User Guide

November 2009

CATx KVM Mini Extender Range

Standard Kit
Model SDLink/LC

Dual Access Kit
Model SDLink/DM

Audio/Serial Kit
Model SDLink/AM

Remote Units
Model SDLink/RLC
Model SDLink/MAR

6-Port Remote Unit Hubs
Model SDRK/6R
Model SDRK/6RA

PS/2 Extender Kit
Model SDLink/PS2

Cautions and Notes

The following symbols are used in this guide:

CAUTION. This indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.

NOTE. This indicates important information to help you make the best use of this product.

Copyrights and Trademarks

©2004/2009. All rights reserved. This information may not be reproduced in any manner without the prior written consent of the manufacturer.

Information in this document is subject to change without notice and the manufacturer shall not be liable for any direct, indirect, special, incidental or consequential damages in connection with the use of this material.

All trademark and trade names mentioned in this document are acknowledged to be the property of their respective owners.

Safety Precautions and Installation Guidelines

To ensure reliable and safe long-term operation please note the following installation guidelines:

- Do not use to link between buildings.
- Only use in dry, indoor environments.
- If the building has 3-phase AC power, try to ensure that equipment connected to the Local and Remote Units is on the same phase.
- Try not to route the CATx link cable alongside power cables.
- The use of shielded CATx cable is recommended to maintain compliance.
- Ensure that the system connected to the Local Unit is connected to power ground.
- Ensure that the monitor connected to the Remote Unit is connected to power ground and does not use an isolated power supply.
- The Remote Unit and any power supplies can get warm. Do not situate them in an enclosed space without any airflow.
- Do not place the power supply directly on top of the Remote Unit.
- This product is not suitable for use in isolated medical environments.

To safeguard against personal injury and avoid possible damage to equipment or property, please observe the following:

- **Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not attempt to dismantle or repair any power supply. Do not use a power supply if it appears to be defective or has a damaged case.**
- **Connect all power supplies to grounded outlets. In each case, ensure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.**
- **Do not attempt to modify or repair this product, or make a connection from the CATx link interface (RJ45) to any other products, especially telecommunications or network equipment.**
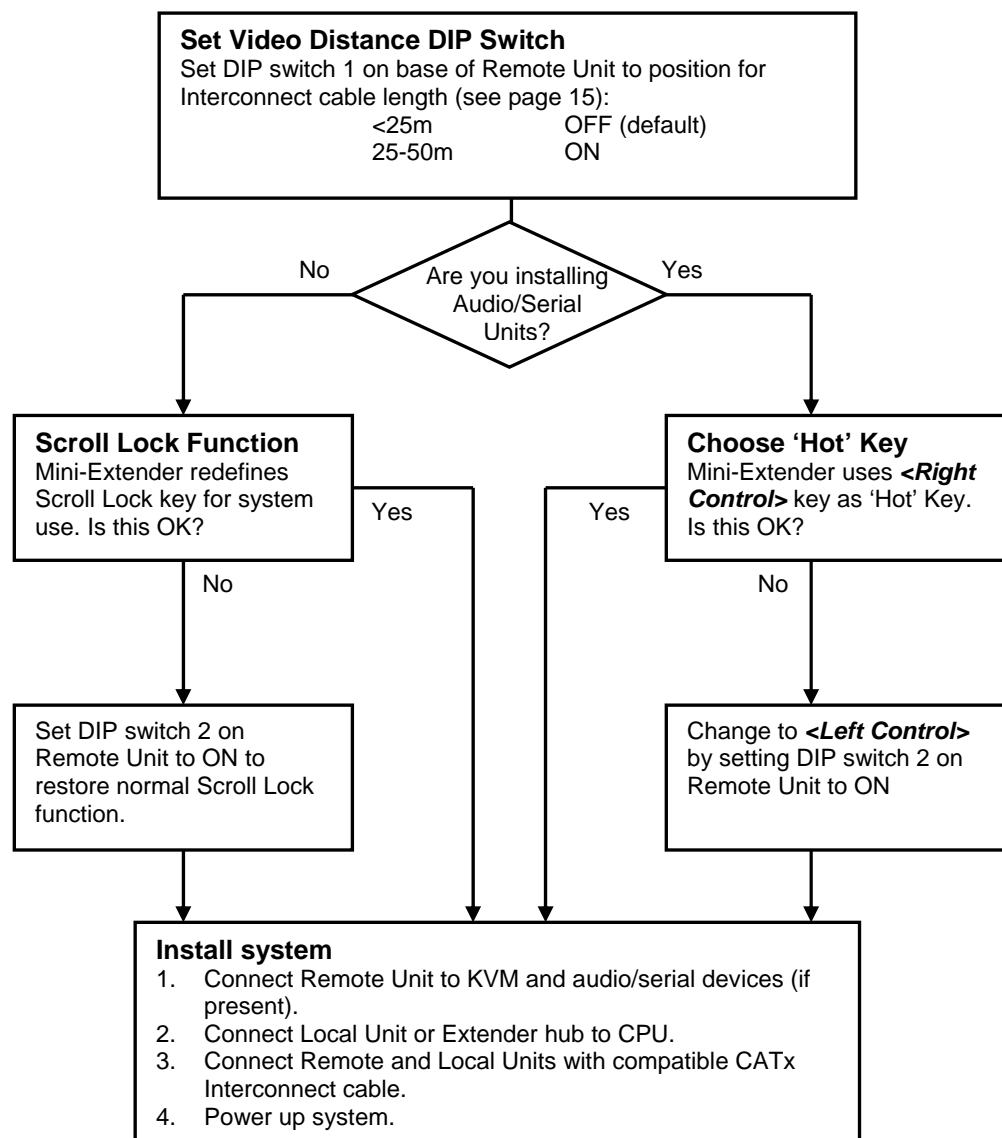
Contents

1. *Quick Setup*

This section briefly describes how to install your Mini Extender system and optimize the video signals. Unless you are an experienced user, we recommend that you follow the full procedures described in the rest of this manual.

