

# FOI-4341 and FOI-4431

## FIBER OPTIC ISOLATOR



### Description

The FOI-4341 and FOI-4431 both provide complete electrical isolation for V.35 communications. The units are transparent to all handshaking protocols and can accept data and clock signals up to a maximum rate of 6.144 Mbps. A regeneration switch on the FOI-4341 allows users to toggle between synchronous applications that require Send Timing (ST) and asynchronous or synchronous applications that require Terminal Timing (TT).

The units can be used in areas of high electrical noise or in and out of RF shielded enclosures. The fiber optic cable is not susceptible to interference caused by impulse noise, crosstalk, or EMI. Privacy of communications is also enhanced because the fiber optic cable does not radiate any emissions. FiberPlex recommends "T" units for high security applications because they have been TEMPEST tested and approved.

In addition, fiber optic cable offers much longer transmission distances than traditional V.35 cabling. Multimode optics on the units can extend the distance to 2km, while singlemode optics can further extend the distance to 20km. A typical link consists of an FOI-4341 at the Data Communication Equipment (DCE) and an FOI-4431 at the Data Terminal Equipment (DTE) with a duplex fiber optic cable between them as shown under "TYPICAL APPLICATION".



### V.35

#### DC to 6.144 Mbps

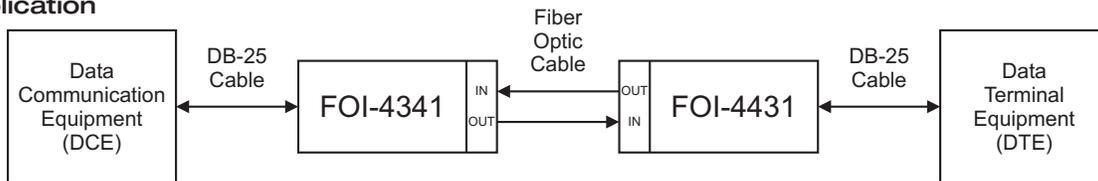
**FOI-4341:** To DCE

**FOI-4331:** To DTE

#### Features:

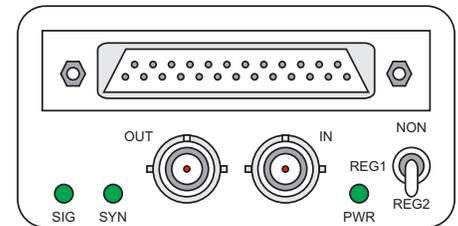
- Data Rate: DC to 6.144 Mbps
- Supports tail circuit and null modem functions for DCE to DCE or DTE to DTE communications. Requires two of the same FOI units.
- An alternate interface (RS-422 or RS-232) may be installed at the opposite end, allowing the user to create a link between two electrically incompatible interfaces without requiring a separate interface converter. For more information, please see the "OPTICAL COMPATIBILITY" table.

### Typical Application

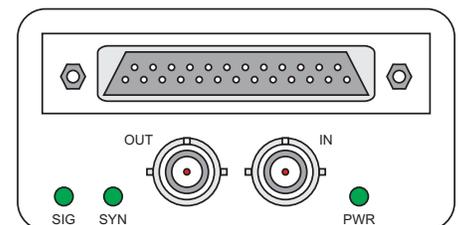


### LED Indicators

| Label | Color | Description  |
|-------|-------|--|
| PWR   | Green | Power supply in FOI unit is operating properly.  |
|       | Off   | No power from the PSQ power supply or open fuse inside the FOI unit. Check that the PSQ power supply is operating properly. If the PSQ power supply is good, separate the FOI unit from the PSQ power supply for 30 seconds and then reattach so that the fuse inside the FOI unit has time to reset. If the PWR led is still off or not constant, replace the FOI unit.                                       |
| SIG   | Green | <b>Standard units:</b> No function. The SIG led will turn on upon power up and remain on.<br><b>TEMPEST units:</b> Optical signal in detected.   |
|       | Off   | <b>Standard units:</b> No function. The SIG led will turn on upon power up and remain on.<br><b>TEMPEST units:</b> No optical signal in or optical level too low. Check that the opposite unit has power and that the fiber optic cables are properly connected. The transmit OUT optic from one end of the network connects to the receive IN optic at the opposite end as shown under "TYPICAL APPLICATION". |
| SYN   | Green | Unit is in sync.   |
|       | Off   | No sync characters detected. Unit is unable to frame to the data stream.   |



