EDSM Enhanced Digital Status Module





Technical Manual Enhanced Digital Status Module

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Alpha Technologies



Enhanced Digital Status Module Technical Manual

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NOTE:

Photographs contained in this manual are for illustrative purposes only. These photographs may not match your installation.

NOTE:

Operator is cautioned to review the drawings and illustrations contained in this manual before proceeding. If there are questions regarding the safe operation of this powering system, please contact Alpha Technologies or your nearest Alpha representative.



NOTE:

Alpha shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries, or other hardware if used or operated in any manner or subject to any condition not consistent with its intended purpose, or is installed or operated in an unapproved manner, or improperly maintained.

Notice of CE compliance:

Alpha Technologies Communications Modules, models USM2.5 and EDSM, have been qualified as EMC Class 'B' product, when configured in Alpha Uninterruptible Power Supply (UPS) product. When an optional embedded transponder assembly is configured in an Alpha UPS with Communications Module, the resultant UPS product configuration complies only to Class 'A' requirements, in accordance with the EMC Directive and applicable Technical Standards.

Contacting Alpha Technologies: www.alpha.com

OR

For general product information and customer service (7 AM to 5 PM, Pacific Time), call

1-800-863-3930,

For complete technical support, call

1-800-863-3364 7 AM to 5 PM, Pacific Time or 24/7 emergency support

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Safety Notes

Review the drawings and illustrations contained in this manual before proceeding. If there are any questions regarding the safe installation or operation of this product, contact Alpha Technologies or the nearest Alpha representative. Save this document for future reference.

To reduce the risk of injury or death, and to ensure the continued safe operation of this product, the following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.

ATTENTION:

The use of ATTENTION indicates specific regulatory/code requirements that may affect the placement of equipment and /or installation procedures.



A NOTE provide additional information to help complete a specific task or procedure.

CAUTION!

The use of CAUTION indicates safety information intended to PREVENT DAMAGE to material or equipment.



WARNING!

WARNING presents safety information to PREVENT INJURY OR DEATH to the technician or user.

General Safety Precautions

To avoid injury:

- This enclosure and its associated hardware must be serviced only by authorized personnel.
- Enclosure must remain locked at all times, except when authorized service personnel are present.
- Remove all conductive jewelry or personal equipment prior to servicing equipment, parts, connectors, wiring, or batteries.
- Read and follow all installation, equipment grounding, usage, and service instructions included in this manual.
- Use proper lifting techniques whenever handling enclosure, equipment, parts, or batteries.
- Batteries contain dangerous voltages, currents and corrosive material. Battery installation, maintenance, service and replacement must be performed by authorized personnel only.
- Never use uninsulated tools or other conductive materials when installing, maintaining, servicing or replacing batteries.
- Use special caution when connecting or adjusting battery cabling. An improperly connected battery cable or an unconnected battery cable can result in arcing, a fire, or possible explosion.
- A battery that shows signs of cracking, leaking or swelling must be replaced immediately by authorized personnel using a battery of identical type and rating.
- Avoid any contact with gelled or liquid emissions from a valve-regulated lead-acid (VRLA) battery. Emissions contain dilute sulfuric acid which is harmful to the skin and eyes. Emissions are electrolytic, which are electrically conductive and are corrosive. Follow the Chemical Hazards notes if contact occurs.
- Do not smoke or introduce sparks in the vicinity of a battery.
- Under certain overcharging conditions, lead-acid batteries can vent a mixture of hydrogen gas that is explosive. Proper venting of the enclosure is required.
- Follow the battery manufacturer's approved transportation and storage instructions.



Enclosures, equipment, or parts may be damaged or cause damage if used or installed improperly.

To avoid damage:

- Prior to installation, verify that the AC input voltage to the enclosure and its equipment match with respect to voltage and frequency.
- Prior to installation, verify that the output voltage from the enclosure or its equipment match the voltage requirements of the connected equipment (load).
- Prior to installation, verify that the enclosure's utility service panel is equipped with a properly rated circuit breaker for use with the equipment inside. Refer to manufacturer's recommendations.
- Review and upgrade utility service panel circuit breaker requirements whenever the equipment within the enclosure is changed.
- Prior to installation, contact local utilities, local building maintenance departments, and cable/piping locator services to ensure that installation does not interfere with existing utility or building cables/piping.
- Do not exceed the output rating of equipment. Verify load requirements prior and during connection process.
- Prior to handling the batteries, touch a grounded metal object to dissipate any static charge that may have developed in your body.