Set Video Distance DIP Switch
Set DIP switch 1 on base of Remote Unit to position for Interconnect cable length (see page 15):

<25m	OFF (default)
25-50m	ON

Are you installing Audio/Serial Units?

No   Yes

Scroll Lock Function
Mini-Extender redefines Scroll Lock key for system use. Is this OK?

Yes

No

Set DIP switch 2 on Remote Unit to ON to restore normal Scroll Lock function.

Choose 'Hot' Key
Mini-Extender uses *<Right Control>* key as 'Hot' Key. Is this OK?

Yes

No

Change to *<Left Control>* by setting DIP switch 2 on Remote Unit to ON

Install system
1. Connect Remote Unit to KVM and audio/serial devices (if present).
2. Connect Local Unit or Extender hub to CPU.
3. Connect Remote and Local Units with compatible CATx Interconnect cable.
4. Power up system.

Any Problems? See Installation and Troubleshooting sections.

Note: *The above chart is not applicable to SDLink/PS2*

Command Summary

The implementation of commands in the Mini Extender family differs in Standard and Audio/Serial systems:

Standard Units

SDLink/LC, SDLink/DM, SDLink/RLC and SDLink/6R only

Standard and Dual Access Mini Extenders redefine the Scroll Lock key for issuing system commands:

Command	Key Sequence
Reset Keyboard and Mouse Devices	<Scroll Lock>
Mouse Recovery	<Scroll Lock> + Left and Right Mouse buttons
Dual Access Systems Only (for example, SDLink/DM):	
Activate Console (local or remote console)	Any key or mouse action Only operates if other console has been inactive for at least 2s
Start/End Private Session (local console only)	<Scroll Lock> also resets keyboard and mouse. To do so without starting Private session, press <Scroll Lock> twice.

Audio/Serial Units

SDLink/AM, SDLink/MAR and SDLink/6RA only

After pressing and releasing an initial 'hot' key, normally ***<Right Control>***, on the remote keyboard, you can issue a number of commands:

Command	Key (after pressing 'hot' key)
Reset Local Keyboard and Mouse	<Num-Pad Up Arrow>
Mouse Recovery	<Num-Pad Left Arrow>
When used with compatible Dual Access Audio/Serial Local Units/Hubs (for example, SDRK/6AD):	
Activate Console	Any key or mouse action Only operates if other console has been inactive for at least 2s
Start/End Private Session at remote console	<Scroll Lock>

*You can change the 'hot' key to **<Left Control>** by setting DIP switch 2 to ON.*

2. Overview

Introduction

CATx KVM Mini Extenders enable high-resolution video, PS/2 keyboard and mouse, and, optionally, stereo audio, and serial port signals to be communicated up to 50m over CATx (Category 5, 5e, 6 or higher) cable.

A basic SDLink extension system comprises a *Local Unit* (transmitter) and a *Remote Unit* (receiver). The Local Unit connects directly to the computer (or a KVM switch system) using the supplied cable(s). The user *console* (keyboard, mouse and monitor) attaches to the Remote Unit. The Remote and Local Units communicate video and data information along the connecting CATx cable (Figure 1).

Within the product range, models are available with combinations of the following:

- Audio transmission: bi-directional stereo audio (16-bit digitized).
- Serial transmission: transparent serial COM port (to 19.2Kbps).
- Dual access: allowing a second user console at the Local Unit.
- 6-port Remote Hubs in a rack mount chassis.

Glossary

The following terms are used in this guide:

CATx	Any Category 5, 5e, 6 or higher cable.
PSU	Power Supply Unit.
KVM	Keyboard, Video and Mouse.
Console	A keyboard, monitor, and mouse, plus optional serial/audio devices.
Dual Access	A system allowing connection of local and remote user consoles.
Single Head	An extender system that supports one monitor.
Dual Head	An extender system that supports two monitors.

Local Access
SDLink/DM only.

LOCAL Unit

KVM extension over CATx
cables up to 50m.

