icron

EL5200 HDMI® + USB 2.0 Extender

HDMI® and USB 2.0 100m Cat 5e KVM Extender System

User Guide

EXTREME LINK™

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

Thank you for purchasing the EL5200 KVM Extender.

Please read this guide thoroughly.

FCC Radio Frequency Interference Statement Warning

This device complies with FCC Part 15 Subpart B.

CE Statement

The product meets European Standard EMC EN 55022 Class A, EN 61000, and EN 55024.

IC Statement

This Class A digital apparatus complies with Canadian ICES-003.

Information contained herein is subject to change without notice.

Document #90-01011-A02

Contents

Introduction

The instructions in this guide assume a general knowledge of computer installation procedures, familiarity with cabling requirements, and some understanding of USB devices.

NOTES provide additional useful and important information.

! CAUTIONS provide important information about an operational requirement.

Product Contents

- Local Extender (LEX)
- Remote Extender (REX)
- (2) 5V DC power adapter
- USB Cable
- HDMI Cable
- Quick Start Guide and Warranty Information

The product requires two power adapters, one for the LEX and one for the REX.

This product supports Cat 5e or better cabling (i.e. Cat 6, Cat 7, etc). **All references to "Cat 5e" should be read as "Cat 5e or better".**

Requirements

To complete the installation, you will require the following items that are not included with the product:

- A computer that is USB compatible (with USB compliant operating system) and has an HDMI port;
- USB 1.1 or 2.0 compatible device(s);
- A minimum of Cat 5e Shielded Twisted Pair (STP) cable with two Cat 5e RJ45 connectors (if using surface cabling),
  OR
- A minimum of Cat 5e cabling with two information outlets and two Cat 5e patch cords with Cat 5e RJ45 connectors (if using premise cabling).

While Cat 5e STP is the minimum category of twisted pair cabling, for the best experience, and to minimize interference and cross-talk, **Cat 6 STP or better is strongly recommended.** When using Cat 5e cabling, the layout and quality of your cable runs and connections becomes extremely important. Please **refer to the Cabling section on page 5** for more detailed information.

About the EL5200 KVM Extender

The EL5200 KVM Extender system incorporates ExtremeLINK™, which enables users to extend both HDMI video and USB 2.0 up to 100 meters (330 feet). The following ExtremeLINK™ features are included:

- True Plug and play. No installation of software drivers required.
- Supports all major operating systems: Windows®, Mac OS X®, and Linux®
- Reliable operation with USB 2.0 and 1.1 devices and hubs
- Patented USB extension technology

Compatibility and Recommended Setup

The product is compatible with many graphics cards, operating systems and monitors, and supports high definition video resolutions of up to 1080p, 1920 x 1200, and 4K. However, there is no guarantee that all devices will be compatible with the product as there are a number of different factors that may impact the operation of this KVM Extender.

This product supports both USB 1.1 and 2.0 devices. These devices include: keyboards, mice, flash drives, microphones, speakers, printers, and USB 1.1 web cameras. If uncertain whether your USB 2.0 device(s) can be supported, please contact Technical Support: **techsupport@icron.com**.

note USB 2.0 devices are limited to 30Mbps of throughput. Not all USB 2.0 devices will reach full performance as a result.

HDMI Cables

! Poorly terminated HDMI cables may result in damage to the devices they are connected to. **Please ensure that you use the HDMI cable provided with the product when connecting the LEX (Local Extender) to the host computer and high quality HDMI cables for all other HDMI connections.**

Cabling

! **Solid core Category 6 STP cable with Category 6 RJ45 connectors is recommended for best performance. Using Cat 5e or unshielded Cat 6 cabling may leave your signal more susceptible to interference and noise which may result in poor video performance or reduced extension distance.**

Cable Type	Maximum Distance	Notes
Solid Core Cat 5e UTP	100m (330 ft)	High susceptibility to electrical interference
Solid Core Cat 5e STP		Moderate susceptibility to electrical interference
Solid Core Cat 6 UTP		High susceptibility to electrical interference
Solid Core Cat 6 STP		**Recommended**
Solid Core Cat 7 STP		**Recommended**

Host Operating Systems

- Windows 7 (32 bit & 64 bit)
- Windows Vista (32 bit & 64 bit)
- Mac OS X
- Windows XP (32 bit & 64 bit)
- Linux

