VDE/200

VDE/200
Product Handbook

Part Number 15.00.001

23 February 2001
Rev. A

Lightwave Communications
A **LANTRONIX®** Company

VDE/200 Product Handbook

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1.0 Overview

The VDE/200 Video Display Extension System is a series of products designed to transport high resolution video signals from computers and other video sources to video displays and projectors located hundreds or even thousands of feet away. Fiber optic technology has been employed in the system to maximize performance and be transparent to the signals being carried. VDE/200 products are designed to transport all of the signals required by a remote user for interaction with the central processor.

VDE/200 series products are designed to be plug-compatible with computer workstations, video displays, and user devices such as a keyboard, a mouse, and a digitizing tablet. (See Figure 1.) A VDE/200 System can be used to create a wide variety of networks with no impact on system processing power or performance. Each fiber optic link connects transparently between the video source and the video display, eliminating the need for complex data communication equipment and associated software. Simply stated, a VDE/200 unit allows a user to sit at a location greatly removed from a processor and interact exactly as if the processor was located on the user's desk.

Up to 3000 Feet
of Fiber Optic Cable

Computer Workstation
and VDE/200 Transmiter

Remote User Location
(Video Display, Keyboard,
Mouse and VDE/200 Receiver)
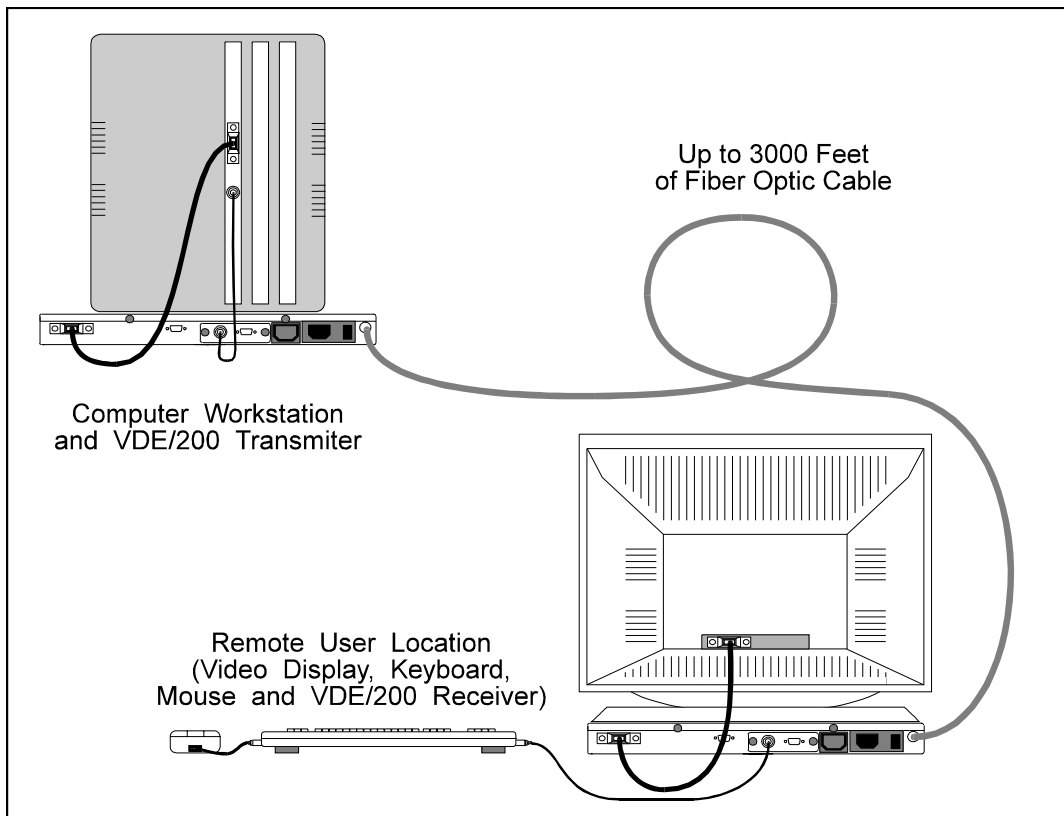
1.1   Product Selection Guide

The following products are available in the VDE/200 Product Line:

Ref.	Model 160	End	Rack	Mux	Video Conns.
1	200.160.0204	Tx			BNC
2	200.160.0104	Tx			13W3
3	200.160.0202	Tx		X	BNC
4	200.160.0100	Tx		X	13W3
5	200.160.0206	Tx	X		BNC
6	200.160.0106	Tx	X		13W3
7	200.160.0200	Tx	X	X	BNC
8	200.160.0102	Tx	X	X	13W3
9	200.160.0205	Rx			BNC
10	200.160.0105	Rx			13W3
11	200.160.0203	Rx		X	BNC
12	200.160.0101	Rx		X	13W3
13	200.160.0207	Rx	X		BNC
14	200.160.0107	Rx	X		13W3
15	200.160.0201	Rx	X	X	BNC
16	200.160.0103	Rx	X	X	13W3

Model 350 Ultra-High Resolution VDE/200 Systems - Part Numbers:

200.350.0200	Model 350 Rack Mount Transmitter with mux, BNC (4)
200.350.0201	Model 350 Rack Mount Receiver with mux, BNC (4)
200.350.0202	Model 350 Stand Alone Transmitter with mux, BNC (4)
200.350.0203	Model 350 Stand Alone Receiver with mux, BNC (4)
200.350.0204	Model 350 Stand Alone Transmitter Video Only, BNC (4)
200.350.0205	Model 350 Stand Alone Receiver Video Only, BNC (4)
200.350.0206	Model 350 Rack Mount Transmitter Video Only, BNC (4)
200.350.0207	Model 350 Rack Mount Receiver Video Only, BNC (4)
200.350.3200	Model 350 Rack Mount Transmitter with mux, BNC (4), 1300nm
200.350.3201	Model 350 Rack Mount Receiver with mux, BNC (4), 1300nm
200.350.3202	Model 350 Stand Alone Transmitter with mux, BNC (4), 1300nm
200.350.3203	Model 350 Stand Alone Receiver with mux, BNC (4), 1300nm
200.350.3204	Model 350 Stand Alone Transmitter Video Only, BNC (4), 1300nm
200.350.3205	Model 350 Stand Alone Receiver Video Only, BNC (4), 1300nm
200.350.3206	Model 350 Rack Mount Transmitter Video Only, BNC (4), 1300nm
200.350.3207	Model 350 Rack Mount Receiver Video Only, BNC (4), 1300nm

Keyboard/Serial Plug-in "Personality Modules" Only. One additional Aux Serial port on chassis.

KEYBOARD AND SERIAL DATA (Personality) MODULES (Plug-in) Part Numbers:	
200.000.0001	Sun Microsystems, TTL, 8 pin mini-din and DB9 serial port
200.000.0002	Silicon Graphics, RS-423, 6 pin mini din and DB9 serial port
200.000.0004	RS-232, DB25
200.000.0005	RS-422, DB15 (Bloomberg Financial Services and others)
200.000.0017	SGI Indigo2, Indy, IBM PS/2, 6 Pin mini din Kbd, 6 Pin mini din mouse port
200.000.0007A	IBM PC, AT, 6 Pin mini din Kbd, DB9 serial mouse port
200.000.0008	DEC, LK401 Keyboard and mouse port, Call to verify Kbd. Type
200.000.0009	Hewlett Packard, HPIL Kbd/mouse

New models are constantly being introduced; please contact Lightwave if you don't see a product that exactly matches your requirements.

2.0   System Description

Each VDE/200 System consists of a pair of hardware units. One unit, the Transmitter, is located with the processor or other video source. The second unit, the Receiver, is located with the video monitor or other graphic display device. A cable containing multimode optical fibers is used to connect these two units.

2.1   Product Offerings

Three Products are currently offered in the VDE/200 series:

Model 160:   High Performance, full RGB (and sync) system designed to handle signals up to 160MHz, as found on displays with up to 1600 x 1200 pixel resolution. With the appropriate User Data option (for keyboard, mouse, and other user devices) installed, this system is fully compatible with workstations from SUN, Silicon Graphics, Hewlett Packard, and many other manufacturers. *The Model 160 is recommended for long distance (over 500 ft.) applications.*

Model 350:   Cost effective transport system for RGB (and sync) signals ranging in speed up to 350 MHz, including the 1920 x 1200 pixel resolution systems on the market today.   Packaged identically to the Model 160, this unit also supports the same set of workstation manufacturers and data interface options.

2.2   System Components

2.2.1   Transmitter

The Transmitter acts as the interface between the computer workstation and the fiber optic cable. It is responsible for converting the electrical video signals into optical (light) signals that can travel down the fiber. When the data option is installed, the Transmitter is also responsible for converting between the electrical signals provided by the workstation and the optical signals which are sent over the fiber optic cable.

The Transmitter is packaged in a low profile "pizza box" which can be placed beneath most desktop processors or mounted into a standard 19" rack. Fiber Optic connections are made internally by removing the top cover; this system provides maximum protection for the optical connectors while still allowing all cables to exit the rear of the Transmitter.

2.2.2   Receiver

The Receiver acts as the interface between the fiber optic cable and the user display. It is responsible for converting the optical signals (sent by the Transmitter) into electrical video signals that are used to drive the display. When the data option is installed, the Receiver is also responsible for converting between the electrical signals provided by the user devices (such as keyboard,

mouse, or serial device) and the optical signals which are sent over the fiber optic cable.

The Receiver is packaged in a low profile "pizza box" which can be placed directly beneath virtually any video display or mounted into a standard 19" rack. The Receiver is capable of supporting monitors weighing up to 150 lb. (68 kg) with a base no larger than 14"x14" (356 x 356 mm.) As in the Transmitter, all fiber optic connections are made internally.

2.3   System Fiber Requirements

Pre-existing, user-installed multimode optical fiber can be used for the VDE/200 System. Cable assemblies may also be purchased separately from Lightwave. The number of fibers required depends on the number and type of signals being carried (refer to the table in Section 3.2 of this document.)

All of the common multimode fiber types can be used for VDE/200 installations, including 50/125 micron, 62.5/125 micron and 100/140 micron fiber. This fiber must be of the modern *graded index* construction if the run is to be over 300 feet; virtually all of the fiber installed for data communications since 1987 is of this type.

2.4   Radio and Television Interference Statement

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instruction, it may cause interference to radio and television reception.

This equipment has been tested and complies with the limits for a Class B digital device in accordance with the specifications in Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

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- Reorient the receiving antenna
- Relocate the VDE/200 with respect to the receiver
- Move the VDE/200 away from the receiver
- Plug the VDE/200 into a different outlet so that the VDE/200 and receiver are on different branch circuits

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WARNING

This equipment has been certified to comply with the limits for a Class B computing device under Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. Any changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

REMARKS

To meet FCC requirements, shielded cables and power cords are required to connect the device to a personal computer, peripheral, or other Class B certified device.

Shielded power cords are supplied with the VDE/200. Shielded video and data cables are also available for purchase from Lightwave.

2.5   Radio and Television Interference Statement for Canada

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class B, prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

2.6 Informationen zur Elektromagnetischen Kompatibilität - Deutschland (Germany)

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß das

Video Display Extender VDE/200 Model 160 and Model 350

in Übereinstimmung mit den Bestimmungen der BMPT-AmtsblVfg 243/1991 funk-entstört ist. Der vorschriftsmäßge Betrieb mancher Geräte (z.B. Messender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Zentralamt für Zulassungen im Fernmeldewesen wurde das Inbetriebnehmen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

Lightwave Communications, Incorporated
100 Washington Street, Milford, Connecticut, 06460 U.S.A.

3.0   Installation Instructions

3.1   Before You Install

The VDE/200 product line consists of several different base units (Receiver and Transmitter) and a variety of Interface Modules. Both the base units and the interface modules are sold in pairs, unless prior arrangements have been made with Lightwave. In addition, Lightwave may supply fiber optic cable and/or data and video interface cables.

While choosing a location for the units, keep in mind that the Transmitter must be located close to the video source, so that the interface cables can reach the appropriate connections. Similarly, the Receiver must be located within the reach of the cables connecting the video display and other user devices. The Transmitter and Receiver can each support up to 150 lbs (70 kg), so they can be placed directly beneath many types of computer equipment, including hi-res dislpays. Make sure that there is at least 4 inches (10 cm) of free space behind the rear panel of each unit to allow the fiber cable to be installed without excessive bending.

The following block diagram shows a typical system layout:
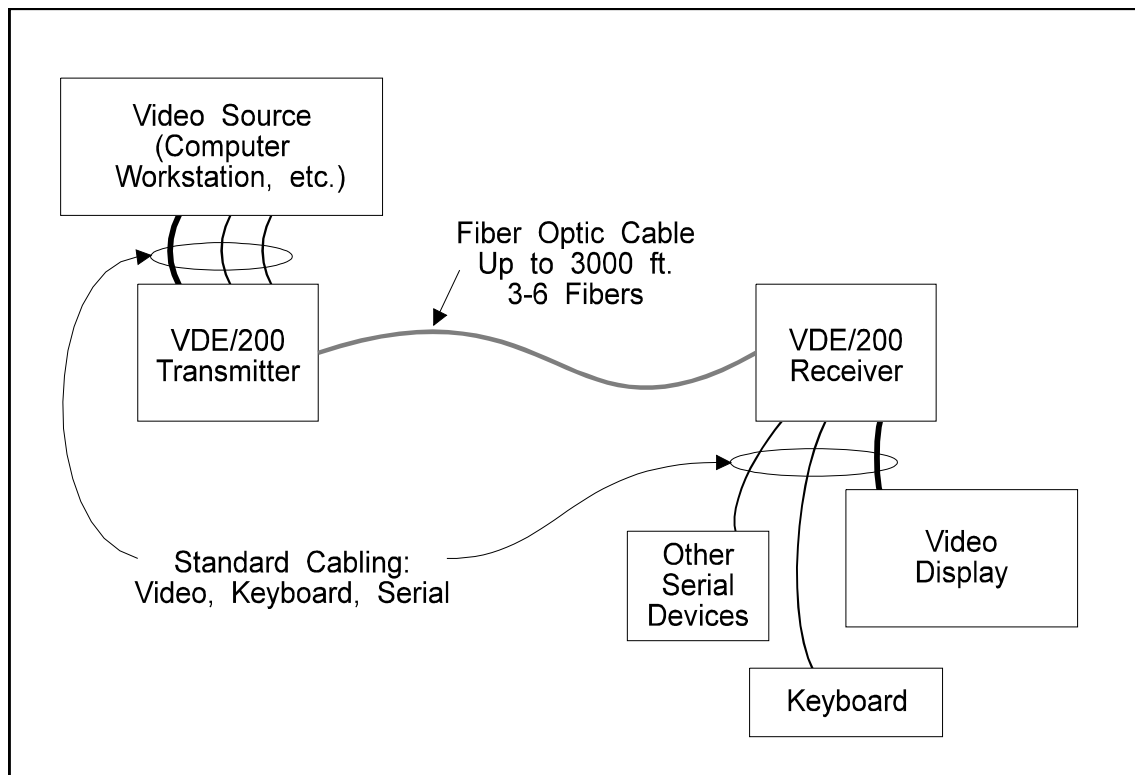
3.2   Fiber Optic Cable

VDE/200 series products are designed to use industry standard fiber optic cables and connectors. This cable is typically supplied by Lightwave, or may be customer furnished. The number of fibers will depend on the system being installed:

RGB Video, Sync on Green	3 fibers
RGB Video, Separate Sync	4 fibers
RGB Video (Sync on Green) and User Data	5 fibers
RGB Video (Separate Sync) and User Data	6 fibers

All fibers must be the same length, *plus or minus six inches*. Also, each fiber must be of the same type and conform to the limits in the following table.

Model 160 & 350:

Fiber Type	Maximum Loss (End to End)
50/125 Micron	4.0 dB
62.5/125 Micron operating with 850 nm optics	7.0 dB
62.5/125 Micron operating with 1300 nm optics	5.0 dB

The above table is for use as a guideline only; specialized optics can be installed for unique applications, including optics for singlemode optical fiber.

Note that 100/140 micron fiber is not recommended, but may be used in special instances. Consult Lightwave prior to using this type of fiber.

A note on connectors:

The VDE/200 System requires ST$^{®}$ compatible connectors on both ends of the fiber optic cable. These connectors can be flat polished or they can be PC polished to minimize reflections. Splices and patch panels along the length of the fiber should have insertion loss of less than 0.5 dB and optical return loss greater than
30 dB.

Note: ST$^{®}$ is a registered trademark of AT&T Corporation.