REMOTE Unit

Serial and Audio Transmission
Kit: SDLink/AM
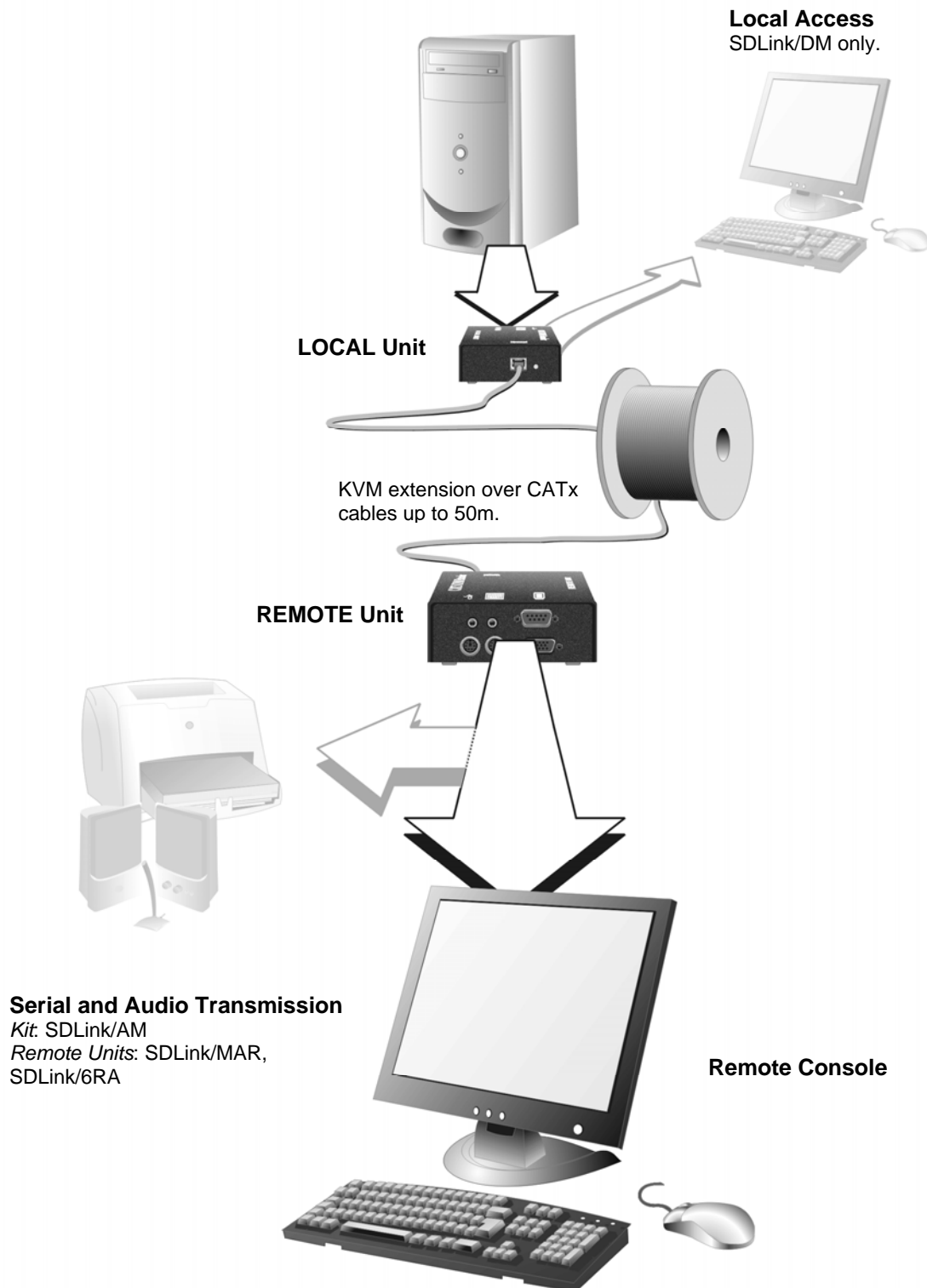*Remote Units*: SDLink/MAR,
SDLink/6RA

Remote Console

Figure 1   CATx KVM Mini Extender system

Features

All members of the CATx KVM Mini Extender product family offer the following features:

- Support for high video resolution over extended distances: 1280x1024@75Hz up to 50m

- Video equalization circuitry compensates for loss of image quality over extended cable lengths.

- Fully buffered signals to ensure consistent remote operation of your PC.

- Intelligent PS/2 keyboard and mouse emulation ensures PCs do not lock-up and allows peripherals to be hot-plugged.

- DDC emulation in Local Unit ensures compatibility for all standard graphics modes.

- Dual-Access models allow local or remote operation.

- *Audio/Serial versions only*: Transparent serial port enables any serial device to be extended (up to 19.2K Baud). The serial port may be used to extend one device (requiring handshaking lines), or up to three simple serial devices (no handshaking).

- *Audio/Serial versions only*: Bi-directional stereo audio (16-bit digitized) support on certain models enables high-quality audio extension.

- Local Units are normally powered directly by the PC (or switch).

- Private Mode on dual-access models allows user to lock out remote console.

- Small footprint chassis.

- Rack mount options available.

- Surge protection on each RJ45 port.

- Mini Extender Remote Units are fully compatible with SDRK Rack hubs.

- CPU KVM cables included (certain models).

SDLink/PS2 extends PS/2 keyboard and mouse only over distances to300m.

Product Range

There are eight products in the Mini Extender range:

Kits for KVM Extension Only	
SDLink/LC	Single Video Channel, PS/2 KB & Mouse Local Unit (Single Access) + Remote Unit
SDLink/DM	Single Video Channel, PS/2 KB & Mouse Local Unit (Dual Access) + Remote Unit
Kits for KVM, Audio and Serial Extension	
SDLink/AM	Single Video Channel, PS/2 KB & Mouse, Audio and Serial Local Unit (Single Access) + Remote Unit
Kits for PS/2 Extension Only (up to 300m)	
SDLink/PS2	PS/2 KB & Mouse Local Unit (Single Access) + Remote Unit
Remote Units Only	
SDLink/RLC	Single Video Channel, PS/2 KB & Mouse
SDLink/MAR	Single Video Channel, PS/2 KB & Mouse, Audio and Serial
SDRK/6R	6-port Mini Extender Hub, 1U rack <u>Each port:</u> Single Video Channel, PS/2 KB & Mouse
SDRK/6RA	6-port Mini Extender Hub, 1U rack <u>Each port:</u> Single Video Channel, PS/2 KB & Mouse, Audio and Serial

Compatibility

Interface Compatibility

- **PS/2 Keyboard:** Compatible with all standard keyboards. Certain keyboards with enhanced features may also be supported with custom firmware.

