EXPLORER 122
User manual

COBHAM

Document Number: 98-150578-A

Release Date: July 15 2016

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Compliance Statement (Part 15.19)
The enclosed hardware device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received including interference that may cause undesired operation of the device.

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This Class B digital apparatus complies with Canadian ICES-003, RSS-Gen and RSS-210.
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Warnings, Cautions, and Notes

Text marked with "Warning", "Caution" or "Note" show the following type of data:

⚠️ *WARNING*: A Warning is an operation or maintenance procedure that, if not obeyed, can cause injury or death.

⚠️ *CAUTION*: A Caution is an operation or maintenance procedure that, if not obeyed, can cause damage to the equipment.

▶ Note *NOTE*: A Note gives information to help the reader.

General Safety Precautions

General safety precautions are as follows:

⚠️ *WARNING*: There are no user-serviceable parts inside the terminal. The terminal should only be opened by a technician that is trained and certified to service the EXPLORER 122 Terminal.

⚠️ *WARNING*: This device emits radio frequency (RF) energy when in transmit mode. In order to comply with FCC RF Exposure limits, the unit must be installed in such a way as to ensure that a minimum separation distance of 44 cm (18 inches) is maintained between the antenna and any nearby persons.

About this Manual

This manual contains information about the EXPLORER 122 Mobile Terminal, including installation procedures, webpage operations, and troubleshooting procedures.

Supporting Documentation

The following list provides documentation associated with this user manual.

Product number	Title
98-150579-A	EXPLORER 122 Terminal Quick Start Guide
1216662	ViaSat MSS Terminal AT Command Interface

Additional information may be found on the Cobham website, located at: http://www.cobham.com/satcom, select Service and Support > Cobham SATCOM Service and Support > 24-7 Self Service Center / Technical Downloads.

Acronyms

Acronyms and Definitions	
- A -	ADC................................Analog-Digital Conversion AES.................................Advanced Encryption Standard ANSI..............................American National Standards Institute
- B -	BIT..................................Built-in Self Tests
- D -	DHCP.............................Dynamic Host Configuration Protocol
- H -	EIA.................................Electronic Industries Alliance EIRP...............................Effective Isotropic Radiated Power
- E -	Es/No.............................Energy Symbol/Noise
- F -	FDD................................Full Duplex Mode FIPS...............................Federal Information Processing Standard FL....................................Forward Link FPGA..............................Field Programmable Gate Array FTP.................................File Transfer Protocol
- G -	GB...................................Gigabyte GLONASS......................GLObal NAvigational Satellite System GNSS..............................Global Navigational Satellite System GPS.................................Global Positioning System
- H -	HTTP..............................Hypertext Transfer Protocol HW..................................Hardware
- I -	IE.....................................Internet Explorer IEEE................................Institute of Electrical and Electronics Engineers IF.....................................Intermediate Frequency IP.....................................Internet Protocol IP66................................Ingress Protection
- L -	LAN.................................Local Area Network (Ethernet) LHCP..............................Left-Hand Circular Polarization LOS.................................Line of Sight

Acronyms and Definitions		
- M -	M2M	Machine-to-Machine
	MAC	Media Access Control
	Mbps	Megabits per second
	MMI	Multi-Media Interface
	MSS	Mobile Satellite Services
- N -	NAT	Network Address Translator
- O -	OSD	Over-The-Air Software Download
	OTA	Over-The-Air
- P -	PC	Personal Computer
	PLL	Phase Locked Loop
	POST	Power On Self-Tests
- R -	RF	Radio Frequency
	RHCP	Right-Hand Circular Polarization
	RX	Receive
- S -	SCADA	Supervisory Control and Data acquisition
	SSID	Service Set Identifier
- T -	TCP	Transmission Control Protocol
	TIA	Transmission Industry Association
	TX	Transmit
- U -	UDP	User Datagram Protocol
	URL	Uniform Resource Identifier
	UV	Ultra Violet
- V -	VDC	Voltage Direct Current
- W -	WLAN	Wireless Local Area Network

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1 Introduction

1.1 Introduction to the EXPLORER 122 Terminal

The EXPLORER 122 is the smallest auto tracking terminal in the EXPLORER range of satellite terminals. It is a compact communications-on-the-move satellite terminal offering highly reliable real-time IP data connectivity, and the possibility of using EXPLORER Push-to-Talk and GPS tracking services across the coverage area.

Whether you're engaged in emergency response, humanitarian operations, fleet management or transportation, EXPLORER 122 is an easy deployable communication system you can always rely on. Simply place the antenna on the roof of your vehicle and get access to the Internet instantly.

The EXPLORER 122 Terminal uses ViaSat's L-band Mobile Satellite Service (MSS), which offer 99.9% network availability. MSS provides encrypted connections with latencies below 800 milliseconds, and uses the high-performance Ligado satellite that covers North America.

The EXPLORER 122 two-way networking capability enables both real-time monitoring and real-time control for a wide range of applications such as emergency first responders, homeland security forces, disaster aid workers, correspondents, etc.

Figure 1-1. EXPLORER 122 Terminal

The EXPLORER 122 Terminal interfaces seamlessly with EXPLORER Push-to-Talk to provide users with reliable and cost-effective communication using least-cost routing between terrestrial networks and satellites. AES-256 data link layer encryption is employed to ensure the integrity of your data is not compromised.

Rugged IP66 dust and powerful water jet-resistant enclosure ensures reliable communications in the toughest environments.

The guidelines below provide an overview of the terminal's capabilities and basic operation. For detailed configurations, please contact your EXPLORER 122 retailer, or the Cobham customer support listed at the back of this manual.

1.2 Features of the EXPLORER 122 Terminal

Key Features of the EXPLORER 122 terminal include:

- IP-based networking
- Wired Ethernet and wireless LAN Interfaces
- Built-in DHCP/NAT router
- Full-duplex connectivity
- Low-latency for instant text message transfer and real-time monitoring with no delays
- Embedded commercial GPS
- IP66
- 10-30 VDC Input
- Built-in Web MMI
- AES-256 Encryption

1.3 EXPLORER 122 Standard Equipment and Optional Accessories

1.3.1 Standard Equipment

The EXPLORER 122 features the following standard accessories:

- EXPLORER 122 Terminal
- Connector Mating Kit

1.3.2 Optional Accessories

The EXPLORER 122 offers the following optional accessories:

- Magnetic Mounting Kit
- EXPLORER Push-to-Talk Connection Box
- Pre-Fabricated Over-molded cable

1.4 Key Specifications

The key specifications for the EXPLORER 122 Terminal are summarized in Table **1-1** below.

