GE
Security

Fiber Optic Transmission System
Two Channels Multiprotocol Data
Models S715D and S7715D

installation instructions

imagination at work

11-0715D-C

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BEFORE YOU BEGIN

Read these instructions before installing or operating this product.

Note: This installation should be made by a qualified service person and should conform to local codes.

This manual provides installation and operation information. To use this document, you must have the following minimum qualifications:

- A basic knowledge of CCTV systems and components
- A basic knowledge of electrical wiring and low-voltage electrical hookups

Intended use

Use this product only for the purpose for which it was designed; refer to the product specification and user documentation.

Customer Support

For assistance in installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, please contact Technical Support and Sales:

GE Security
Call: 888 437-3287 (US, including Alaska and Hawaii; Puerto Rico; Canada)
Outside the toll-free area: 503 885-5700
www.gesecurity.com

Note: You should be at the equipment and ready with details before calling Technical Support.

Conventions Used in this Manual

Boldface or button icons highlight command entries. The following **WARNING, CAUTION,** and **Note** statements identify potential hazards that can occur if the equipment is handled improperly:

* **WARNING:**
Improper use of this equipment can cause severe bodily injury or equipment damage.

** **CAUTION:**
Improper use of this equipment can cause equipment damage.

Note: Notes contain important information about a product or procedure.

* This symbol indicates electrical warnings and cautions.
** This symbol indicates general warnings and cautions.

1 INTRODUCTION

This is a guide to the installation and operation of the S715D and S7715D series fiber optic data and contact closure transmission system. Please read the entire manual before installing the equipment.

NOTE: The series numbers S715DT and S715DR are used to describe all models of transmitters and receivers unless noted otherwise.

The Series S715D and S7715D transmission systems offer simultaneous real-time transmission of:

- Two channels of two-way multi-protocol data (MPD)
- Two channels of two-way relay/contact closures

The S715D system operates over one or two multimode fibers and the S7715D uses one or two single-mode fibers. A complete system consists of an S715DT transmitter and an S715DR receiver, or two S715D transceivers. Units are designed for installation in the 515R1 or 517R1 Card Cages or in the 501R rack card enclosure. Figure 1 shows a basic system diagram.

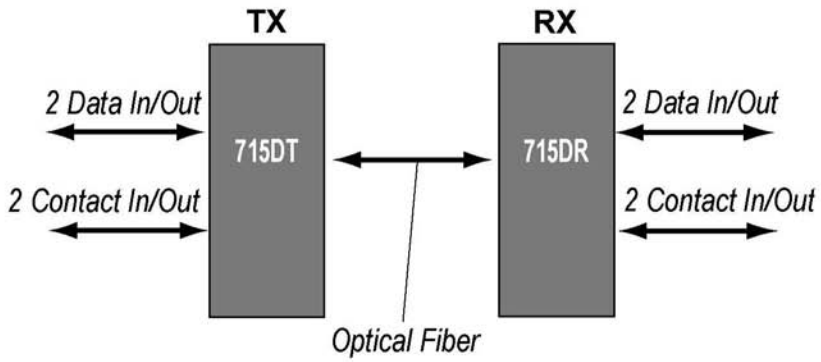


Figure 1. S715D System Diagram

2 MODULE SETUP

2.1 UNPACKING THE UNIT

In the event that anything is missing from the following list, contact your authorized dealer or representative.

- S715DT (S7715DT) Transmitter, S715DR (S7715DR) Receiver, or S715D (S7715D) Transceiver
- User Manual

Save the original packing materials in case it becomes necessary to return the unit.

CAUTION:
Take all necessary precautions to protect the unit from static electricity during the following procedures. Equipment damage may result.

2.2 DATA TRANSLATION

The data translation capability of the S715D series is unique in the industry. It enables translation from one data format to another and eliminates the need for external translation devices.

The translation is in the physical layer only; it cannot interpret specific protocols or translate commands. Due to the encoding schemes utilized in Manchester and Biphase, these formats are exempt from translation. Data translation examples are shown in Table 1.

Table 1. Data Translations

Translation	TX Switch Setting	RX Switch Setting	Comments
TTL to RS232 three-wire	3	1	Signal level conversion
RS232, three-wire to TTL	1	3	Signal level conversion
TTL to RS422	3	4	Single ended to differential conversion
RS422 to TTL	4	3	Differential to single ended conversion
RS232, three-wire to RS422	1	4	Single ended to differential conversion
RS422 to RS232, three -wire	4	1	Differential to single ended conversion
RS232, five-wire to RS485	2	7 - A	RS232 handshaking bit is used to indicate tri-state
RS485 to RS232, five-wire	7 – A	2	Tri-State detection circuitry activates handshaking bit

2.3 INPUT/OUTPUT DATA FORMAT

Determine the data formats required for input and output for both data channels. The data formats may be the same or different for each channel. The data format can also differ from input to output on the same data channel.