**FOI-4341-ST Front View**

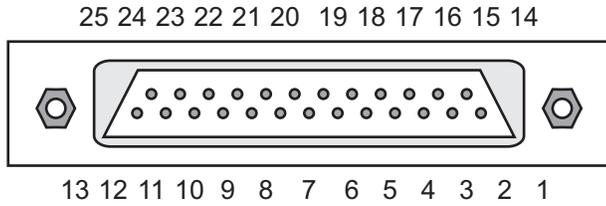


**FOI-4431-ST Front View**

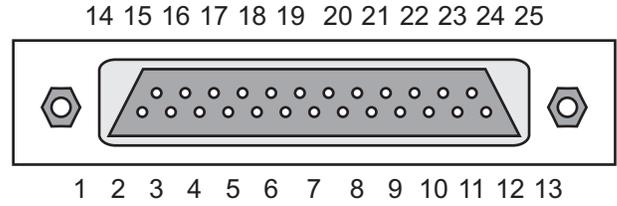
# FOI-4341 and FOI-4431

FIBER OPTIC ISOLATOR

## TO DCE



## TO DTE



**FOI-4341 DB-25 Male pinout**

| Pin | Direction | Label | Description                            |
|-----|-----------|-------|--|
| 1   |           |       | Chassis Ground                         |
| 2   | Out       | TD    | Transmit Data A<br>Transmit Data B     |
| 14  |           | TD\   |  |
| 3   | In        | RD    | Receive Data A<br>Receive Data B       |
| 16  |           | RD\   |  |
| 4   | Out       | RTS   | Request To Send                        |
| 5   | In        | CTS   | Clear To Send                          |
| 6   | In        | DSR   | Data Set Ready                         |
| 7   |           |       | Signal Ground                          |
| 8   | In        | DCD   | Data Carrier Detect                    |
| 10  |           |       |  |
| 13  |           |       |  |
| 15  | In        | ST    | Send Timing A<br>Send Timing B         |
| 12  |           | ST\   |  |
| 17  | In        | RT    | Receive Timing A<br>Receive Timing B   |
| 9   |           | RT\   |  |
| 18  | Out       | LL    | Local Loopback                         |
| 19  |           |       |  |
| 20  | Out       | DTR   | Data Terminal Ready                    |
| 21  | Out       | RL    | Remote Loopback                        |
| 22  | In        | RI    | Ring Indicator                         |
| 23  |           |       |  |
| 24  | Out       | TT    | Terminal Timing A<br>Terminal Timing B |
| 11  |           | TT\   |  |
| 25  |           |       |  |

**FOI-4431 DB-25 Female pinout**

| Pin | Direction | Label | Description                            |
|-----|-----------|-------|--|
| 1   |           |       | Chassis Ground                         |
| 2   | In        | TD    | Transmit Data A<br>Transmit Data B     |
| 14  |           | TD\   |  |
| 3   | Out       | RD    | Receive Data A<br>Receive Data B       |
| 16  |           | RD\   |  |
| 4   | In        | RTS   | Request To Send                        |
| 5   | Out       | CTS   | Clear To Send                          |
| 6   | Out       | DSR   | Data Set Ready                         |
| 7   |           |       | Signal Ground                          |
| 8   | Out       | DCD   | Data Carrier Detect                    |
| 10  |           |       |  |
| 13  |           |       |  |
| 15  | Out       | ST    | Send Timing A<br>Send Timing B         |
| 12  |           | ST\   |  |
| 17  | Out       | RT    | Receive Timing A<br>Receive Timing B   |
| 9   |           | RT\   |  |
| 18  | In        | LL    | Local Loopback                         |
| 19  |           |       |  |
| 20  | In        | DTR   | Data Terminal Ready                    |
| 21  | In        | RL    | Remote Loopback                        |
| 22  | Out       | RI    | Ring Indicator                         |
| 23  |           |       |  |
| 24  | In        | TT    | Terminal Timing A<br>Terminal Timing B |
| 11  |           | TT\   |  |
| 25  |           |       |  |

Data and clock signals are highlighted in yellow with a maximum data rate of 6.144 Mbps. All other signals not highlighted are control signals with a maximum data rate of 120 kbps.

