

235 Series

DIGITAL FIBER OPTIC S-VIDEO/AUDIO/DATA TRANSPORT SYSTEM



BCI reserves the right to make changes to the products described herein without prior notice or consent. No liability is assumed as a result of their use or application. All rights reserved.

©2005Broadata Communications, Inc.



SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY
PRECAUTIONS AS OUR PRODUCTS CONTAIN

CLASS I LASER PRODUCTS

WARNING

Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up.

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.



This manual is intended for use by trained service personnel. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.



SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

TABLE OF CONTENTS

1.0	PRODUCT DESCRIPTION	5
2.0	SETUP	8
2.1	MOUNTING	9
2.2	CABLING AND CONNECTORS	9
2.2.1	ELECTRICAL CABLE CONNECTION	9
2.2.1.1	VIDEO INTERFACE	9
2.2.1.2	AUDIO INTERFACE	11
2.2.1.3	SERIAL DATA INTERFACE	13
2.2.2	OPTICAL FIBER CONNECTION	17
2.3	DC POWER CONNECTION	18
3.0	OPERATION	19
4.0	MAINTENANCE AND TROUBLESHOOTING	20
4.1	MAINTENANCE	20
4.2	TROUBLESHOOTING	21
5.0	SPECIFICATIONS	23
6.0	SERVICE PROCEDURE	25
6.1	REPLACEMENT POLICY	25
6.2	RETURN AND REPAIR SERVICE	25
7.0	LIMITED WARRANTY	26

1.0 PRODUCT DESCRIPTION

The 235 system provides simultaneous transmission of digitized S-video, stereo audio, and/or data over one or one pair of fibers. Unidirectional 235 system transmits two (2) audios (or one (1) stereo audio pair) and one (1) baseband S-video channel in one direction. The bi-directional 235 system transmits and receives two (2) audios (or one (1) stereo audio pair), one (1) baseband S-video channel, and one (1) serial data (RS-232/RS-422) channel in both directions. The video and audio quality in the 235 system exceeds professional standards. In addition, the 235 can be configured to transmit two (2) NTSC/PAL video, instead of one (1) S-video. Many versions of optical transmitter and receiver combinations are available to address different distance requirements.

The 235 features a digital fiber optic transmission technology, capable of providing sharp video and crisp audio, with little or no maintenance, high functionality reliability, and low operating cost. The quality of video, audio and data transmission in BCI's digital designs is much superior to the analog transmission designs used by other manufacturers (based on amplitude or frequency modulation). No user adjustments are required in the 235 system, enabling quick setup and trouble-free operation.

The 235 comes with two packaging options: a rugged, standalone, and compact unit, or a plug-in card for a card cage system. Panel connectors are provided for video (DIN and BNC), audio (terminal block), data (terminal block), and fiber connection (FC-type for singlemode fiber or ST-type for multimode fiber). They are also easily monitored by separate LED indicators for power, optical link, and channel activity.

Due to its digital transmission design, the 235 is capable of addressing a variety of non-standard configurations. Note that Figures 1-1 and 1-2 illustrate the various 235 models.

