1620 modem interrogations by the Control Board. If the modem response is incorrect, the modem will be reinitialized.

INITIALIZATION INTERVAL
Command: **ii**
Default Value: **12:00:00**
Range: **00:00:00 to 24:00:00**

This parameter is the time between GSP-1620 modem initialization attempts by the Control Board. Use 00:00:00 for no re-initializations after power-up.

INITIALIZATION OFFSET
Command: **io**
Default Value: **05:30:00**
Range: **00:00:00 to 24:00:00**

This parameter offsets the first modem initialization event from midnight.

RESET INTERVAL
Command: **ri**
Default Value: **24:00:00**
Range: **00:00:00 to 24:00:00**

This parameter is the time between modem reset events. Use 00:00:00 for no reset events.

RESET OFFSET
Command: **ro**
Default Value: **11:30:00**
Range: **00:00:00 to 24:00:00**

This parameter offsets the first modem reset event from midnight.

POWER CYCLE INTERVAL
Command: **pi**
Default Value: **24:00:00**
Range: **00:00:00 to 24:00:00**

This parameter is the time between modem power cycle events. Use 00:00:00 for no events.

POWER CYCLE OFFSET
Command: **po**
Default Value: **00:00:00**
Range: **00:00:00 to 24:00:00**

This parameter offsets the first modem power cycle event from midnight.

SAVE
Command: **s**
Default Value: **n/a**
Range: **n/a**

Write all the current parameter settings to eeprom. This also re-initializes the GSP-1620 modem. Any empty lines in the list of AT commands are removed.

GET AUDIT LOG
Command: al
Default Value: n/a
Range: n/a

Retrieves all Audit log entries from the GS1 Control Board. All Audit Log messages are date and time stamped. Audit log messages and their meaning are shown below.

- ~~Start-up: Direct internet mode: GS1 board was booted in 'Direct Internet' mode~~. (obsolete)
- ~~Start-up: Asynchronous mode: GS1 board was booted in 'Asynchronous' mode~~. (obsolete)
- Failed to send AT command: Incorrect modem response to GS1 AT command.
- Self reset: GS1 board detected that the GSP-1620 reset itself.
- Invalid SMS length: An SMS of invalid length was received and ignored.
- Invalid SMS request: An SMS with an invalid request number was received and ignored.
- Dialup Failed: No channel or busy signal when sending #777 to gateway.
- PPP Negotiation Failed: Failed to negotiate with Globalstar internet after sending #777.
- Failed to wakeup logger: No acknowledgment from data logger on wake up attempt.
- No ACK when request sent: After wake up, data logger does not acknowledge commands.
- No wakeup from Logger: After successful communications, data logger does not wake up.
- No Data Reply from Logger: After successful communications, data logger wakes up but does not send data.

CLEAR AUDIT LOG
Command: ac
Default Value: n/a
Range: n/a

Clears all Audit log entries from the GS1 Control Board.

GET CALL LOG
Command: cl
Default Value: n/a
Range: n/a

Retrieves all Call log entries from the GS1 Control Board. Call log example are listed below (T is the connection time in seconds and N is the number that called).

- 'Asynchronous' mode: 2004/04/07 08:37:06 T=28 N=
- 'Direct Internet' mode: 2004/04/07 08:41:24 T=3 N=#777

CLEAR CALL LOG
Command: cc
Default Value: n/a
Range: n/a

Clears all Call log entries from the GS1 Control Board.

EVERYTHING
Command: e
Default Value: n/a
Range: n/a

Show all the current settings of the Control Board parameters. These values may not be the same as the values in the Control Board's eeprom if the user has edited the parameters without issuing the SAVE command.

RESET
Command: **re**
Default Value: **n/a**
Range: **n/a**

The Control Board resets the GSP-1620 modem using the modem reset line, and then sends the initialization strings to the modem.

POWER CYCLE
Command: **pc**
Default Value: **n/a**
Range: **n/a**

The Control Board cycles the power to the GSP-1620 (power turned off for about 8 seconds and then turned on again), and then sends the initialization strings to the modem.

INITIALIZATION DELAY
Command: **id**
Default Value: **10**
Range: **0 to 255**

The number of seconds that must elapse after a power-up before the Control Board tries to first initialize the GSP-1620 modem.