Peripherals

- Keyboards
- Mass Storage Devices
- USB 1.1 Web Cameras
- Mice
- Speakers
- Microphones

HDMI® Compliancy

The EL5200 KVM Extender incorporates HDMI technology, and is compliant in supporting the following HDMI features:

- Full uncompressed high definition 1080p, 1920 x 1200, and 4K video resolution
- Depth perception of 2D and 3D
- Deep Color and x.v. Color
- Lip Sync Pass-through
- CEC Pass-through
- HDCP Pass-through

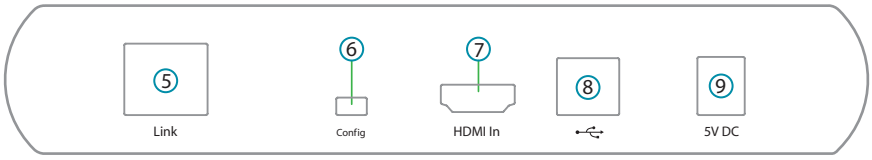
Local Extender (LEX) Description and Markings

The LEX connects to the host computer **using the supplied HDMI and USB cable**.

! It's important to use the HDMI cable supplied with the product when connecting the LEX to the host computer to ensure proper operation.

Front View

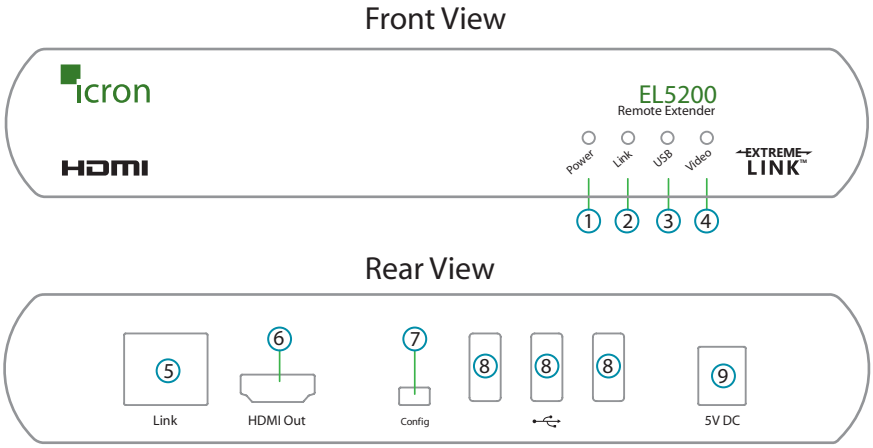
Rear View



ITEM	TYPE	DESCRIPTION
1	Power LED (Green)	Green Light: The system is powered and ready to use. No Light: The system does not have power.
2	Link LED (Green)	Green Light: The LEX and REX are able to communicate with each other across the link. No Light: There is no communication between the LEX and REX.
3	USB LED (Green)	Green Light: The LEX and the host computer are communicating with each other and working. Blinking Green Light: The host has suspended communication with the LEX. No Light: The host and the LEX are not communicating or not connected.
4	Video LED (Green)	Solid Green Light: HDCP (digital rights management) content is being transmitted. Blinking Green Light: Video (non-HDCP) content is being transmitted. No Light: There is no video being transmitted.
5	Link Port (RJ45)	Accepts RJ45 connector for Cat 5e cabling.
6	Config	Reserved for use by Icron Technologies and its technology partners.
7	HDMI In	Accepts HDMI connector for video input from the host computer.
8	Device Port (USB Type B)	Connects the LEX to the host computer.
9	Power Port	Connects to the 5V, 3A power adapter.