Category	Specification
Size:	250 x 146 x 62 (LxWxH mm.)
Weight	< 2 Kg
Power Consumption	48 W max
Antenna Receive G/T	-21.0 dB/K at Zenith
Antenna Transmit EIRP	Up to +8 dBW at Zenith, configurable in 0.1 dB steps
Frequency Range	L-band RX: 1525.0-1559.0 MHz TX: 1626.5-1660.5 MHz
Modulation	RX: BPSK, QPSK, 8-PSK and 16-APSK TX: CRMA
Waterproof/Dustproof	IP 66
Humidity	up to 95% condensing at 45°C, per IEC 60068-2-30
Temperature - Operating	-20°C to +55°C
Temperature - Storage	-40°C to + 85°C
Solar Radiation	1120 W/m^2; per IEC-60068-2-5
Vibration (Operational)	Random vibration of 1.05g rms at vibration spectrum: 5 to 20 Hz: 0.02g^2/Hz 20 to 150 Hz: -3dB/octave
Vibration (Survival)	Transportation vibe per IEC 60068-2-64, Freq: 5-200Hz, ASD: 1.0m^2/s^3
Shock (Operational)	IEC 60068-2-64, 50m/s^2, 11 ms
Shock (Survival)	Transportation shock per IEC 60068-2-29, A = 180m/s^2, t = 6mS
Approval	FCC, IC

Table 1-1. EXPLORER 122 Terminal Key Specifications

EXPLORER 122
User Manual

2 Getting Started

2.1 Unpacking

The EXPLORER 122 Terminal is shipped in packaging materials that are uniquely designed for the product. The following packing list describes the contents of a typical EXPLORER 122 shipment:

1. EXPLORER 122 Terminal

2. Mating Connector (assembly required)

Upon unpacking of the box, inventory the contents and inspect for sign of damages during shipping. Contact your retailer in case of missing contents or noticeable defects.

To get started, the additional following items may be required:

3. Magnetic Mount (Platform Dependent)

> Note   *NOTE: Contact your terminal integration partner for specific mounting equipment.*

2.2 Selecting Mounting Location

The EXPLORER 122 Terminal is designed for mobile vehicle installation. The terminal can be permanently mounted with mounting screws or temporarily mounted with magnetic mounts using the Installation kit (optional accessories).

Mounting location should be selected to provide the terminal with a clear line-of-sight to the operational satellite without any obstructions from the vehicle. Figure 2-1 illustrates improper vs proper placement of the terminal.

Terminal should be placed as far away from other transmit antennas as possible.

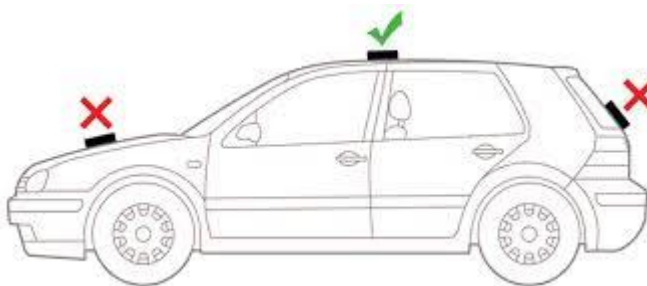> ⚠️ *WARNING: Terminal antenna should be kept at least 44 cm from direct exposure to humans.*

Figure 2-1. Terminal Location – Line of Sight

2.3   Installation

The EXPLORER 122 Terminal is 250 mm long by 146 mm wide (excluding connector) and 62 mm high. The terminal is designed to be magnetically-mounted to a vehicular platform. Two size M5 mounting holes for magnetic mounts are located on the underside of the terminal as shown in Figure 2-2.

⚠️ **CAUTION**: The "Caution" icon identifies procedures or factors that can affect the installation and configuration of the system (may damage or render equipment inoperable).

Figure 2-2. Terminal Mounting Hole Locations
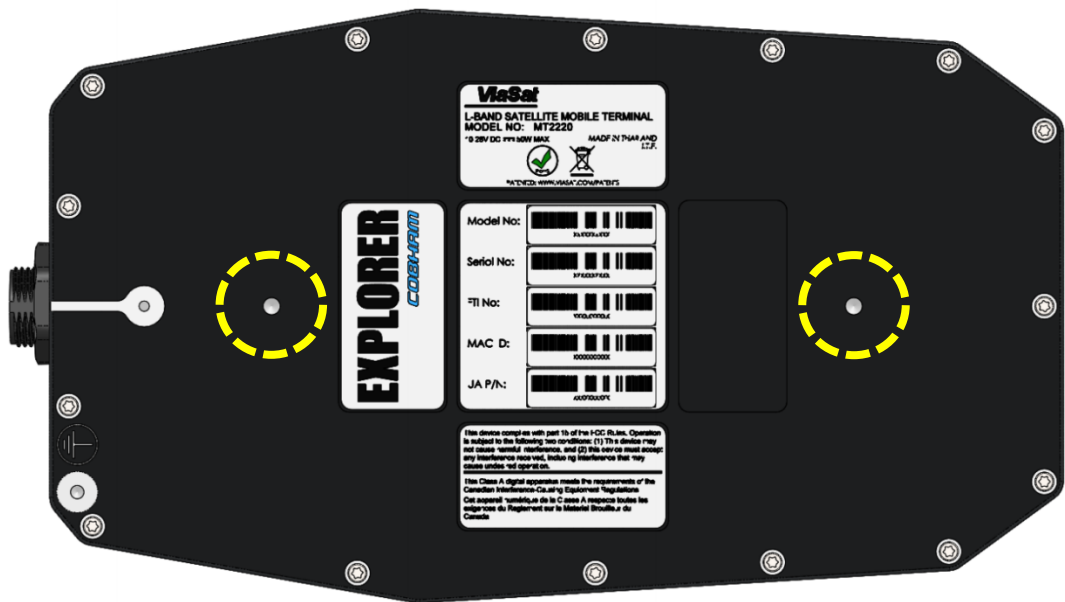
The terminal should be installed with the connector facing the rear of the vehicle. An example of installation with a rear facing connector is shown in Figure 2-3.

⚠️ **CAUTION**: Do not over tighten.

⚠️ **CAUTION**: Do not apply pressure to the cable/connector during the installation.

⚠️ **CAUTION**: Do not force the connector pins to mate since this may damage the pins.

Figure 2-3. Terminal Mounting Example

2.4   Powering Up

The EXPLORER 122 Terminal is designed to automatically start up when DC power is applied via an ignition sensor line. An ON/OFF power switch does not exist on the terminal.

At the completion of its power-up sequence, the terminal will automatically search for GNSS and MSS satellite signals.

⚠️ *CAUTION: Do not stand in front of the unit once power is applied.*

2.5   Obtaining a GNSS Fix

The MSS network does not require the terminal location to access the network. However, terminal location enables optimal customer service.

At the completion of its power-up sequence, the terminal will automatically search for GNSS and satellite signals. The default position reporting uses GPS satellites and the terminal will automatically attempt to get a new GPS lock every time it is powered on. Obtaining a lock may take up to 5 minutes upon power-up.

2.6   Antenna Pointing

The EXPLORER 122 Terminal contains an electronically steerable antenna and does not require any pointing by the user.

2.7   Connecting the EXPLORER 122 Terminal to Other Equipment

2.7.1   Interfaces

The EXPLORER 122 Terminal offers the following wired interfaces via a multi-pin circular connector as shown in Figure 2-4 and Table 2-1.