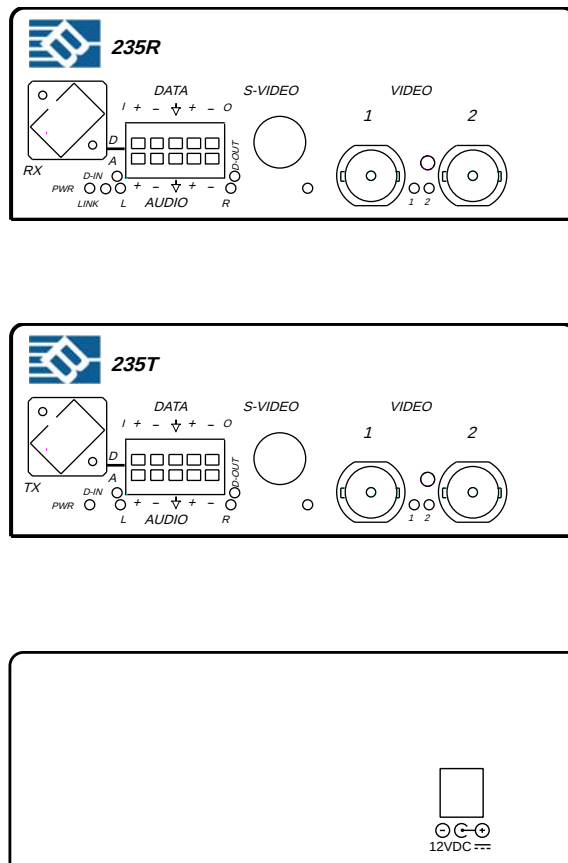


Figure 1-1
235-T/R Front/Rear Panels

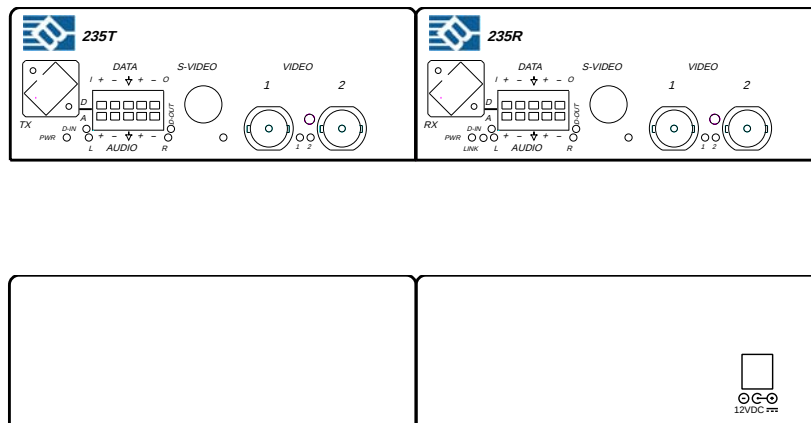


Figure 1-2
235-TRX Front/Rear Panels

2.0 SETUP

The BCI 235 Series units are used in pairs. One 235-T transmitter unit is located at the near-end and connected through one optical fiber, to the 235-R receiver located at the far-end of the link. For the 235-TRX, equal transceivers are located at both near-end and far-end locations and connected through two optical fibers. Connections are one to one between both units. For WDM applications, the 235-TRX units are configurable for one fiber connectivity. Figures 2-1 and 2-2 depict typical installations for the 235-T/R and 235TRX, respectively.

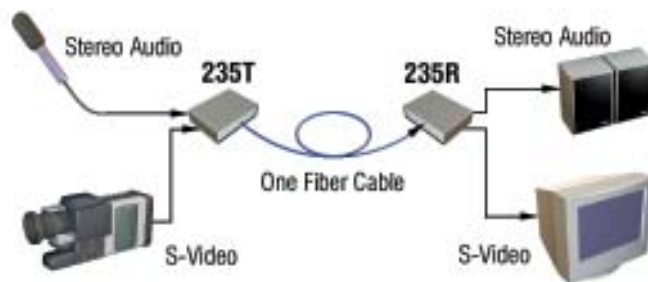


Figure 2-1
235-T/R Setup

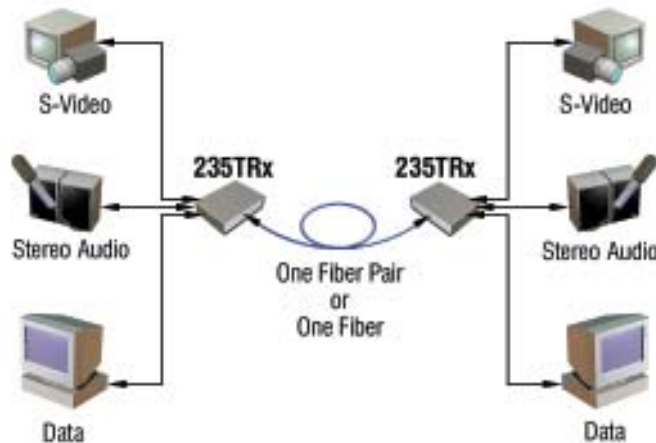


Figure 2-2
235-TRX Setup

2.1 Mounting

Before installing the units into your housing, make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitations (also known as the minimum bend radius).