3.3   Step by Step Instructions - Video

Step 1:   **Unpack the main shipping container and observe that the following items are enclosed:**

Qty	Item
1	VDE/200 Transmitter Base Unit (smaller unit)
1	VDE/200 Receiver Base Unit (larger unit)
1	Product Handbook (this document)
2	AC Power Cords

Note: Other equipment (such as user data interfaces, fiber cable, video cables, etc.) may be enclosed or packaged separately, depending on options ordered.

Step 2:   **Remove the top cover from the Transmitter (the smaller unit).**

a) Loosen the two thumbscrews located at the rear of the unit.
b) Raise the rear edge of the cover slightly and slide the cover back about 1 inch until it clears the front flange.
c) Lift the cover off and set aside.

Step 3:   **Remove the fiber optic cable clamping and protection devices from inside the Transmitter.**

a) Remove the internal cable clamp located inside the front left corner of the VDE/200 unit by loosening thumbscrew holding the cable clamp and removing. Lift the clamp off the threaded bolt.
b) Remove the cable protection grommet from rear panel of VDE/200 unit by squeezing inner sleeve of grommet and sliding upwards through cable slot.

Step 4:   **Attach the clamping and protection devices to the fiber optic cable.**

a) Place the clamp around the cable approximately 6 inches (15 cm) from the end of the cable sheath. (Refer to the drawing below.)
b) Place grommet on cable by sliding the cable through the slot on the grommet. Grommet should be placed 12-16 inches (30-40 cm) from the cable clamp. (See diagram below)
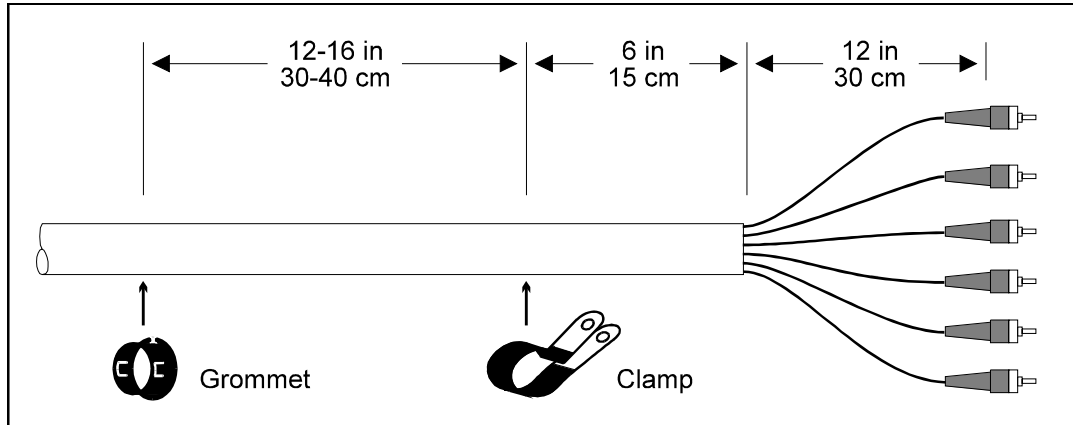
Step 5: **Place the fiber optic cable inside the Transmitter and attach.**

a) Arrange the cable inside the VDE/200 unit to have the end of the cable sheath resting against the front panel of the unit, and the cable to the outside of the threaded post. (Refer to the drawing below.)
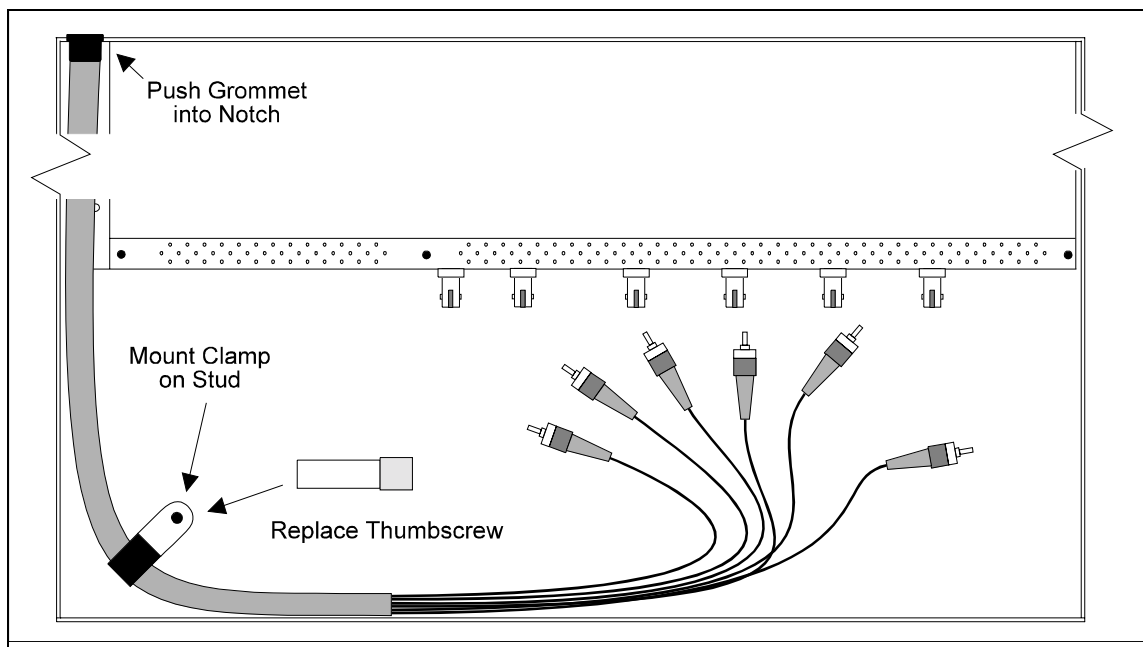
b) Slide the cable into the slot in the rear of the unit, making sure that the grommet is positioned to the outside of the VDE/200 case.

c) Slip the grommet into the round cable entrance hole so that it surrounds and protects the cable from the sheet metal edges of the box.

d) Replace the clamp onto the threaded bolt (attached to the base of the VDE/200 unit).

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e) Make sure both holes of the clamp are on the threaded bolt, replace thumbscrew and tighten.

Step 6: **Remove the protective cap from each optical connector. This cap may be in the form of a large cap that covers the entire connector end, or a small cap that covers just the fiber optic ferrule.**

Note:

Each connector in the optic cable supplied by Lightwave is polished mirror-smooth and is ready to be connected. Customer supplied cables should be inspected to make sure each connector tip and ferrule is polished and free from debris.
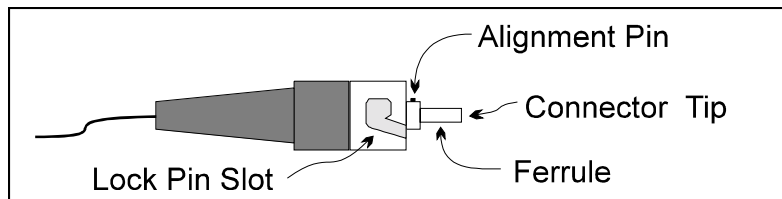
Step 7: **Connect each optical fiber to the corresponding optical connector on the VDE/200 units.**

a) Cable assemblies supplied by Lightwave are color coded to match the label inside each VDE/200 unit. The unit may have 4,5, or 6 optical receptacles, depending on options ordered.
b) With the protective cap removed (Step 6), position each connector so that the alignment pin is facing up. Slide the ferrule into the optical connector so that the alignment pin enters the slot of the receptacle.
c) Twist the sleeve of the connector so that the lock pin on each receptacle is firmly seated inside the lock pin slot on the connector.

Sync Select Switch

Fiber Optic Receptacles
(4,5, or 6 per Unit)

Lock Pin

Alignment Slot

Keyboard/Data

Separate Sync
Sync on Green

Grey	Brown

Sync on Green Systems:

Blue	Green	Orange	No Connection

Separate Sync Systems:

Blue	Green	Orange	White

Fiber Optic Transmitter
(Connect to Workstation/Video Source)
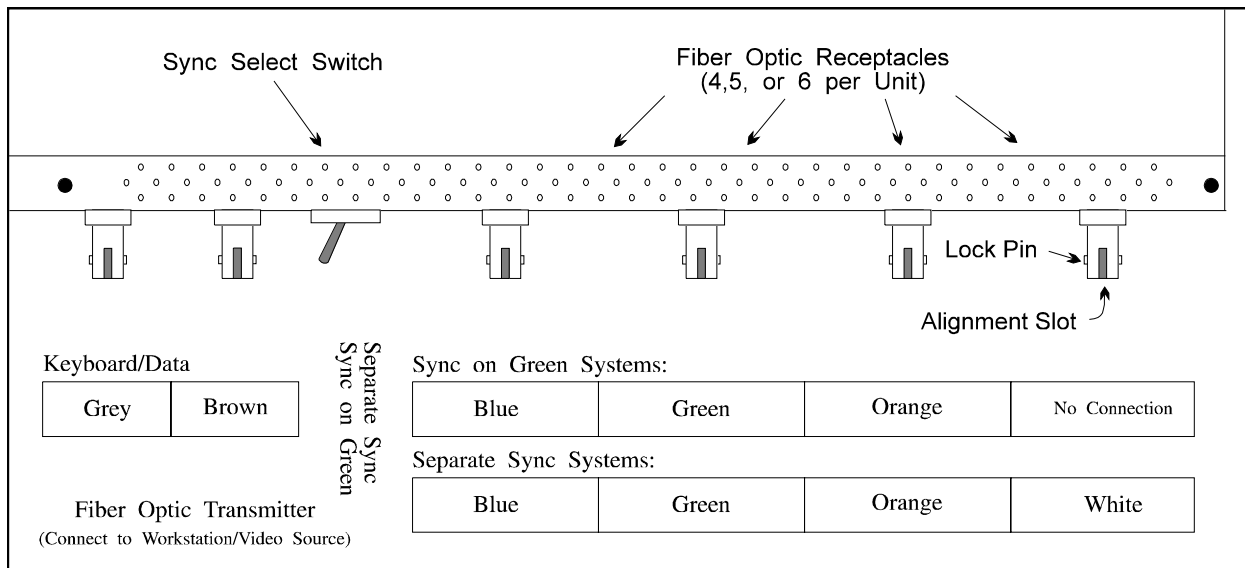
Step 8:   **Determine which Sync method your system will be using, and place the "Sync Select" switch in the proper position.**

Step 9:   **Replace top cover on unit.**

Repeat **Steps 2 thru 9** for the VDE/200 Receiver.

Step 10:   **Attach video interface cables.**

Two different video cable types are supported by VDE/200 models 160 and 350:

         a) 13W3 Connector.
         b) BNC Connectors (3 or 4 required for RGB)

Installation for each of these connector types is explained separately below.

13W3
Connector

Step 10A: **13W3 Cables**
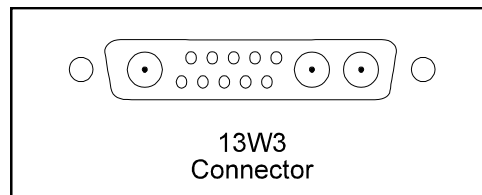
Two male to male 13W3 cable assemblies will be required for each VDE/200 link; one cable between the video source and the VDE/200 Transmitter, and a second cable between the video display and the VDE/200 Receiver.

Cable Requirements: Standard, male to male 13W3 cables as provided by workstation manufacturers are perfectly suitable for connection to the VDE/200 link. Cable lengths should be less than 15 feet to ensure optimal video performance. One cable is typically supplied with each computer workstation; a

second cable will need to be purchased from the workstation/display manufacturer or from Lightwave (Lightwave part number 200.0001).

To install the 13W3 video cables to a VDE/200 unit, simply remove any dust caps covering the connectors, plug the cable into the rear panel of the VDE/200 unit, and tighten the thumbscrews to secure.

Step 10B: BNC Cables

3 BNC
Connectors
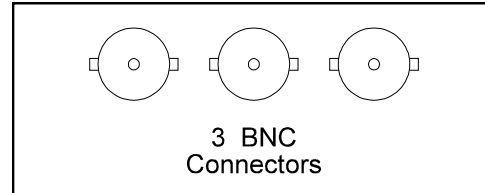
Six or Eight BNC to BNC cables will be required for each VDE/200 link; three cables on each end of the VDE/200 link for Sync on Green systems and four on each end of the link for Separate Sync systems. Users must consult documentation supplied by the video source and video display manufacturers to determine which type of Sync is used on a particular system. Limited assistance in this area is available from Applications Engineering of Lightwave.

Cable Requirements: Standard 75 ohm, male to male BNC cables are required. 50 ohm cables (which are common in many electronics labs) should not be used for optimum video performance. Cable lengths should not exceed 15 feet on either end of the VDE/200 link; greater lengths can cause signal degradation. 75 ohm video BNC to BNC cables can be obtained from a variety of sources, including Lightwave (Lightwave part number 200.0002).

To install BNC cables, use the following procedure:

1) Clearly identify each connector that is used to carry video signals. It is crucial to system operation to correctly connect the Red, Green, Blue and Sync (if used) channels on both ends of a VDE/200 link.

2) Connect the BNC cables, one at a time, between the video source and the VDE/200 Transmitter. Each cable should be between the same signal on both units; i.e. Red to Red, Green to Green, Blue to Blue, and Sync to Sync (if used). To make each connection; slip the male cable connector over the female connector mounted on the equipment, and turn the outer ring of the male connector until it locks.

3) Repeat the above procedure for the cables between the video display and the VDE/200 Receiver.

4) Verify that the Sync switch in both the VDE/200 Transmitter and the VDE/200 Receiver are set correctly. Both switches must be in the same position (Sync on Green or Separate Sync) for the VDE/200 link to operate.

3.4   Step by Step Instructions - Data Option

VDE/200 Systems may be optionally equipped with data interface capability for transporting keyboard, mouse, and user data that is serial in format, including many printers (LaserJets®, among others), trackballs, digitizing tablets, and stereo goggles. Several different types of interfaces have been developed to match with different workstation platforms.

The Data Option consists of two portions in both the Transmitter and the Receiver:

> 1) A User Data Interface Module, which provides the unique "personality" required to connect to each type of workstation and keyboard. These modules are designed to be changed by users whenever a new type of processor or keyboard is to be connected to the VDE/200.

> 2) A multiplexer that is installed in the factory, which converts electrical signals into optical signals. This multiplexer also supports the Auxiliary Data Port, which is permanently installed in each VDE/200 unit that has been equipped for data transport.

The diagram below shows where the User Data Interface module is installed on the rear of the VDE/200 unit. One modules will be factory installed in both the VDE/200 Transmitter and Receiver.

Note:

Units that are not equipped with the Data Option will not have the Auxiliary Data Port, nor a User Data Interface Module installed (a blank panel will be installed in their place). Such units will also not have internal optical connectors for data.

Auxiliary Data Port

User Data Interface Module

Aux

Kbd   Ser

1
0

Interface Module Thumbscrews
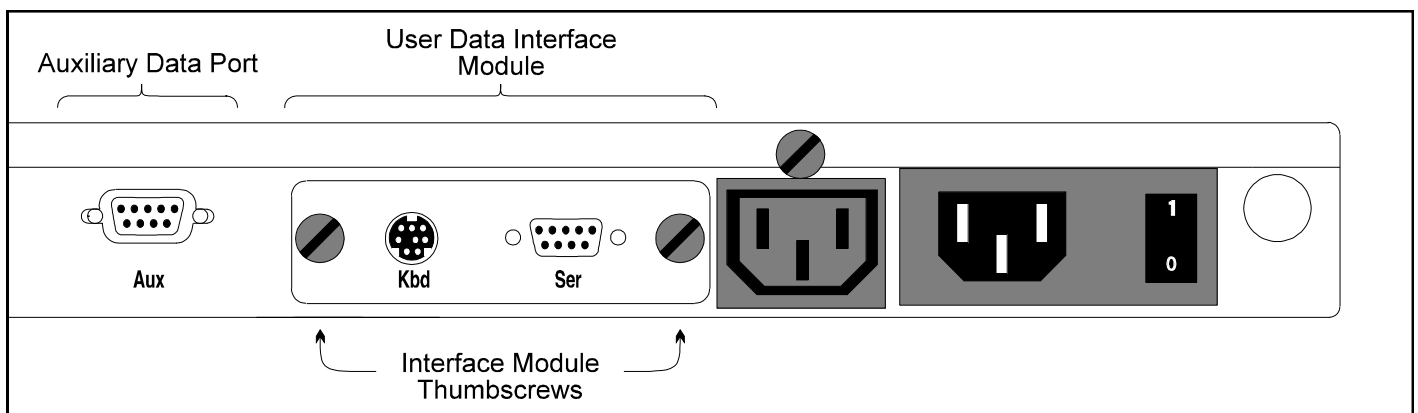
To make connections to the User Data Interface Modules, refer to instructions that accompany each of the interface modules.