- DC Power

- LAN (Ethernet)

The EXPLORER 122 Terminal offers the following wireless interface:

- WLAN

2.7.2   Wired Interface

The pinout for the EXPLORER 122 Terminal connector is shown in Figure 2-4 and Table 2-1. For more detailed cable instructions, refer to Appendix A.
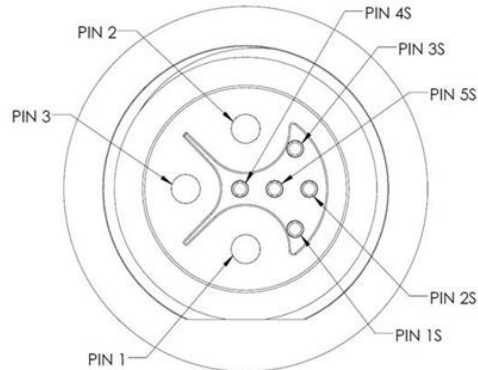

Figure 2-4 EXPLORER 122 Terminal Connector Pinout Drawing

Table 2-1. EXPLORER 122 Terminal Connector Pinout Table

Manufacturer	Terminal Connector Part Number	Cable Connector Part Number
Chogori	23305515-02	23305211-03

Pin Number	Signal Name	Description
1	VIN	+10 to +30 VDC Power
2	IGNITION	Ignition Sense Line
3	VIN RTN	Power Return
1S	ETH RX+	Ethernet RX (+)
2S	ETH RX-	Ethernet RX (-)
3S	ETH TX+	Ethernet TX (+)
4S	Drain Wire	Ethernet Shield
5S	ETH TX-	Ethernet TX (-)

2.7.2.1 DC Power/Ignition Sense Interface

The terminal is designed to use +10 to +30 Volt Direct Current (VDC) negative ground vehicle power systems. For safety, the EXPLORER 122 Terminal should be installed in a circuit with an inline 7.5 A fuse that will trip during extended overcurrent events.

The nominal power consumption when receiving is approximately 9 Watts (W). During transmission bursts or terminal boot up, the power draw can be up to 48 W.

The EXPLORER 122 Terminal power on/off is controlled by the ignition sense line using internal software, rather than a hard on/off switch on the red power line. Connect wires to the battery and ignition switch as shown in the power harness wiring diagram.
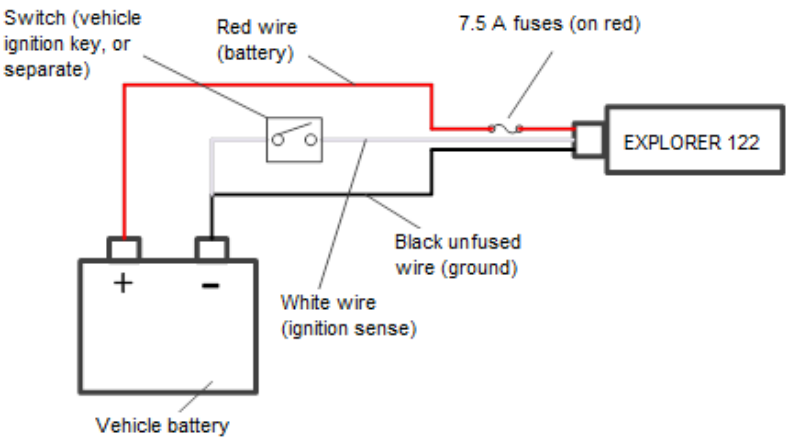

Figure 2-5 Power Harness Wiring

- When the ignition sense line is pulled low (less than 2 V), the EXPLORER 122 Terminal performs a controlled shutdown sequence (under software control), de-registering and saving any relevant operational data before powering off.

- When the ignition sense line is pulled high (5 to 30 V) or left unconnected, the EXPLORER 122 Terminal powers on.

⚠️ *CAUTION: Do not apply an input voltage to the terminal outside of the specified range. This will permanently damage your terminal.*

⚠️ *CAUTION: Observe proper Electro-static Discharge (ESD) practices during installation.*

The terminal protects against continuous inputs of -32 VDC to +32 VDC. Applying an input voltage outside this range may permanently damage the terminal and cause it to become non-operational.

2.7.2.2 Ethernet Interface

The Ethernet interface is defined by IEEE 802.3 for operation in 10Base-T and 100Base-TX modes with the exception of the connector type. Cabling for Ethernet connectivity must meet ANSI/TIA/EIA-568-A specifications for Category 5 or Category 5e cables. It is recommended that the wired Ethernet interface be used for permanent installation. Contact your terminal retailer for power/Ethernet cable or build your own cable assembly as shown in section 6.

⚠️ *CAUTION: Use an Ethernet cable length no greater than 100m (328 ft.) to ensure proper terminal operation.*

2.7.3 Wireless Interface

2.7.3.1 WLAN Interface

To connect your WLAN-enabled device to the EXPLORER 122, perform the following:

1. Make sure that WLAN feature on your device is turned on.
2. Place the device near the terminal.
3. Search for available WLAN networks on your device.
4. The default SSID will be vmt_<FTI>_base where <FTI> should be replaced with the fixed terminal identifier unique to your terminal. Check the label on the terminal enclosure to obtain the FTI.
5. Select the SSID of your terminal network when it appears on the list.

Note *NOTE: Default password of your EXPLORER 122 WLAN is **terminal***

Encryption type is WPA2

6. It may take up to 2 minutes before a wireless connection is made and the configuration webpage is available.

3 Connecting to the EXPLORER 122 Terminal

The terminal will attempt to log in automatically to an available satellite network as soon as it is powered on. The user interface is presented as a web page that is accessible from the terminal. Features of the terminal can be controlled using the web interface. This interface is used for determining terminal operational status, satellite link status and other terminal information. This interface allows the user to perform control actions on the terminal for certain activities such as reboot, managing IP addresses/ports, and controlling default transmit power-up states.

> Note ▸ *NOTE: The webpage is only available through a local wired Ethernet or WLAN connection to the terminal. This interface is not accessible through the satellite network and will not transmit data over the satellite network.*

3.1 Web Server Connection

3.1.1 Address/Port Number

The web server address will be the same as the terminal IP Address. By default, the terminal IP addresses are:

- Wired Ethernet interface: **192.168.100.1**
- WLAN interface: **192.168.200.1**

The terminal IP Addresses are defined as the Destination IP address for incoming datagrams to the terminal. These addresses are configurable through the configuration web page. The web server port number is set to the standard port 80.

To connect to the terminal, enable DHCP settings on your PC or mobile device, and enter the terminal IP address in your web browser.

If you do not wish to use the default DHCP server configuration, you will need to ensure that your PC's static IP address is on the same network as the terminal.

> Note ▸ *NOTE: The terminal will come from the factory with default DHCP server settings to allow easy connection.*

3.1.2 Protocol

The web server will use the HTTP protocol for connection with the platform interface devices.

3.1.3 Web Browsers Supported

The EXPLORER 122 Terminal may be accessed by using the latest released version of Google Chrome™.

3.2 Login

The web server will present a login screen for the user to access all activities shown below. Without the proper user login, no terminal functionality or status is available from the web page. The terminal will be responsive to all login requests during all modes of operation.

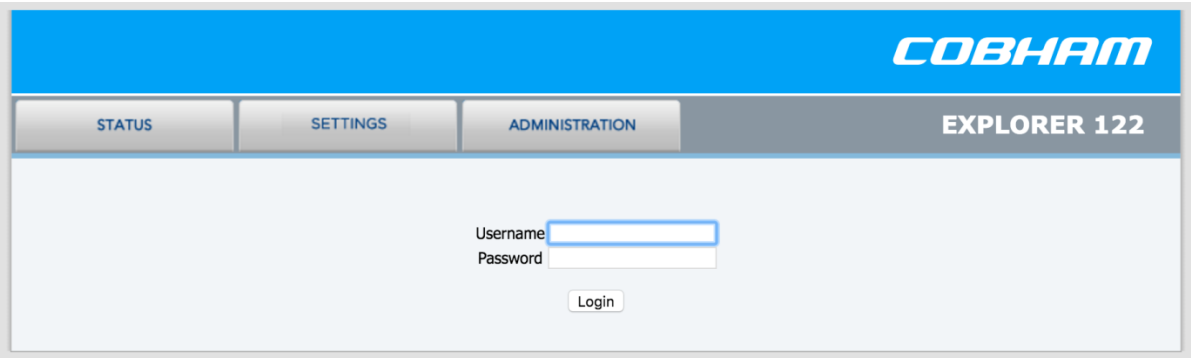Contact your terminal retailer or integrator for login credentials for your terminal.