- **PS/2 Mouse:** Compatible with all standard 2-button, 3-button and wheel mice. To connect to a PC that does not have a PS/2 mouse port, an active serial converter is required - Model: *Mdapt (PS/2)*.

- **Audio:** Input and output are line-level. Amplified speakers are required. A microphone may be directly connected to the Remote Unit (optional pre-amplification).

- **Serial:** Transparent up to 19.2K Baud (38.4K operation may be possible with some devices). The following serial signals are extended: TX, RX, RTS, CTS, DTR, DSR. In rare cases, a wiring adaptor may be required to transfer RI and DCD.

- **Video:** VGA to SXGA. Separate sync, composite sync, or sync-on-green. Maximum resolution and refresh rates depend on cable length and cable type (see **Appendix D: Specifications**, page 39).

Extender Compatibility

You can use CATx KVM Mini Extenders with other SDLink and SDBX products belonging to the same family in any combination. However, it is not possible to mix Standard and Audio products within a system.

Family	*SDLink*	*SDBX*	*Mini Extenders*	*Local Hubs*
Standard	SDLink1 SDLink2 SDLink2/SW SDLink/R SDLink/RSW	SDBX/S1 SDBX/D1 SDBX/S2 SDBX/R1 SDBX/R2 SDBX/R4 SDBX/D2	**SDLink/LC** **SDLink/DM** **SDLink/RLC** **SDRK/6R** SDMX/S2 SDMX/D2 SDMX/R2	SDRK/6 SDRK/6D SDRK/12
Audio	SDLink1/AU SDLink2/AU SDLink/RA	SDBX/SA1 SDBX/DA1 SDBX/SA2 SDBX/RA1 SDBX/RA2 SDBX/RA4 SDBX/DA2	**SDLink/AM** **SDLink/MAR** **SDRK/6RA** SDMX/SA2 SDMX/DA2 SDMX/RA2	SDRK/6A SDRK/6AD
Serial	SDLink1/S SDLink2/S SDLink/RS			SDRK/6S SDRK/6SD
PS/2 No Video			**SDLink/PS2**	

How to Use This Guide

This guide describes the installation and configuration of the SDLink and SDRK range of CATx KVM Mini Extenders. Although the connection and operation of the system is relatively straightforward, you should consider the following before getting started:

Connection & Compatibility

If you have purchased an *SDLink Extender kit*, this will contain all the cables required to connect the Local Unit to your PC or KVM switch. The remote console (keyboard, monitor and mouse) and any audio and serial equipment connect directly to the Remote Unit.

If you have purchased an *SDLink Remote Unit* or *SDRK rack hub*, ensure that it is compatible with your Local Unit (see **Compatibility**, page 11).

For information about connection and installation, see **Installation**, page 13.

Interconnection Cable

You will need CATx cable, terminated with RJ45 plugs, to connect the Local and Remote Units (see **Interconnection Cable Requirements**, page 14.

Adjusting Video

Video signals become distorted when transmitted over CATx cables. To get the best from your extender system, set the DIP switch on the Remote Unit to optimize the video image quality.

- For experienced users, there is a **Quick Setup** section at the start of this guide (see page 5).

- For the full procedure, see **Remote Unit Operation**, page 22.

3. *Installation*

For first-time users, we recommend that you carry out a test placement, confined to a single room, before commencing full installation. This will allow you to identify and solve any cabling problems, and experiment with the KVM Extender system more conveniently.

Package Contents

You should receive the following items in your Mini Extender package. If anything is missing, please refer to **Appendix C: Obtaining Technical Support**, page 38.

- Mini Extender Remote Unit (or Hub).

- 9V DC universal power supply for Remote Unit.
  All except SDLink/PS2.

- 5V DC universal power supply for Remote Unit.
  SDlink/PS2 only.

- Mini Extender Local Unit.
  Only included in extender kits.

- KVM CPU combination cable (1.0m) with PS/2 (6-pin MiniDIN male) keyboard and mouse connectors, VGA video (HD15 male) connector, and 25-way (DB25 male) extender connector.
  Not included with Remote Units or SDLink/PS2.

- Two keyboard and mouse CPU cables (1.8m) with PS/2 (6-pin MiniDIN male) connectors.
  SDLink/PS2 only.

- Serial cable (1.0m, DB9 male/female connectors, 1:1 connections).
  SDLink/AM only.

- Dual audio cable (1.0m, 3.5mm stereo plugs)
  SDLink/AM only.

- Rack mount brackets
  SDRK/6R and SDRK/6RA only

- IEC AC Power Cord.

- Quick Start Guide.

Interconnection Cable Requirements

To connect the Local and Remote Units you will need CATx (any category 5, 5e, 6 or higher) cable terminated with RJ45 plugs. Please note that shielded cable is advised to maintain regulatory EMC compliance.