2.3.1 MANUAL DATA SELECTION

To set the data format for channels 1 and 2, see Figure 2, Figure 3, Table 2 and perform the following.

1) Select a data format for each Data channel on the transmitter using DATA SELECT switch SW1 (channel 1) and SW2 (channel 2).

2) Select a data format for each Data channel on the receiver using DATA SELECT switch SW1 (channel 1) and SW2 (channel 2).

NOTE: The DATA SELECT switches, SW1 and SW2 are shipped in the Auto Configure setting (position 0).

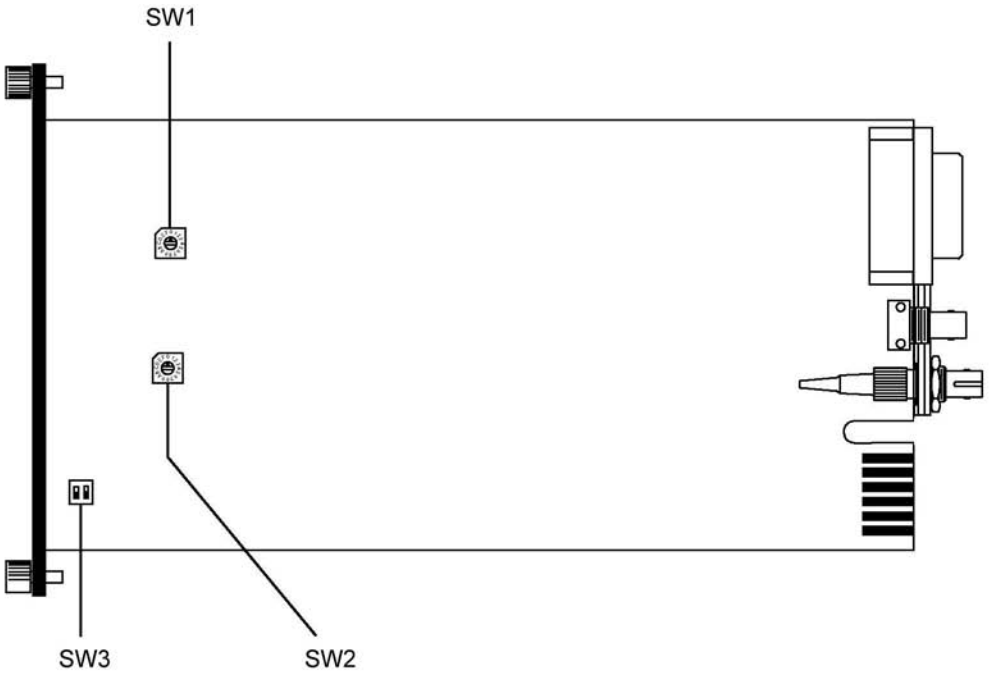
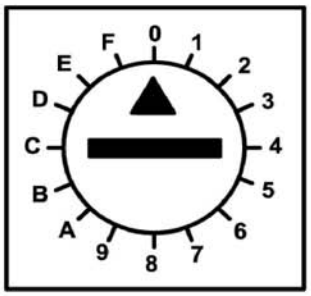


Figure 2. S715D Location of Switches



SW1 - DATA CHANNEL 1

SW2 - DATA CHANNEL 2

Figure 3. DATA SELECT Switches SW1 and SW2

Table 2. DATA SELECT SW1/SW2 Settings

Setting	Data Mode	Setting	Data Mode
0	Not Configured or Auto Configuration	8	RS485 two -wire, 2V offset
1	RS232	9	RS485 four-wire standard
2	RS232 with handshake	A	RS485 four-wire, 1V offset
3	TTL	B	RS485 four-wire, 2V offset
4	RS422 two-wire	C	Not used
5	Manchester/Biphase	D	Not used
6	RS485 two-wire Standard or SensorNet	E	Receiver Test mode
7	RS485 two -wire, 1V offset	F	Transmitter Test mode

2.3.2 AUTO DATA CONFIGURATION

The S715D modules can be set for Auto Data Configuration, where the format of the data on channel 1 or channel 2 is controlled from one unit, either the transmitter or the receiver. To use the Auto Data Configuration feature, perform the following.

1) Set the DATA SELECT switches SW1 or SW2 on one unit to position 0 (default setting).

2) Set the DATA SELECT switches SW1 or SW2 on the other unit to the desired format.

3) If the data format needs to be changed for a particular channel, only the DATA SELECT switches on one unit need to be changed. The other unit remains in position 0 and will auto-configure according to the selected data format.