SWITCH INTERVAL
Command: **si**
Default Value: **12:00:00**
Range: **00:00:00 to 23:59:59**

Used when the optional multiplexer board is installed. This parameter is the time between port switches from RS-232 port A to port B then port B to port A. If set to a value of 0:00:00, then no switching will occur and unit stays connected to channel A.

SWITCH OFFSET
Command: **so**
Default Value: **12:00:00**
Range: **00:00:00 to 23:59:59**
Used when the optional multiplexer board is installed. This parameter offsets the first RS-232 port A to port B switch interval from midnight.

FORCE PORT A
Command: **fa**
Default Value: **n/a**
Range: **n/a**

Force the multiplexer to channel A.

FORCE PORT B
Command: **fb**
Default Value: **n/a**
Range: **n/a**

Force the multiplexer to channel B.

AT COMMAND STRINGS

	DEFAULT VALUES
1	ATZ
2	ATE0
3	ATS0=1
4	ATX0
5	AT$QCSMSA=1
6	<*blank*>
7	<*blank*>
8	<*blank*>
9	<*blank*>
10	ATV0

~~AT COMMAND STRINGS~~ (OBSOLETE)

DEFAULT VALUES

	MODE = 0	MODE = 1
1	ATZ	ATZ
2	ATE0	ATE0
3	ATS0=0	ATS0=1
4	ATX0	ATX0
5	AT$QCSMSA=1	<*blank*>
6	<*blank*>	<*blank*>
7	<*blank*>	<*blank*>
8	<*blank*>	<*blank*>
9	<*blank*>	<*blank*>
10	ATV0	ATV0

Lines 1-9 are AT command string entry commands. Line 10 is hard coded and cannot be altered. The default values should not be changed. A command with an equals sign following will set the value of that parameter. The “save” command must be issued after changing any of the parameters in order to permanently save the new configuration.

Example:

```
>6=AT+IFC=0,0 <enter>          : sets AT Command String 6 to AT+IFC=0,0
>s <enter>                     : saves the new value to the GS1 eeprom.
Saving - please wait
Values saved
Initializing modem...
2005/04/20 14:01:02 - initializing modem - successful
>
```

ALL
Command: **a**
Default Value: **n/a**
Range: **n/a**

Show all the current AT strings that will be sent to the GSP-1620 modem on initialization.

DEFAULT
Command: **default, ~~d~~ (OBSOLETE)**
Default Value: **n/a**
Range: **n/a**

Clear all AT Command String settings and set the strings to their default value as determined by the MODE bit.

ICLEAR
Command: **iclear**
Default Value: **n/a**
Range: **n/a**

Clear all AT settings so nothing is sent to the GSP-1620 (deletes fields 1-9).

~~CLEAR~~ (OBSOLETE)
Command: **c**
Default Value: **n/a**
Range: **n/a**

Clear all AT settings so nothing is sent to the GSP-1620 (deletes fields 1-9).

QUIT
Command: **q**
Default Value: **n/a**
Range: **n/a**

Place the GS1 Control Board into low power mode. The GS1 will automatically wake-up when a call is received or when a carriage return is received on the programming port.

DATALOGGER CONFIGURATION

The FTS Globalstar Transceiver is capable of operating with most FWS-11, FWS-12 and FWS-12S Data loggers. Configuration information for each data logger is given below.

FWS-12S DATALOGGER

Display Port Configuration for Transceiver 'Asynchronous' or 'Direct Internet' Mode

No configuration is required as the FWS-12S Display port is set for FTS Telemetry mode.

Telemetry Port Configuration for Transceiver 'Asynchronous' or 'Direct Internet' Mode

Step 1. Using cable CBL-FWS-LDS-PC, connect your FWS12S to your computer's com port.
Step 2. Run TOOLBOX application
Step 3. Select **Local Station** and **Logger Type** of FWS12S
Step 4. From the pull down the **Data_Logger** menu select **Set FTS Telemetry**
Step 5. Click OK on the "Set the Telemetry to type: FTS, are you sure?" dialog box.
Step 6. Disconnect the CBL-FWS-LDS-PC cable.

