



**FDR2600 SERIES
RS-485 (2 OR 4-WIRE) REPEATER
DATA INTERFACE**

**Architectural & Engineering
Specifications**

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A & E SPECIFICATIONS

A & E SPECIFICATIONS

FDR2612

RS-485 (2 or 4-WIRE) REPEATER DATA INTERFACE

1. ACCEPTABLE MANUFACTURER

- 1.1. Optellios, Inc., 11 Penns Trail, Suite 300, Newtown, PA 18940 USA
Telephone: 267.364.5298, Fax: 267.364.5357
Email: info@optellios.com, Internet: www.optellios.com
- 1.2. Substitutions: Not Permitted
- 1.3. All fiber optic modules shall be supplied from a single manufacturer

2. FIBER OPTIC DATA REPEATER

- 2.1. Provide fiber optic data repeaters as required. The system shall transmit a single channel of bi-directional data supporting 2 or 4-wire RS-485 (with tri-state) data interfaces. The system shall have an automatically resetting anti-streaming (anti-jabber) circuit for the interruption of faulty data streams to prevent tie-up of network data. The system shall have a time-out selection of 4 – 124 seconds in 4 second increments with an option for infinity (disabled). The system requirements shall be two (2) multimode optical fibers. The system shall have a substantially wide dynamic range as to never require optical or electrical adjustments in order to operate within the given specifications. Optical attenuators shall never be required. The system shall provide local diagnostic indicators. All modules shall be available in both card mount and surface mount versions. All modules shall have automatic resettable polymer fuses on all power rails, which shall provide for automatic reset, as well as transient suppression on all data input/output (I/O) connections. A short circuit in one module shall not affect the operation of other modules powered from the common power supply. All card mount modules shall have the ability to be inserted into and removed from the communication management chassis without interrupting power with no risk of damage to other modules or the communications management chassis during replacement. The system shall have an operating temperature of -40°C to +74°C, ambient, a storage temperature of -40°C to +85°C, ambient, a relative humidity ability of 0% to 95% (non-condensing), have an option for conformal coating, and a MTBF of > 100,000 hours. The system shall exceed NEMA TS-1/TS-2 and Caltrans Traffic Signal Control Equipment Specifications for operating temperature, humidity, mechanical shock, vibration, and voltage transient protection. The system radiated emissions shall be compliant with FCC Part 15, Class B, and EN55022 specifications.

2.2. SPECIFICATIONS

- 2.2.1. Data: One (1) channel, bi-directional

2.3. DATA SPECIFICATIONS

- 2.3.1. Data Interface: RS-485 (2 or 4-wire with tri-state)
- 2.3.2. Data Rate: DC – 115.2 kbps
- 2.3.3. Bit Error Rate (BER): < 1×10^{-9} @ maximum optical loss budget
- 2.3.4. Operating Mode: Simplex or full-duplex

2.4. OPTICAL SPECIFICATIONS

- 2.4.1. Fiber Type: Multimode
- 2.4.2. Wavelength: 850nm
- 2.4.3. Number of Fibers: Two (2)
- 2.4.4. Optical Emitter Type: LED
- 2.4.5. Transmitter Output Power: 25 μ w (-16 dBm)
- 2.4.6. Receiver Sensitivity: 1 μ w (-30 dBm)

A & E SPECIFICATIONS

- 2.4.7. Optical Power Budget: 14 dB
- 2.5. STATUS INDICATOR SPECIFICATIONS
 - 2.5.1. Power (normal/fault)
 - 2.5.2. Data Transmit
 - 2.5.3. Data Receive
 - 2.5.4. Anti-Streaming
- 2.6. The data repeater shall be Optellios Fiber Patrol model FDR2612. The units shall be either card mount or stand alone. Refer to contract drawings for mounting type.

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A & E SPECIFICATIONS

FDR2631

RS-485 (2 or 4-WIRE) REPEATER DATA INTERFACE

1. ACCEPTABLE MANUFACTURER

- 1.1. Optellios, Inc., 11 Penns Trail, Suite 300, Newtown, PA 18940 USA
Telephone: 267.364.5298, Fax: 267.364.5357
Email: info@optellios.com, Internet: www.optellios.com
- 1.2. Substitutions: Not Permitted
- 1.3. All fiber optic modules shall be supplied from a single manufacturer