1.0 Introduction

Alpha's Enhanced Digital Status Module (EDSM) is a status monitoring interface for the XM Series 2 power supply. The EDSM can monitor up to six power supplies and an AlphaGen generator. Up to two battery strings can be monitored directly using the AUX connector and applicable wiring harness. Battery Sense wire kits are sold separately.

The EDSM continuously gathers power supply, generator, and battery data. Data is transferred to an industry standard digital transponder (DT) using a serial interface, specified by the ANSI/SCTE25-3 standard. DT Connector equipped EDSMs (Alpha P/N 745-678-20) connect to either an embedded digital transponder or an external digital transponder. Transponders quickly assemble and prepare data for headend equipment and network monitoring software. The software graphically displays the power supply status via a user-friendly interface.

Existing Alpha Technologies enclosure tamper switches are accommodated through the EDSM tamper connector. The EDSM/embedded transponder package requires less cabling than previous status monitoring products.

The EDSM LED indicators can be viewed day or night. In conjunction with XM Series 2 Smart Display and status LEDs, it is easy to diagnose the health of the power system.

The combination of network monitoring software and local displays and indicators will give the technician complete detail of the overall power system health.

CAUTION!

The EDSM DT Connector is only used for connecting to an external digital transponder. Connecting this port to any other device may result in damage to the EDSM and associated equipment.



EDSM Alpha P/N 745-678-21 (legacy product)



Fig. 1-1, Enhanced Digital Status Module

1.0 Introduction, continued

1.1 System Layout

The diagram below shows a typical power supply system using either an embedded or external digital transponder. The EDSM can monitor up to six (6) power supplies, two battery strings via the AUX connector, and one (1) generator. The EDSM collects data from these devices and relays it to the head end using a digital transponder.



(Alpha P/N 162-028-10)

System Part Numbers:			
EDSM with DT Connector	745-678-20		
EDSM Sheet Metal/Faceplate	745-427-21		
XMS2 Serial Interface	704-742-20		
AlphaBus Communications Cable	874-460-20		
Available Battery Sense Wire Kits:			
874-842-21	WR KT,BAT SNSE,COMM MDL,36V 1STR,6'		
874-842-27	WR KT,BAT SNSE,COMM MDL,36V 1STR,9'		
874-842-28	WR KT,BAT SNSE,COMM MDL,36V 2STR,9'		
874-841-21	WR KT,BAT SNSE,COMM MDL,48V 1 STR,6'		
874-841-20	WR KT,BAT SNSE,COMM MDL,48V 2 STR,6'		

2.0 Connectors and Indicators

2.1 LED Indicators

- ALM The red ALM LED reflects system level alarms. When a system level alarm is active, the ALM LED will flash. A major alarm is present when the LED is flashing faster than the READY LED. A minor alarm is present when the LED is flashing slower than the READY LED.
- RDY The green RDY LED flashes once per second to indicate that the EDSM software is running normally. Under normal conditions, this LED is only turned off while alarm codes are being displayed.
- DT The green DT LED indicates active communications between the EDSM and the DT. It is an indication of receive activity of the serial communications between the EDSM and DT.
- COM The COM LED indicates active communications on the RS-485 Alpha Bus. The Alpha Bus is the internal communications link between the EDSM and the power system. It is a combined indication of both transmit and receive activity.



Fig. 2-1, LED Arrangement

2.2 STAT Switch

The momentary push-button labeled "STAT" on the front panel has two functions. When held down MORE than 3 seconds, the microcontroller will reset. If held down LESS than 2 seconds, the LED matrix will display any faults being reported to the microcontroller. Repeated presses of the STAT button will display subsequent alarms. The table below lists all of the valid error codes.