To change a User Data Interface Module, use the following procedure:

Step 1: Identify the User Data Interface Module that is to be installed in both the Transmitter and the Receiver. Each interface module is labeled with a part number and is designated as either Transmitter (TX) or Receiver (RX). The following table summarizes the available interface modules.

KEYBOARD AND SERIAL DATA (Personality) MODULES (Plug-in) Part Numbers:	
200.000.0001	Sun Microsystems, TTL, 8 pin mini-din and DB9 serial port
200.000.0002	Silicon Graphics, RS-423, 6 pin mini din and DB9 serial port
200.000.0004	RS-232, DB25
200.000.0005	RS-422, DB15 (Bloomberg Financial Services and others)
200.000.0017	SGI Indigo2, Indy, IBM PS/2, 6 Pin mini din Kbd, 6 Pin mini din mouse port
200.000.0007A	IBM PC, AT, 6 Pin mini din Kbd, DB9 serial mouse port
200.000.0008	DEC, LK401 Keyboard and mouse port, Call to verify Kbd. Type
200.000.0009	Hewlett Packard, HPIL Kbd/mouse

Step 2:   Turn power **OFF** on both units.

Step 3:   On the VDE/200 Transmitter, loosen the thumbscrews holding the User Data Interface Modules into the rear panel of the VDE/200.

Step 4:   Remove the old User Data Interface Module by grasping the module and sliding it straight out from the rear of the VDE/200 unit.

Step 5:   Slide the new User Data Interface Module into the opening in the VDE/200 rear panel, making sure that the edges of the card are engaged in the card guides located on either side of the opening. Press the User Data Interface Module into the panel firmly, until the face plate is flush with the rear panel of the VDE/200.

Step 6:   Tighten the thumbscrews to attach the User Data Interface Module to the VDE/200 rear panel.

Step 7:   Repeat the above procedure for the VDE/200 Receiver.

Step 8:   Place the old User Data Interface Modules into the protective packaging formerly occupied by the new modules. Place the modules in a safe place for storage.

The VDE/200 Data Option is now ready to operate. Connect the keyboard and other data devices to the interface cards as described in the instruction sheets that accompany each User Data Interface Module, and apply power as described in Section 4. Fiber optic connections do not need to be changed to use newly installed User Data Interface Modules, since the factory installed optical multiplexer modules were not changed in this operation.

3.5   Step by Step Instructions - Rack Mounting

VDE/200 Systems may be optionally equipped with front panels designed for mounting into standard 19" EIA compatible racks. (This option must be specified when ordering.) Rack mount slide kits are also recommended; part numbers are listed in the following table. Step by step instructions are given below for installing a VDE/200 unit with Lightwave.

RACK SLIDE KITS (For Rack Mounted Units) - Part Numbers:	
08.05.235A	Tx or Rx Rack Slide, for use with rack mount versions only, 24", locking

Before You Install -- For safe operation of the VDE/200 System, it is important to make sure that each unit is installed in a suitable environment. The following precautions should be observed:

a) The VDE/200 is designed to work at an ambient temperature of 25°C (77°F). Closed or multi-unit racks may have an operating ambient temperature that exceeds the room ambient temperature. Make sure that the VDE/200 always operates at an ambient temperature of 25°C (77°F) to prevent unsafe operation.

b) Ventilation can become restricted in rack mount installations. The VDE/200 is designed to operate with convection cooling provide by the air holes located in the bottom and top covers of the unit. Make sure that these ventilation holes are not obstructed by equipment placed directly in contact with either the bottom or the top of a VDE/200 Transmitter or Receiver. Forced ventilation (provided by rack mounted fans) is recommended within large equipment cabinets.

c) Make sure that each VDE/200 unit is properly supported in both the front and rear of the unit. Front and rear mounting brackets are included in the rack mount slide kit; both must be used for proper installation of the slides.

d) When multiple pieces of equipment are to be installed in the same rack, it is important for each unit to be properly supplied with operating voltage and current. Nameplate ratings for each piece of equipment should be taken into consideration when designing supply circuits.

e) All rack mounted equipment should be reliably connected to earth ground. Pay close attention to grounding at all times, particularly when equipment is not directly connected to power mains (such as when a power strip is used).

Each VDE/200 unit is designed to occupy one standard rack unit of 1.75 inches. Several VDE/200 units may be installed may be installed in adjacent rack units; however it is recommended that at least one rack unit be left empty for each five VDE/200 units installed to provide an air gap.

Step 1:   Unpack the rack mount slide kit and observe that the following items are present:

Qty   Item
 1   Left Hand Rack Mount Slide
 1   Right Hand Rack Mount Slide
 2   Front Mounting Brackets (smaller angled pieces)
 2   Rear Mounting Brackets (larger angled pieces)
 1   Front Bracket Hardware Kit
 1   Rear Bracket Hardware Kit
 1   Instruction Sheet

Step 2:   Remove the inner portion of each slide. The inner potion is the narrowest of the three extrusions which make up each slide. To remove, slide the inner portion out until it locks, then raise the lock release lever, then slide the inner portion the remainder of the way out.

Step 3:   Locate and remove the mounting screws on the left side of the VDE/200 unit by using the following diagram:

Screws for Rack Mount Slides

Front Panel with
Rack Mount Cutouts
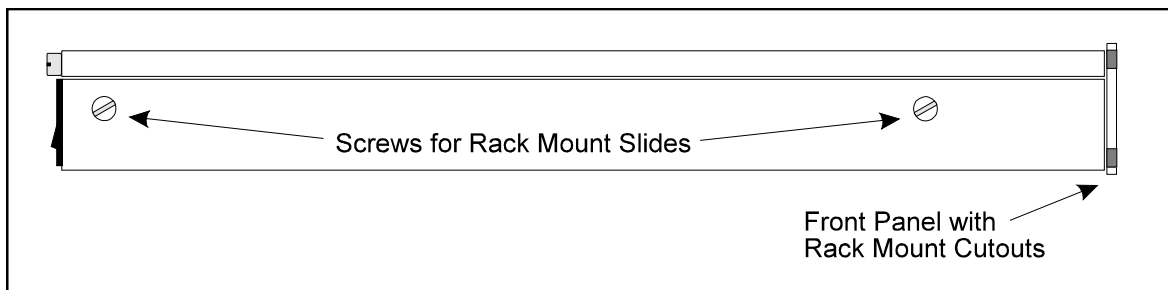
Step 4:   Attach the inner portion of the left hand slide bracket to the VDE/200 unit using the two screws removed in Step 3, above. Upon completion, the left side of the VDE/200 should appear as shown in the diagram below.

Step 5:   Repeat steps 3 and 4 for the right side of the VDE/200 unit.

Step 6:   Attach the remaining portions of the rack mount slides to the rack using the front and rear mounting brackets and the instructions provided with the rack mount slide kit. The user will be required to

supply mounting bolts and nuts that are compatible with the user's particular rack.

Step 7:   With the rack mounted slides fully retracted, slip the VDE/200 unit (with both inner sections of the slides attached) into the rack. Push the VDE/200 unit into to rack until it stops, then raise the lock release lever, and then push the unit all the way into the rack. The following illustration shows a VDE/200 unit fully inserted into a rack, before the security bolts are installed:
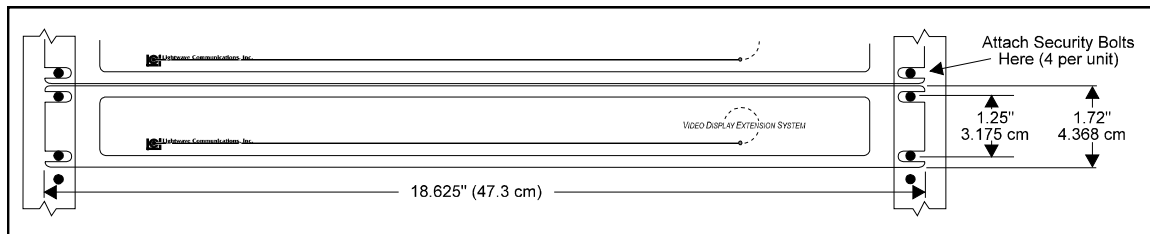
Step 8:   Secure the VDE/200 unit to the rack with bolts through the slots located on either side of the front panel. This completes the installation.

A Note on Operation: To attach or modify the fiber optic cable connections to a VDE/200 unit, simply remove the security bolts, slide the unit out, and remove the top cover of the unit. Once the connections have been modified to the user's satisfaction, release the locks on the slides, push the VDE/200 unit back into the rack, and replace the security bolts.

Note:

Users with 24 inch slides should only pull the VDE/200 unit out far enough to get access to the top cover. If the VDE/200 unit is pulled out too far, the slide assemblies will lock in the out position, and it may be necessary to remove the slides from the rack to release the locking mechanism.

4.0 Operating Instructions

4.1 Power Up

Step 1 - Start with the power OFF for all of the following devices:
  a) Video Source (computer workstation, etc.)
  b) VDE/200 Transmitter
  c) VDE/200 Receiver
  d) Video Display

Step 2 - Make sure that the AC Power has been connected to the VDE/200 Transmitter, VDE/200 Receiver, and other equipment.

Step 3 - Turn the Power On in the following sequence:
  a) VDE/200 Receiver unit
  b) VDE/200 Transmitter unit
  c) Video source (typically a computer workstation).
  d) Video display.

Note:

The two VDE/200 units have a green light on the front panel that illuminates when the power is on.

Note:

Some workstations will not power up correctly if a keyboard is not connected, and some monitors will automatically shut off if they turned on without a video signal present. The VDE/200 System is designed to transport these signals transparently.

The ON/OFF switch is located at rear of each unit, on the right hand side if you are facing the rear. Refer to the following diagram for locating this switch:

ON/OFF SWITCH

Convenience Outlet   Power Cord   Fiber Cable
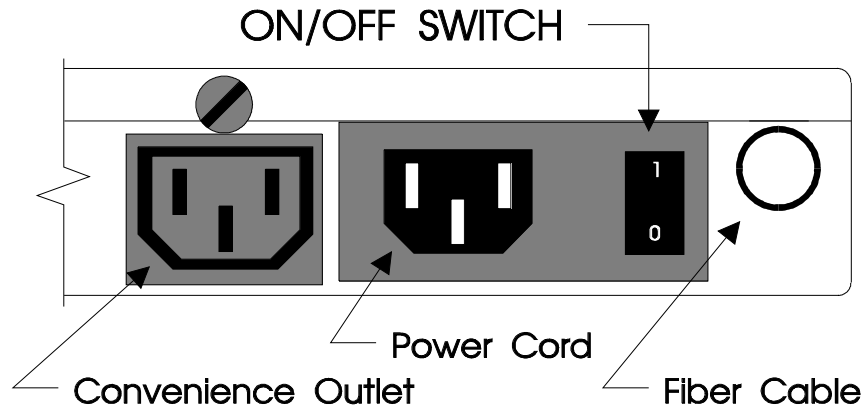
4.2   Using the System

During normal operation, the VDE/200 System should be completely transparent to the user. All aspects of system operation, including keyboard controls, monitor sense lines, have been considered in the design of the VDE/200. There are no user adjustments inside either the Transmitter or Receiver unit.

To operate your VDE/200 System, there are no changes required in the operation of your Video Source, Video Display, Keyboard, Mouse or other serial device.

The VDE/200 is designed for constant operation, and may be left on continuously. If desired, the units may be turned off when they are not in use. To turn the system on, use the procedure described on the previous page.

If the video signal from the Video Source to the VDE/200 Transmitter is interrupted momentarily, and the VDE/200 System loses video sync, the system may take a few seconds to re-calibrate after the video signal is reapplied. This process appears to the user as a quick series of screen discolorations, somewhat like the degaussing feature of some displays.

4.3   Precautions

The VDE/200 has been designed to comply with the latest international standards for safety and reliability. With normal care, the system is capable of providing many years of reliable service. When using the system, observe the following precautions:

1) The Transmitter and Receiver have ventilation holes along the front of the top cover and in the bottom of each unit. Keep the holes free from obstruction. Do not allow liquids or any other substance to fall into the ventilation holes. Keep the top cover on except when making the optical fiber connections.

2) The fiber optic cable which extends from the rear of the Transmitter and Receiver units must not be crushed. Keep a minimum bend radius of four inches - otherwise excessive signal loss may occur.

3) Turn power off to the unit before changing any of the cable connections to the unit or a data interface board.

4) Do not remove the internal metal shield of the Transmitter or Receiver, which covers the electronic circuitry and the AC power supply. Hazardous voltages are present inside this shield.

5.0   Troubleshooting Guide

Typical system problems have been grouped into the following categories:

- No Picture at all (5.1)
- Scrambled Picture (5.2)
- Improper Color Balance (5.3)
- Keyboard or Mouse does not Operate (5.4)
- AUX port does not Operate (5.5)
- Stereo goggles do not function (5.6)

Solutions to these problems are discussed below. If you need further assistance, please call Lightwave's Applications Engineering Department at (203) 878-9838 or 1-800-871-9838.

5.1   No Picture

This problem has three major causes:

1)   Video signal is not reaching the video display.
2)   Video sync signal is incompatible with the video display.
3)   Video display has lost synchronization for an extended period.

REMEDIES

A.   Ensure power is on to all four video system elements:

- Video Source (Processor)
- VDE/200 Transmitter
- VDE/200 Receiver
- Video Display

Power On lights are provided on the front panel of both the VDE/200 Transmitter and the VDE/200 Receiver. If the ON/OFF switch is in the correct position, and the power light is not on, check the AC power cord (including outlet strip) and the AC fuse located next the ON/OFF switch. If replacement is required, use a 4.0 amp slo-blo fuse rated for use at 120 VAC. For 240V applications, use a 2.0 amp fuse.

B.   Ensure that both of the electrical video cables are correctly connected.

One electrical video cable must be connected between the video source and the VDE/200 Transmitter. Another electrical video cable must be connected between the VDE/200 Receiver and the video display. Instruction for connecting these cables are provided in Section 4 of this handbook.

C. <u>Ensure that the fiber optic cable is connected between the VDE/200 Receiver.</u>

(See Section 4 for fiber installation instructions).

Note: The optical signals used in the VDE/200 System are invisible to the naked eye. Measurement of these signals requires an optical power meter calibrated for 850nm or 1300 nm operation, depending on the wavelength of the VDE model. Optical Output power will vary with video signal content. The following table specifies the typical optical output power (into 62.5/125 micron fiber) with an all-white display:

wavelength	wattage	decibels
850 nm	14 µW	-18.5 dBm
1300 nm	7 µW	-21.5 dBm

D. <u>Verify that video source is compatible with video display.</u>

To check this, connect the video display directly to the video source using workstation manufacturer supplied cabling, if possible. This test will ensure that both the source and display have been configured for compatible operation.

E. <u>Ensure that the "Sync on Green/Separate Sync" switch is set correctly on both the VDE/200 Transmitter and the VDE/200 Receiver.</u>

Both units must have this switch in the same position. Contact your workstation manufacturer or Applications Engineering at Lightwave if you need help in determining which sync method your system is using.

F. <u>Reset the video display.</u>

This is typically done by turning the power off to the display for ten seconds and then re-applying power. Other displays may have a "RESET' button; consult the manufacturer's instructions for your display.

Note: Do not remove power from the VDE/200 Receiver unit.

Some video displays will automatically blackout when a video signal (with a proper video sync pulse) has not been applied for a period of time. This is particularly common if the video display is powered up well before the video source is powered up. By resetting the display, with a video signal present, this automatic blackout feature is bypassed.

G.   <u>For SGI systems using sync on green, check the display sync format.</u>

Some displays require composite sync to function. A VDE receiver can output composite sync even if the computer attached to the transmitter is using sync on green. A jumper setting on the receiver can be changed to accommodate a display that requires composite sync; see figure B.4 in Appendix B for the jumper setting.

5.2   Scrambled Picture

This problem is typically caused by an incorrect sync method. Refer to 5.1 D and E (above) for steps to resolve this problem.

5.3   Improper Color Balance

This problem typically has three major causes:

1)   Video signal components have been swapped.
2)   VDE/200 Receiver is unable to attain ALC Lock on one or more video signals, which is caused by excessive loss in the fiber optic cable.
3)   Unequal cable lengths.

<u>REMEDIES</u>

A.   <u>Verify cable connections.</u>

Check all of the cabling from the video source all the way through to the video display to ensure that each of the cables has been connected correctly, i.e. Red to Red, Green to Green, Blue to Blue, and Sync to Sync (if used). Since the VDE/200 System is totally transparent to the video signal content, crossed wires or fibers cannot be detected by the system.