2. FIBER OPTIC DATA REPEATER

- 2.1. Provide fiber optic data repeaters as required. The system shall transmit a single channel of bi-directional data supporting 2 or 4-wire RS-485 (with tri-state) data interfaces. The system shall have an automatically resetting anti-streaming (anti-jabber) circuit for the interruption of faulty data streams to prevent tie-up of network data. The system shall have a time-out selection of 4 – 124 seconds in 4 second increments with an option for infinity (disabled). The system requirement shall be one (1) multimode optical fibers. The system shall have a substantially wide dynamic range as to never require optical or electrical adjustments in order to operate within the given specifications. Optical attenuators shall never be required. The system shall provide local diagnostic indicators. All modules shall be available in both card mount and surface mount versions. All modules shall have automatic resettable polymer fuses on all power rails, which shall provide for automatic reset, as well as transient suppression on all data input/output (I/O) connections. A short circuit in one module shall not affect the operation of other modules powered from the common power supply. All card mount modules shall have the ability to be inserted into and removed from the communication management chassis without interrupting power with no risk of damage to other modules or the communications management chassis during replacement. The system shall have an operating temperature of -40°C to +74°C, ambient, a storage temperature of -40°C to +85°C, ambient, a relative humidity ability of 0% to 95% (non-condensing), have an option for conformal coating, and a MTBF of > 100,000 hours. The system shall exceed NEMA TS-1/TS-2 and Caltrans Traffic Signal Control Equipment Specifications for operating temperature, humidity, mechanical shock, vibration, and voltage transient protection. The system radiated emissions shall be compliant with FCC Part 15, Class B, and EN55022 specifications. The modules shall use lasers that are compliant with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations Subchapter J.

2.2. SPECIFICATIONS

- 2.2.1. Data: One (1) channel, bi-directional

2.3. DATA SPECIFICATIONS

- 2.3.1. Data Interface: RS-485 (2 or 4-wire with tri-state)
- 2.3.2. Data Rate: DC – 115.2 kbps
- 2.3.3. Bit Error Rate (BER): < 1×10^{-9} @ maximum optical loss budget
- 2.3.4. Operating Mode: Simplex or full-duplex

2.4. OPTICAL SPECIFICATIONS

- 2.4.1. Fiber Type: Multimode
- 2.4.2. Wavelength: 1310/1550nm
- 2.4.3. Number of Fibers: One (1)
- 2.4.4. Optical Emitter Type: Laser

A & E SPECIFICATIONS

- 2.4.5. Transmitter Output Power: 25 μ w (-16 dBm)
- 2.4.6. Receiver Sensitivity: 1 μ w (-30 dBm)
- 2.4.7. Optical Power Budget: 14 dB
- 2.5. STATUS INDICATOR SPECIFICATIONS
 - 2.5.1. Power (normal/fault)
 - 2.5.2. Data Transmit
 - 2.5.3. Data Receive
 - 2.5.4. Anti-Streaming
- 2.6. The data repeater shall be Optellios Fiber Patrol model FDR2631. The units shall be either card mount or stand alone. Refer to contract drawings for mounting type.

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A & E SPECIFICATIONS

FDR2652

RS-485 (2 or 4-WIRE) REPEATER DATA INTERFACE

1. ACCEPTABLE MANUFACTURER

- 1.1. Optellios, Inc., 11 Penns Trail, Suite 300, Newtown, PA 18940 USA
Telephone: 267.364.5298, Fax: 267.364.5357
Email: info@optellios.com, Internet: www.optellios.com
- 1.2. Substitutions: Not Permitted
- 1.3. All fiber optic modules shall be supplied from a single manufacturer

2. FIBER OPTIC DATA REPEATER

- 2.1. Provide fiber optic data repeaters as required. The system shall transmit a single channel of bi-directional data supporting 2 or 4-wire RS-485 (with tri-state) data interfaces. The system shall have an automatically resetting anti-streaming (anti-jabber) circuit for the interruption of faulty data streams to prevent tie-up of network data. The system shall have a time-out selection of 4 – 124 seconds in 4 second increments with an option for infinity (disabled). The system requirement shall be two (2) single mode optical fibers. The system shall have a substantially wide dynamic range as to never require optical or electrical adjustments in order to operate within the given specifications. Optical attenuators shall never be required. The system shall provide local diagnostic indicators. All modules shall be available in both card mount and surface mount versions. All modules shall have automatic resettable polymer fuses on all power rails, which shall provide for automatic reset, as well as transient suppression on all data input/output (I/O) connections. A short circuit in one module shall not affect the operation of other modules powered from the common power supply. All card mount modules shall have the ability to be inserted into and removed from the communication management chassis without interrupting power with no risk of damage to other modules or the communications management chassis during replacement. The system shall have an operating temperature of -40°C to +74°C, ambient, a storage temperature of -40°C to +85°C, ambient, a relative humidity ability of 0% to 95% (non-condensing), have an option for conformal coating, and a MTBF of > 100,000 hours. The system shall exceed NEMA TS-1/TS-2 and Caltrans Traffic Signal Control Equipment Specifications for operating temperature, humidity, mechanical shock, vibration, and voltage transient protection. The system radiated emissions shall be compliant with FCC Part 15, Class B, and EN55022 specifications. The modules shall use lasers that are compliant with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations Subchapter J.