Display	Alarm	Definition
ALM/RDY	Reserved	This code is not used.
ALM/RDY	EOD Imminent	Line loss, batteries cannot support backup power much longer.
ALM/RDY DT/COM	Battery System Fault	Battery string is too low or too high. Battery delta is too great. No batteries detected.
ALM/RDY	Tamper	Cabinet intrusion.
ALM/RDY	Reserved	Indicated program switch is on.
ALM/RDY	System Addressing Fault	System device has an invalid address.
ALM/RDY	System Test Failure	Battery or inverter failure.
ALM/RDY	XM2 Alarm	An XM2 is reporting alarm status.
ALM/RDY	ECM Alarm	The generator is reporting alarm status.
ALM/RDY DT/COM	Configuration Error	Lost communication with XM2. No temp probes found. XM2 has configuration error. Some XM2s see line, others do not.
ALM/RDY	Self Test Fail	EDSM failed self-test on initial power up.
ALM/RDY	Daughter Board Status	Daughter board Battery Sense is missing or failed.
ALM/RDY	No Alarm	Normal condition, no alarms reported.

Legend:

Unlit LED
Green Lit LED
Red Lit LED

Table 2-1, Alarm Codes

2.3 COM Connector

The COM connector is used to communicate with the other devices in the power system (i.e. the AlphaGuard CMM, XM2-SI card). The DT connector can connect the EDSM to an external digital transponder.



Pin #	Description
1	Sys Com Pwr (+)
2&5	RS-485 (+)
3 & 4	RS-485 (-)
6	Sys Com Pwr (-)

Fig. 2-2, COM Connector



Fig. 2-3, DT Connector



The DT connector is only used for connecting to an external digital transponder. Connecting any other device to the DT connector may result in damage to the EDSM, associated equipment, and errantly connected device (i.e. laptop).

2.4 AUX and Tamper Connectors

The AUX connector allows the EDSM to monitor two 36Vdc or 48Vdc battery strings. The TAMPER connector is used for cabinet door detection. Tamper switches are wired in parallel and connected at this location. The pin numbering and description are shown below:

Pin #	Description			
Tamper Switch				
1	Tamper Sense			
2	Tamper Sense (logic ground)			
AUX Connector				
1	Battery 1A Neg			
2	Battery 1A Pos (12V)			
3	Battery 2A Pos (24V)			
4	Battery 3A Pos (36V)			
5	Battery 1B Pos (12V)			
6	Battery 2B Pos (24V)			
7	Battery 3B Pos (36V)			
8	Battery 4A or 4B Pos (48V)			



Fig. 2-4, Tamper Switch and AUX Connector

2.5 DIP Switch

The on board DIP Switch (SW2) is used to configure the tamper polarity, provide RS-485 biasing per the ANSI/SCTE25-3 Specification, and to enable programming. The factory default switch settings are in the OFF position, with the exception of #3 in the ON position. The tamper polarity switch allows for either a N/O or N/C switch to be used for enclosure door monitoring. The ANSI/SCTE25-3 specification requires the RS-485 signals to be optionally biased to the Vcc and ground of the equipment. The programming mode switch setting is used during programing of the micro controller. SW4 MUST be in the OFF position for normal operation of the EDSM. For most transponders, SW3 must be in the ON position.

Switch #	Position Description	Function	Description
1	OFF [default]	Tamper Polarity	Normally Closed
1	ON	Tamper Polarity	Normally Open
2	OFF [default]	HMS Pullup/down	RS-485(+) Pulled Up RS-485(-) Pulled Down
2	ON	HMS Pullup/down	No Bias
3	OFF	HMS Line Balance	No Balance
3	ON [default]	HMS Line Balance	RS-485 lines tied through 120 Ohm resistor
4	OFF [default]	Program	User Mode
4	ON	Program	Programming Mode

Table	2-2.	DIP	Switch	Settings
Tuble	<u> </u>		Ownton	Counigo



Fig. 2-5, DIP Switch Location

2.6 Headers

The OEM Embedded Transponder (OEMET) connector is located in the lower right hand corner of the circuit board and uses a 2x5 ribbon cable connector. The connector is used for connecting the EDSM to a digital transponder. Example OEMET include: Tollgrade Docsis Embedded Transponder, Tollgrade HMS Embedded Transponder, AM HMS Embedded Transponder, WISI HMS Embedded Transponder, Tollgrade Proprietary Embedded Transponder, and AM Proprietary Embedded Transponder.