B.   <u>Ensure that the fiber optic cable is installed properly.</u>

Make sure that the minimun bend radius has not been violated (typically 4 inches) and that the maximum allowable cable loss is not exceeded on each fiber.

Loss tests can be performed by using a fiber optic power meter and light source, such as the MLP 1-2 Multimode Light Pack from Noyes Fiber Systems. For proper operation, the maximum cable loss should not exceed those values given in Section 3.2 of this document. Note: Excessive cable loss may be caused by tight bends inside the VDE/200 Transmitter or Receiver. Check each fiber to ensure that no tight radius bends (less than 1/2" radius) are present in any of the fibers. Also check to make sure that each of the optical fibers, including any patch cables,

are the same length (within six inches). Unequal length fibers will create color fringes on displayed objects.

5.4   Keyboard or Mouse does not operate.

Note: Some units may not be equipped with this option.

REMEDIES

A.   Ensure that the proper interface boards have been installed.

These boards are sold in pairs and must be in both the VDE/200 Transmitter and Receiver. The following table lists part numbers that are printed on each interface card. Note that these these cards <u>must</u> be used in pairs; use of incompatible interfaces (for example 09.20.0050 and 09.20.0053) can <u>damage your equipment</u>.

Model	Description	VDE/200 Transmitter	VDE/200 Receiver
200.000.0001	8-Pin Mini-DIN (SUN)	09.20.0051	09.20.0050
200.000.0002	6-Pin Mini-DIN (SGI)	09.20.0053	09.20.0052
200.000.0004	RS-232 (DB-25)	09.20.0057	09.20.0056

Note: Interface boards in both the Transmitter and Receiver of the VDE/200 System must be compatible (refer to table above). These boards are sold in pairs and must be used that way in the VDE/200 System.

B.   Ensure that the keyboard and mouse cabling are correctly installed.

Cables must be present between the video source and the VDE/200 Transmitter, and between the VDE/200 Receiver and the user keyboard/mouse. The VDE/200 data interface modules have been designed to use standard, vendor supplied interface cables that are wired straight through (do not use null modems or other special cables).

C.   Ensure that the fiber optic cables for the data multiplexer are correctly connected.

See Section 3 for installation information. Note that both of the Keyboard/Data fibers must be installed at all times for the data option to operate correctly

5.5   AUX port does not operate.

Note: Some units may not be equipped with this option.

The AUX port is present only on VDE/200 units that have been equipped with the MUX/DEMUX option. Note that the operation of this port is independent of the interface boards; the AUX port will operate whether or not interface boards have been installed.

REMEDIES

A.   Check that the serial port cabling has been installed properly.

Cables must be present between the data source and the VDE/200 Transmitter, and between the VDE/200 Receiver and the data destination. Typically, this will require cables in excess of those supplied with the original computer system. These cables are available from Lightwave.

B.   Check that both of the optical fibers are correctly installed.

Remove the top cover of the VDE/200 Transmitter and/or Receiver, and refer to the installation instructions in Section 3 of this manual. Make sure that the fiber cable is connected to the data MUX/DEMUX optics inside the VDE/200 Transmitter and Receiver.

5.6   Stereo goggles do not function using the VDE AUX port.

REMEDIES:

A.   Check that all cables are connected properly.

If using the Lightwave stereo goggles Y-cables (P/N 200.9000 and 200.9001), see figure A.29 in Appendix A to verify that the cables are connected properly.

B.   Check the transmitter and receiver multiplexer settings.

See figures A.27 and A.28 in Appendix A. Change the jumpers to the proper settings for stereo goggles if they are set otherwise.

Appendix A   Personality Module Configurations and Connector Pinouts

Figure A.1
Auxiliary Port Connector Pinout
Transmitter (CPU) Side

STEREO (TTL)* PIN 1
RxD PIN 2
TxD PIN 3
PIN 4
GND PIN 5

PIN 6
PIN 7 RTS
PIN 8 CTS
PIN 9 +V**
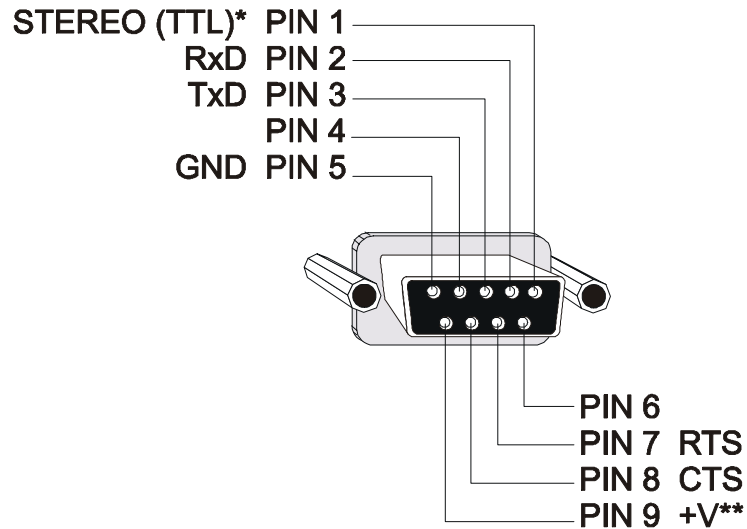
Auxiliary Port DB9 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	Stereo*	Stereo Sync (TTL)	Input
2	RxD	Receive Data	Output
3	TxD	Transmit Data	Input
4	-	-	NC
5	GND	Signal Ground	N/A
6	-	-	NC
7	RTS	Request to Send	Input
8	CTS	Clear to Send	Output
9	+V**	Power +12VDC	Output/NC

* Depends on JP4 setting – signals only on dual fiber multiplexer transmitter
** Depends on JP3 setting – signals only on dual fiber multiplexer transmitter

Figure A.2
Auxiliary Port Connector Pinouts
Receiver (Keyboard/Mouse/Monitor) Side

GND PIN 5
PIN 4
TxD PIN 3
RxD PIN 2
STEREO (TTL)* PIN 1

PIN 9 +V**
PIN 8 CTS
PIN 7 RTS
PIN 6
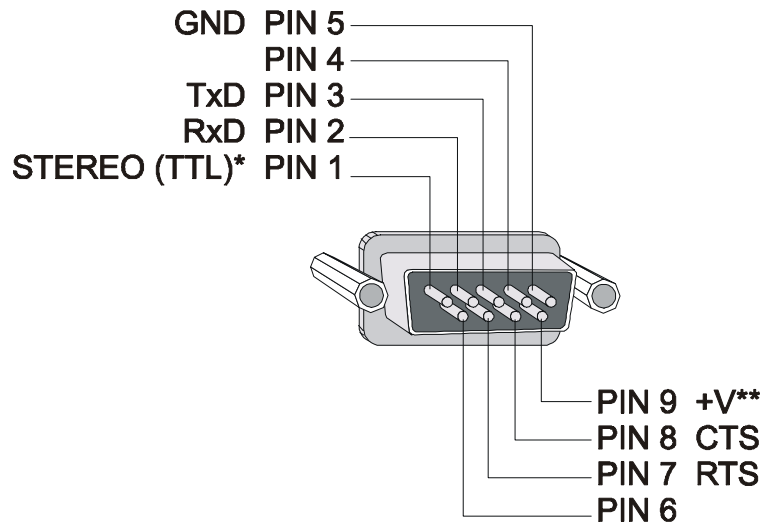
Auxiliary Port DB9 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	Stereo*	Stereo Sync (TTL)	Output
2	RxD	Receive Data	Input
3	TxD	Transmit Data	Output
4	-	-	NC
5	GND	Signal Ground	N/A
6	-	-	NC
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	+V**	Power +12VDC	Output/NC

* Depends on JP4 setting – signals only on dual fiber multiplexer receiver
** Depends on JP3 setting – signals only on dual fiber multiplexer receiver

Figure A.3
Sun Transmitter Personality Module
P/N 200.000.0001-TX (CPU Side)

LIGHTWAVE COMMUNICATIONS
TRANSMITTER INTERFACE MODULE
MINI-DIN 8   PN 09.20.0051

Transmitter
Identifier

Keyboard   Serial

8-Pin Mini-Din Female Connector   DB9 Female Connector
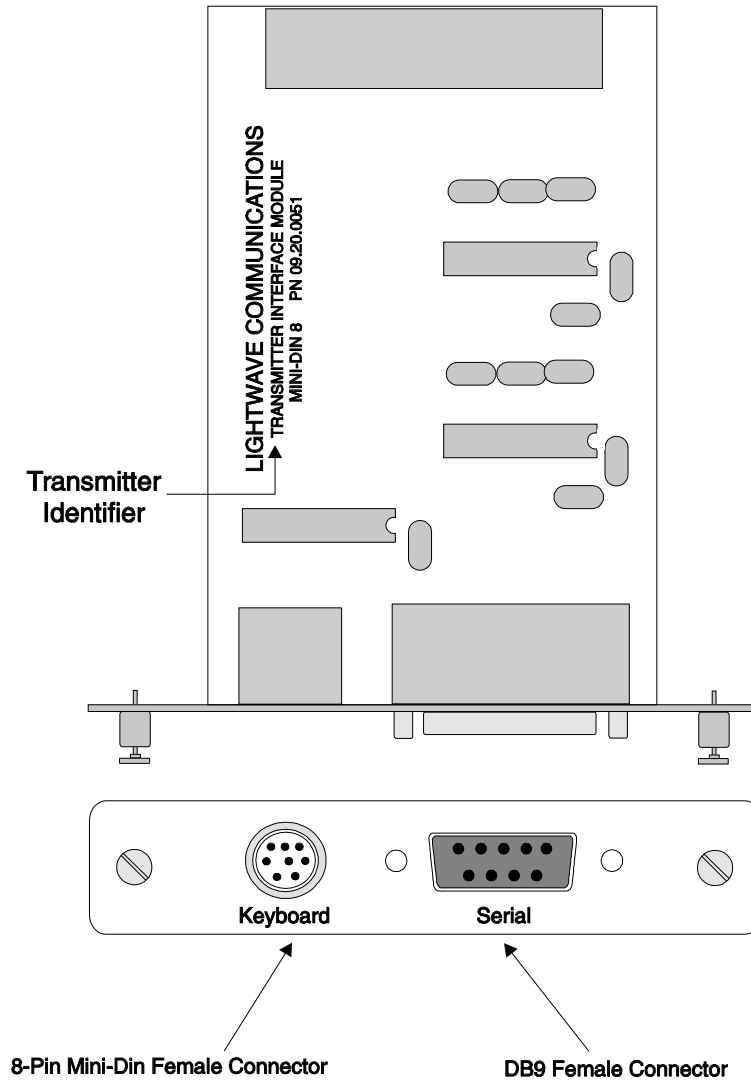
Figure A.4
Sun Transmitter Personality Module Connector Pinouts
P/N 200.000.0001-TX (CPU Side)
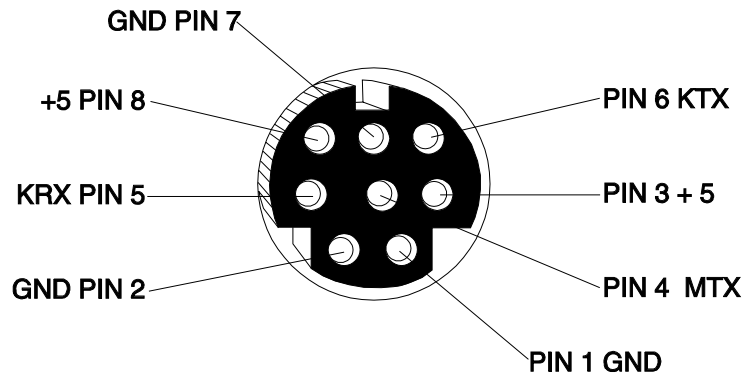
Keyboard/Mouse 8-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	GND	Signal Ground	NA
2	GND	Signal Ground	NA
3	+5	Power	NC
4	MTX	Mouse to CPU	Output
5	KRX	CPU to Keyboard	Input
6	KTX	Keyboard to CPU	Output
7	GND	Signal Ground	NA
8	+5	Power	NC

Serial Port DB9 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	DCD (tied to pin 6)	Data Carrier Detect	Output
2	RxD	Receive Data	Output
3	TxD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Output
7	RTS	Request to Send	Input
8	CTS	Clear to Send	Ouput
9	-	-	NC

Figure A.5

Sun Receiver Personality Module
P/N 200.000.0001-RX (Keyboard/Mouse/Monitor Side)

LIGHTWAVE COMMUNICATIONS
RECEIVER INTERFACE MODULE
MINI-DIN 8   PN 09-20-0050

Receiver
Identifier

Keyboard   Serial

8-Pin Mini-Din Female Connector   DB9 Male Connector

VDE/200 Product Handbook
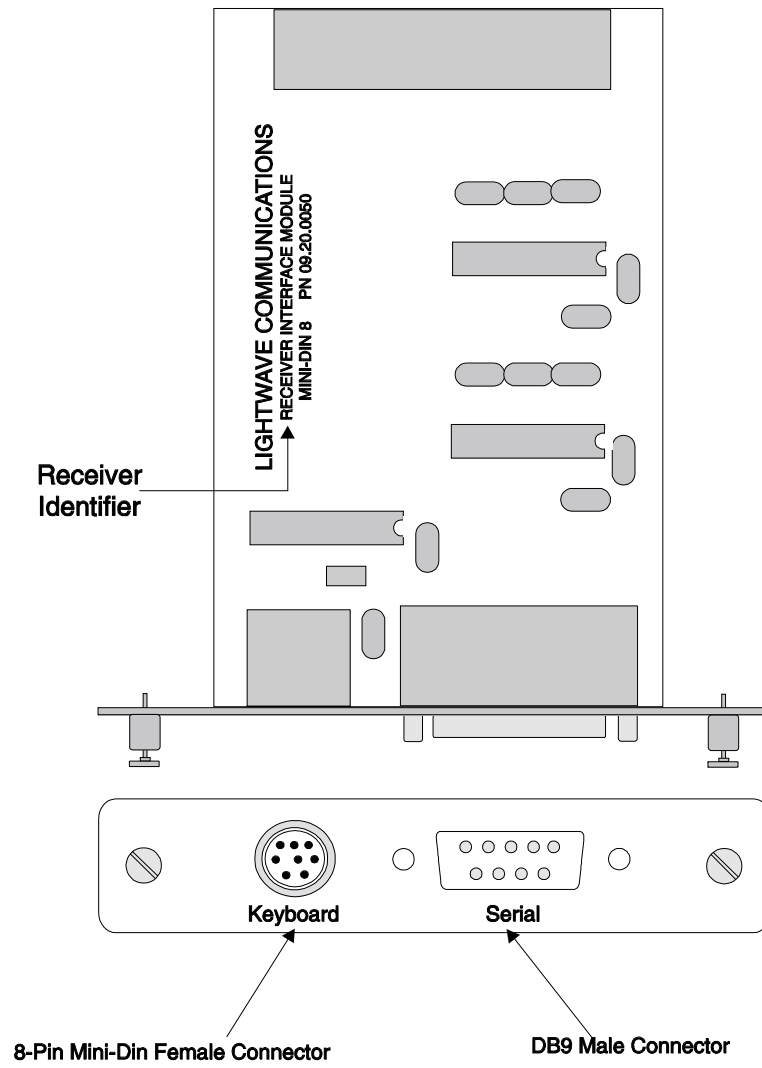
Figure A.6
Sun Receiver Personality Module Connector Pinouts
P/N 200.000.0001-RX (Keyboard/Mouse/Monitor Side)

GND PIN 7
+5 PIN 8
KRX PIN 5
GND PIN 2
PIN 6 KTX
PIN 3 + 5
PIN 4 MTX
PIN 1 GND

Keyboard/Mouse 8-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	GND	Signal Ground	NA
2	GND	Signal Ground	NA
3	+5	Power	NC
4	MTX	Mouse to CPU	Output
5	KRX	CPU to Keyboard	Input
6	KTX	Keyboard to CPU	Output
7	GND	Signal Ground	NA
8	+5	Power	NC

GND PIN 5
DTR PIN 4
TxD PIN 3
RxD PIN 2
N/C PIN 1

PIN 9 N/C
PIN 8 CTS
PIN 7 RTS
PIN 6 DSR

Serial Port DB9 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	-	-	NC
2	RxD	Receive Data	Output
3	TxD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Output
7	RTS	Request to Send	Input
8	CTS	Clear to Send	Ouput
9	-	-	NC