2.2. SPECIFICATIONS

- 2.2.1. Data: Two (2) channel, bi-directional

2.3. DATA SPECIFICATIONS

- 2.3.1. Data Interface: RS-485 (2 or 4-wire with tri-state)
- 2.3.2. Data Rate: DC – 115.2 kbps
- 2.3.3. Bit Error Rate (BER): < 1×10^{-9} @ maximum optical loss budget
- 2.3.4. Operating Mode: Simplex or full-duplex

2.4. OPTICAL SPECIFICATIONS

- 2.4.1. Fiber Type: Single mode
- 2.4.2. Wavelength: 1310nm
- 2.4.3. Number of Fibers: Two (2)
- 2.4.4. Optical Emitter Type: Laser

A & E SPECIFICATIONS

- 2.4.5. Transmitter Output Power: 500 μ w (-3 dBm)
- 2.4.6. Receiver Sensitivity: 6 μ w (-26 dBm)
- 2.4.7. Optical Power Budget: 23 dB
- 2.5. STATUS INDICATOR SPECIFICATIONS
 - 2.5.1. Power (normal/fault)
 - 2.5.2. Data Transmit
 - 2.5.3. Data Receive
 - 2.5.4. Anti-Streaming
- 2.6. The data transceiver shall be Optellios Fiber Patrol model FDR2652. The units shall be either card mount or stand alone. Refer to contract drawings for mounting type.

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A & E SPECIFICATIONS

FDX2671

RS-485 (2 or 4-WIRE) REPEATER DATA INTERFACE

1. ACCEPTABLE MANUFACTURER

- 1.1. Optellios, Inc., 11 Penns Trail, Suite 300, Newtown, PA 18940 USA
Telephone: 267.364.5298, Fax: 267.364.5357
Email: info@optellios.com, Internet: www.optellios.com
- 1.2. Substitutions: Not Permitted
- 1.3. All fiber optic modules shall be supplied from a single manufacturer

2. FIBER OPTIC DATA REPEATER

- 2.1. Provide fiber optic data repeaters as required. The system shall transmit a single channel of bi-directional data supporting 2 or 4-wire RS-485 (with tri-state) data interfaces. The system shall have an automatically resetting anti-streaming (anti-jabber) circuit for the interruption of faulty data streams to prevent tie-up of network data. The system shall have a time-out selection of 4 – 124 seconds in 4 second increments with an option for infinity (disabled). The system requirement shall be one (1) single mode optical fibers. The system shall have a substantially wide dynamic range as to never require optical or electrical adjustments in order to operate within the given specifications. Optical attenuators shall never be required. The system shall provide local diagnostic indicators. All modules shall be available in both card mount and surface mount versions. All modules shall have automatic resettable polymer fuses on all power rails, which shall provide for automatic reset, as well as transient suppression on all data input/output (I/O) connections. A short circuit in one module shall not affect the operation of other modules powered from the common power supply. All card mount modules shall have the ability to be inserted into and removed from the communication management chassis without interrupting power with no risk of damage to other modules or the communications management chassis during replacement. The system shall have an operating temperature of -40°C to +74°C, ambient, a storage temperature of -40°C to +85°C, ambient, a relative humidity ability of 0% to 95% (non-condensing), have an option for conformal coating, and a MTBF of > 100,000 hours. The system shall exceed NEMA TS-1/TS-2 and Caltrans Traffic Signal Control Equipment Specifications for operating temperature, humidity, mechanical shock, vibration, and voltage transient protection. The system radiated emissions shall be compliant with FCC Part 15, Class B, and EN55022 specifications. The modules shall use lasers that are compliant with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations Subchapter J.
- 2.2. SPECIFICATIONS
 - 2.2.1. Data: One (1) channel, bi-directional
- 2.3. DATA SPECIFICATIONS
 - 2.3.1. Data Interface: RS-485 (2 or 4-wire with tri-state)
 - 2.3.2. Data Rate: DC – 115.2 kbps
 - 2.3.3. Bit Error Rate (BER): < 1×10^{-9} @ maximum optical loss budget
 - 2.3.4. Operating Mode: Simplex or full-duplex
- 2.4. OPTICAL SPECIFICATIONS
 - 2.4.1. Fiber Type: Single mode
 - 2.4.2. Wavelength: 1310/1550nm
 - 2.4.3. Number of Fibers: One (1)
 - 2.4.4. Optical Emitter Type: Laser

A & E SPECIFICATIONS

- 2.4.5. Transmitter Output Power: 500 μ w (-3 dBm)
- 2.4.6. Receiver Sensitivity: 6 μ w (-26 dBm)
- 2.4.7. Optical Power Budget: 23 dB
- 2.5. STATUS INDICATOR SPECIFICATIONS
 - 2.5.1. Power (normal/fault)
 - 2.5.2. Data Transmit
 - 2.5.3. Data Receive
 - 2.5.4. Anti-Streaming
- 2.6. The data repeater shall be Optellios Fiber Patrol model FDR2671. The units shall be either card mount or stand alone. Refer to contract drawings for mounting type.

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