Figure 3-1. Login Screen

The default Username/Password is **admin**/**admin**. After a successful login, the user will be directed to the System Status page in Section 3.

After an unsuccessful login, the following web page with error banner is presented.
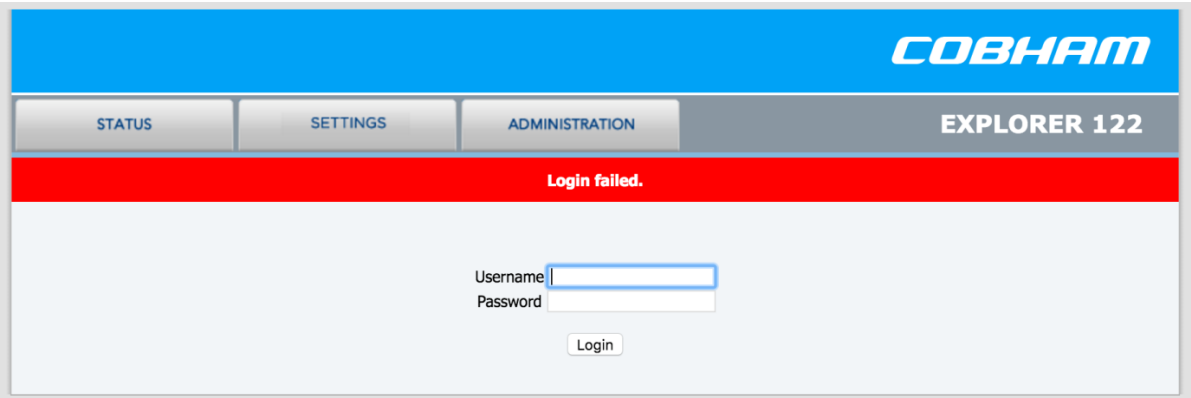

Figure 3-2. Failed Login

3.3 Status Tab

The status bar is included at the top of each page. It displays the current status of the connection to the network and the latest GPS information (Figure 3-3).
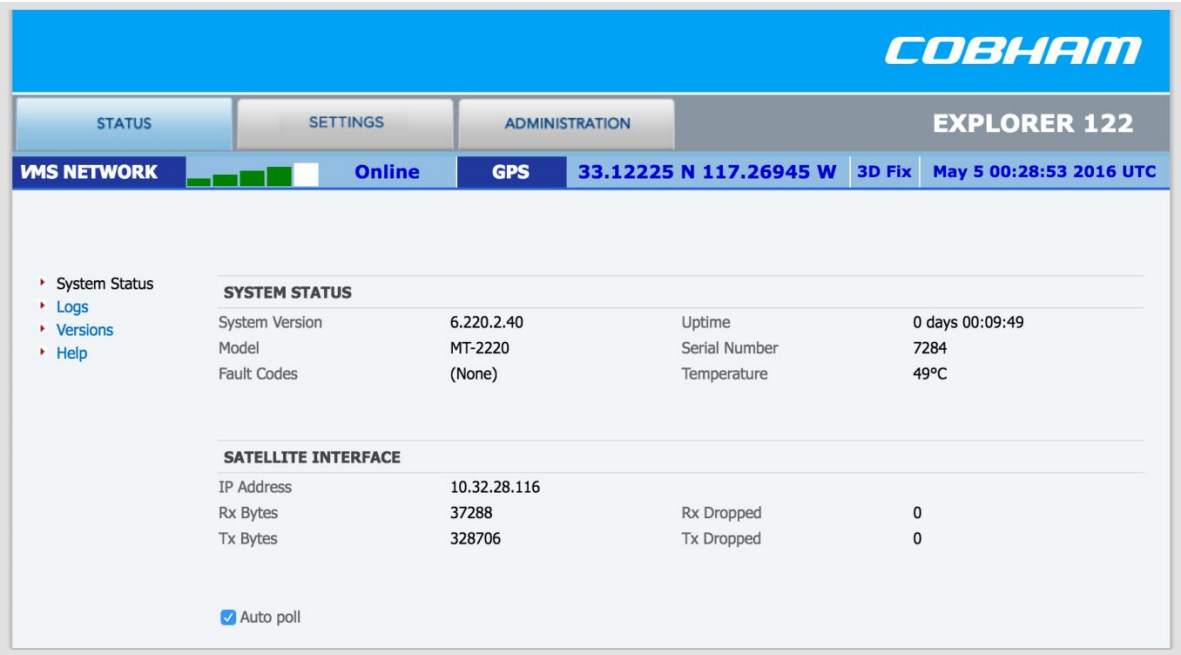
Figure 3-3. Status Tab

3.3.1 Network

The received signal strength bars indicate the current received signal strength. The number of bars that are green indicates the strength of the received signal for the modulation scheme being used on the current received forward link. The more bars there are the stronger the signal.

The status field shows the current state of the terminal on the network. Possible statuses are shown below in:

Note   *NOTE: Signal strength will vary based on factors such as terminal location, current data rate, and service plan.*

Table 3-1. Network Status

Status Field	Status Meaning
Searching	Terminal is searching for the forward link
Acquired	Terminal has acquired a forward link
Registering	Terminal is registering with the network
Online	Terminal logged in to the network and ready for use
Offline	Terminal logged off the network
Re-Registering	Terminal requesting to re-login

3.3.2 GNSS

The GNSS fields show the current location. The location will only be valid when the terminal has acquired enough GPS/GLONASS satellites for a valid lock.

3.3.3 System Status

System status displays general information about the current system (Table 3-2).

The Tx Bytes and Rx Bytes fields display the number of bytes sent and received over the satellite. The Tx Dropped field displays the number of outgoing packets intended to be sent over the satellite link but were dropped due to queue limitations, encryption failure or other transmit errors. The Rx Dropped field displays the number of incoming packets that were dropped due to space limitations, decryption failure, data integrity check failure or other reception errors.

The Temperature field displays current temperature in Celsius within the terminal.

⚠️ *CAUTION: If you are experiencing issues with your terminal or observing fault codes after reboot attempts, contact customer support.*

Table 3-2. System Status Fault Codes

Description	Fault Code	Action
General fault	0x01 - 0x53	Reboot the terminal
Over temp fault	0x61 - 0x63	Place terminal in environment less than +70°C and power off until terminal cools down
Under temp fault	0x69 - 0x6B	Place terminal in environment greater than -40°C until terminal warms up
Power fault	0x70 or other	Reboot the terminal

3.3.4 Logs

The Logs page allows the user to view or display system log files. All log files with the exception of the NV (Non-Volatile) Log are volatile and are not maintained through reboots. The NV Log contains high priority information that is saved through reboots (Figure 3-4).
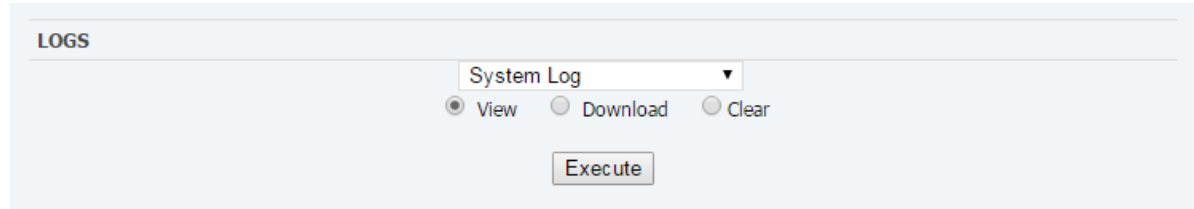

Figure 3-4. Logs Pane

System Log

The System Log displays information about the operating system environment, including drivers and devices.