Figure A.7

A - 6

SGI Transmitter Personality Module
P/N 200.000.0002-TX (CPU Side)

LIGHTWAVE COMMUNICATIONS
TRANSMITTER INTERFACE MODULE   SGI / 6 PIN
PN 200.000.0002-TX   REV C

Transmitter
Identifier

H1

H1
STEREO GOGGLES

H1 NO GOGGLES INSTALLED
JUMPER PINS 1 & 2

H1 GOGGLES INSTALLED
JUMPER PINS 2 & 3
TTL OUTPUT ON DB9 PIN1

Keyboard   Serial

6-Pin Mini-Din Female Connector   DB9 Pin Female Connector

Figure A.8
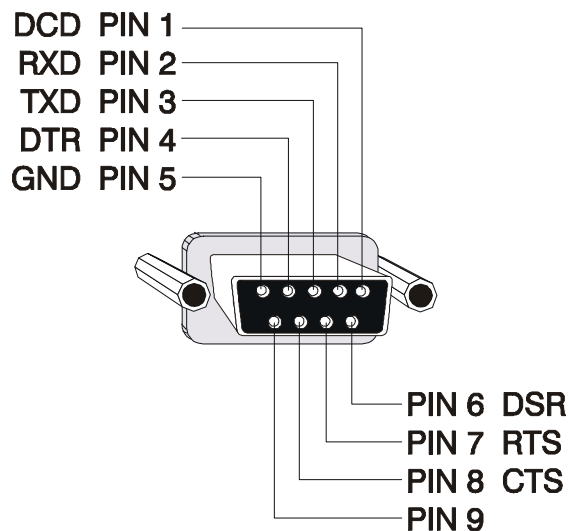**SGI Transmitter Personality Module Connector Pinouts**
P/N 200.000.0002-TX (CPU Side)
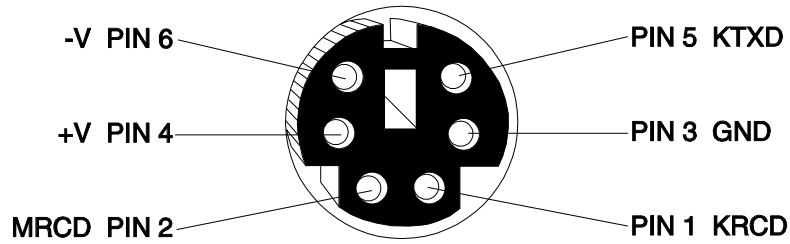
Keyboard/Mouse 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard to CPU	Output
2	MRCD	Mouse to CPU	Output
3	GND	Signal Ground	NA
4	+V	Power	NC
5	KTXD	CPU to Keyboard	Input
6	-V	Power	NC
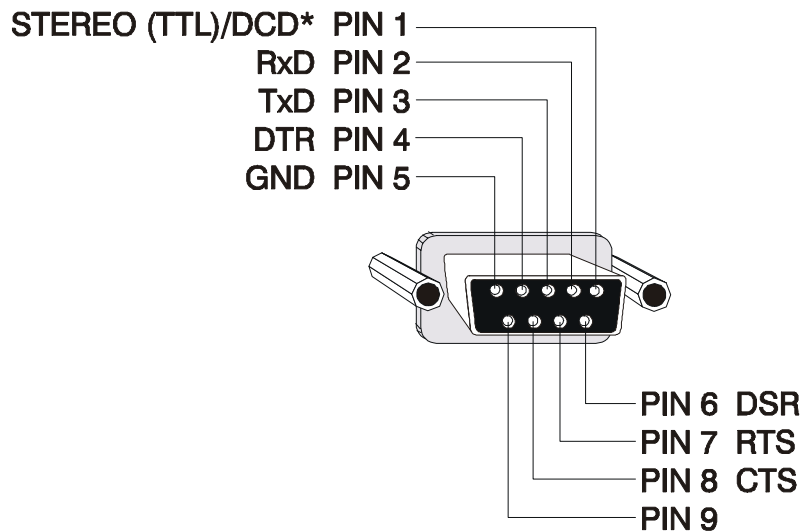
Serial Port DB9 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	Stereo/DCD (tied to pin 6)*	Stereo Sync (TTL)/Data Carrier Detect)	Input/Output
2	RxD	Receive Data	Output
3	TxD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Output
7	RTS	Request to Send	Input
8	CTS	Clear to Send	Output
9	-	-	NC

* Depends on jumper H1 setting (see Figure A.7)

Figure A.9
SGI Receiver Personality Module
P/N 200.000.0002-RX (Keyboard/Mouse/Monitor Side)

Receiver
Identifier

LIGHTWAVE COMMUNICATIONS
RECEIVER INTERFACE MODULE
SGI/6 PIN

P/N 200.000.0002-RX REV C

H2
SERIAL PORT
POWER

H2 NO POWER
JUMPER PINS 1 & 2

H2 POWER ON DB9 PIN 9
+12 VOLTS
JUMPER PINS 2 & 3

H1
STEREO GOGGLES

H1 NO GOGGLES INSTALLED
JUMPER PINS 1 & 2

H1 GOGGLES INSTALLED
JUMPER PINS 2 & 3
TTL OUTPUT ON DB9 PIN1

H1

H2

H3

H3
KEYBOARD PORT
POWER

5
8
12
H3
+ 12 VOLTS
JUMP PINS 1 & 6

5
8
12
H3
+ 8 VOLTS
JUMP PINS 2 & 5

5
8
12
H3
+ 5 VOLTS
JUMP PINS 3 & 4

Keyboard   Serial

6-Pin Mini-Din Female Connector   DB9 Male Connector

A - 9

Figure A.10
SGI Receiver Personality Module Connector Pinouts
P/N 200.000.0002-RX (Keyboard/Mouse/Monitor Side)
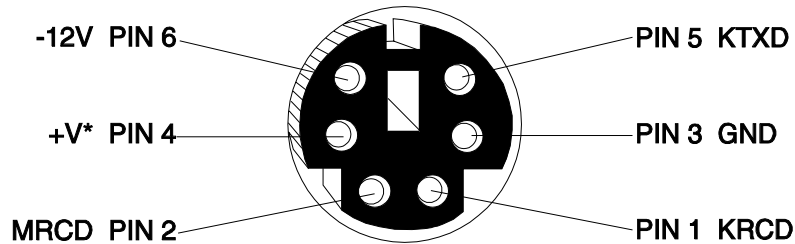
-12V PIN 6   PIN 5 KTXD

+V* PIN 4   PIN 3 GND

MRCD PIN 2   PIN 1 KRCD

Keyboard/Mouse 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard to CPU	Input
2	MRCD	Mouse to CPU	Input
3	GND	Signal Ground	NA
4	+V (5/8/12 V)*	Power	Output
5	KTXD	CPU to Keyboard	Output
6	-12V	Power	Output

* Voltage selection on jumper H3 (see figure A.9)

GND PIN 5
DTR PIN 4
TxD PIN 3
RxD PIN 2
STEREO (TTL)/NC** PIN 1

PIN 9 +V***
PIN 8 CTS
PIN 7 RTS
PIN 6 DSR
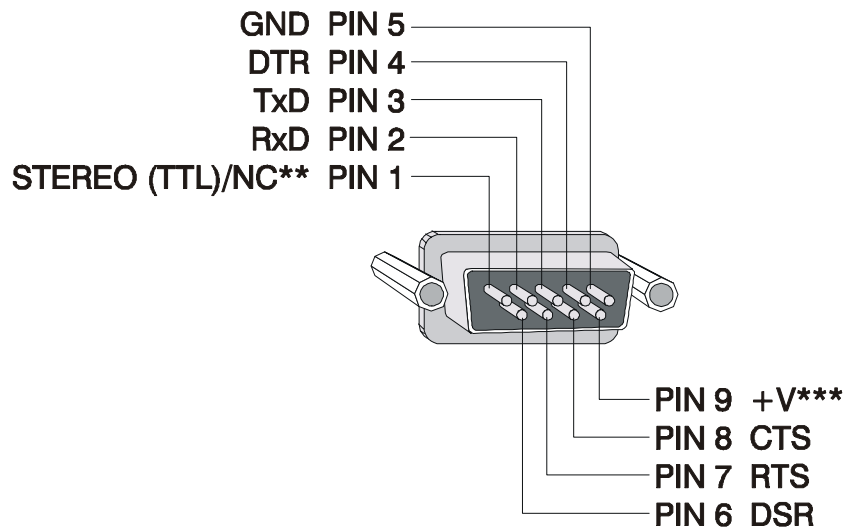
Serial Port DB9 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	Stereo/NC**	Stereo Sync (TTL)/NC	Output/NC
2	RxD	Receive Data	Input
3	TxD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Input
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	+V***	Stereo Power	Output

** Depends on setting of jumper H1 (see figure A.9)
*** Depends on setting of jumper H2 (see figure A.9)

Figure A.11
RS-232 Transmitter Personality Module
P/N 200.000.0004-TX (CPU Side)

Transmitter Identifier

LIGHTWAVE COMMUNICATIONS
TRANSMITTER INTERFACE MODULE
RS-232C DB-25F

DTE
DCE

DB25 Pin Female Connector
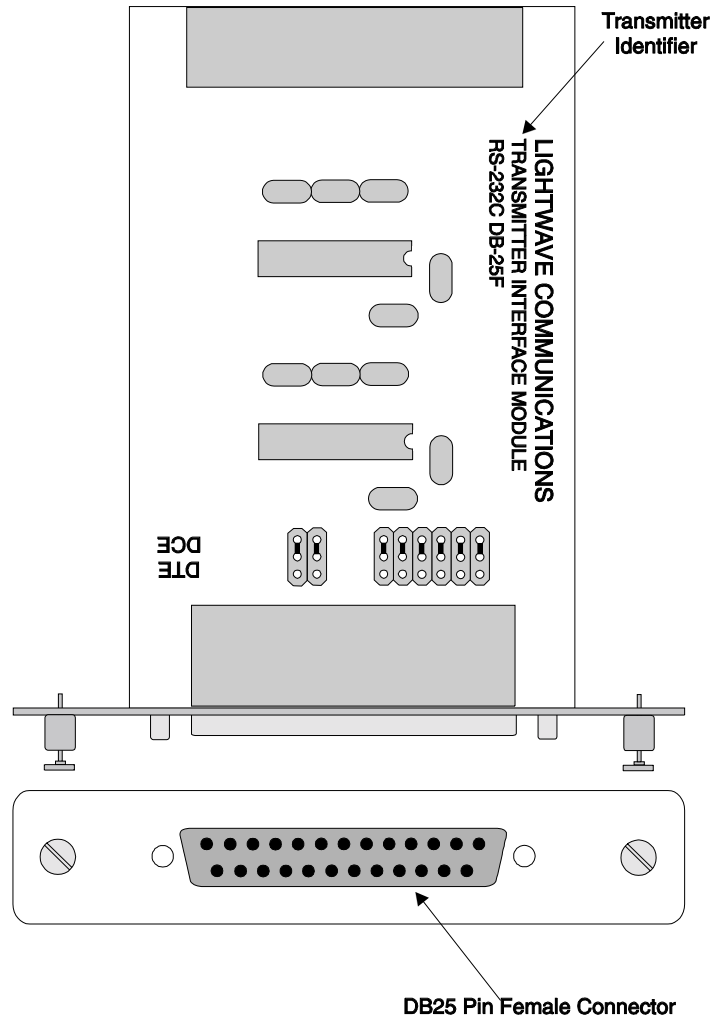
Figure A.12
RS-232 Transmitter Personality Module Connector Pinouts
P/N 200.000.0004-TX (CPU Side)
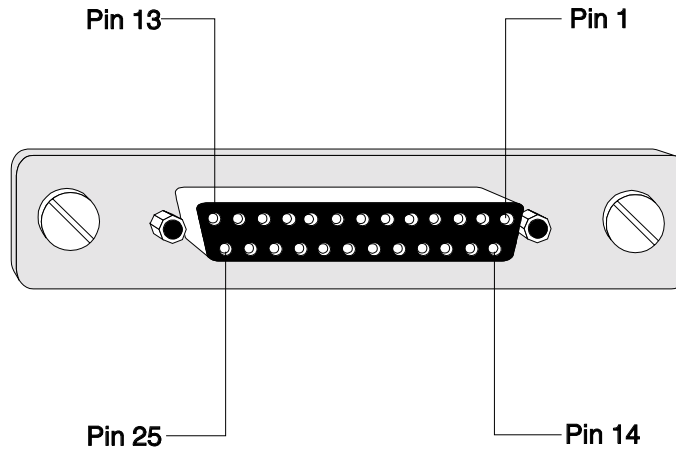
DCE (Default) DB25 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUPUT
2	TxD	Transmit Data	Input
3	RxD	Receive Data	Output
4	RTS	Request to Send	Input
5	CTS	Clear to Send	Output
6	DSR	Data Set Ready	Output
7	SG	Signal Ground	NA
8	DCD	Data Carrier Detect	Output
20	DTR	Data Terminal Ready	Input

DTE DB25 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
2	TxD	Transmit Data	Output
3	RxD	Receive Data	Input
4	RTS	Request to Send	Output
5	CTS	Clear to Send	Input
6	DSR	Data Set Ready	Input
7	SG	Signal Ground	NA
8	DCD	Data Carrier Detect	Input
20	DTR	Data Terminal Ready	Output

Figure A.13
RS-232 Receiver Personality Module
P/N 200.000.0004-RX (Keyboard/Mouse/Monitor Side)

Receiver
Identifier

LIGHTWAVE COMMUNICATIONS
RECEIVER INTERFACE MODULE
RS-232C DB-25M PN 09.20.0056

DTE
DCE

DB25 Male Connector
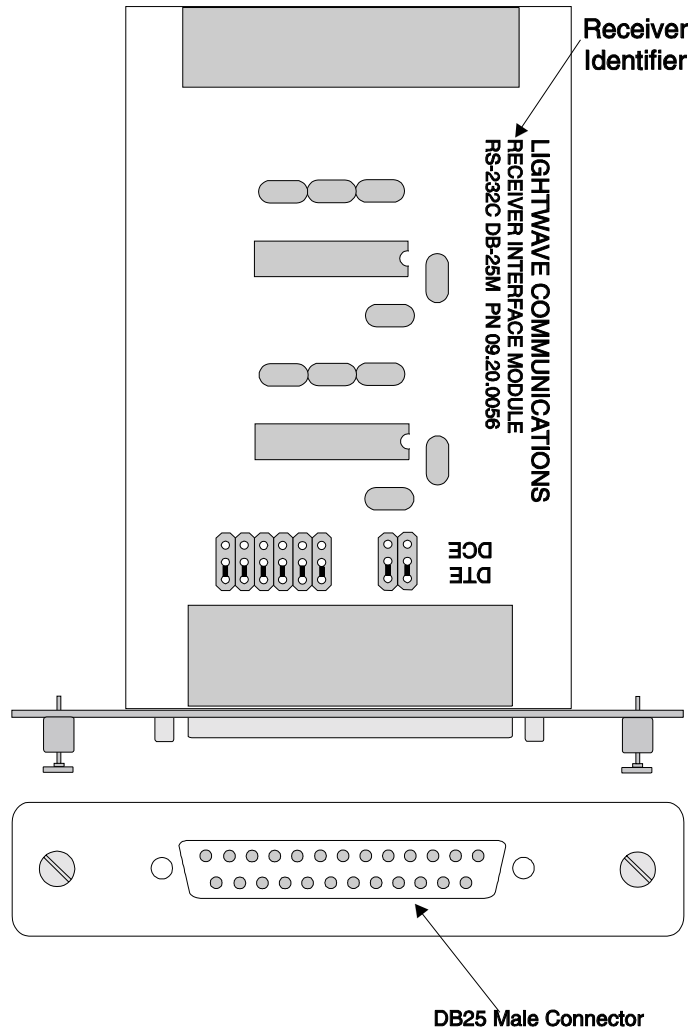
Figure A.14
RS-232 Receiver Personality Module Connector Pinouts
P/N 200.000.0004-RX (Keyboard/Mouse/Monitor Side)
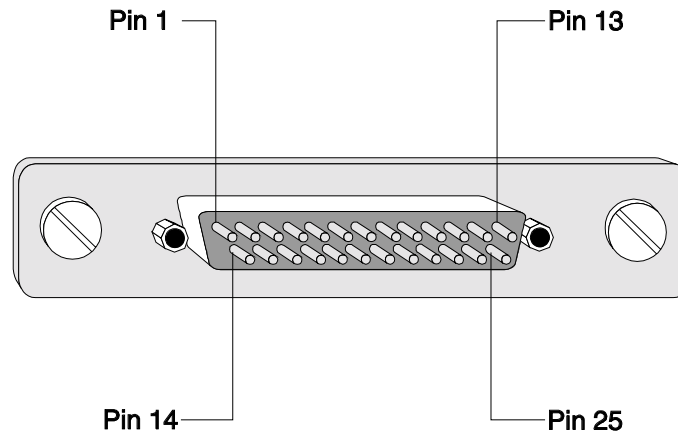
DTE (Default) DB25 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
2	TxD	Transmit Data	Output
3	RxD	Receive Data	Input
4	RTS	Request to Send	Output
5	CTS	Clear to Send	Input
6	DSR	Data Set Ready	Input
7	SG	Signal Ground	NA
8	DCD	Data Carrier Detect	Input
20	DTR	Data Terminal Ready	Output