2.4 OPTICAL ALARM

Rack cards are supplied with an alarm function that activates if the optical signal input to the module fails. This alarm can be output to the rack power supply, where an audible alarm and alarm output contact closure can be activated. The optical alarm is controlled using DIP switch SW3 on the audio/data card. To set the optical alarm, see Figure 2 and Figure 4 and perform the following.

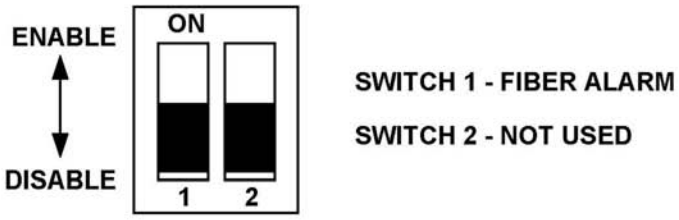


Figure 4. ALARM Switch SW3

1) Set switch SW3-1 to ON to enable the FIBER (optical) alarm.

2) If the optical alarm output is not desired, set the DIP switch SW3-1 to OFF.

NOTE: Setting ALARM switch SW3-1 to OFF does not affect the operation of the LEVEL/LOSS LED. A red LED always indicates signal loss.

3 INSTALLATION

This fiber-optic link is supplied as a rack card. The rack cards can also be used in a standalone configuration if placed in a 501R rack card enclosure.

Units should be installed in dry locations protected from extremes of temperature and humidity.

3.1 RACK CARDS

Rack cards are installed in a 19-inch (483-mm), EIA standard card-cage rack, either the 515R1 or the 517R1. Follow these guidelines to install rack cards.

CAUTION:
Although rack cards are hot-swappable and can be installed without turning off power to the rack, the power switch on the rack power supply should be turned off and the rack power supply disconnected from any power source before installing rack cards.

1) Make sure that the card is oriented right-side up, and slide it into the card guides in the rack until the edge connector at the back of the card seats in the corresponding slot in the rack's connector panel. Seating may require thumb pressure on the top and bottom of the card's front panel.

CAUTION:
Do not press on any of the LEDs when installing cards into the rack. Equipment damage may result.

2) Tighten the two thumbscrews on the card until the front panel of the card is seated against the front of the rack.

3.2 501R RACK CARD ENCLOSURES

Follow these guidelines to install rack cards in the 501R rack card enclosure.

CAUTION:
The rack card module can be powered only by 13.5 - 16 VDC. AC power must not be used. It is recommended that the 613P power adapter be used to supply power to the module. Damage to the equipment may result if AC power is used.

CAUTION:
Complete all instruction steps before supplying power to the unit.

1) Look inside the enclosure to determine the location of the socket for the edge connector on the card. Orient the card so that it will seat in the socket, and slide it into the card guides in the enclosure until the edge connector at the back of the card seats in the socket. Seating may require thumb pressure on the top and bottom of the card's front panel.

CAUTION:
Do not press on any of the LEDs when installing cards into the enclosure. Equipment damage may result.

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2) Tighten the two thumbscrews on the card until the front panel of the card is seated against the front of the enclosure.

3) Determine where the module will be installed, and ensure that there is adequate space for making the various cable connections and for reading the diagnostic LEDs. See Figure 5.

NOTE: The type of screws chosen must be suitable for the surface on which the module is to be mounted.

4) Standalone modules can be attached to suitable flat surfaces with four No. 6 (3 mm) screws. After the enclosure is securely attached to a flat surface, the cable connections can be made.