Control Message Manager

The Control Message Manager processes network control messages and maintains the terminal login state.

Web Administration

This log file contains information about actions performed by or when using the Web Administration interface.

AT Server

The AT Server logs interactions between the internal AT command server and external AT clients.

GPS

The GPS provides information regarding the internal GPS receiver and client.

NV Log

The NV logs high-priority terminal information that is maintained through reboots.

3.3.5 Versions

This field displays the version number of each terminal software component.

3.4 Settings Tab

The settings tab lists terminal settings that can be modified by the user. A description of each setting is listed below.

3.4.1 Network Interface

The Network Interface pane allows the user to set both the wired and wireless IP/subnet mask for the terminal (Figure 3-5).

Figure 3-5. Network Interface Pane

Configure the Ethernet interface IP Address and Subnet Mask. These fields must be in dot notation (a.b.c.d) and contain a valid IP address.

⚠️ **CAUTION**: *Modifying the IP Address and Subnet Masks can result in loss of connectivity to the terminal. See Section **Error! Reference source not found.** for ore information on network configuration settings and examples.*

3.4.2 DHCP Server

There are two options for DHCP server configuration: dynamic and static (Figure 3-6).

Dynamic Assignments

The DHCP server can be configured with a pool of IP addresses that it will lease to clients.

The Pool Start and Pool End fields are set to the start and end IP addresses. The Netmask field is set to the subnet mask that a client should use. Each of these fields must be a valid IP address or subnet mask in dot notation (a.b.c.d).

The lease time is the time in minutes that a lease given to a client will be valid.

Static Assignments

The DHCP server can also be configured to provide a static IP address to a particular network device. The network device is determined by its hardware MAC address. Each time the DHCP server gets a request from a device that matches the MAC address the assigned IP address will be given to the device.

The Name field is the hostname of the network device that will be assigned a static IP address. This name must not contain any white space and should consist of alphanumeric characters, hyphens or underscores. The MAC Address field is set to the MAC address of the network device. This field must be specified as follows: xx:xx:xx:xx:xx:xx, where xx is a two-digit hexadecimal number. The IP Address field specifies the IP address to be assigned to the network device with the corresponding MAC address. The IP address is specified in dot notation (a.b.c.d).

Active Leases Table

Any currently active DHCP assignments are shown in the Active Leases and Static IP Assignments in Figure 3-6.

Figure 3-6. DHCP Server - Active Leases

Ethernet DHCP Address Pool

The IP address allocation and lease time for the wired Ethernet dynamically-assigned DHCP address pool is configured in Figure 3-7.

Figure 3-7. DHCP Server - Wired Ethernet DHCP Dynamic Address Pool

WLAN DHCP Address Pool

The IP address allocation and lease time for the WLAN dynamically-assigned DHCP address pool is configured in Figure 3-8.

Figure 3-8. DHCP Server - WLAN DHCP Dynamic Address Pool

Static IP Assignments

The IP address to MAC pairing for static IP assignments is contained in Figure 3-9.

STATIC IP ASSIGNMENTS			
Name	**IP Address**	**MAC Address**	
(None)			

Figure 3-9. DHCP Server - Static IP Assignments Table

Static Routes

Static routes are configured and listed in Figure 3-10

STATIC ROUTES			
Destination	**Netmask (CIDR)**	**Gateway**	
	/		Add

STATIC ROUTE TABLE			
Destination	**Netmask (CIDR)**	**Gateway**	

Figure 3-10. DHCP Server - Static Routes Tables

3.4.3 Port Forwarding

The terminal provides a network address translator (NAT) that creates a private network for devices attached to the terminal. Devices behind the terminal NAT are invisible to any hosts outside the terminal NAT.

The only way to access a device behind the terminal is either:

- Have the device behind the terminal initiate the connection

- Create a port forwarding assignment to the device in the terminal

Port forwarding allows incoming UDP or TCP packets destined for a specific port to be forwarded to a network device (client or host) "behind" the terminal NAT. The incoming packet will be forwarded to the destination port and IP address defined by the port forwarding rule. Using port forwarding assigns the port being forwarded to a single host IP address and excludes this port from being used by any other host.

⚠️ *CAUTION: Modifying port forwarding settings can result in loss of connectivity to the network. See Section **Error! Reference source not found.** for details on network onfiguration and examples.*

Port Forward Assignments

Any currently active port forwarding assignments will be shown in the Port Forwarding Assignments table (Figure 3-11).

To add a port forwarding configuration, enter the following information into the Port Forwarding table:

1. **Name** – Set to the logical name of the service being forwarded. This name must not contain any white space and should consist of alphanumeric characters, hyphens or underscores.
2. **Incoming Port** – Set to the port number of the service to be forwarded, such as 21 for FTP.
3. **Protocol** – Select between UDP/TCP/Both.
4. **Server IP** – Set to the IP address, in dot notation, of the host that the packets will be forwarded to.
5. **Server Port** – Set to the port number on the Server IP that the packets will be sent to. This port can be the same as the Incoming Port, but does not need to be.
6. When complete, click **Add** and the assignment will show up in the Port Forwarding Assignments shown in Figure 3-11.

PORT FORWARDING

Name	Incoming Port	Protocol	Server IP	Server Port	
		UDP ⇕			Add

PORT FORWARDING ASSIGNMENTS

Name	Incoming Port	Protocol	Server IP	Server Port	
		(None)			

Figure 3-11. Port Forwarding Pane

3.4.4 Wireless LAN Interface

The WiFi interface pane is used to configure your wireless access point interface for the WLAN (Figure 3-12).

To configure the access point settings set the following:

1. **SSID** – This is also known as your network name. Provide a unique SSID for the network. The name must not exceed 32 characters.
2. **Network Password** – The terminal uses WPA2 encryption and requires a password. Use this field to set the network password for the WLAN. The network password must be at least 8 characters long but cannot be more than 63 characters.
3. **Channel** – Choose a transmit channel for your WLAN. Channels 1,6, and 11 are the primary transmission channels used. If interference is experienced on those channels then use one of the other channels.
4. Click **Save**.

Figure 3-12. WiFi Interface Pane

3.4.5 Satellite Interface

Configure the satellite interface transmit settings. These settings can be used to inhibit terminal transmissions, both in real-time and at boot up (Figure 3-13).

> **Note** **NOTE**: *If terminal transmit is inhibited at boot up it will not be able to communicate on the VMS network until transmit is enabled.*

Figure 3-13. Satellite Interface Pane

The IP Address and Subnet Mask fields contain the external (Satellite Interface) address configuration assigned to your terminal. These fields are assigned by your service provider.