2.2 Cabling and Connectors

In order to setup the BCI 235 properly, make sure to observe the following instructions when installing the proper cables. The 235 requires two parts to the cabling setup: the electrical and the optical.

2.2.1 Electrical Cable Connection

The three available cable connections on the electrical side are for video, audio and data connections. Follow the proceeding instructions in order to properly install your electrical connections.

2.2.1.1 Video Interface

The 235 is capable of receiving and transmitting one baseband S-video signal unidirectionally/bi-directionally, respectively. The video signals are connected through an S-video cable (e.g., RG59U). Use the following procedure for installing video devices.

For the near-end TX unit, connect and label one S-video cable to the user's video source connector labeled "VIDEO OUTPUT" (e.g., camera) and connect the other end of the cable to the 235 "S-VIDEO" connector. (See Figure 2-3). Note that the user can also connect two NTSC/PAL sources through "Video 1 and 2" BNC connectors.

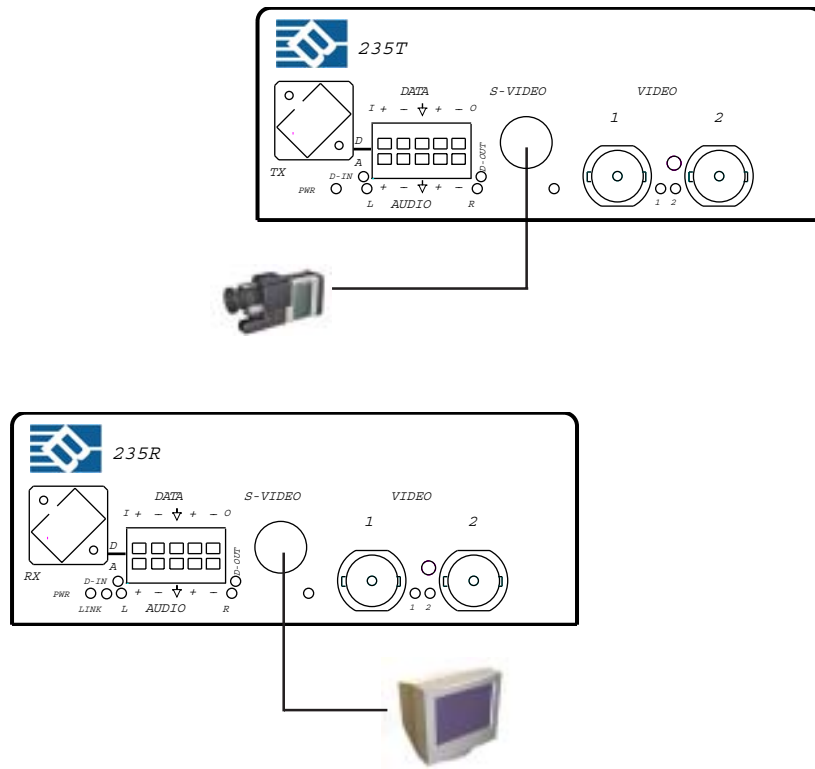


Figure 2-3
Cable Connections for the Video Port

2.2.1.2 Audio Interface

The audio interface supports two channel high fidelity transmissions. Two separate mono channels or one stereo channel is transmitted in each direction. Line-level audio signals are connected to the 235 units using twisted pair shielded cable. The following steps illustrate the installation procedures for audio devices.