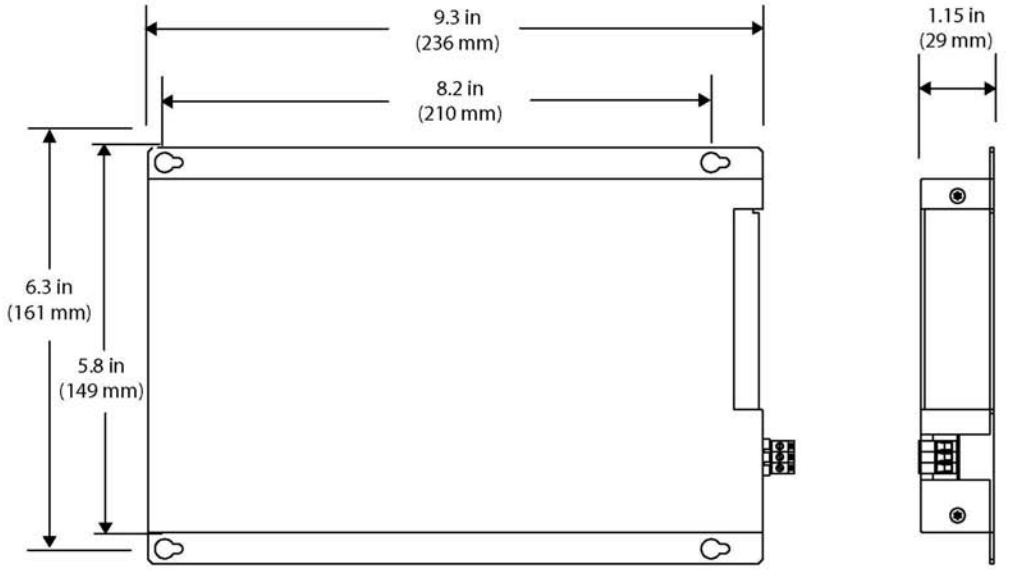


Figure 5. 501R Rack Card Enclosure Mounting Data

3.3 CONNECTIONS

All data, contact, and fiber connections are made to the back panel of the S715D module. When connecting data or contact signals, always wire the signal OUT pins on the data equipment to the signal IN pins on the fiber links, and the signal IN pins on the data equipment to the signal OUT pins on the fiber links. See Figure 6.

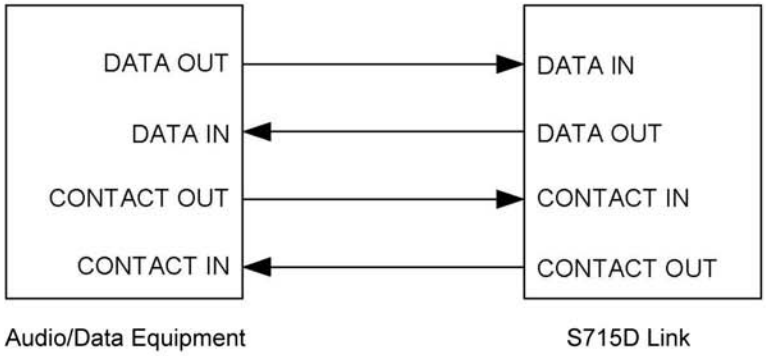
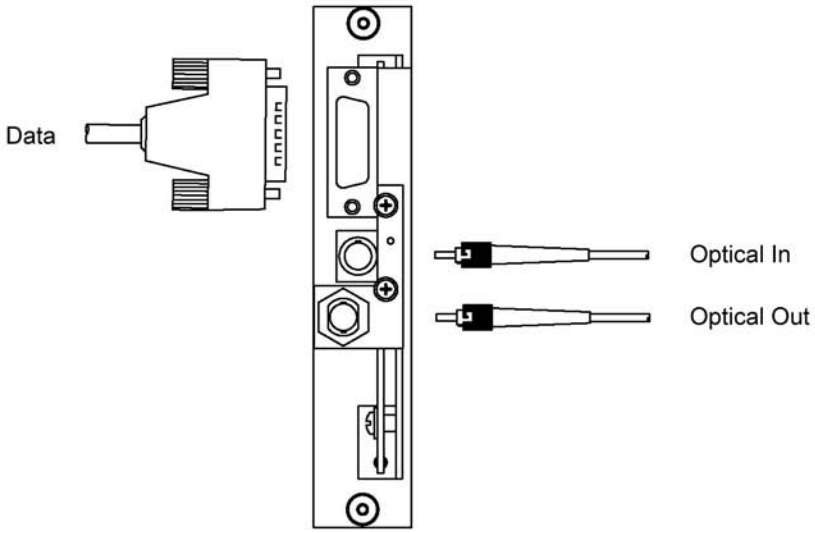


Figure 6. S715D Fiber Link Audio – Data – Contact Connections

3.3.1 BACK PANEL CONNECTIONS

Data and contact signals can be connected directly to the unit by wiring a 26-pin male D-connector (AMP plug part number 748474-1, pin part number 748333-4) and attaching it to data connector J4 on the back panel of the unit. See Figure 7. Table 3 lists the signal and pin information.



Note: Optical In connector is not present on 1-Fiber models.

Figure 7. S715D 2-Fiber Module Back Panel Connections

Table 3. J4 Audio/Data Connections

Pin	Signal	Pin	Signal
1	NO CONNECTION	14	NO CONNECTION
2	GROUND	15	NO CONNECTION
3	NO CONNECTION	16	GROUND
4	CONTACT CHANNEL 1 IN +	17	DATA CHANNEL 1 OUT -
5	NO CONNECTION	18	DATA CHANNEL 1 IN -
6	NO CONNECTION	19	CONTACT CHANNEL 2 OUT -
7	DATA CHANNEL 1 OUT +	20	CONTACT CHANNEL 1 OUT +
8	DATA CHANNEL 1 IN +	21	CONTACT CHANNEL 1 OUT -
9	DATA CHANNEL 2 IN -	22	+5 VDC BIAS
10	CONTACT CHANNEL 2 OUT +	23	GROUND
11	NO CONNECTION	24	DATA CHANNEL 2 OUT +
12	NO CONNECTION	25	DATA CHANNEL 2 OUT -
13	CONTACT CHANNEL 2 IN +	26	DATA CHANNEL 2 IN +

3.3.2 INTERFACE BOARD CONNECTIONS

The S715D units are also supplied with an interface board that attaches directly to the back of the module. The interface board contains screw terminal connectors for the data and contact inputs and outputs. Refer to Figure 8 and Table 4 through Table 14 for interface board wiring information.