Interconnect cables must be solid-core type. Stranded patch cable will give poor results over longer distances. The pairing of the cable and pinning of its connectors should normally be in accordance with EIA-568B.

Cable Pinning/Pairing

The following table illustrates which RJ45 connector pins the extenders use for various signals. It also details the standard EIA-568B wiring scheme that is recommended for most installations.

Looking into the RJ45 socket on a Remote Unit, Pin 1 is on the right and Pin 8 on the left.

Pin	Color (EIA-568B)	Signal
1	White/Orange	Blue Video
2	Orange/White	
3	White/Green	Green Video
6	Green/White	
4	Blue/White	Red Video
5	White/Blue	
7	White/Brown	Data
8	Brown/White	

EIA-568A wiring can also be used. Contact Technical Support for details.

Technical Note: Although skew (color separation) can be an issue on some CATx cables, it would not normally be observed on cables <50m. Even so, we still recommend the use of low skew cables with Mini Extenders.

Remote Unit Installation

Setting the Cable Length DIP Switch

If your application uses a CATx cable less than 25m in length, or you have an SDLink/PS2, you can continue to the next section.

Mini Extender Remote Units incorporate video equalization circuitry, allowing you to compensate for the loss in image quality that occurs when video signals are transmitted along CATx cables. At the factory, Remote Units are configured to optimize the video signals for Interconnect cables up to 25m in length.

If you intend to use cables of 25-50m in length:

1. Locate the DIP switches on the underside of the Remote Unit. On a 6-port Mini Extender hub, there are six pairs of DIP switches, also located on the underside, in line with each port.

2. Set DIP Switch 1 as follows:

Interconnect Cable Length (m)	DIP Switch 1 Position
0 – 25	OFF (default)
25 – 50	ON

If you are carrying out a test placement prior to final installation, set the DIP switch to the position appropriate to the test cable's length. When your tests are complete, set the DIP switch to the position appropriate for the CATx cable length used in the full installation.

*For information about DIP switch 2, see **Remote Unit Operation**, page 22.*

Attaching Rack Mount Brackets

SDRK/6R and SDRK/6RA only

You can mount 6-port Mini Extender Remote Hubs in a 19" rack using the supplied brackets. To attach the brackets:

1. Remove the two screws on each side of the Remote Hub case.
2. Match up the holes on a bracket to the vacant screw holes on the Remote Hub case.
3. Fasten the bracket to the Remote Hub using the original screws.
4. Repeat the procedure with the other bracket.
5. Fit the assembly into your 19" equipment rack and fasten using appropriate screws, cage nuts or bolts (not supplied).

Connecting the Remote Unit

To install a Remote Unit:

1. Switch off all devices.

2. Connect your keyboard, monitor and mouse to the Remote Unit/Hub port as
    shown in Figure 2 (Standard) and Figure 3 (Audio/Serial).

    > *These ports may also be attached to the CPU side of a KVM switch in order
    > to have a remote CPU. However, if you are attempting to use the extender
    > between cascaded KVM switches this may not work. Please contact Technical
    > Support to discuss your application.*

3. If appropriate, connect audio equipment and serial devices. Connect the
    audio cables as follows:

Remote Unit	*Audio Device*
Audio Out	Speakers
Audio In (MIC)	Microphone

    See **Appendix B: Audio/Serial Ports: Operation & Multi-Port
    Configuration**, page 36 for further information.

    Connect the CATx cable to the INTERCONNECT socket on the front of the
    Remote Unit/Hub port as shown in

4. Figure 4.

5. Connect the PSU to power the Unit.

    ⚠ **Only use the power supply originally supplied with this
    equipment or a manufacturer approved replacement.**

    **NEVER CONNECT A REMOTE UNIT'S POWER SUPPLY TO A LOCAL
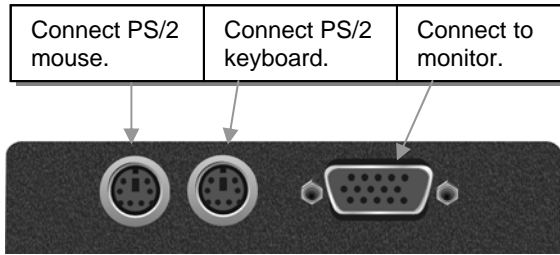   UNIT OR HUB. THIS COULD DAMAGE THE EXTENDER SYSTEM.**

Connect PS/2 mouse. | Connect PS/2 keyboard. | Connect to monitor.

Figure 2   Standard Mini Remote Unit/Hub Port – rear view (SDLink/RLC, SDLink/LC, SDLink/DM, SDRK/6R)

Connect PS/2 mouse. | Connect PS/2 keyboard.
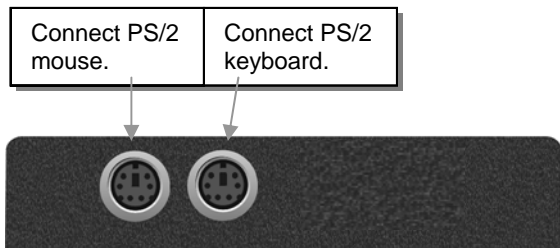
Figure 2A   SDLink/PS2 Remote Unit – rear view

Connect to speakers. | Connect to microphone. | Connect to serial device, for example, a touch screen.