To send audio signals, on the TX module, at the near-end location, label and connect two twisted pair shielded cables to the "AUDIO OUTPUT" connectors of the line level audio source. On the 235, connect the other end of the cables to the front panel terminal block connectors labeled "AUDIO IN". For stereo channels, be sure to match the cables at both ends (L to L, R to R), and make sure the connections mate with the correct polarities (+ to +, - to -). (See Figure 2-4).

To receive audio signals, on the RX module, at the far-end location, label and connect two twisted shielded pair cables to the "AUDIO INPUT" connectors of the line level audio receiver. On the 235, connect the other end of the cables to the front panel terminal block connectors labeled "AUDIO OUT". If using stereo channels, be sure to match the cables at both ends (L to L, R to R), and make sure the connections mate with the correct polarities (+ to +, - to -).

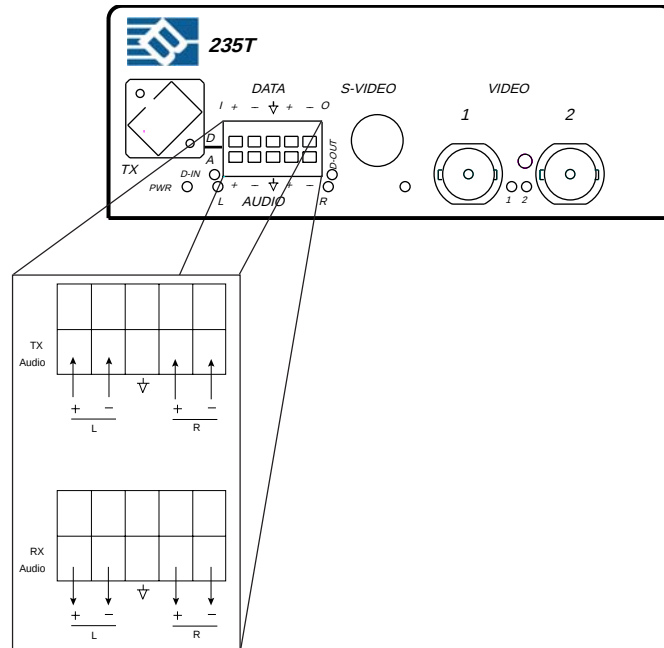


Figure 2-4
Cable Connections for the Audio Port

2.2.1.3 Serial Data Interface (235-TRX Series only)

Each 235-TRX unit can be used for either a RS-232 or RS-422 interface, not both simultaneously.

RS-232 unbalanced data

The 235 transmits unbalanced data signals. Follow the procedures for installing data terminal devices. (See Figure 2-5).

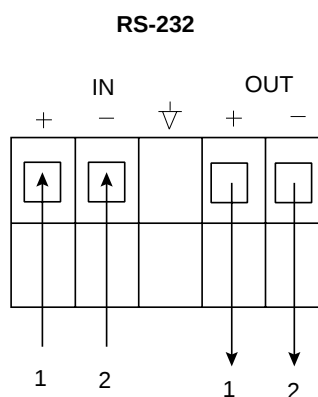
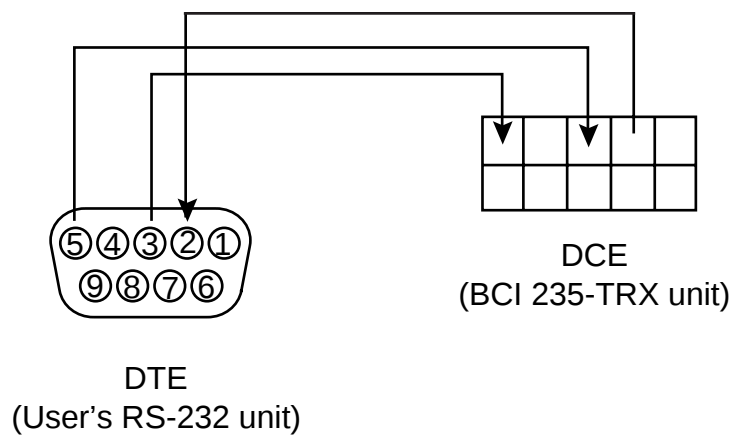