**FOI-4341 Switch**

| Label       | Position | Description  |
|-------------|----------|--|
| <b>NON</b>  | Up       | Non-Regeneration<br>Typically set for asynchronous or synchronous applications requiring Terminal Timing (TT). Transmit Data (TD) and Terminal Timing (TT) from the DTE are both passed transparently to the DCE with the addition of normal propagation delay and sampling jitter.  |
| <b>REG1</b> | Middle   | Regeneration 1 and 2<br>Typically set for synchronous applications requiring Send Timing (ST). This may be used to correct for timing delays over long runs of wiring between the DCE and the DTE.<br><br>Terminal Timing from the DTE is ignored and will not be passed to the DCE. Instead, Send Timing (ST) from the DCE is looped back to the Terminal Timing (TT) output on the FOI-4341.<br><br>Transmit Data (TD) from the DTE is sampled in on the rising edge of Send Timing (ST) from the DCE. |
| <b>REG2</b> | Down     | Transmit Data (TD) from the DTE is sampled in on the falling edge of Send Timing (ST) from the DCE.  |

The REG1 and REG2 switch position is determined by the data rate of the V.35 link and the distance between the DCE and the DTE. In some cases if the timing delays are just right, a link will function in 2 switch positions, NON and REG1 or NON and REG2. It is also possible to have a link operate in all 3 switch positions, NON, REG1, and REG2. However, in synchronous applications where the DCE requires Send Timing (ST), it would be more beneficial to use either REG1 or REG2 rather than NON because regeneration eliminates the sampling jitter from the Transmit Data (TD) to the DCE.

**FOI-4341 Optical Compatibility**

| Model           | Description   | Typical Application                             |
|-----------------|---------------|---|
| <b>FOI-4341</b> | V.35 to DCE   | V.35 ↔ fiber ↔ V.35 (tail circuit - DCE to DCE) |
| <b>FOI-4431</b> | V.35 to DTE   | V.35 ↔ fiber ↔ V.35                             |
| <b>FOI-4541</b> | RS-422 to DTE | V.35 ↔ fiber ↔ RS-422                           |
| <b>FOI-4411</b> | RS-232 to DTE | V.35 ↔ fiber ↔ RS-232                           |

**FOI-4431 Optical Compatibility**

| Model           | Description   | Typical Application                           |
|-----------------|---------------|---|
| <b>FOI-4431</b> | V.35 to DTE   | V.35 ↔ fiber ↔ V.35 (null modem - DTE to DTE) |
| <b>FOI-4341</b> | V.35 to DCE   | V.35 ↔ fiber ↔ V.35                           |
| <b>FOI-4451</b> | RS-422 to DCE | V.35 ↔ fiber ↔ RS-422                         |
| <b>FOI-4141</b> | RS-232 to DCE | V.35 ↔ fiber ↔ RS-232                         |