DCE DB25 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
2	TxD	Transmit Data	Input
3	RxD	Receive Data	Output
4	RTS	Request to Send	Input
5	CTS	Clear to Send	Output
6	DSR	Data Set Ready	Output
7	SG	Signal Ground	NA
8	DCD	Data Carrier Detect	Output
20	DTR	Data Terminal Ready	Input

Figure A.15
PS/2 Transmitter Personality Module
P/N 200.000.0017-TX (CPU Side)

Transmitter
Identifier

LIGHTWAVE COMMUNICATIONS INDY/PS2 KEY MOUSE INTR., TRANSMITTER

Keyboard   Mouse

6-Pin Mini Din Female Connectors
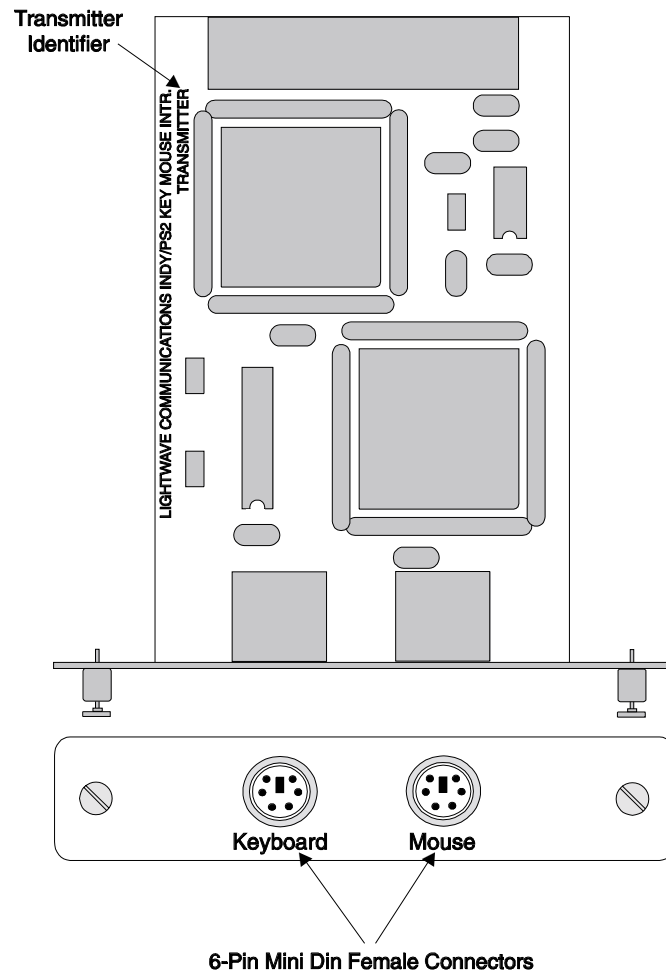
Figure A.16
PS/2 Transmitter Personality Module Connector Pinouts
P/N 200.000.0017-TX (CPU Side)
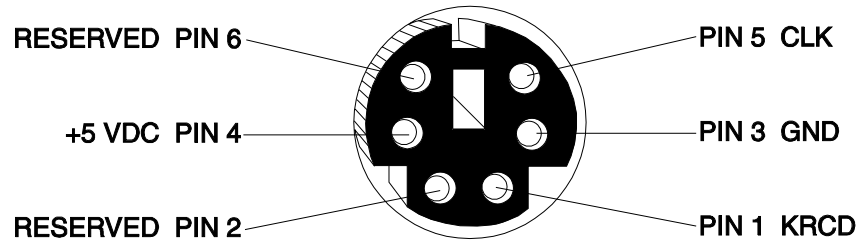
RESERVED PIN 6 ——— PIN 5 CLK

+5 VDC PIN 4 ——— PIN 3 GND

RESERVED PIN 2 ——— PIN 1 KRCD

Keyboard 6-pin Mini-DIN

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard Data	Output/Input
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	NC
5	CLK	Keyboard Clock	Output/Input
6	-	Reserved	NC

RESERVED PIN 6 ——— PIN 5 CLK

+5 VDC PIN 4 ——— PIN 3 GND

RESERVED PIN 2 ——— PIN 1 MRCD
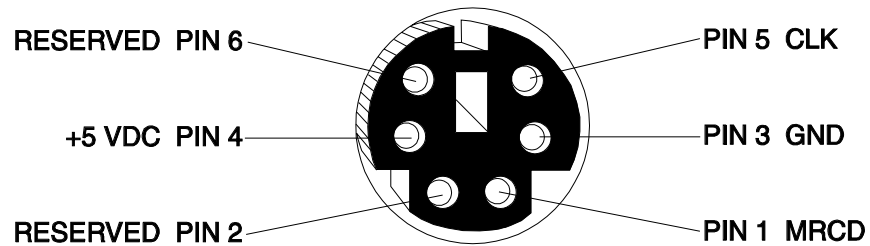
Mouse 6-pin Mini-DIN

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	MRCD	Mouse Data	Output/Input
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	NC
5	CLK	Keyboard Clock	Output/Input
6	-	Reserved	NC

Figure A.17
PS/2 Receiver Personality Module
P/N 200.000.0017-RX (Keyboard/Mouse/Monitor Side)

Receiver
Identifier

LIGHTWAVE COMMUNICATIONS INDY/PS2 KEY MOUSE INTR.
RECEIVER

Keyboard   Mouse

6-Pin Mini Din Female Connectors
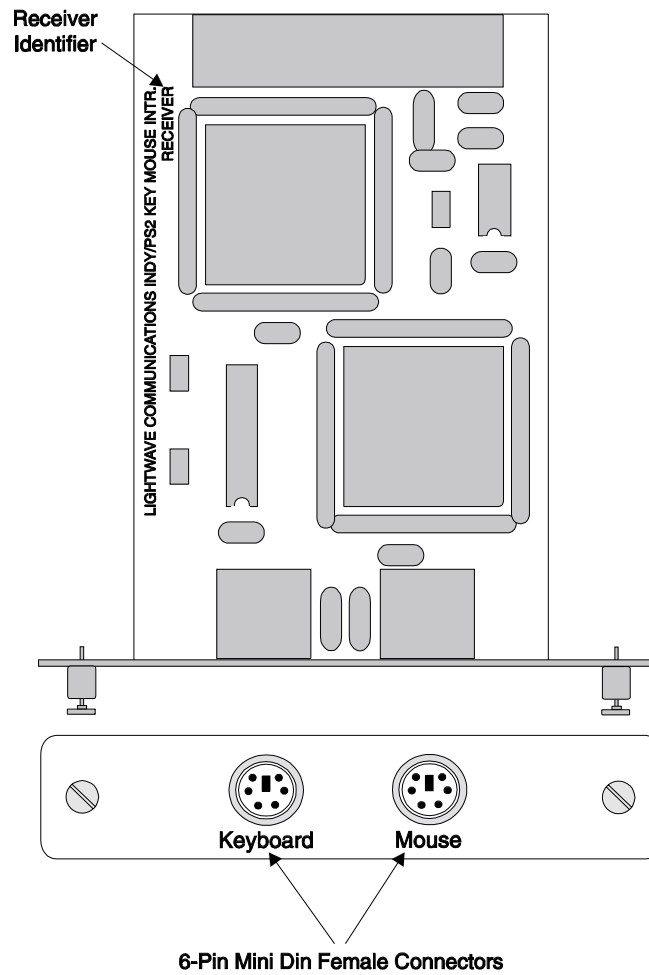
Figure A.18
PS/2 Receiver Personality Module Connector Pinouts
P/N 200.000.0017-RX (Keyboard/Mouse/Monitor Side)
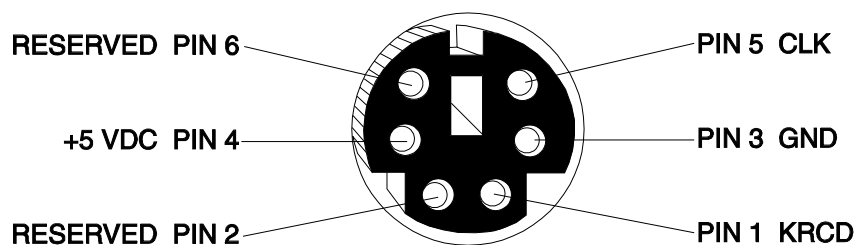
RESERVED PIN 6 — PIN 5 CLK
+5 VDC PIN 4 — PIN 3 GND
RESERVED PIN 2 — PIN 1 KRCD

Keyboard 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard Data	Input/Output
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	Output
5	CLK	Keyboard Clock	Input/Output
6	-	Reserved	NC

RESERVED PIN 6 — PIN 5 CLK
+5 VDC PIN 4 — PIN 3 GND
RESERVED PIN 2 — PIN 1 MRCD
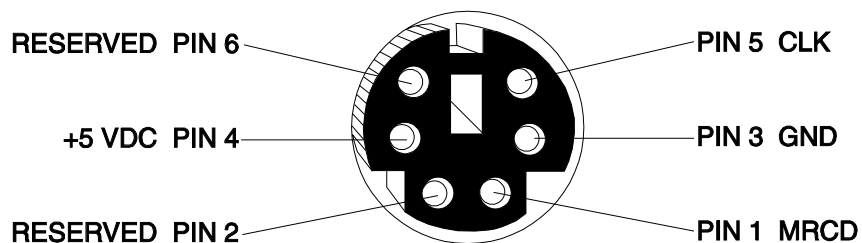
Mouse 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	MRCD	Mouse Data	Input/Output
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	Output
5	CLK	Mouse Clock	Input/Output
6	-	Reserved	NC

Figure A.19
AT Transmitter Personality Module
P/N 200.000.0007-TX (CPU Side)

Transmitter
Identifier

TRANSMITTER
INTERFACE MODULE

LIGHTWAVE COMMUNICATIONS

Keyboard

Serial

6-Pin Mini-Din Female Connector

DB9 Female Connector
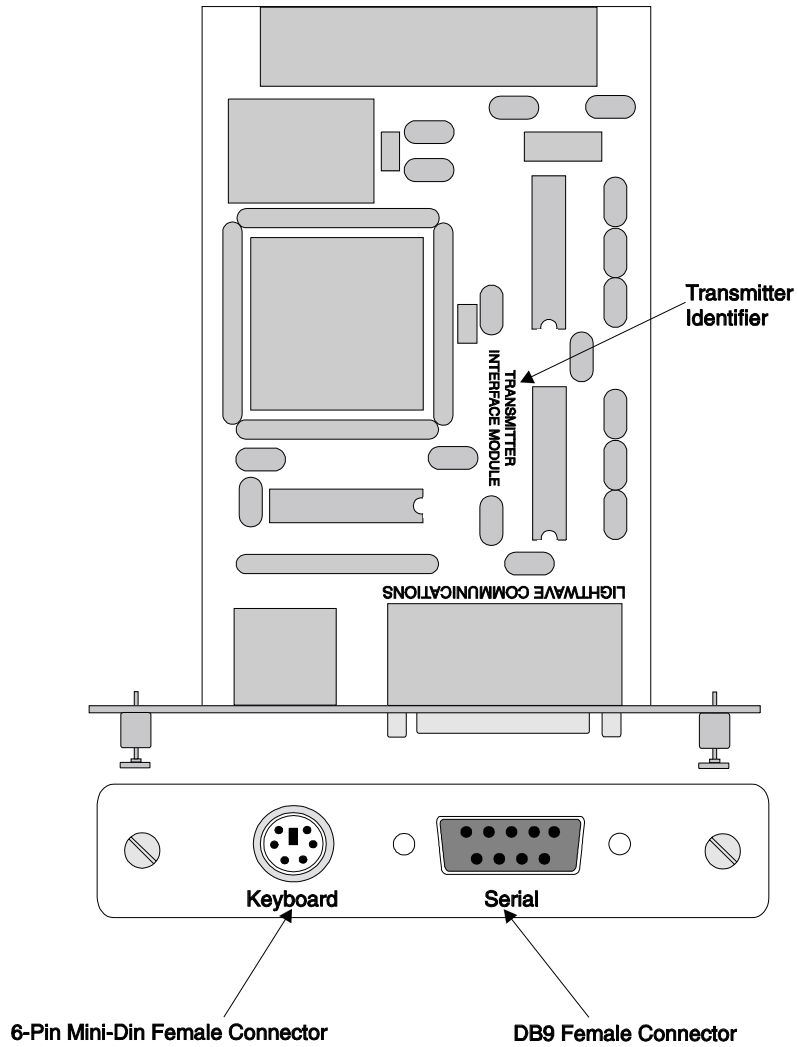
Figure A.20
AT Transmitter Personality Module Connector Pinouts
P/N 200.000.0007A-TX

RESERVED PIN 6
+5V PIN 4
RESERVED PIN 2
PIN 5 CLK
PIN 3 GND
PIN 1 KRCD

Keyboard 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard Data	Output/Input
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	NC
5	CLK	Keyboard Clock	Output/Input
6	-	Reserved	NC

DCD PIN 1
RxD PIN 2
TxD PIN 3
DTR PIN 4
GND PIN 5

PIN 6 DSR
PIN 7 RTS
PIN 8 CTS
PIN 9 NC

Serial Port DB9 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	DCD (tied to pin 6)	Data Carrier Detect	Output
2	RxD	Receive Data	Output
3	TxD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Output
7	RTS	Request to Send	Input
8	CTS	Clear to Send	Output
9	-	-	NC

Figure A.21
AT Receiver Personality Module
P/N 200.000.0007A-RX (Keyboard/Mouse/Monitor Side)

Receiver
Identifier

RECEIVER
INTERFACE MODULE

LIGHTWAVE COMMUNICATIONS

Keyboard

Serial

6-Pin Mini-Din Female Connector

DB9 Pin Male Connector
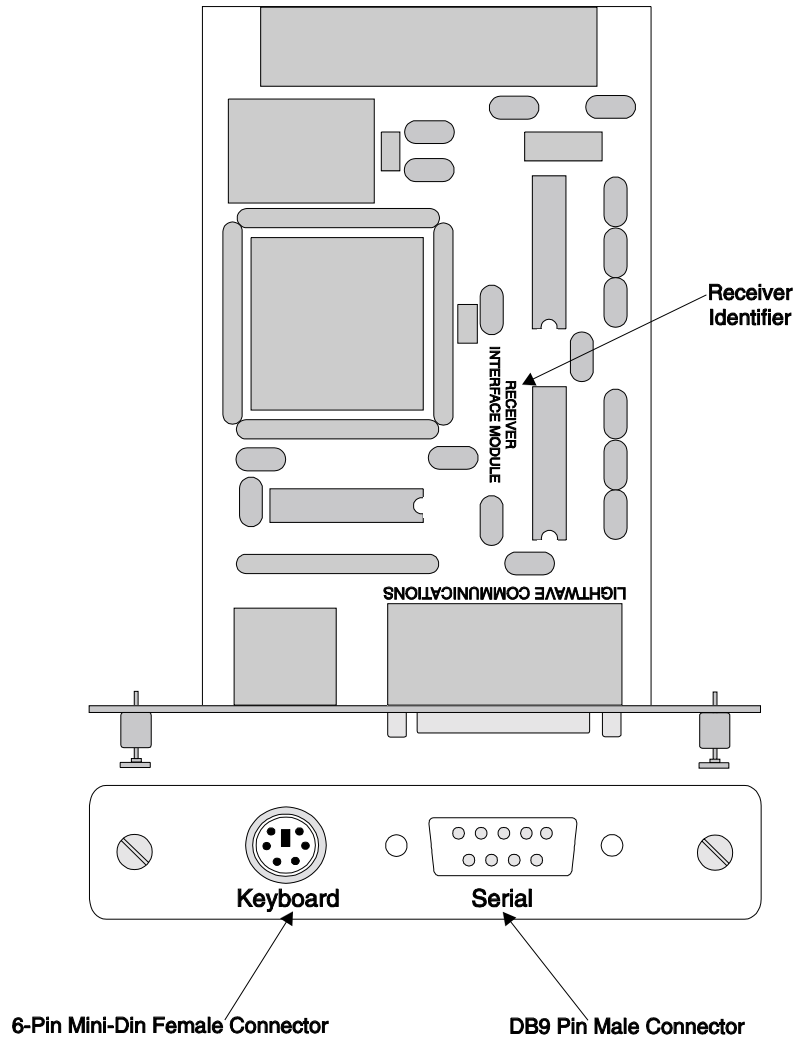
Figure A.22
AT Receiver Personality Module Connector Pinouts
P/N 200.000.0007A-RX (Keyboard/Mouse/Monitor Side)