Connect PS/2 mouse. | Connect PS/2 keyboard. | Connect to monitor.
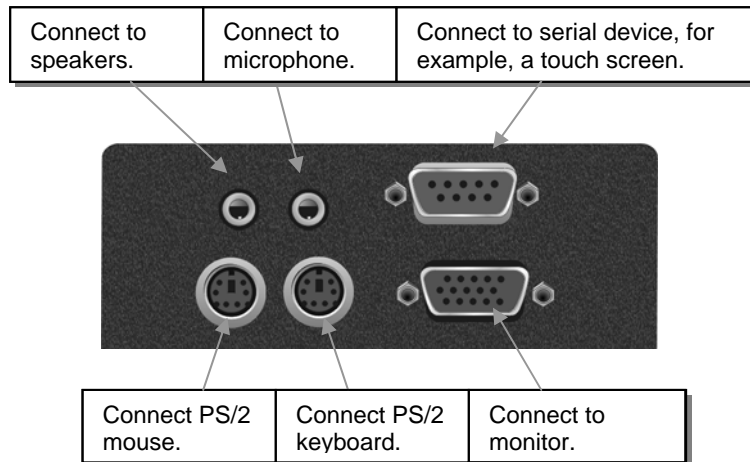
Figure 3   Audio Mini Remote Unit/Hub Port – rear view (SDLink/MAR, SDLink/AM, SDRK/6RA)

Interconnect – carries video and data signals. Connect to Interconnect port on Local Unit using CATx cable. | Connect to approved power supply.
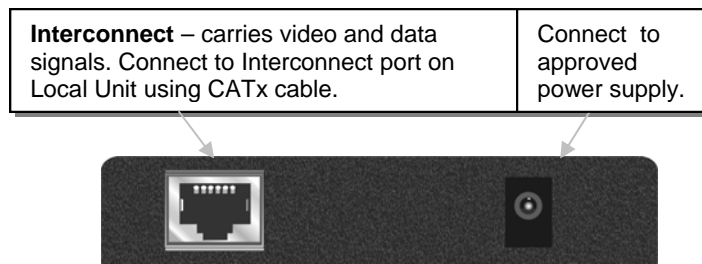
Figure 4   Remote Unit/Hub Port - front view (Hub has single power supply connector on rear)

Local Unit Installation

To install a Local Unit:

1. Switch off the PC and other devices before connection.

2. Using the supplied CPU KVM cable(s), connect the keyboard, monitor(s) and mouse connectors on the computer (or KVM switch) to the corresponding connectors on the Local Unit as shown in Figure 5.

   Ensure that you attach the keyboard and mouse connectors to the correct ports. The keyboard connector is purple; the mouse connector is green.

   If your PC does not have a PS/2 mouse port, an active serial converter will be required - Model No: Mdapt (PS/2).

3. If you have a dual access system, connect the keyboard, mouse and monitor for the local console to the appropriate ports on the Local Unit. The ports may also be used to feed into a KVM switch.

4. If you have an audio/serial Unit, connect the audio serial cables between the computer and Local Unit. Connect the audio cables as follows:

Computer	*Local Unit*
Audio Out (green)	Audio In
Audio In/Microphone (pink/blue)	Audio Out

5. Connect the CATx cable from the Remote Unit to the INTERCONNECT socket on the front of the Local Unit (see Figure 7).

6. Power up the PC and Remote Unit. The green LED on the Local Unit indicates the powered status of the PC and Remote Unit, and the integrity of the CATx connection:

LED off	PC not powered or keyboard PS/2 cable to Local Unit disconnected.
LED on continuously	Remote Unit not powered, CATx cable disconnected, or PC in BIOS boot sequence.
LED flashing	Remote Unit powered, data link operating correctly.

   The Local Unit normally takes power through the PCs keyboard port. In video only applications, this connection is not used and an external PSU is required. Please contact Technical Support to obtain a suitable power supply.
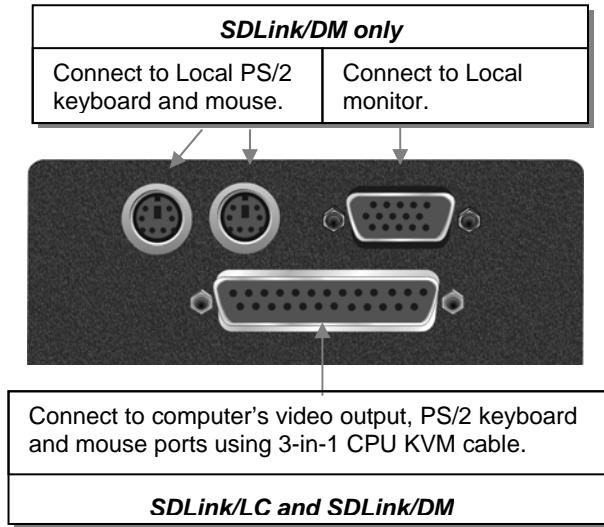
SDLink/DM only	
Connect to Local PS/2 keyboard and mouse.	Connect to Local monitor.

Connect to computer's video output, PS/2 keyboard and mouse ports using 3-in-1 CPU KVM cable.