Figure 2-5
Cable Connections for the Data Port

1. For the near-end, label and connect one serial computer data cable to the user's RS-232 device.
2. Connect the other end of this cable to the front panel RS-232 terminal block connector on the 235-TRX.
3. At the far-end, label and connect one serial computer data cable to the remote RS-232 device.
4. Connect the other end of this cable to the front panel RS-232 terminal block connector on the far-end 235-TRX unit.

Figure 2-6 shows pin connections between the 235-TRX unit (as a DCE unit) and the user's RS-232 device (as a DTE unit).



Pin	Name	Pin	Name
1	Data Carrier Detect (DCD)	6	Data Set Ready (DSR)
2	Receive Data (RX)	7	Request to Send (RTS)
3	Transmit Data (TX)	8	Clear to Send (CTS)
4	Data Terminal Ready (DTR)	9	Ring Indicator (RI)
5	Signal Ground		
RS-232 9-Pin D-Sub Pin Name (DTE)			

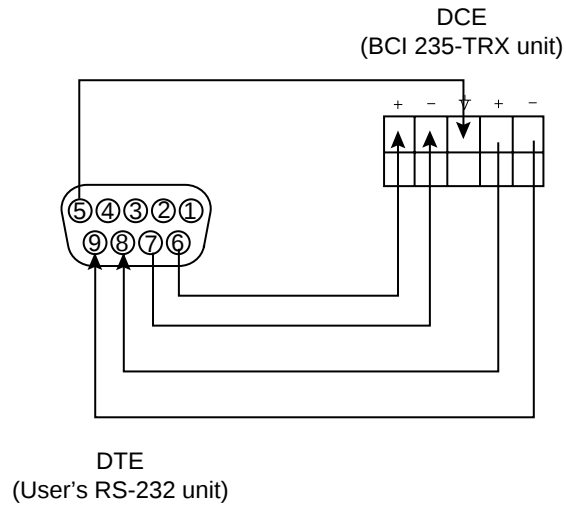
Figure 2-6
Pin Connections Between 235-TRX Unit
and User's RS-232 Device

RS-422 differential serial data

The 235 transmits differential data signals compatible with Full Duplex RS-422 electrical signals. ***Note that the RS-422 does not support handshaking control signals.*** Use the following steps for data transmission.

1. For the near-end, label and connect one serial computer data cable to the user's RS-422 device.
2. Connect the other end of this cable to the front panel RS-422 female pin connector on the 235.
3. At the far-end, label and connect one serial computer data cable to the remote RS-422 device.
4. Connect the other end of this cable to the front panel RS-422 terminal block connector on the far-end 235 unit.

Figure 2-7 shows pin connections between the 235 unit (as a DTE unit) and the user's RS-422 device (as a DCE unit).



Pin	Name	Pin	Name
1	Not Used	6	TX ⁺
2	Not Used	7	TX ⁻
3	Not Used	8	RX ⁺
4	Not Used	9	RX ⁻
5	Signal Ground		

Figure 2-7
Pin Connections Between 235 and User's RS-422 Device

2.2.2 Optical Fiber Connection

Most cable manufacturers identify individual fibers in the fiber cable. Select an appropriate terminated fiber. Each unit's optical ports in the system are specified for use with Multimode (62.5/125 micron) fiber, or Singlemode (9/125 micron) fiber. Follow the ensuing instructions on installing and connecting the fiber optic links:

1. Ensure the power is off before proceeding with the fiber optic cable installation.
2. Prior to connecting the fiber optic cables, remove and save the dust caps from the optical port of both the 235 units. Clean the fiber optic connector and use a lint-free cloth dampened with alcohol to thoroughly wipe the side and end of the ferrule. Use Table 1 as a guideline when connecting ST and FC connectors.
3. Cross-connect the fibers from one unit to the other connecting the near end 235 unit's optical TX port to the far end 235 unit's optical RX port as illustrated in Figure 2-8.