FWS-12 DATALOGGER

Telemetry Port Configuration for Transceiver 'Asynchronous' or 'Direct Internet' Mode

No configuration is required as the FWS-12 Telemetry port is set for FTS Telemetry mode.

FWS-11 DATALOGGER

Display Port Configuration for Transceiver 'Asynchronous' or 'Direct Internet' Mode

Display Port cannot be used for communication in either mode.

Telemetry Port Configuration for Transceiver 'Asynchronous' or 'Direct Internet' Mode

No configuration is required as the FWS-11 Telemetry port is set for FTS Telemetry mode.

FTS SOFTWARE CONFIGURATION

The following software configuration instructions assume that the data logger has been correctly configured as per the previous sections instructions and that the Globalstar transceiver GS1 Control Board has been programmed to the desired operating mode ('Asynchronous' or 'Direct Internet').

FIRE WEATHER PLUS 2000

FIRE WEATHER plus 2000 must be version 4.17 or greater.

FIRE WEATHER plus 2000 Configuration for Globalstar 'Asynchronous' Mode

To make an 'Asynchronous' call to the site using FTS FIRE WEATHER plus 2000 software, perform the following station set-up steps:

a) start the FIRE WEATHER plus 2000 software.

b) create or modify the desired station from the Station Management pull down menu.

c) select FTS Communications as the communications method.

d) select TM Ultra as the telephone modem.

e) enter the Globalstar unit's 11 digit phone number into the phone number box (enter only 7 digits if long distance dialing is not required).

The station can now be called as if it is a telephone modem site.

FIRE WEATHER plus 2000 Configuration for Globalstar 'Direct Internet' Mode

To make a 'Direct Internet' call to the site using FTS FIRE WEATHER plus 2000 software, perform the following station set-up steps:

a) start the FIRE WEATHER plus 2000 software.

b) create or modify the desired station from the Station Management pull down menu.

c) select GSNet Direct Internet as the communications method.

d) enter the Globalstar unit's area code and telephone number.

e) set the GSNet host information by entering the IP address, port number and working folder of the computer running the GSNet application. This information can be entered specifically for each station or globally in the GSNet Preferences pull-down menu.

f) ensure that GSNet is set-up and running on the required computer otherwise FIRE WEATHER plus 2000 will not be able to send SMS e-mail messages or receive internet data from the remote stations.

The station can now be contacted with SMS email messages to have the requested data returned to the host via and internet connection.

TOOLBOX

Toolbox must be version 2.14 or greater.

Toolbox Configuration for Globalstar 'Asynchronous' Mode

To make an 'Asynchronous' call to the site using FTS Toolbox software, perform the following station set-up steps:

f) start the Toolbox software.

g) select or add the desired station.

h) select FTS Communications as the communications method.

i) select FTS GS4000 as the modem.

j) enter the Globalstar unit's 11 digit phone number into the phone number box (enter only 7 digits if long distance dialing is not required).

The station can now be called as if it is a telephone modem site.

Toolbox Configuration for Globalstar 'Direct Internet' Mode

To make a 'Direct Internet' call to the site using FTS Toolbox software, perform the following station set-up steps:

g) start the Toolbox software.

h) select or add the desired station.

i) select GSNet Direct Internet as the communications method.

j) enter the Globalstar unit's area code and telephone number.

k) set the GSNet host information by entering the IP address, port number and working folder of the computer running the GSNet application. In Toolbox, this information can be entered specifically for each station or globally in the GSNet Preferences pull-down menu.

l) ensure that GSNet is set-up and running on the required computer otherwise Toolbox will not be able to send SMS e-mail messages or receive internet data from the remote stations.

The station can now be contacted with SMS email messages to have the requested data returned to the host via and internet connection.

GSNET

GSNet must be version 1.8 or greater.

GSNet Configuration for Globalstar 'Asynchronous' Mode

GSNet is not required when calling the stations using Globalstar 'Asynchronous' mode.