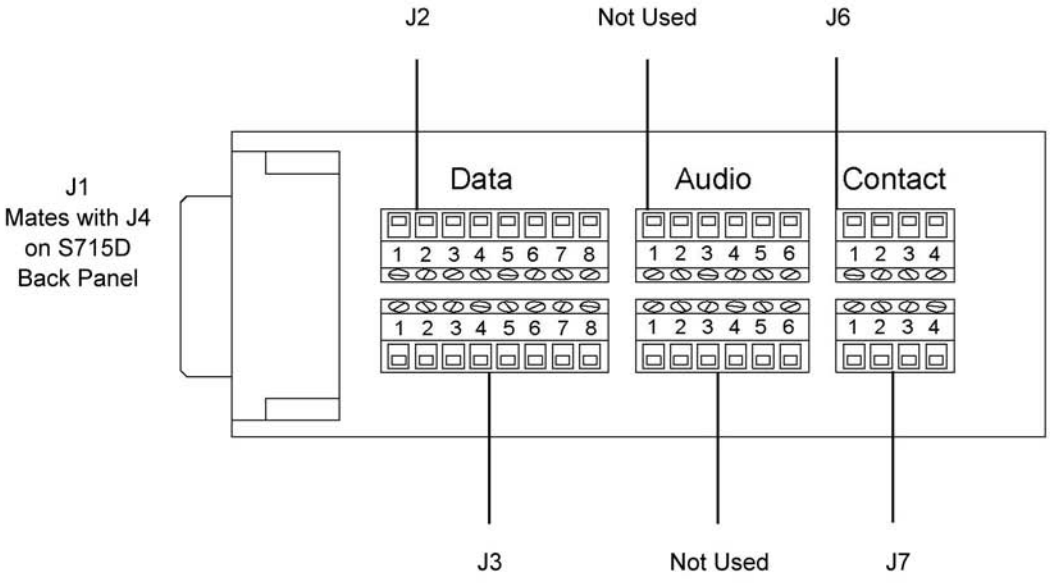


Figure 8. S715D Interface Board

Table 4. Interface Board Connections

Pin	Signal	Pin	Signal
Connector J2		**Connector J3**	
1	GROUND	1	GROUND
2	DATA CHANNEL 1 OUT +	2	DATA CHANNEL 2 OUT +
3	DATA CHANNEL 1 OUT -	3	DATA CHANNEL 2 OUT -
4	+5 VDC BIAS	4	+5 VDC BIAS
5	DATA CHANNEL 1 IN +	5	DATA CHANNEL 2 IN +
6	DATA CHANNEL 1 IN -	6	DATA CHANNEL 2 IN -
7	TERMINATION	7	TERMINATION
8	GROUND	8	GROUND
Connector J6		**Connector J7**	
1	CONTACT CHANNEL 1 IN +	1	CONTACT CHANNEL 2 IN +
2	CONTACT CHANNEL 1 IN -	2	CONTACT CHANNEL 2 IN -
3	CONTACT CHANNEL 1 OUT +	3	CONTACT CHANNEL 2 OUT +
4	CONTACT CHANNEL 1 OUT -	4	CONTACT CHANNEL 2 OUT -

Table 5. J2/J3 Connections for RS232 Data

SW1 / SW2 – Position 1	
Pin	**Signal**
1	GROUND/SHIELD
2	RS232 OUT
3	NO CONNECTION
4	NO CONNECTION
5	RS232 IN
6	NO CONNECTION
7	NO CONNECTION
8	GROUND

Table 6. J2/J3 Connections for RS232 Data with Handshaking

SW1 / SW2 – Position 2	
Pin	**Signal**
1	GROUND/SHIELD
2	RS232 OUT
3	RTS/CTS OUT
4	NO CONNECTION
5	RS232 IN
6	RTS/CTS IN
7	NO CONNECTION
8	GROUND

Table 7. J2/J3 Connections for TTL Data

SW1 / SW2 – Position 3	
Pin	**Signal**
1	GROUND/SHIELD
2	NO CONNECTION
3	TTL OUT
4	NO CONNECTION
5	TIE TO PIN 1
6	TTL IN
7	NO CONNECTION
8	GROUND

Table 8. J2/J3 Connections for RS422 Data

SW1 / SW2 – Position 4	
Pin	**Signal**
1	GROUND/SHIELD
2	RS422 OUT -
3	RS422 OUT +
4	NO CONNECTION
5	RS422 IN -
6	RS422 IN +
7	NO CONNECTION
8	GROUND