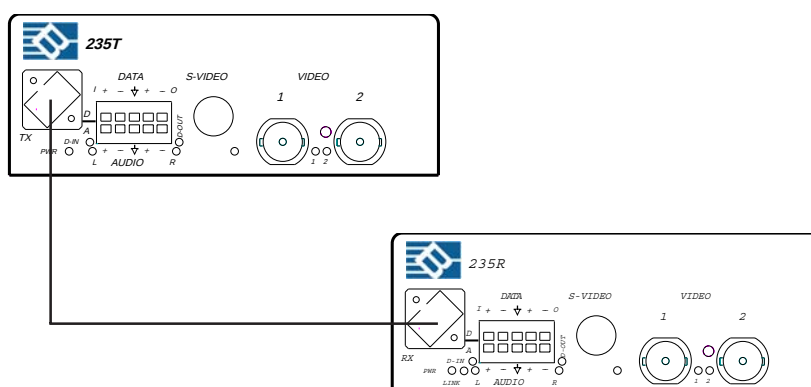


Figure 2-8
Fiber Optic Connection

Connector	Illustration	Description
ST	 ST Connector	Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward until it can be turned clockwise to latch to the port.
FC	 FC Connector	Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward and screw clockwise until it is tight.

Table 1
Fiber Optic Connector Legend

2.3 DC Power Connection

Congratulations! You are now ready to power up the BCI 235 and set up your network connection. In order to make sure that you have a proper installation, please observe the following:

1. Your AC jack has power.
2. The 12VDC power supply is working.
3. Your electrical system has proper grounding (this ensures that your power supply does not suffer from voltage variations).
4. **Power Surge Protection. This is optional**, but highly recommended. A UPS system provides voltage regularity as well as prevents spikes from occurring, thus protecting your 235 from sensitive voltage conditions.

The 235 derives power from an external 12VDC power supply. This power supply is a wall mounted AC/DC adapter, 100-240 VAC, 50-60 Hz, at 1A. This power supply comes standard for the 235 unless otherwise specified.

To provide power to the 235, simply connect the power cord, already provided with the units, and connect it to the wall jack. (You will find one power cord per unit). Once the power cord has been connected to the wall jack, connect 12VDC to the unit and the unit should power up immediately.

If you have any problems or concerns, regarding the installation, make sure that you have taken the proper steps to ensure a proper power connection. Otherwise, feel free to contact us for any questions you may have.

3.0 OPERATION

After the installation procedure is completed, the units are ready for operation. To operate the BCI 235 units, simply apply power as indicated in the previous step. Note that the front panel link status indicator, shown in Table 2, Section 4.1, will be activated.

4.0 MAINTENANCE AND TROUBLESHOOTING

4.1 Maintenance

There is no operator maintenance other than keeping the units clean. However, observe the following light indicators to make sure that the unit is working properly:

Label	Function	Description
L	Audio-L	This GREEN LED indicates L-channel input audio activity (TX)/L-channel output audio activity (RX)
R	Audio-R	This GREEN LED indicates R-channel input audio activity (TX)/R-channel output audio activity (RX)
S-Video	S-Video	This GREEN LED indicates S-Video input signal is present (TX)/S-Video output signal is present (RX)
1	Video 1	This GREEN LED indicates channel-1 composite video input is present (TX)/channel-1 composite video output is present (RX)
2	Video 2	This GREEN LED indicates channel-2 composite video input is present (TX)/channel-2 composite video output is present (RX)
D-IN	Data In	This GREEN LED indicates input data activity
D-OUT	Data Out	This GREEN LED indicates output data activity
LINK	Link	This GREEN LED indicates optical link is present and established
PWR	Power	This RED LED indicates that power is present

Table 2
Status Indicators

4.2 Troubleshooting

If the BCI 235 units do not operate properly after installation, check for: possible cable breaks, loose connections, and incorrect cable connections. If a problem exists on the fiber link, please check your fiber connectors for improperly cleaned fiber cables and connectors. If problems persist that may be fiber related, contact BCI at 1-800-214-0222 for further assistance.