Remote Extender (REX) Description and Markings

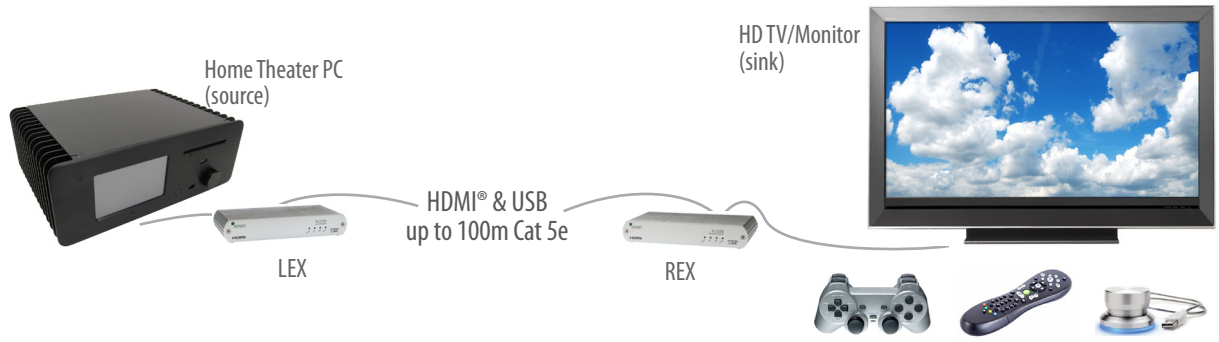
The REX provides HDMI output to a monitor and three USB Type A ports for standard USB devices. Additional devices may be connected by attaching USB hubs.



ITEM	TYPE	DESCRIPTION
1	Power LED (Green)	Green Light: The system is powered and ready to use. No Light: The system does not have power.
2	Link LED (Green)	Green Light: The LEX and REX are able to communicate with each other across the link. No Light: There is no communication between the LEX and REX.
3	USB LED (Green)	Green Light: The LEX and the host computer are communicating with each other and working. Blinking Green Light: The host has suspended communication with the LEX. No Light: The host and the LEX are not communicating or not connected.
4	Video LED (Green)	Solid Green Light: HDCP (digital rights management) content is being transmitted. Blinking Green Light: Video (non-HDCP) content is being transmitted. No Light: There is no video being transmitted.
5	Link Port (RJ45)	Accepts RJ45 connector for Cat 5e cabling.
6	HDMI Out	Accepts HDMI connector to the remote monitor.
7	Config	Reserved for use by Icron Technologies and its technology partners.
8	Device Port (USB Type A)	Accepts USB device(s).
9	Power Port	Connects to the 5V, 3A power adapter.

Installation Guide

Before you can install the product, you need to prepare your site:



1. Determine where the computer is to be located and set up the computer.
2. Determine where you want to locate the remote desktop, including the monitor, keyboard, mouse and any other USB device(s).
3. If you are using surface cabling, the product supports a maximum distance of 100m (330 ft).

   OR

   If you are using premise cabling, ensure Cat 5e cabling is installed between the two locations,with Cat 5e information outlets located near both the computer and the USB device(s), and the total length, including patch cords, is no more than 100m.

Installing the LEX Unit

1. Place the LEX unit near the computer.
2. Connect the supplied USB cable to the USB port on the LEX, and an available USB 2.0/1.1 Type A Port on the computer.
3. Connect the **supplied HDMI cable to the LEX** (HDMI In), and an available HDMI Port on the computer.

Installing the REX Unit

1. Place the REX unit near the monitor and USB device(s) in the desired remote location.
2. Connect an HDMI cable (not included) to the REX (HDMI Out) to the monitor.
3. Plug your USB Device(s) into the USB ports on the REX.

Connecting the LEX to the REX

With Surface Cabling

1. Plug one end of the Cat 5e cabling (not included) into the Link port (RJ45) on the LEX.
2. Plug the other end of the Cat 5e cabling into the Link port (RJ45) on the REX.

With Premise Cabling

1. Plug one end of a Cat 5e patch cord (not included) into the Link port (RJ45) on the LEX.
2. Plug the other end of the patch cord into the Cat 5e information outlet near the host computer.
3. Plug one end of the second Cat 5e patch cord (not included) into the Link port (RJ45) on the REX.
4. Plug the other end of the second patch cord into the Cat 5e information outlet near the USB device(s).

Connecting Power to the LEX and REX

1. Plug the supplied 5V, 3A power adapter into a suitable AC outlet near the LEX.
2. Connect the power adapter to the LEX.
3. Plug the supplied 5V, 3A power adapter into a suitable AC outlet near the REX.
4. Connect the power adapter to the REX.

! Use only the power adapters supplied with the product. Use of substitute adapters may cause permanent damage to the system and will void the warranty.