Current Transmit State – Allows you to disable your terminal's ability to transmit. For normal operation, this should be set to **Enabled**. If disabled, your terminal will not be able to send data over the satellite interface.

Transmit State at Power Up – Allows you to alter the power-up behavior so that the terminal will not transmit when powered up. For normal operation, this should be set to **Enabled**. If disabled, your terminal will not be able to send data over the satellite interface upon power-up.

3.5 Administration Tab

The Administration tab provides additional information and settings such as file uploads and user administration.

3.5.1 Antenna Pointing

The EXPLORER 122 Terminal does not require pointing. This pane reports the current receive signal strength indicator (RSSI) of the terminals satellite network link (Figure 3-14).

Figure 3-14. Antenna Pointing Pane

3.5.2 Crypto

Displays status of the encryption engine used to provide data security (Figure 3-15).
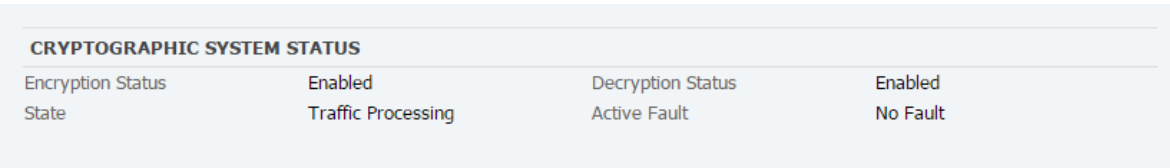

Figure 3-15. Crypto Pane

3.5.3 File Upload

The file upload function is used to upload terminal configuration files (Figure 3-16).

⚠ *CAUTION: Improper file uploads can cause severe damage to the terminal. File uploads should only be attempted if directed by customer or integrator support.*
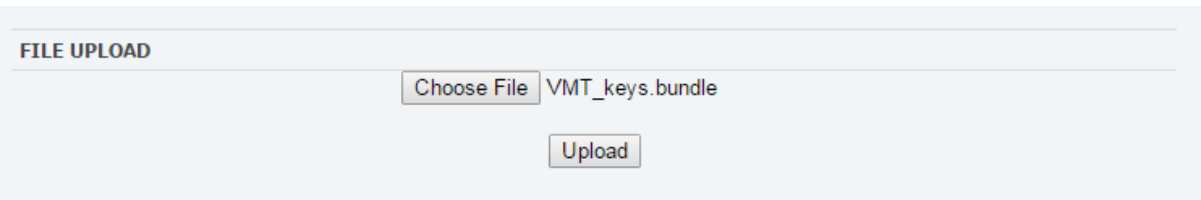

Figure 3-16. File Upload Pane

3.5.4 HW Diagnostics

Hardware diagnostics executes any or all of the terminal built-in tests. These diagnostics test the basic functionality of the hardware components of the terminal. They can aid in finding the cause of any hardware faults reported by the terminal. These tests should only be run when the terminal is offline (Figure 3-17).

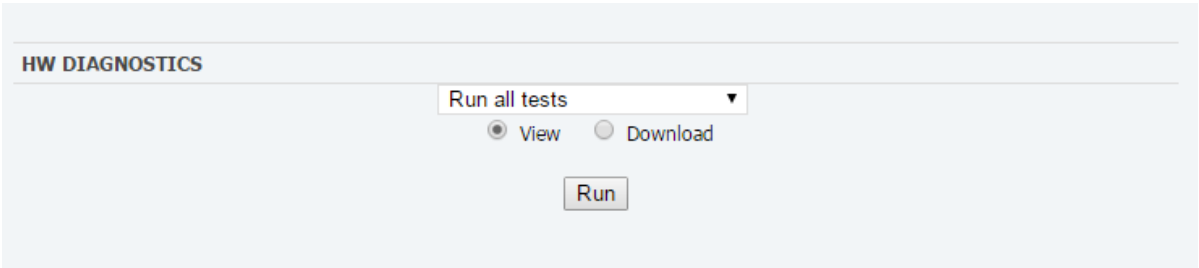**Figure 3-17. HW Diagnostics Pane**

3.5.5 Logout

Initiates logout from the current webpage session (Figure 3-18).
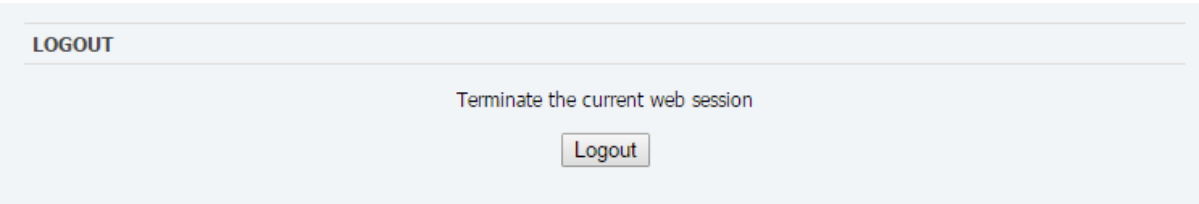
Figure 3-18. Logout Pane

3.5.6 Net Diagnostics

Network diagnostics initiates pings to the destination IP address up to a maximum of 10 times. The results of the pings will be displayed (Figure 3-19).
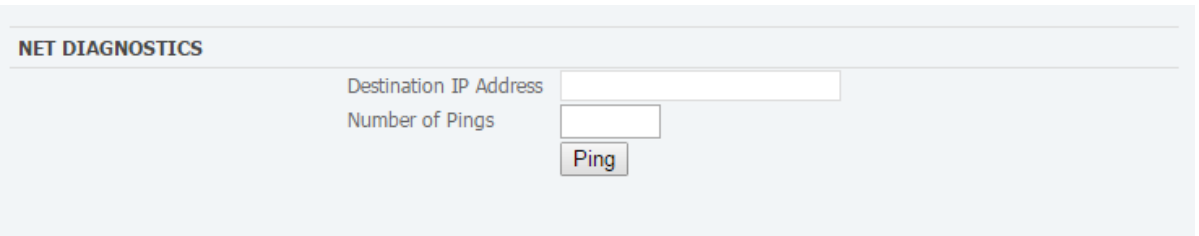
Figure 3-19. Net Diagnostics Pane

3.5.7 OSD Status

Over-the-Air Software Download (OSD) downloads new software into the terminal using the satellite link instead of a local file upload. This page displays the current status of any downloads in progress. OSD is a "trickle file download", using only idle capacity in the satellite link sent in the background (Figure 3-20).

Figure 3-20. OSD Status Pane

3.5.8 Reboot

Initiates a reboot of the terminal (Figure 3-21).