For electrical problems, perform the following troubleshooting procedures:

1. **If the POWER indicator is OFF, check for the following:**
 - a. The line cord is plugged into the unit and your outlet has power.
2. **If the POWER indicator is ON, but the Optical Link indicator is OFF, check for the following:**
 - a. Make sure the appropriate (Singlemode or Multimode) fibers are being used.
 - b. Fiber and fiber connectors are not broken. Ensure that the optical loss does not exceed the specified optical power attenuation (see Section 5.0 Specifications for the optical power budget).
 - c. For each unit, the transmit (TX) fiber is connected to the other unit's receiver (RX).
3. **If the POWER indicator and Optical Link indicator are ON, but the audio/video channels are not operating, then:**
 - a. Check to see that the attached user equipment is turned on.
 - b. Both ends of the link are connected to the corresponding equipment and to the same corresponding channel port.

- c. Cable connections at both the video/audio channels are securely fastened to each connector. Turn the power off, then back on to reset the link.
- d. Output levels of the user's video and audio sources are not above the allowed input levels of the 235 units (see Section 5.0 Specifications).

5.0 SPECIFICATIONS

Video

Channel Capacity	1
Bandwidth	8 MHz
Video Level	1.2Vp-p @ 75 Ohms
Differential Gain	<1%
Differential Phase	<0.7°
SNR (Weighted)	>70dB
Connector	S-Video or BNC

Audio

Channel Capacity	2
Operating Mode	Balanced or Unbalanced
Input/Output Impedance	600/600 Ohms (Balanced)
Max. Input/Output Level	+10dBm @ 600 Ohms (Balanced)
Freq. Response	20kHz to 20kHz
THD+N	>85dB @ 1kHz (Balanced)
Connector	Terminal Block

Serial Data

Channel Capacity	1
Signal Format	RS-232 or RS-422
Operating Mode	Full Duplex with Handshake
Data Rate	Up to 115.2kbps (RS-232) Up to 384kbps (RS-422)
Connector	Terminal Block

Physical

Dimension: (H x W x D)	
Standalone/external power	Unidirectional: 1.72" x 4.36" x 8.75" Bi-directional: 1.72" x 8.6" x 12.0"
Card-cage plug-in card	5.24" x 0.94" x 11.6"
Power	
Standalone/external power	12VDC @ 1 A
Operating Temperature	0 to +50°C
Humidity	0 to 95% RH, non-condensing
Status Indicators	Power, Optical Link, Video/Audio/Data Activity

Optical

Fiber Type	Multimode and Singlemode
Number of Fibers	2 or 1
Wavelength	1310 and/or 1550 nm
Fiber Optic Connector	ST (Multimode) FC (Singlemode)

Typical Power Budget and Transmission Distance

Application	Power Budget (1)	Typical Distance KM (2)	Typical Distance Miles (2)
Multimode Fiber	12	3	1.8
Singlemode Fiber	12	25	16
Singlemode Long Distance	20	60	37

(1) These are typical values for the 235 Series. The actual values may vary.

(2) These are typical distance coverage figures. The maximum distance coverage may be greater than these typical numbers, depending on fiber type, fiber bandwidth, connector splicing losses, chromatic dispersion, environmental factors, etc.

6.0 SERVICE PROCEDURE

6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at **800-214-0222** for information.

6.2 Return/Repair Service

The BCI 235 System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

7.0 LIMITED WARRANTY

Broaddata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com



60000-0235-A₁