GSNet Configuration for Globalstar 'Direct Internet' Mode

To make a 'Direct Internet' call to the site, GSNet must be running on a computer with a static IP (if a router is used, the computers port number must be open). Perform the following steps to configure GSNet:

a) start the GSNet software.

b) choose the Setup > Modify Settings pull down selection and enter the required information as follows:

IP Address:	Company IP address
Port Number:	Port number used by GSNet (this port must allow incoming UDP data packets)
Mail Server:	Company e-mail server
SMS Server Address:	Globalstar SMS e-mail server address (default: msg.globalstar.ca)
Local Mailbox:	return mailbox address
Max Connect Wait:	maximum time to wait for first packet response (default: 180)
Max No Activity Wait:	maximum time to wait between packets (default: 200)
Max Resend Wait:	maximum time to wait before resending a packet (default: 8)

Begin Strobe Non-Activity Time:

maximum wait time during periods of inactivity (e.g. the data logger retrieving a large amount of data) before sending a random strobe packet to keep the Globalstar connection active (default: 45)

TROUBLESHOOTING TIPS

ON SITE

- Check that the battery voltage at the remote station is above 10 V during a connection. If the battery voltage droops during a transmission the connection may be lost.
- Check that the modem has power and look for loose or swapped RX and TX antenna connections.
- Make sure the antenna has a clear view of the sky and hasn't accumulated debris or excessive snow.
- Connect a PC running HyperTerminal set for 9600 BPS, no parity, 8 data bits and 1 stop bit to the transceiver programming port. For the GS-4000 use a CBL-FWS-LDS-PC cable. For Fixed Site and Quick Deploy transceivers use a CBL-GS1-OPER-PC cable to connect to P5 on the GS1 Control Board (these transceivers will need to be opened for access to the GS1 control board).
  - Provide power to the transceiver and watch for the message:

    >GSx boot code version: 4.1

    GS1 restarting...
    Detecting logger…
    2000/01/01 00:00:10 - GS1 restarting - successful
    Wait for modem initialization...
    Initializing modem...
    2000/01/01 00:00:20 - initializing modem – successful
    >GS1 entering sleep mode, press <enter> to wake-up

  - Wake-up the transceiver and type the status command (st<enter>) to view the Globalstar system status. An example response is shown below:

    SERVICE AVAILABLE: YES
    SERVICE MODE: GLOBALSTAR
    PROVIDER: GSTAR CA
    GATEWAY: 11
    RSSI: 4
    REGISTRATION: YES
    ROAMING: NO
    CALL STATE: IDLE
    CALL TYPE:
    CALL DURATION: 0
    NUMBER:

    The received signal strength indicator (RSSI) should be stable with a reading of 3 or 4. If the RSSI is low, check for antenna obstructions and loose or damaged antenna cables. If RSSI is 0, check for swapped RX/TX antenna connections as well. If the RSSI is changing from high values to low values on subsequent status commands the modem may not be registered with a visible service provider. This will also be indicated by SERVICE AVAILABLE: NO and REGISTRATION: NO check with Globalstar technical support to ensure the modem has been properly activated.

  - Confirm the GS1 settings for the AT Initialization Strings. The settings should be the same as the default settings listed earlier in this manual.
  - Monitor the programming port while a call is attempted to determine if the Asynchronous call or SMS message is received and if the data is collected and correctly returned.

SPECIFICATIONS

FTS GLOBALSTAR TRANSCEIVER

Power Supply Voltage Range	8 Vdc to 20 Vdc (nominally 12 Vdc)
Current Consumption (typical) Standby Transmit	 45mA @ 12 Vdc input 500mA @ 12 Vdc input
Data Rate	9600 bps via Globalstar satellite constellation 300 bps to 115.2 kbps via RS-232 Telemetry Port
Operating Frequencies	Transmit: 1610-1625 MHz Receive: 2484-2499 MHz
Maximum Transmit Power	+26 dBm EIRP (0.4 W)
Operating Temperature	-30 to +60 C
Storage Temperature	-40 to +85 C
Size	Fixed Site: FTS custom 5 unit casting Quick Deploy: n/a (part of QD station) GS-4000: cylinder: 10 cm (4”) outer diameter, 36 cm (14”) length with antenna
Weight	Fixed Site: 2.8 kgs (6.2 lbs) w/o antenna Quick Deploy: n/a (part of QD station) GS-4000: 2.7 kgs (6 lbs)