Checking the Installation

1. On the LEX and REX units, check that the Power, Link, USB, and Video LEDs are on. If the Link LED is off, then the cabling between the LEX and REX unit is not installed properly or is defective.
2. Check to see if the USB LED is on and the Video LED is blinking or on, if they are not, this indicates there is no USB data or video data. Check the HDMI and USB connections to the host computer, and the HDMI connection to the monitor. Check to see if any USB devices are connected to the REX.
3. If the product is not displaying video or your USB device fails to be detected by your operating system, consult the Troubleshooting Guide.

Connecting a USB Device

1. Install any software required to operate the USB device(s). Refer to the documentation provided for your USB device(s), as required.
2. Connect the USB device to the device port on the REX.
3. Check that the USB device is detected and installed properly in the operating system.

Troubleshooting Guide

The following table provides troubleshooting tips. The topics are arranged in the order in which they should be executed, in most situations. If you are unable to resolve the problem after following these instructions, please contact Technical Support for further assistance at **techsupport@icron.com**.

PROBLEM	CAUSE	SOLUTION
All LEDs on LEX are off.	• The LEX is not receiving power from the power adapter.	1. Ensure that the power adapter is properly connected to the LEX. 2. Check that the power adapter is connected to a live source of electrical power.
All LEDs on REX are off.	• The REX unit is not receiving power from the power adapter.	1. Ensure that the power adapter is properly connected to the LEX. 2. Check that the power adapter is connected to a live source of electrical power.
Link LEDs on LEX and REX are off.	• There is no connection between the LEX and REX	1. Ensure a Cat 5e cable is connected between the LEX and REX. Ensure Cat 5e STP or better cabling with conductor RJ45 connectors is used. 2. Connect a new short Cat 5e patch cord between the LEX and REX to determine if the original Cat 5e cable is defective. 3. Ensure the Cat 5e cable is as straight as possible (i.e. not coiled).
Link LED on LEX is on, USB LED on LEX is off.	• The host computer is not powered on. • The LEX is not connected to the computer. • The computer does not support USB hubs. • The USB cable is defective. • The unit is malfunctioning.	1. Disconnect all USB devices from the REX. 2. Disconnect the LEX from the computer. 3. Disconnect the LEX and REX from the power adapters. 4. Reconnect the LEX to the power adapter. 5. Reconnect the REX to the power adapter. 6. Reconnect the USB devices to the REX. 7. Reconnect the LEX to the computer. 8. If the USB LED continues to stay off, contact Technical Support.

PROBLEM	CAUSE	SOLUTION
All LEDs on both the LEX and REX are on, but the USB device does not operate correctly or is detected as an "Unknown Device" in the operating system.	• The USB device is malfunctioning. • The computer does not recognize the USB device. • The application software for the device is not operating. • The KVM extender product is malfunctioning.	1. Disconnect the KVM extender product from the computer. 2. Connect the USB device directly to the USB port on the computer. 3. If the device does not operate properly, consult the user documentation for the USB device. 4. Update your system BIOS, chipset or USB Host controller drivers from your System/Motherboard manufacturer's website. 5. Make sure the operating system has all the latest updates installed. 6. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the KVM extender product. Connect the KVM extender product to the computer. 7. If the second device does not operate, the KVM extender product may be malfunctioning. Contact Technical Support for assistance. 8. If the second device does operate properly, the first device may not be compatible with the KVM extender product.
Blinking Video on the Sink (Monitor).	• A poor quality or damaged Cat 5e cable is being used. • The cabling is coiled.	1. Remove all loops in the Cat 5e cable. 2. Confirm extender operation with a Cat 5e patch cable.
Video frames are being dropped.	• The extender is not compatible with the HDCP source and/or sink device.	1. Contact Technical Support.
Video LED is off.	• One or both of the HDMI cables are not connected, are of poor quality or are malfunctioning. • The sink or source is not supported. • The KVM extender product is malfunctioning.	1. Confirm extender operation with HDMI cables that are less than 5m (16' 4") in length. 2. Confirm extender operation with a Cat 5e patch cable. 3. Contact Technical Support.