Table 9. J2/J3 Connections for Manchester/Biphase Data

SW1 / SW2 – Position 5	
Pin	**Signal**
1	MANCHESTER/BIPHASE OUT -
2	MANCHESTER/BIPHASE OUT +
3	NO CONNECTION
4	NO CONNECTION
5	MANCHESTER/BIPHASE IN -
6	MANCHESTER/BIPHASE IN +
7	NO CONNECTION
8	GROUND

Table 10. J2/J3 Connections for Manchester/Biphase Termination Unit Data

SW1 / SW2 – Position 5	
Pin	**Signal**
1	MANCHESTER/BIPHASE OUT -
2	MANCHESTER/BIPHASE OUT +
3	NO CONNECTION
4	NO CONNECTION
5	MANCHESTER/BIPHASE IN -
6	MANCHESTER/BIPHASE IN +
7	TERMINIATION - TIE TO PIN 5
8	GROUND

Table 11. J2/J3 Connections for RS485 2-Wire Data

SW1 / SW2 – Position 6 (standard offset) Position 7 (1V offset) Position 8 (2V offset)	
Pin	**Signal**
1	GROUND/SHIELD
2	NO CONNECTION
3	NO CONNECTION
4	+5 VDC BIAS OUT
5	RS485 -
6	RS485 +
7	TERMINATION – TIE TO PIN 5
8	GROUND

Table 12. J2/J3 Connections for RS485 4-Wire Data

SW1 / SW2 – Position 9 (standard offset) Position A (1V offset) Position B (2V offset)	
Pin	**Signal**
1	GROUND/SHIELD
2	RS485 OUT -
3	RS485 OUT +
4	+5 VDC BIAS OUT
5	RS485 IN -
6	RS485 IN +
7	TERMINATION – TIE TO PIN 5
8	GROUND

Table 13. J2/J3 Connections for SensorNet Data

SW1 / SW2 – Position 6	
Pin	**Signal**
1	GROUND/SHIELD
2	NO CONNECTION
3	NO CONNECTION
4	+5 VDC BIAS OUT
5	SENSORNET -
6	SENSORNET +
7	TERMINATION – TIE TO PIN 5
8	GROUND

Table 14. J2/J3 Connections for Test Mode Loopback

SW1 / SW2 – Position F	
Pin	**Signal**
1	NO CONNECTION
2	TIE TO PIN 5
3	TIE TO PIN 6
4	NO CONNECTION
5	TIE TO PIN 2
6	TIE TO PIN 3
7	NO CONNECTION
8	GROUND

3.3.3 BUILT-IN TERMINATION

The S715D features a built-in termination on the Interface Board for RS485, Manchester, Biphase, and SensorNet installations. Refer to Table 4, and Table 10 through Table 13.

3.3.4 FIBER OPTIC CABLE CONNECTIONS

Most cable manufacturers identify the individual fibers in the cable. Select appropriately terminated fiber and mark both ends with a unique identification label (e.g. for cable no. 03, fiber no. 08) to ensure that the fiber connected to the near end is the same as the one connected to the far end.

The proper optical connection will link the transmitter's TRANSMIT (OUT) port to the receiver's RECEIVE (IN) port. See Figure 7.

1) Wipe the inside of the port's sleeve with a lint-free pipe cleaner moistened with reagent-grade isopropyl alcohol. Blow dry with dry air.
2) Clean the connector using a lint-free cloth dampened with reagent-grade isopropyl alcohol. Thoroughly wipe the side and end of the ferrule. Blow the ferrule dry with dry air. Visually inspect the ferrule for lint.
3) Fasten the fiber optic cable to the port.

3.3.5 STANDALONE MODULE POWER CONNECTIONS

CAUTION:
Standalone modules can be powered only by 13.5 - 16 VDC. AC power must not be used. Damage to the equipment will result.

The 501R rack card enclosure has a removable screw terminal connector for the electrical input connection. Pin 1 of this connector is the GROUND terminal, pin 2 is not used, and pin 3 is the +DC terminal as marked on the enclosure. Connect the input power as follows.

1) Identify the power connector and remove it from the module.
2) Make sure the power supply is not connected to any power source, and strip approximately 0.25 inches (6 mm) of insulation from the ends of the cable.
3) Taking care to observe the correct polarization of the cable, insert one lead into one of the screw sockets and tighten the screw. Confirm the security of the connection with a light pull on the cable.
4) Repeat step 3 for the other conductor.
5) Seat the connector in its position in the fiber unit.
6) Plug the power supply into a suitable outlet.
7) Power up the peripheral equipment and verify system operation.

3.3.6 RACK MODULE POWER CONNECTIONS

Power connections are made automatically when the card is installed. To supply power to the rack, connect the rack power supply to an AC outlet and set the power switch to ON.