## Specifications

|                                    |                            | minimum         | typical          | maximum          | unit          |
|------------------------------------|----------------------------|-----------------|------------------|------------------|---------------|
| <b>Power Requirement</b>           | Voltage Range              | 7               | 9                | 12               | V             |
|                                    | Supply Current             | -               | 550              | -                | mA            |
| <b>Data and Clock Signals V.35</b> | Data Rate                  | DC              | -                | 6.144            | Mbps          |
|                                    | Sampling Jitter            | 0               | -                | 23               | %             |
|                                    | Input Resistance           | 5               | 6.8              | 10               | kΩ            |
|                                    | Common-Mode Input Voltage  | -               | -                | ±7               | V             |
|                                    | Common-Mode Output Voltage | -               | 1.8              | 3                | V             |
| <b>Control Signals V.28</b>        | Data Rate                  | DC              | -                | 120              | kbps          |
|                                    | Sampling Jitter            | 0               | -                | 0.4              | %             |
|                                    | Input Resistance           | 3               | 5                | 7                | kΩ            |
|                                    | Input Voltage Range        | -25             | -                | 25               | V             |
|                                    | Output Voltage Swing       | -               | ±5               | -                | V             |
| <b>Environmental</b>               | Storage Temperature        | -40             | -                | 85               | °C            |
|                                    | Operating Temperature      | 0               | -                | 50               | °C            |
| <b>Interface Connector</b>         | FOI-4341                   | DB-25 Male      |                  |                  |               |
|                                    | FOI-4431                   | DB-25 Female    |                  |                  |               |
| <b>Case Dimensions</b>             | Size 4                     | <b>length</b>   | <b>width</b>     | <b>height</b>    | <b>weight</b> |
|                                    |                            | 4.5 in (114 mm) | 1.453 in (37 mm) | 2.562 in (65 mm) | 2 lb (0.9 kg) |

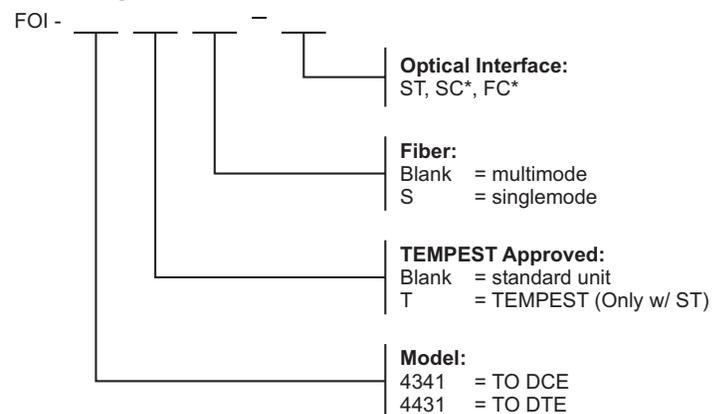
## Optical Characteristics

| Fiber             | Size          | Max Distance | Wavelength | Output Power | Receiver Sensitivity | Loss Budget |
|-------------------|---------------|--------------|------------|--------------|----------------------|-------------|
| <b>Multimode</b>  | 62.5 / 125 μm | 2 km         | 1300 nm    | -18 dBm      | -30 dBm              | 12 dB       |
| <b>Singlemode</b> | 9 / 125 μm    | 20 km        | 1300 nm    | -11 dBm      | -32 dBm              | 21 dB       |

## Accessories

| Model           | Description  |
|-----------------|--|
| <b>CMA-2001</b> | Chassis Mounting Adapter for RMC-2101                                      |
| <b>CMA-3002</b> | Chassis Mounting Adapter for RMC-3101, RMC-3102                            |
| <b>PSQ-4910</b> | Power Supply for FOI-4xxx series   |
| <b>RMC-2101</b> | Rack Mount Chassis 3-1/2" H x 19" W, rear access                           |
| <b>RMC-3101</b> | Rack Mount Chassis 5-1/4" H x 19" W, front access                          |
| <b>RMC-3102</b> | Rack Mount Chassis 5-1/4" H x 19" W, front access with optical patch panel |
| <b>WMA-2001</b> | Wall Mount Adapter with optical patch                                      |
| <b>WMA-3002</b> | Wall Mount Adapter   |

## Ordering Information



\* Indicates Custom Catalog Item

## Standard Options:

|               |               |
|---------------|---------------|
| FOI-4341-ST   | FOI-4431-ST   |
| FOI-4341S-ST  | FOI-4431S-ST  |
| FOI-4341T-ST  | FOI-4431T-ST  |
| FOI-4341TS-ST | FOI-4431TS-ST |

**For special applications that require custom units, please call FiberPlex for more information.**