Specifications

Range	Up to 100m (330 ft) over solid core Cat 5e STP (or better) cable. Solid core Cat 6 STP recommended for best performance.
Video Resolution & Depth	High Definition 1080p, 1920 x 1200, and 4K; Depth: 2D and 3D
Color	36-bit, Deep Color, and x.v. Color
Latency	Less than 1 ms
USB Device Support & Throughputs	High-Speed devices (USB 2.0) - up to 30Mbps Full-Speed devices (USB 2.0 & 1.1) - up to 12Mbps Low-Speed devices (USB 2.0 & 1.1) - up to 1.5Mbps
USB Hub Support	Any single chain can include up to 4 USB hubs
USB Host Support	EHCI (USB 2.0) and OHCI/UHCI (USB 1.1)
AC Adapters	Input: 100-240 V AC, 50 – 60 Hz | Output: 5V DC, 3A (15 W)
Power Available to USB Device at REX	500 mA each port
Enclosure Material	Silver anodized aluminum
LOCAL EXTENDER (LEX)	
Video Connector	1 x HDMI In
USB Connector	1 x USB Type B Receptacle
Link Connector	1 x RJ45
Dimensions	112 mm x 175 mm x 30 mm (4.4" x 6.9" x 1.18")
REMOTE EXTENDER (REX)	
Video Connector	1 x HDMI Out
USB Connector	3 x USB Type A Receptacles
Link Connector	1 x RJ45
Dimensions	112 mm x 175 mm x 30 mm (4.4" x 6.9" x 1.18")
ENVIRONMENTAL	
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Storage Temperature Range	-20°C to 70°C (-4°F to 158°F)
Operating Humidity	20% to 80% relative humidity, non-condensing
Storage Humidity	10% to 90% relative humidity, non-condensing
COMPLIANCE	
Emissions	FCC Part 15 Class A, CE EN 55022 Class A, ICES-003 Class A
Immunity	CE EN 55024
Environmental	RoHS
SUPPORT	
Warranty	2 years

Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting section, you may contact **Technical Support (techsupport@icron.com) and send the following information:**

- Host computer make and model
- Type of Operating System installed (e.g. Windows XP, Mac OS X, Windows 7 etc.)
- Part number and serial number for both the LEX and REX
- Make and model of any USB device(s) attached to the product
- Description of the installation
- Description of the problem

Warranty Information

Limited Hardware Warranty

Icron Technologies Corporation warrants that any hardware products accompanying this documentation shall be free from significant defects in material and workmanship for a period of **two years from the date of purchase.** Icron Technologies Corporation's hardware warranty extends to Licensee, its customers, and end users.

The Warranty does not include repair of failures caused by: misuse, neglect, accident, modification, operation outside a normal operating environment, failure caused by service of the device by non-authorized servicers, or failure caused by a product for which Icron Technologies Corporation is not responsible.

Hardware Remedies

Icron Technologies Corporation's entire liability and the Licensee's exclusive remedy for any breach of warranty, shall be, at Icron Technologies Corporation's option, either (a) return of the price paid or (b) repair or replacement of hardware, which will be warranted for the remainder of the original warranty period or 30 days, whichever is longer. These remedies are void if failure of the hardware has resulted from accident, abuse, or misapplication.

Limitation of Liability

The hardware warranty set forth in this agreement replaces all other warranties. Icron Technologies Corporation expressly disclaims all other merchantability and fitness for a particular purpose and noninfringement of third-party rights with respect to the hardware.

Icron Technologies Corporation dealer, agent, or employee is authorized to make any modification extension, or addition to this warranty. Under no circumstances will Icron Technologies Corporation, its suppliers or licensors be liable for any costs of procurement or substitute products or services, lost profits, loss of information or data, or any other special, indirect, consequential, or incidental damages arising in any way out of the sale of, use of, or inability to use Icron Technologies Corporation product or service, even if Icron Technologies Corporation, its suppliers or licensors have been advised of the possibility of such damages. In no case shall Icron Technologies Corporation, its suppliers and licensors' liability exceed the actual money paid for the products at issue.

Since some jurisdictions do not allow the limitation of implied warranties of liability for incidental, consequential, special or indirect damages, the above limitation may not always apply. The above limitation will not apply in case of personal injury where and to the extent that applicable law requires such liability.