NOTE: To provide earth ground reference, Stand Alone (Enclosure) modules need to be connected to a good earth ground. This can be accomplished by connecting a copper-based conductor from the modules ***DC Common/Ground*** pin to an approved earth ground.

4 OPERATION

4.1 NORMAL OPERATION

S715D fiber links operate automatically after installation. Refer to paragraph 4.3 for details on how to execute the test mode. For description of LED color codes and an explanation of how to diagnose system faults using the LEDs built into the units, refer to section 5, Troubleshooting.

4.2 LED OPERATION

The S715D modules have built-in Status Monitoring And Reliability Test System (SMARTS™) diagnostic capabilities that include LED indicators for monitoring data and optical status. The S715D fiber units have pairs of LED indicators that describe the current state of operation; the current status of the data signals, and fiber optic signal strength.

These indicator pairs are LASER and LEVEL/LOSS, DATA 1 IN/OUT, DATA 2 IN/OUT, CONTACT 1 IN/OUT, CONTACT 2 IN/OUT, ENA 1 and ENA 2. See Figure 9. The operation of the front panel LEDs is described in the following paragraphs.

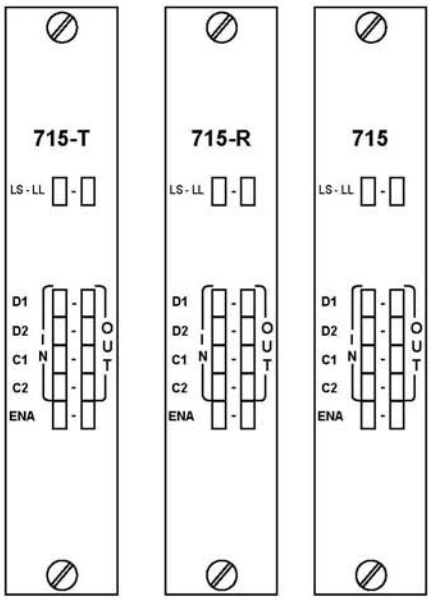


Figure 9. Front Panel LEDs

4.2.1 LASER (LS) INDICATOR

A green LASER LED indicates the laser is operating normally. A red LASER LED indicates the laser is malfunctioning.

4.2.2 LEVEL/LOSS (LL) INDICATOR

This LED indicates the relative optical signal strength received at the module. When sufficient optical power is being received, the LED is green. As the optical power decreases, as happens through long fiber runs, splices or connections, the LEVEL/LOSS LED stays green until the optical power drops below the minimum level.

The LEVEL/LOSS LED will turn bright red to indicate an insufficient amount of optical power is being received. All data will default to its failure state level to eliminate bus contention.

4.2.3 DATA 1, 2 (D1, D2) IN/OUT INDICATORS

The DATA IN LED indicates the level of the data signal being input to the S715D over copper. A green DATA IN LED indicates a logic HIGH is present on the data inputs.

An amber DATA IN LED indicates a logic LOW is present on the copper. No color (OFF) indicates a tri-state or high impedance input.

This LED can be used to determine the resting state of your equipment and, in the RS485 states, verify that a tri-state is being detected properly.

The S715D has special circuitry to capture data transitions and make them visible on the LEDs. High-speed bursts of activity, previously undetectable by standard LED circuits, are easily seen by this special circuitry.

The DATA OUT LED functions identically to the DATA IN LED except that the LED represents data that is being output from the unit. This LED has the same high-speed capture circuitry as the DATA IN LED.

4.2.4 CONTACT 1, 2 (C1, C2) IN/OUT INDICATORS

The CONTACT IN/OUT LEDs indicate the presence of relay/contact closure signals. A green CONTACT IN/OUT LED indicates a closed relay contact, and a red LED indicates an open relay contact.

4.2.5 ENABLED (ENA) 1, 2 INDICATORS

The ENA 1 (left) and ENA 2 (right) LEDs monitor the selected mode of Data channels 1 and 2. They have five states as follows:

- Green indicates a valid mode has been selected.
- Red indicates an invalid mode (spare or TEST mode) has been selected.
- Flashing red/green indicates that no mode has been selected.
- Flashing green/off indicates a valid mode is configured remotely.
- Flashing red/off indicates either an invalid mode or the Test mode is configured remotely.

4.3 TEST MODE

The Test mode enables you to verify the operation of the data circuits in the S715D units, as well as the fiber connection from the S715D transmitter to the S715D receiver. To execute the test mode, perform the following.

1) Set the DATA SELECT switch on the S715D you are testing to F (TX Test Mode). At this end only, wire the data connections as follows (refer to Table 14):

   - Connect the DATA IN+ pin to the DATA OUT+ pin.
   - Connect the DATA IN- pin to the DATA OUT- pin.