RESERVED PIN 6 ————   ———— PIN 5 CLK

+5V PIN 4 ————   ———— PIN 3 GND

RESERVED PIN 2 ————   ———— PIN 1 KRCD

Keyboard 6-pin Mini-DIN Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	KRCD	Keyboard Data	Input/Output
2	-	Reserved	NC
3	GND	Signal Ground	NA
4	+5V	Power	Output
5	CLK	Keyboard Clock	Input/Output
6	-	Reserved	NC

GND PIN 5 ————
DTR PIN 4 ————
TxD PIN 3 ————
RxD PIN 2 ————
PIN 1 ————

———— PIN 9
———— PIN 8 CTS
———— PIN 7 RTS
———— PIN 6 DSR
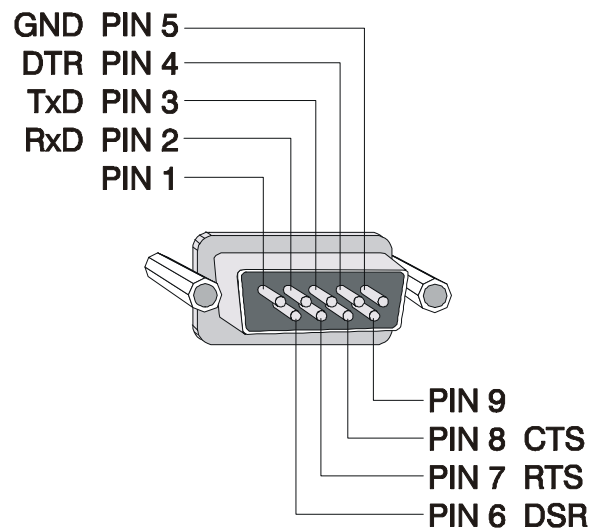
Serial Port DB9 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	-	-	NC
2	RxD	Receive Data	Input
3	TxD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Signal Ground	NA
6	DSR	Data Set Ready	Input
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	-	-	NC

Figure A.23
DEC Transmitter Personality Module
P/N 200.000.0008-TX (CPU Side)
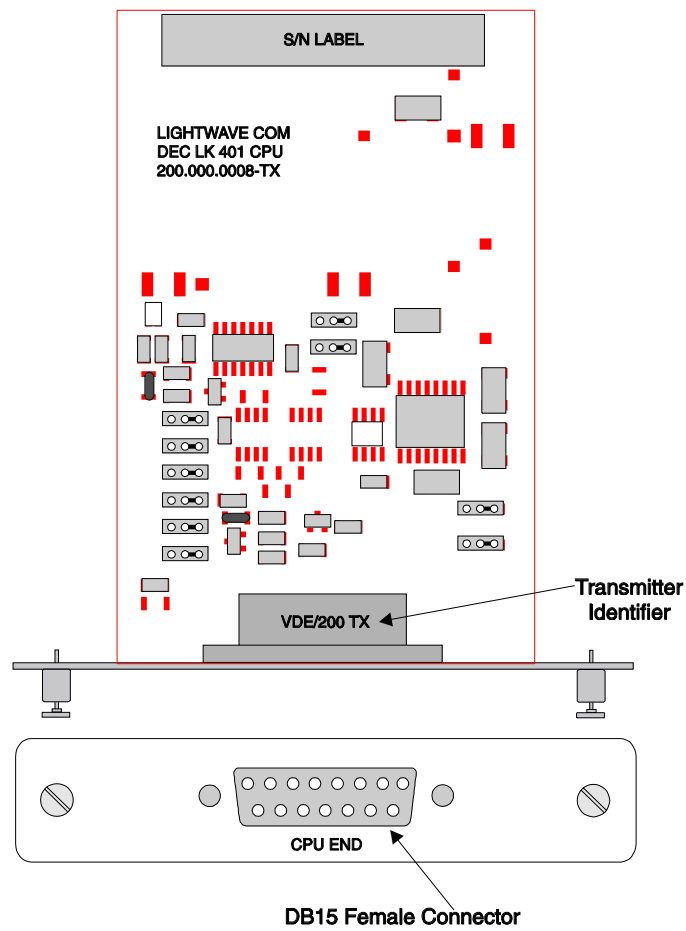
Figure A.24
DEC Transmitter Personality Module Connector Pinouts
P/N 200.000.0008-TX (CPU Side)

PIN 8 ─┐   ┌─ PIN 1

CPU END

PIN 15 ─┘   └─ PIN 9
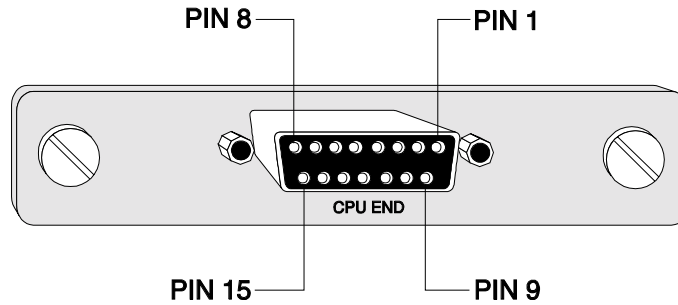
Serial Port DB15 Female

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	GND	Chassis Ground	NA
2	KEYTX	Keyboard Transmit Data	Input
3	KEYRX	Keyboard Receive Data	Output
4	+12V	Keyboard/Tablet Power	Input
5	-	-	NC
6	MSE.RX	Mouse Receive Data	Output
7	MSE.TX	Mouse Transmit Data	Input
8	GND	Chassis Ground	NA
9	GND	Chassis Ground	NA
10	NC	NU	NA
11	NC	NU	NA
12	NC	NU	NA
13	+5V	Mouse Power	Input
14	-12v	Mouse Power	Input
15	GND	Chassis Ground	NA

Figure A.25
DEC Receiver Personality Module
P/N 200.000.0008-RX (Keyboard/Mouse/Monitor Side)

S/N LABEL

LIGHTWAVE COM
DEC LK 401 KB/MS
200.000.0008-RX

Receiver
Identifier

VDE/200 RX

KEYBOARD/MOUSE END
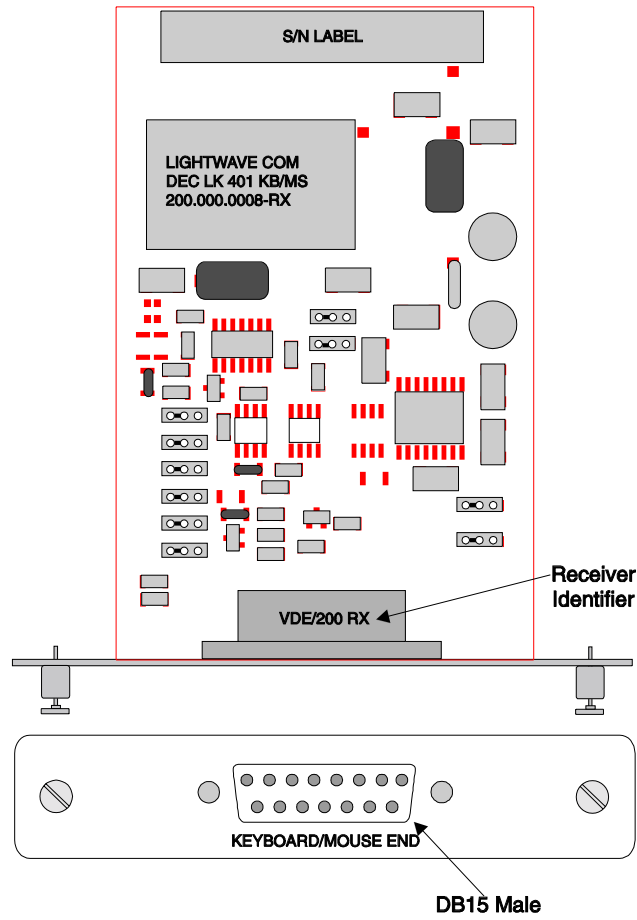
DB15 Male

Figure A.26
DEC Receiver Personality Module Connector Pinouts
P/N 200.000.0008-RX (Keyboard/Mouse/Monitor Side)

PIN 1 ——————   ————— PIN 8

KEYBOARD/MOUSE END

PIN 9 —————   ————— PIN 15
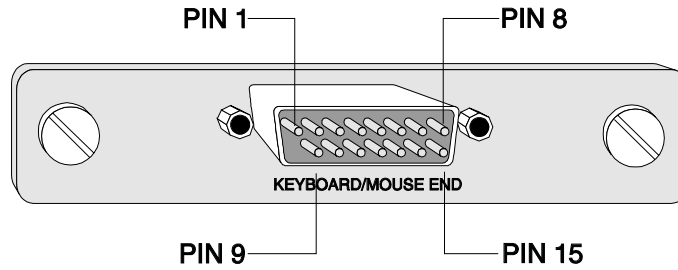
Serial Port DB15 Male

PIN	SIGNAL NAME	DESCRIPTION	INPUT/OUTPUT
1	GND	Chassis Ground	NA
2	KEYTX	Keyboard Transmit Data	Output
3	KEYRX	Keyboard Receive Data	Input
4	+12V	Keyboard/Table Power	Output
5	-	-	NC
6	MSE.RX	Mouse Receive Data	Input
7	MSE.TX	Mouse Transmit Data	Output
8	GND	Chassis Ground	NA
9	GND	Chassis Ground	NA
10	NC	NU	NA
11	NC	NU	NA
12	NC	NU	NA
13	+5V	Mouse Power	Output
14	-12V	Mouse Power	Output
15	GND	Chassis Ground	NA

Figure A.27
Transmitter, Dual Fiber Taxi Multiplexer
P/N 09.20.0075 (CPU Side)

Personality Module
Interface Connector

Goggles Installed
+12V on DB9 pin 9
Jumper 1&2

JP3

Goggles Installed
TTL Output on DB9 pin 1
Jumper 1&2

JP4

JP3
Aux Port
Power

JP4
Stereo
Goggles

No Goggles Installed
No Power
Jumper 2&3

JP3

No Goggles Installed
Jumper 2&3

JP4

Optical Output

Optical Input

Power
Connector
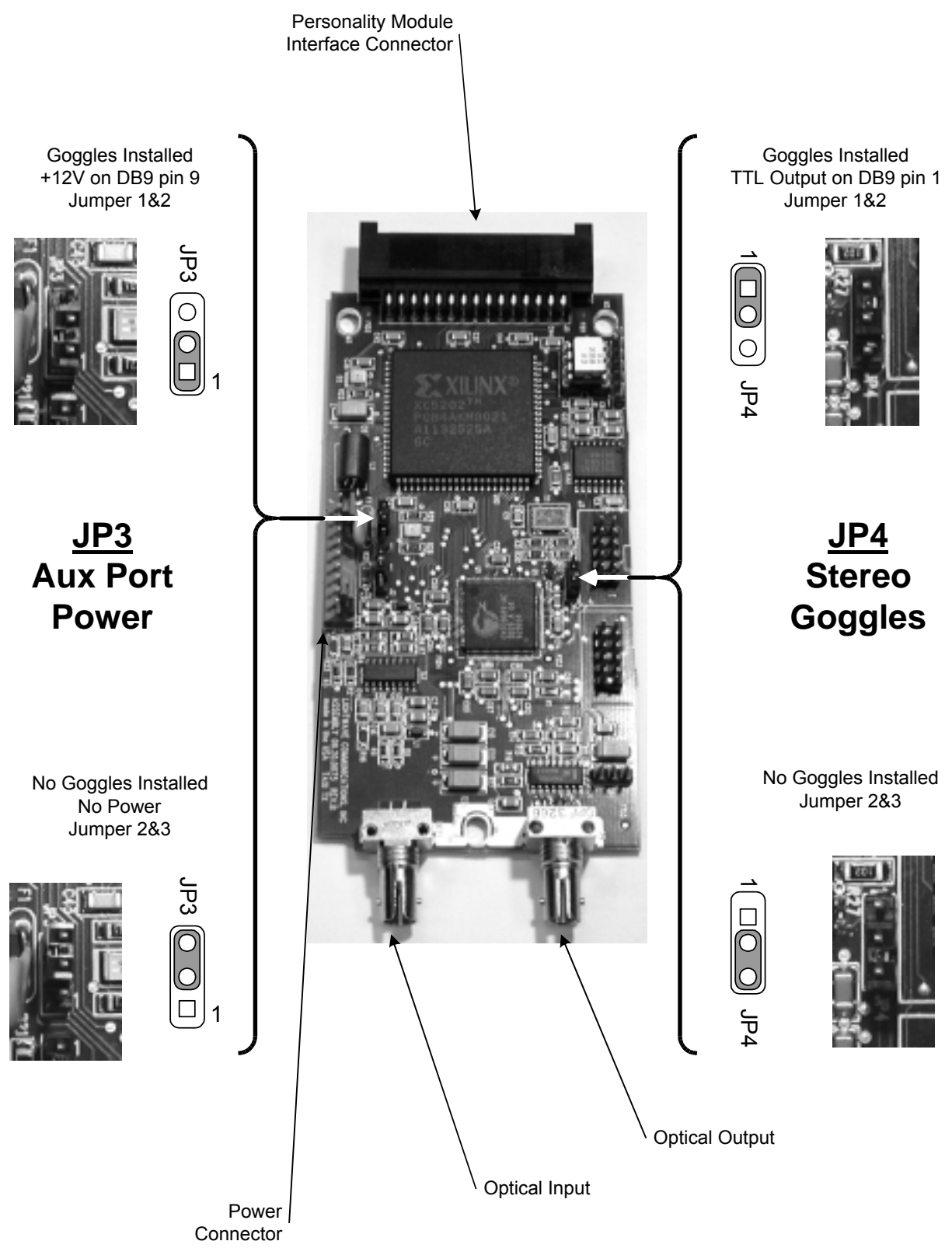
Figure A.28
Receiver, Dual Fiber Taxi Multiplexer
P/N 09.20.0076 (Keyboard/Mouse/Monitor Side)

Personality Module
Interface Connector

Goggles Installed
+12V on DB9 pin 9
Jumper 1&2

JP3

1

Goggles Installed
TTL Output on DB9 pin 1
Jumper 1&2

1

JP4

JP3
Aux Port
Power

JP4
Stereo
Goggles

No Goggles Installed OR
Powering Emitter Externally
No Power
Jumper 2&3

JP3

1

No Goggles Installed
Jumper 2&3

1

JP4

Power
Connector

Optical Output

Optical Input

Figure A.29
Connection Diagram for Stereo Goggles Using Y-cable
P/N 200.9000 (CPU Side) and P/N 200.9001 (Keyboard/Mouse/Monitor Side)

P/N 200.9000 - SGI RS232/
STEREO GRAPHICS "Y"
ADAPTER FOR VDE/200
TRANSMITTER

LABELED "FROM
SGI STEREO
PORT"

VDE
TRANSMITTER

CPU

TO STEREO
PORT

(M) - - - - - DB9 M/F CABLE - - - - - (F) (M)

(M) AUX PORT

TO SERIAL
PORT

(F) - - - - - DB9 M/F CABLE - - - - - (M) (F)

LABELED "FROM
SGI/PC SERIAL
PORT"