Obtaining Warranty Service

To obtain warranty service, you must contact Icron Technologies Corporation within the warranty period for a Return Material Authorization (RMA) number. Icron Technologies Corporation will not accept returns without an authorized RMA number. Be sure you have the serial numbers of the local extender and remote extender before calling. Package the product appropriately for safe shipment and mark the RMA number on the outside of the package. The package must be sent prepaid to Icron Technologies Corporation. We recommend that you insure it or send it by a method that provides for tracking of the package. The repaired or replaced item will be shipped to you, at Icron Technologies Corporation's expense, not later than thirty days after Icron Technologies Corporation receives the defective product.

Address the returned product to:

RMA Coordinator
Icron Technologies Corporation
4664 Lougheed Highway, Suite 221
Burnaby, BC Canada
V5C 5T5

Contacting Sales

Email: sales@icron.com
Tel: +1 604 638 3920

Contacting Technical Support

Email: **techsupport@icron.com**
Tel: +1 604 638 3920

To help us serve you better, please include the following information with your technical support request:

- Host computer make and model
- Type of Operating System installed (e.g. Windows XP, Mac OS X, Windows 7 etc.)
- Part number and serial number for both the LEX and REX
- Make and model of any USB device(s) attached to the product
- Description of the installation
- Description of the problem

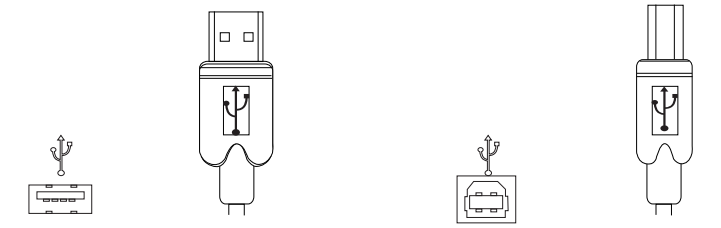
Technical Glossary

Category 5e (Cat 5e) Network Cabling

Category 5e cable is commonly also referred to as Cat 5e. This cabling is available in either solid or stranded twisted pair copper wire variants and as UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair). UTP cables are not surrounded by any shielding making them more susceptible to electromagnetic interference (EMI). STP cables include shielding over each individual pair of copper wires and provides better protection against EMI. **For best performance of this product, solid core Category 6 STP cable with Category 6 RJ45 connectors is recommended.**

USB Cables

USB cables have two distinct connectors. The Type A connector is used to connect the cable from a USB device to the Type A port on a computer or hub. The Type B connector is used to attach the USB cable to a USB device.



RJ45

The Registered Jack (RJ) physical interface is what connects the network cabling (Cat 5e) to the Local Extender (LEX) unit and Remote Extender (REX) unit. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination as the extender uses all four pairs of the cable. RJ45 connectors are sometimes also referred to as 8P8C connectors.

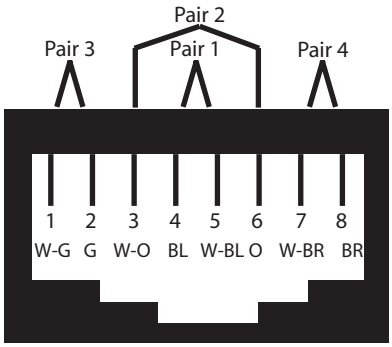
RJ45 Pin Positioning

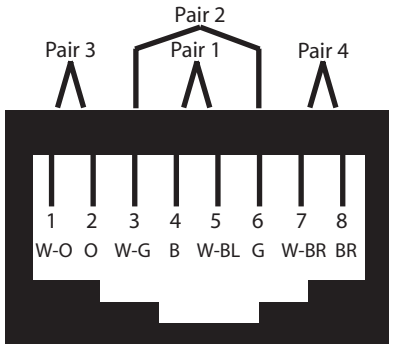
Table 1 - T568A Wiring

PIN	PAIR	WIRE	CABLE COLOR
1	3	1	WHITE/GREEN
2	3	2	GREEN
3	2	1	WHITE/ORANGE
4	1	2	BLUE
5	1	1	WHITE/BLUE
6	2	2	ORANGE
7	4	1	WHITE/BROWN
8	4	2	BROWN

Table 2 - T568B Wiring

PIN	PAIR	WIRE	CABLE COLOR
1	2	1	WHITE/ORANGE
2	2	2	ORANGE
3	3	1	WHITE/GREEN
4	1	2	BLUE
5	1	1	WHITE/BLUE
6	3	2	GREEN
7	4	1	WHITE/BROWN
8	4	2	BROWN





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