Figure 3-21. Reboot Pane

4 Troubleshooting, Maintenance, and Technical Support

The EXPLORER 122 is designed to be very reliable and rugged. The terminal performs automated self-tests and also provides for alarms, manual self-tests, and system resetting to further evaluate the cause for, and possibly correct, any unexpected functionality. A further list of problems that might arise, their possible causes, and potential remedies is provided in section 4.2.
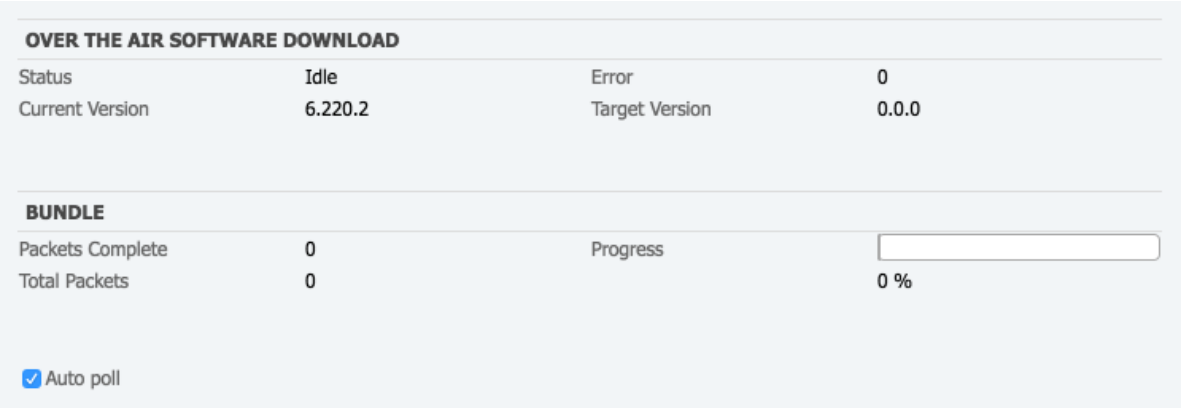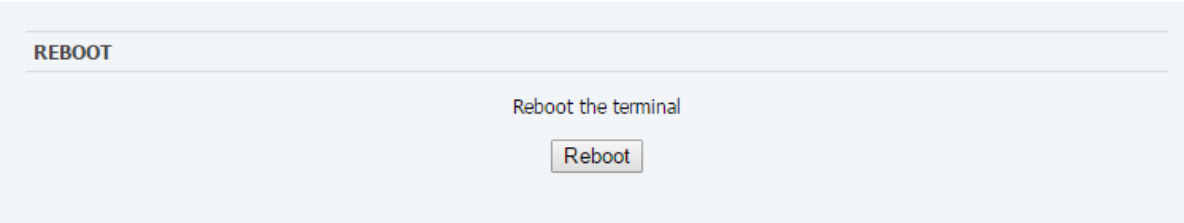
4.1 Self-Tests

The EXPLORER 122 has various self-tests to detect fault conditions. These tests are run on start-up and periodically during the terminal operation. These tests can also be run manually through the HW Diagnostics section 3.5.4. A list of these self-tests is provided in

Table 4-1.

Table 4-1. Self-Tests

Self Tests	Description
Ethernet Controller	Verifies the operation of the Ethernet controller chip
Information Assurance	Verifies the operation of the data encryption and decryption
McBSP1 Serial Interface	Verifies the operation of the forward link decoder
McBSP4 Serial Interface	Verifies the ADC operation
FPGA	Verifies that the FPGA has been programmed correctly and the device driver has been loaded
Temperature Sensor	Reads the current temperature of the board
NAND Flash	Reads a known test pattern from flash sector
DDR SDRAM	Performs walking ones, walking zeros, and address line RAM tests
MIMO	Verifies the RF transceiver's device id
ENSM	Verifies that RF transceiver's operational state is FDD
Real Time Clock	Verifies the real time clock's device id
Rx Synthesizer	Verifies that the RX PLL is locked
Tx Synthesizer	Verifies that the TX PLL is locked
Display Ethernet Status	Displays the number of Ethernet packet received and sent and the link status
Display Current OBIT results	Displays result of the current online BIT tests
Display POST Results	Displays the result of the power-on self-tests

4.2   Troubleshooting Guide

Faults may be detected by visual observation or by the built-in test (BIT). Problems uncovered during preventive maintenance, or while the terminal is in service, their possible cause, and recommended corrective action(s) are described in

Table 4-2.

Table 4-2. Troubleshooting Guide

Problem/Observation	Possible Cause	Corrective Action
Cannot access terminal web server	Terminal not powered on Incorrect IP address Cable is not plugged in correctly	Default Ethernet IP address is 192.168.100.1 Default WLAN IP address is 192.168.200.1 Verify that cable is connected to user device LAN port. Verify the WLAN settings are correct
Terminal not responding to web server interface	Software error	Power Cycle Terminal
Web server shows no position fix	Terminal position is unknown, GNSS signal is weak	Provide terminal with unobstructed view of sky as much as possible. Try to point terminal straight upward to receive GPS fix, then repoint terminal toward L-band satellite
Web server status shows terminal does not exit searching mode	View toward satellite is blocked	Ensure that no object is in front of antenna
WLAN connection cannot be established	Your device is too far from terminal	Mover closer to the terminal
Terminal cannot login or does not exit searching mode	No signal or weak signal Interference	Provide terminal with unobstructed view of sky as much as possible. Reposition the terminal as necessary. Position terminal away from other antennas

Faults may be visually observed as error codes on the Web MMI Status page as seen in Table 4-3. Web MMI Status.

Table 4-3. Web MMI Status

Fault Code	Description	Recommended Action
0x01 - 0x53	General fault	Reboot the terminal
0x61 - 0x63	Over temp fault	Place terminal in environment less than +70°C and power off until terminal cools down
0x69 - 0x6B	Under temp fault	Place terminal in environment greater than -40°C until terminal warms up
0x70 or other	Power fault	Reboot the terminal

4.3   Preventative Maintenance

Preventative maintenance is the systematic, scheduled care and inspection of equipment to prevent equipment failure and to reduce downtime. The primary preventative maintenance for the EXPLORER 122 Terminal is to keep the equipment clean. Use a soft brush, moist sponge, and a clean cloth for this purpose. The radome should be visually inspected for any attached substances, which could potentially obstruct functionality (e.g., mud on the radome).

In addition, to ensure proper functionality and full operating potential of EXPLORER 122 Terminal capabilities, the unit should be visually inspected for cracks, corrosion, and loose mating connector.

4.4   Warranty

For warranty information and repairs, please contact your service provider.

4.5   Serviceable Parts

The EXPLORER 122 Terminal contains no user-serviceable parts.

4.6   Customer Support

Should your Cobham SATCOM product fail, please contact your dealer or installer, or the nearest Cobham SATCOM partner. You will find the partner details on www.cobham.com/satcom where you also find the Cobham SATCOM Self Service Center web-portal, which may help you solve the problem. Your dealer, installer or Cobham SATCOM partner will assist you whether the need is user training, technical support, arranging on-site repair or sending the product for repair. Your dealer, installer or Cobham SATCOM partner will also take care of any warranty issue.