SDLink/LC and SDLink/DM

Figure 5   SDLink/LC and SDLink/DM Local Units - rear view

Connect to CPU PS/2 mouse port.	Connect to CPU PS/2 keyboard port.
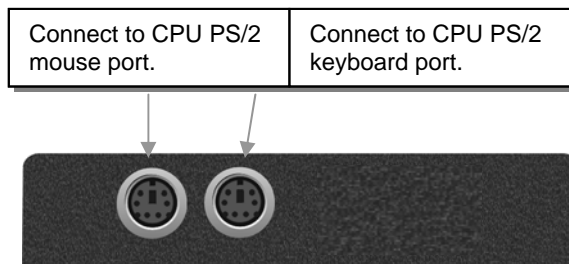
Figure 5A   SDLink/PS2 Local Unit – rear view

Connect to speakers.	Connect to microphone.	Connect to serial device, for example, a touch screen.

Connect to computer's video output, PS/2 keyboard and mouse ports using 3-in-1 CPU KVM cable.
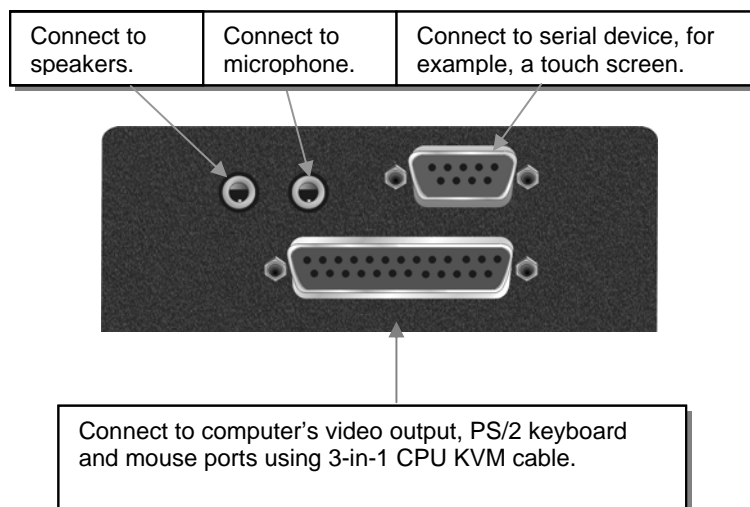
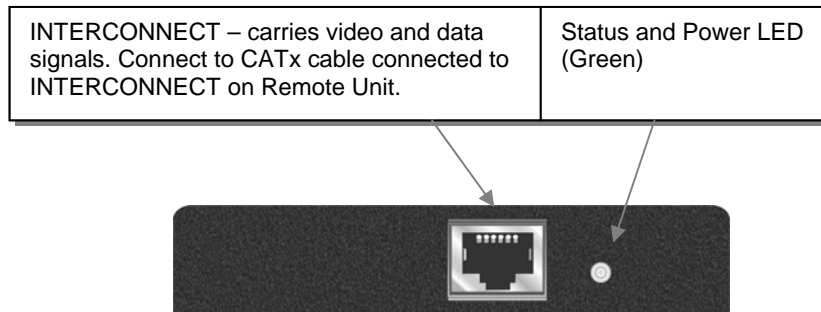*Figure 6   SDLink/AM Local Unit - rear view*

Figure 7   SDLink Mini Local Unit – front view

Connection to Rack Mount Hub Local Units

Mini Extender Remote Units are compatible with SDRK Rackmount Extender Hub Local Units belonging to the same family:

Mini Extender	Compatible Local Rack Hubs
SDLink/LC, SDLink/DM, SDLink/RLC SDRK/6R	SDRK/6, SDRK/6D, SDRK/12
SDLinkAM, SDLink/MAR SDRK/6RA	SDRK/6A, SDRK/6AD

A simple example of the use of a rackmount hub Local Unit, in which an SDLink/RLC Remote Unit is connected to each hub port, is shown in Figure 8. For more complex examples showing the use of Rack Extender Hubs with SDLink Remote Units in efficient ways, see **Appendix A: Example Applications**, page 32.