2) At the opposite end, set the DATA SELECT switch on the S715D to E (RX Test Mode).

3) The transmitting unit should operate as follows:

   - ENABLED LED is RED, indicating that a valid data format has not been selected.
   - DATA OUT LED is slowly flashing between amber, green, and off. This indicates that the test mode is generating an output pattern and sending it out on copper.
   - DATA IN LED should mimic the DATA OUT LED. This indicates a good, proper loopback connection, and proves that the data transmit/receive circuitry is working properly.
   - LEVEL/LOSS might be red or green indicating received fiber signal strength.

4) The receiving unit should operate as follows:

   - ENABLED LED is GREEN indicating a valid data format is selected.
   - DATA OUT LED should slowly flash amber, green, off. This indicates that the fiber path from the unit set for Test mode is reliable.
   - DATA IN LED should be OFF indicating there is no input copper connection made.
   - LEVEL/LOSS LED should be green to off (but not red), indicating that sufficient optical power is being received.
   - The AUDIO OUT LEDs should be green indicating sufficient audio output signal level.

After the test has been performed at one end, swap switch positions and connectors to perform the test on the other end. If the test is successful, the copper-in-to-fiber-to-copper-out conversion is working in both directions.

5 TROUBLESHOOTING

Table 15 contains troubleshooting information for the S715D units.

Table 15. Troubleshooting

Problem	Probable Cause	Solution
Red LASER LED	Laser is malfunctioning	Replace module
Red LEVEL/LOSS LED	Fiber not connected	Connect fiber to receiver and transmitter
	Transmitter/Receiver not powered up	Connect and apply power to module
DATA IN LED is OFF	Tri-state condition	No action required
	Data input not connected to module	Connect data input to module
	Data source not powered up	Apply power to data source
	Data source not transmitting	Check data source and cabling
Red ENA 1 and/or 2 LED	Test or invalid mode selected	Set DATA SELECT switch to valid format
ENABLED 1 and/or 2 LED flashing red/green	Both Transmitter and Receiver set to Auto Configure mode	Set Transmitter or Receiver DATA SELECT switch to valid format
ENABLED 1 and/or 2 LED flashing red/off	Invalid or Test mode configured remotely	Set DATA SELECT switch to valid format if not in Test mode

APPENDIX A: RS485 APPLICATION NOTES

A.1 INTRODUCTION

The S715D is configurable for both full-duplex (four-wire) and half-duplex (two-wire) operation. It can be used for interfacing to systems adhering strictly to the RS-485 specification and for use with systems that use a modified, "fail-safe biased" RS-485 bus.

A.2 CONNECTION

Use high-quality twisted-pair wiring, and make sure all connection points are clean and tight. A loose connection on one of the wires can appear to function, yet cause intermittent errors: DATA LEDs may be flashing as signals pass through the system, but those signals will be corrupt.

A.3 CONFIGURATION

The S715D multi-protocol data (MPD) units are designed to work with virtually any RS485 system. Unfortunately, some systems operate on a "modified" version of RS485 that use a fail-safe biasing to pull up/down their bus during a tri-state condition. In a standard RS485 system, when a driver on a properly terminated bus goes into tri-state, the voltage between the differential outputs should be less than 200 mv.

(This is considered "standard offset" in the product instruction manuals.) A differential output tri-state voltage this small can cause some non-standard systems to latch up, because they are designed for much larger, "fail-safe," offsets.

To be able to interface to such equipment, the S715D MPD units offer two more "offset" level modes. In most cases, the S715D unit should be configured for "standard offset" operation.

When the system is operating properly, the DATA IN and DATA OUT LEDs are off when there is no communication (tri-state) and flash when data is being sent or received. If the link is not functioning properly (LEDs will most likely not turn off), change the DATA SELECT switch on the unit to a higher offset mode.

First try 1 V, then 2 V. If switching the mode switch does not prove effective, the offset level may have to be emulated at one end of the system by using pull-up/down resistors on the data connector. The S715D has a +5 V bias pin and ground pins on the connector for this purpose. Contact the equipment manufacturer's technical support for recommended resistor values and configuration.

A.3 TERMINATION

RS485 systems need to be properly terminated in order to work reliably. Two terminating resistors are used on each RS485 bus, at the farthest ends of the link.

These resistors should be attached to the data/audio connector on the back of the unit if the S715D link is at one end of the bus. If the terminating resistors are left out, the tri-state condition will not be detected, and the bus might lock up. If there are too many terminations on the bus, signal levels might drop too low, or driver circuitry might fail. The standard value of terminating resistors for RS485 is 120Ω.

Customer Support

For assistance in installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, please contact technical support during normal business hours (Monday through Friday, excluding holidays, between 6 a.m. and 5 p.m. Pacific Time).

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