Appendix A - Power/Ethernet Cable Assembly Instruction

This section provides guidelines for the Value-Added Resellers or end-user to assemble the power/Ethernet cables. The solder cup connector kit ships with the terminal.
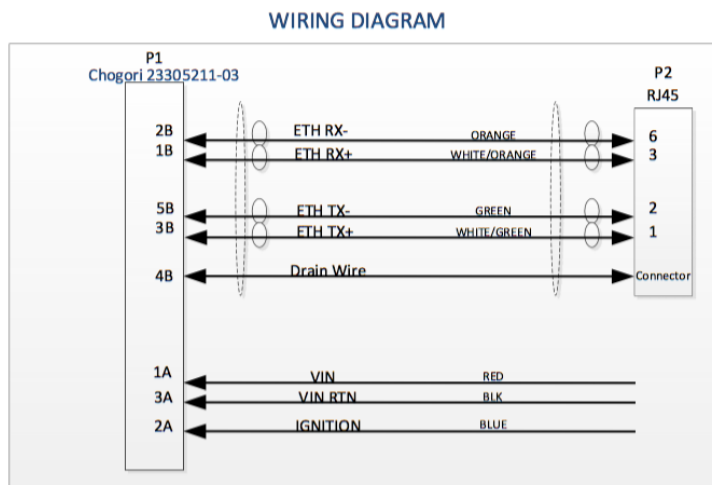
A.1 Required Tools

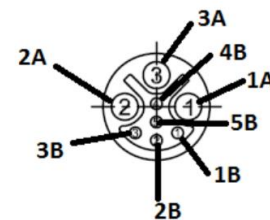The following tools are required to assemble the power/Ethernet cable:

- Utility knife or similar
- 18-26 AWG wire stripper
- Diagonal cutters
- Long-nose pliers
- Soldering iron and solder

A.2 Connector Pinout Information

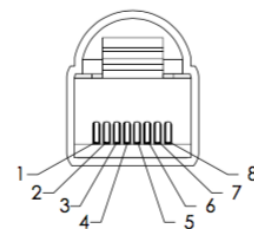The figures below show the connector and cable wiring diagram.

A.3 Cable Specification

The cable selection for this application is influenced by three main principles: current capacity, outdoor application and shielding.

The operating input voltage range for the terminal is 10 to 30 VDC and draws a maximum of 4.8 amperes. If the application requires an extended cable length, it is necessary to calculate the cable voltage drop to determine if the terminal is able to receive the minimum 10 volts for operation. 18 AWG wire is recommended for both power and ground wires.

Exposure to outdoor elements can degrade the insulation of the cable and allow moisture to penetrate the conductor and subsequently degrade the copper conductor. It's highly recommended that the cable chosen shall be able to withstand UV rays.

Cable shielding is a critical design element over long distance. The cable selection can adversely be affected by EMI/RFI/ESI. The cable carries both power and Ethernet data. The data lines should be twisted pair and shielded.

The recommended cable composition is described in the picture below. The overall cable diameter should be less than 9.50 mm in order to fit in the connector backshell.
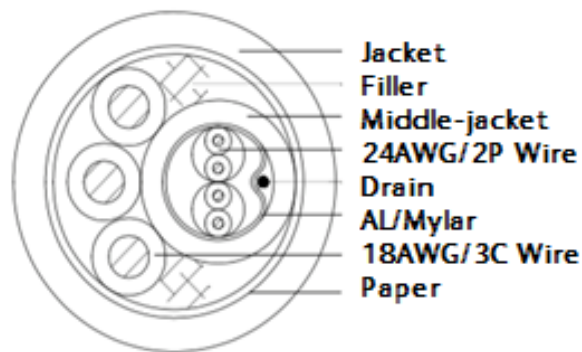
A.3.1 Physical Characteristics

	Parameter	
Conductor		
Construction	24AWG/2P	18AWG/3C
Insulation	HDPE	PVC
Nom. Thickness	0.20 mm	0.38 mm
Min. Thickness	0.15 mm	0.33 mm
OD	1.00 ± 0.10	2.00 ± 0 0.15
Assemble	2P	
Coating	Mylar	
Drain Wire	Tinned Copper 7/0.20	
Coating	Al/Mylar	
Middle-Jacket	PVC	
Nom. Thickness	0.40 mm	
Min. Thickness	0.30 mm	
Outer Jacket	PVC (UV resistance -40°C to +105°C)	
Nom. Thickness	1.10	
Min. Thickness	0.84	
Diameter	9.5 +0/-0.40	
Color		
Wire	Pair 1 green+white/green Pair 2 orange+white/orange	3C: black, red, blue
Jacket	Black	

A.3.2 Mechanical Characteristics

Storage Temperature	-40°C To +105°C	
Operating Temperature	-25°C To +105°C	
Tensile Strength (insulation & jacket)	Before	1.05 Kgf/mm^2
Elongation	Aging	100%
Aging Condition	136 ±2°C x 168 hours	
Tensile Strength	After	>= 70% of unaged
Elongation	Aging	>=65% of unaged

A.3.3 Agency Compliance

Standard	UL758/UL1581
Temperature Rating	-40°C To +105°C
Rated Voltage	300V
Flame Test	VW-1
AWM Specifications	UL Style 2464
Withstanding Voltage	1.5 KV min
Spark Voltage	3 KV

A.3.4 Electrical Characteristics

Max. Conductor DC Resistance @20°C	87.6 Ω/km (24AWG) / 23.2 Ω/km (18AWG)

Max DC Resistance Unbalanced @20°C	5%
Maximum Pair-to-Pair Ground Capacitance Unbalanced	330 pF / 100 m
Characteristic Impedance (1-100 MHz)	$100 \pm 15 \, \Omega$
Frequency	100 MHz
Attenuation (Insertion Loss)*	24 dB
Characteristic Impedance	$100 \pm 15 \, \Omega$
NEXT*	30.1 dB
PS-NEXT*	27.1 dB
ELFEXT*	17.4 dB
PS-ELFEXT*	14.4 dB
Return Loss*	20.1 dB / 100 m
Delay Skew*	45 ns / 100 m

*Min. at 100 MHz

A.4   Cable Assembly Steps

⚠️   *WARNING*: make sure DC power is not connected during cable assembly

Use a utility knife to remove 12mm of the outer jacket of the cable and use diagonal cutters to remove any shielding as shown in Figure A-1. Carefully remove 2-3mm of insulation from the wires using a wire stripper. Avoid nicking the center conductor as you strip the insulation from the wire. Ensure that the drain wire is at the same length as the other wires.
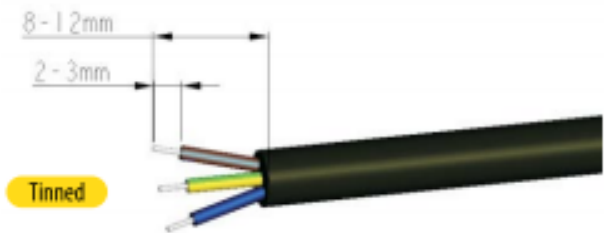

Figure A-1. Cable Assembly Preparation

The bare ends on the stripped wire may require twisting to prevent fraying when the connector parts are slid over the cable. Slide the items over the cable in sequential order as shown in Figure A-2. Observe that the seal ring and red gasket are present.

Figure A-2. Connector Part Description

Apply a thin coat of solder for tinning on the bare wires and on the connector socket contacts in preparation of soldering the wires to the end connector contacts as shown in Figure A-3. Solder the tinned wires to the socket contacts.

Figure A-3. Cable Assembly - Step 1

Assemble the gasket into the clamp ring. The gasket is directional and the flat surface should be installed on the housing side as shown in Figure A-4.

Figure A-4. Cable Assembly - Step 2

Assemble the clamp ring to the housing as shown in Figure A-5.

Figure A-5. Cable Assembly - Step 3

Slide the seal ring to the end of the clamp ring as shown in Figure A-6.

Figure A-6. Cable Assembly - Step 4

Assemble the seal nut and clamp ring as shown in Figure A-7.

Figure A-7. Cable Assembly - Step 5

Appendix B - Satellite Coverage Maps

Figure B-1 shows the Ligado SkyTerra-1 satellite coverage map.

Figure B-1. Ligado's SkyTerra-1 Satellite Coverage Map