Fig. 2-6, Headers

3.0 Module Installation

NOTE:

- If the XMS2 system already has an existing comm module installed, remove the module as outlined in the procedure below. If the system does not have a communications module installed, proceed to the next section for the installation procedure.
- During this procedure, backup capability will be temporarily lost.

3.1 XMS2 Communication Module Removal Procedure

Allow 15 minutes for completion of procedure

Tools required: #2 Phillips screwdriver

- 1. Disconnect any status monitoring cables/harnesses connected to the front panel of the communications module.
- 2. Verify that the battery breaker is OFF.
- 3. Disconnect the battery cable connections.
- 4. Unscrew the three captive mounting/grounding screws located on the front panel of the Inverter Module (IM), and on the existing communications module.
- 5. Slide the IM out of the chassis just far enough to reach the ribbon cable at the back of the module. See Fig. 3-1.
- 6. Unlatch the locking clips holding the ribbon cable connector into the plug, and gently remove the connector from the plug.



Fig. 3-1, Ribbon Cable Removal

3.0 Module Installation, continued

- 3.1 XMS2 Communication Module Removal Procedure, continued
 - 7. Slide the inverter module out of the power supply.
 - 8. Unscrew the captive mounting screws holding the existing comm module onto the inverter module sheet metal.
 - 9. Verify that the 2x9 pin jumper is in position, seated fully into the inverter module.
 - 10. Align the XMS2 header on the EDSM with the 2x9 jumper and gently press into place.
 - 11. Tighten the captive mounting screws into the inverter module.

Fig. 3-2, EDSM Details

- 3.0 Module Installation, continued
 - 3.1 XMS2 Communication Module Removal Procedure, continued
 - 12. Slide the inverter module sheet metal into the card guides of the power supply and reconnect the ribbon cable to the connector and latch the locking pins.
 - 13. Using ONLY the handle on the front of the inverter module, firmly seat the inverter module into the power supply and tighten the thumb screws.
 - 14. Verify that the BATTERY BREAKER is in the OFF position.
 - 15. Reconnect the battery pack to the inverter module, and set the BATTERY BREAKER to the ON position.
 - 16. Reconnect all other cables and sensors.
 - 17. Connect devices to the EDSM as shown below.
 - Verify and program if necessary all XMS2 power supplies to a unique address (1 through 7) via the XM2 (refer to XM2 Technical Manual Smart Display Set Up Menu). Refer to the AlphaGuard manual for CMM hookup.

Fig. 3-3, Device Interconnection

- 3.0 Module Installation, continued
 - 3.1 XMS2 Communication Module Removal Procedure, continued
 - 19. Press and hold the STAT push-button on the front panel of the EDSM until all LEDs go out, continue to press the button until the RDY LED is lit indicating that the reset function is initiated. A reset will force the EDSM to "ping" all devices in the system.
 - 20. Place a magnet over the tamper sensor to override the Tamper Alarm.
 - 21. Verify that the ALM LED is off, and the RDY LED is flashing at a 1Hz rate (once per second). If alarms are present, use the table below to determine the cause and take corrective action.
 - 22. After all alarms are cleared, verify no alarms are present at the head end.

Problem	Cause	Solution
RDY LED on solid	SW2 Pos 4 'Program' in the ON position	Set SW2 Pos 4 to the OFF position
LEDs on and not flashing	STAT switch pressed to indicate alarm codes	Continue pressing STAT until all LEDs flash
LEDs off and not flashing	XMS2 (2x9) header missing	Insert header
Individual battery readings	Incorrectly wired batteries	Verify wiring harness is properly terminated at each battery
not displaying properly	Damaged connector/pins	Inspect connector pins, replace harness if necessary

Table 3-1,	Troubleshooting
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