MULTIMODE FIBER
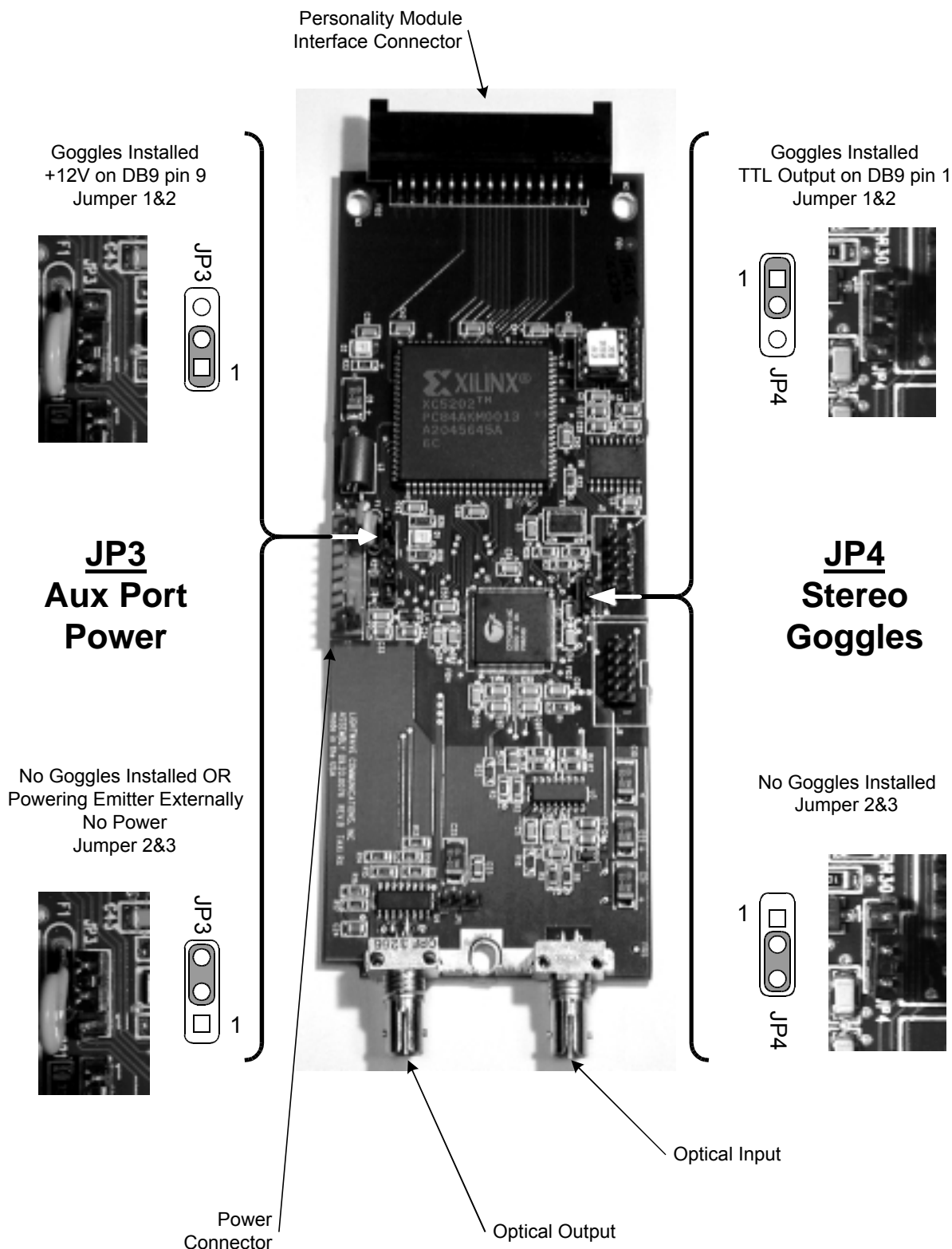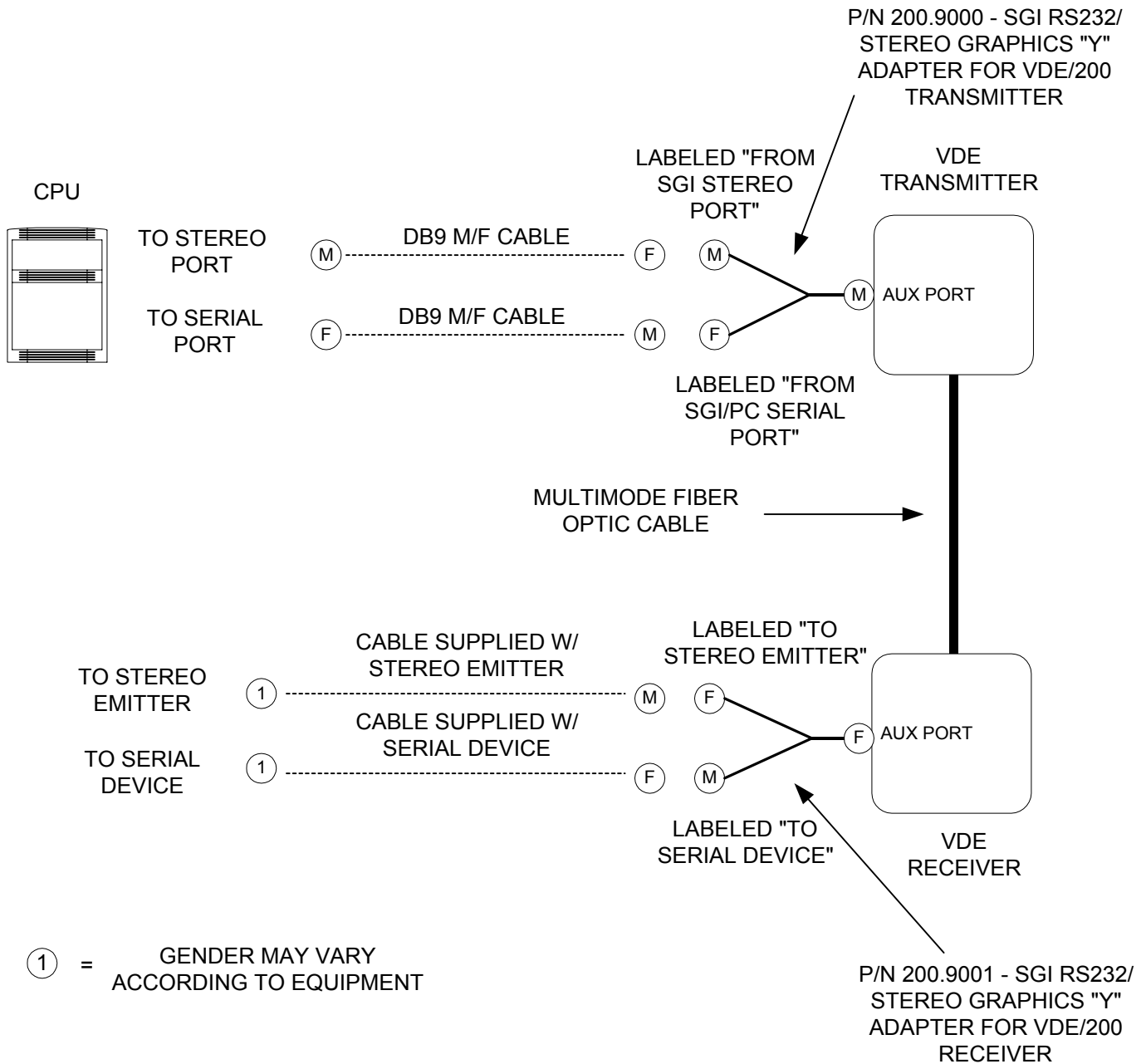OPTIC CABLE   ⟶

LABELED "TO
STEREO EMITTER"

TO STEREO
EMITTER

(1) - - - - CABLE SUPPLIED W/ STEREO EMITTER - - - - (M) (F)

(F) AUX PORT

TO SERIAL
DEVICE

(1) - - - - CABLE SUPPLIED W/ SERIAL DEVICE - - - - (F) (M)

LABELED "TO
SERIAL DEVICE"

VDE
RECEIVER

(1) =   GENDER MAY VARY
         ACCORDING TO EQUIPMENT

P/N 200.9001 - SGI RS232/
STEREO GRAPHICS "Y"
ADAPTER FOR VDE/200
RECEIVER

NOTE: THE Y-CABLE WILL NOT
WORK WITH THE AUDIO EXTENSION
SYSTEM (AES).

Appendix B   Receiver and Transmitter Motherboard Configurations for 13W3 Chassis

Figure B.1
Transmitter Shunt Positions
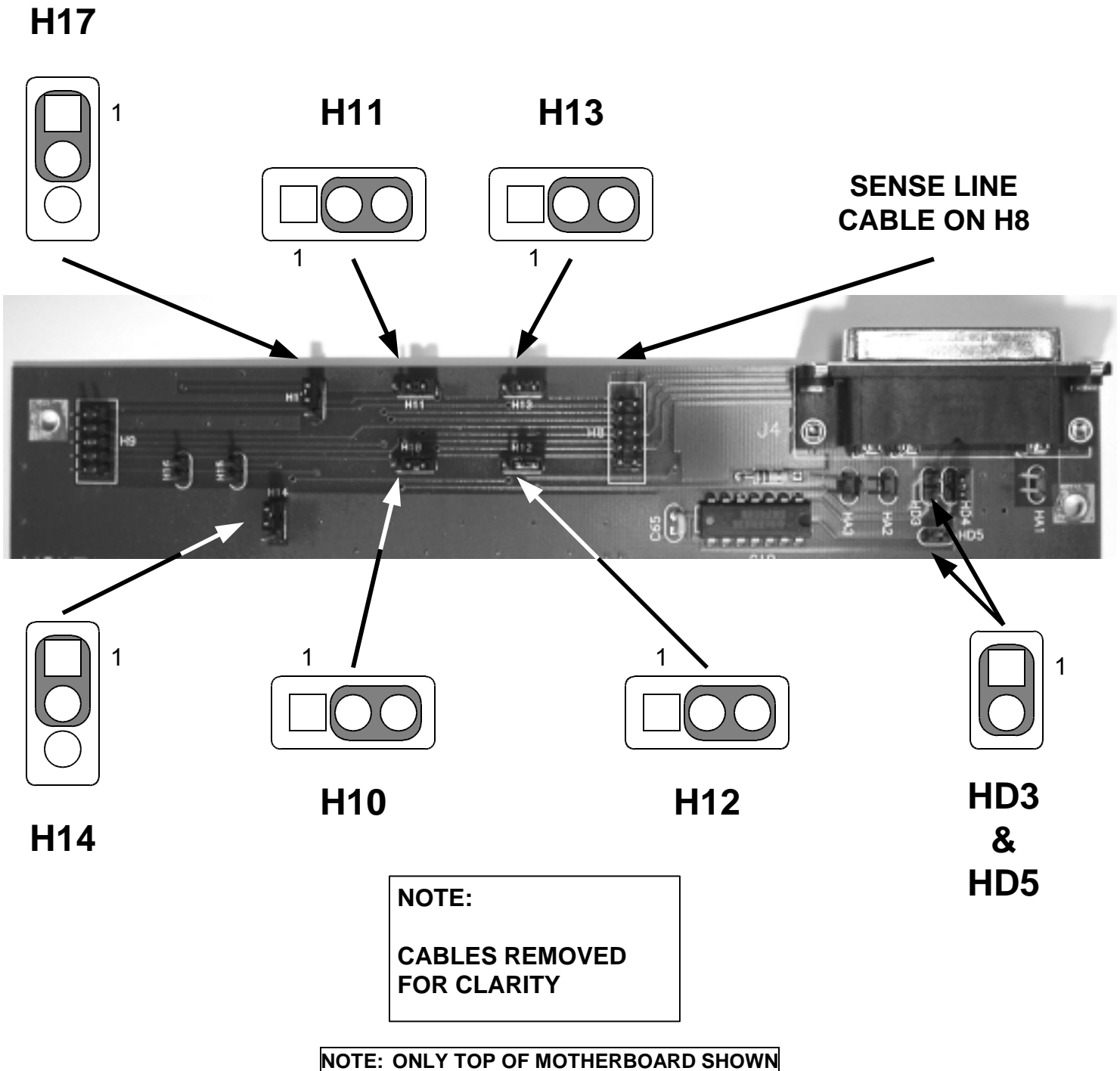**Sun Video (Composite Sync)**

H17

H11

H13

SENSE LINE CABLE ON H8

H14

H10

H12

HD3 & HD5

NOTE:

CABLES REMOVED FOR CLARITY

NOTE: ONLY TOP OF MOTHERBOARD SHOWN

Figure B.2
Receiver Shunt Positions
Sun Video (Composite Sync)

H14

H17

H13

H11

1

1

1

1

NOTE:

**CABLES REMOVED
FOR CLARITY**

1

1

**SENSE LINE
CABLE ON H8**

H10

H12

NOTE: ONLY TOP OF MOTHERBOARD SHOWN

Figure B.3
Tranmitter Shunt Positions
SGI Video (Sync on Green)

H17

**SENSE LINE
CABLE ON H9**

H11

H13

H14

H10

H12

**HD3
&
HD5**
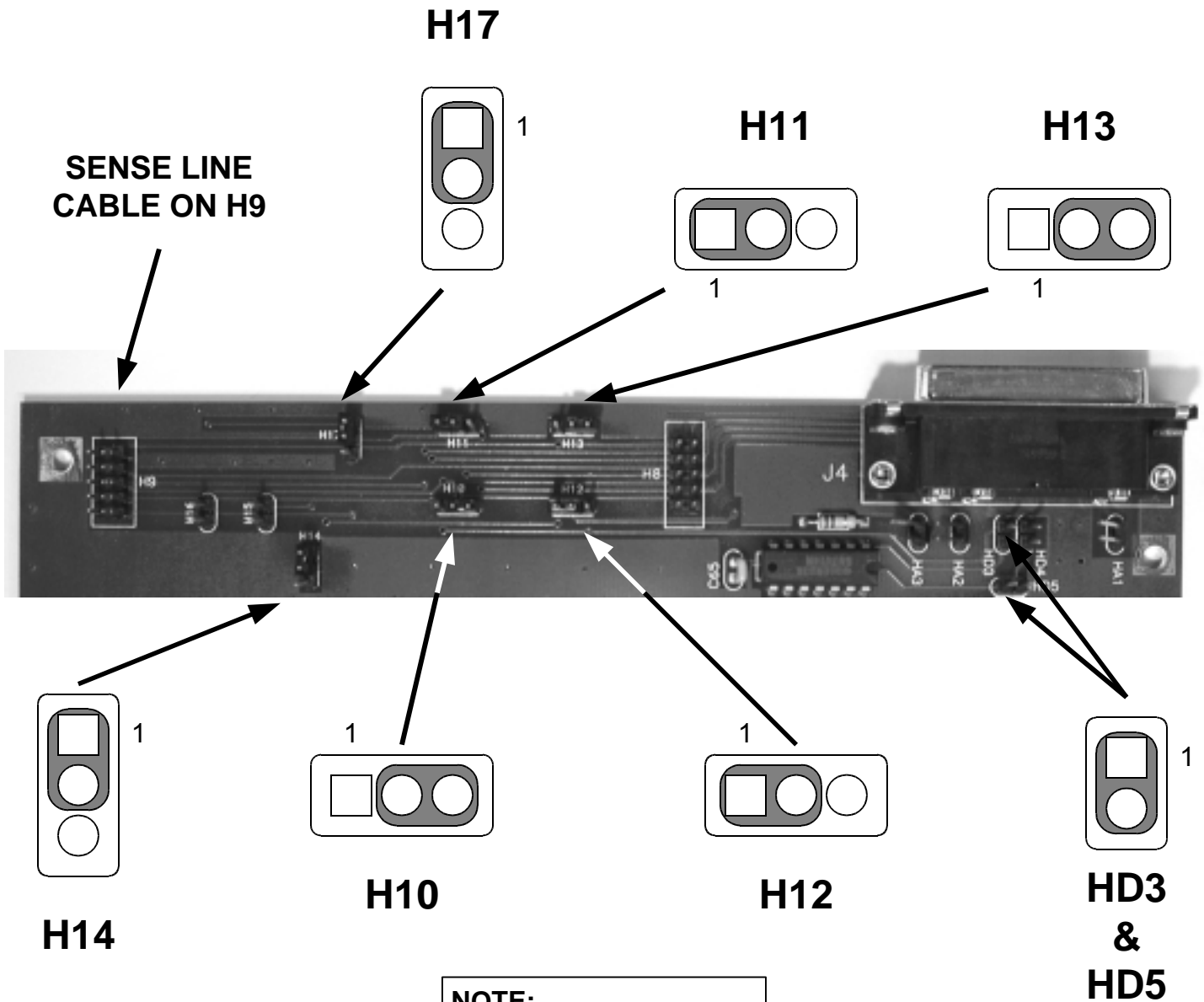
NOTE:

CABLES REMOVED
FOR CLARITY

NOTE: ONLY TOP OF MOTHERBOARD SHOWN

Figure B.4
Receiver Shunt Positions
SGI Video (Sync on Green)

NOTE:

**CABLES REMOVED
FOR CLARITY**

H14   **H17**

1   1

H13   **H11**

1   1

**SENSE LINE
CABLE ON H9**

1   1   1

H10   **H12**   **H12**
composite sync **composite sync**
enabled   **disabled**

NOTE: ONLY TOP OF MOTHERBOARD SHOWN