Individual Rack Hub operation is not covered in this guide. Please refer to the documentation supplied with your Rack Hub Unit.
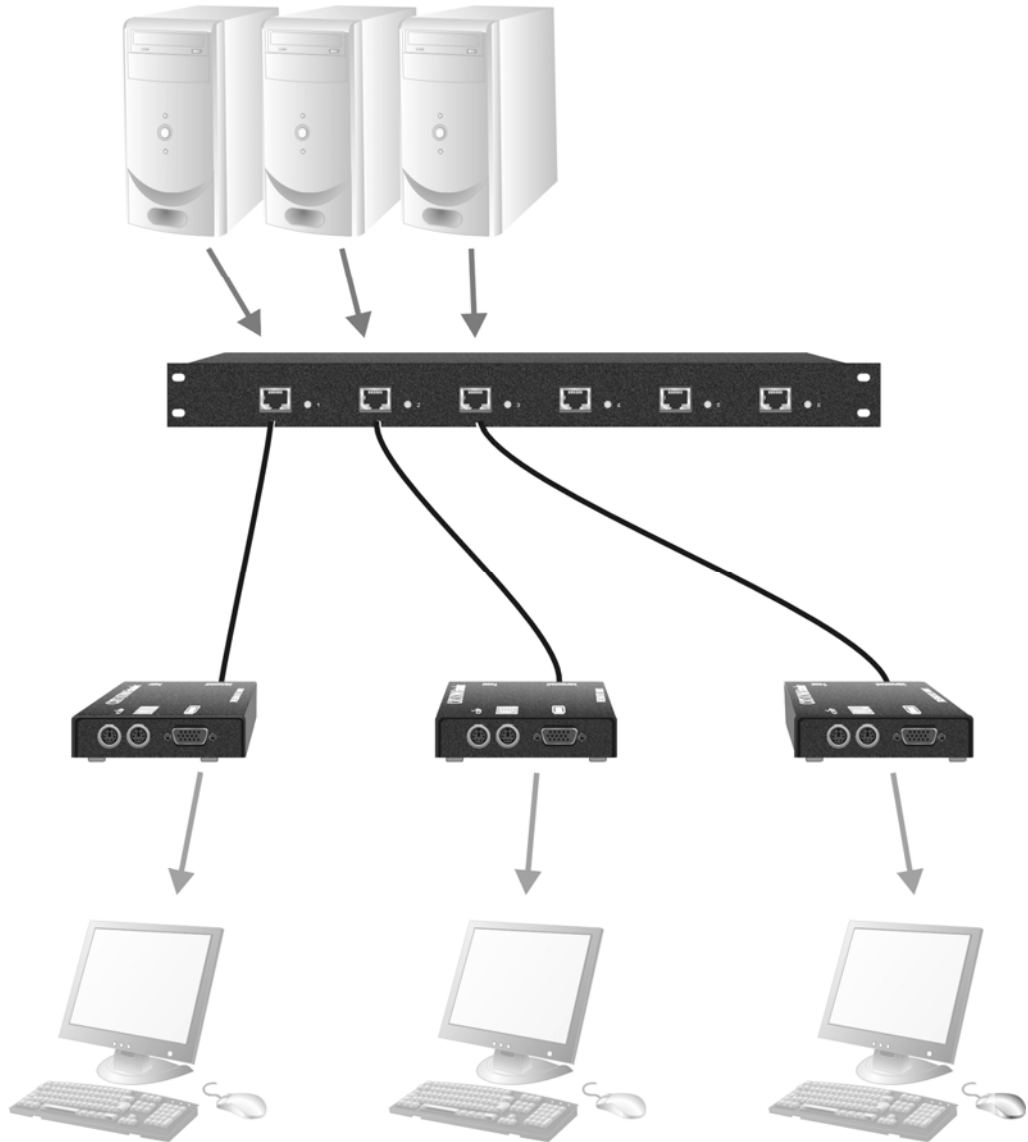
Figure 8   Simple system using SDRK/6 Hub and SDLink/RLC Remote Units

4. *Remote Unit Operation*

The operation of Standard and Audio/Serial Remote Units is slightly different. Please read the section appropriate to your system.

For information about serial/audio port operation, see **Appendix B: Audio/Serial Ports: Operation & Multi-Port** Configuration, page 36.

Operating Standard Units

Mini Extender kits: SDLink/LC, SDLink/DM, SDLink/PS2
Mini Extender Remote Unit: SDLink/RLC
Mini Extender 6-port Remote hub: SDRK/6R

Scroll Lock Function

Standard Remote Units use the Scroll Lock key for system commands. The following table lists the commands available at a standard remote console:

Command	*Key Sequence*
Reset Keyboard and Mouse *All except SDLink/PS2*	***<Scroll Lock>***
Reset the remote console's keyboard and mouse. You may need to do this if you have plugged a keyboard or mouse into a powered Remote Unit and it has not initialized correctly.	
Mouse Recovery	Hold down ***Left and Right Mouse buttons*** *then press and release **<Scroll Lock>***
Use this command if you experience erratic movement of the mouse pointer or you have lost mouse movement after hot plugging the Local Unit into the CPU. In the case of erratic mouse movement, you may need to enter the command a number of times to re-synchronize the mouse signal. Alternatively, stop moving the mouse for a few seconds and the operating system's mouse drivers may automatically re-synchronize the signal. If the Local Unit has been hot-plugged, this command will issue a request to the OS to initialize the mouse. *Use this command with care*.	
Activate Console *SDLink/DM only*	***Any key or mouse action***
Gain control of CPU from local console. Only operates if local console has been inactive for at least 2s.	

You can restore normal Scroll Lock activity by setting switch 2 on the DIP switch block to ON. If you do this on a Dual Access system (SDLink/DM, for example):

- Private Mode operation is disabled.
- To reset the keyboard and mouse, you will need to re-power the Remote Unit or hot-plug the keyboard and mouse on the Local Unit.

Operating Audio/Serial Remote Units

Mini Extender kits: SDLink/AM
Mini Extender Remote Unit: SDLink/MAR
Mini Extender 6-port Remote hub: SDRK/6RA

With these systems, keyboard hot keys are used to carry out keyboard and mouse reset functions.

To enter these commands:

1. Press and release the initial 'hot' key.
   By default, the initial 'hot' key is <**Right Control**>
2. Press and release the command key.

Changing the Initial Hot Key

The initial 'hot' key for both Remote and Local Units may be changed from <**Right Control**> to <**Left Control**> by moving switch 2 on the Remote Unit's DIP switch block to the ON position.

Hot Key Commands

After pressing the initial 'hot' key on the remote keyboard, you can issue a number of commands by pressing additional keys. These commands allow you to reset the keyboard and/or mouse.

Command	Key Sequence
Reset Keyboard and Mouse	*<Num-Pad Up Arrow>*

Reset the remote console's keyboard and mouse. You may need to do this if you have plugged a keyboard or mouse into a powered Remote Unit and it has not initialized correctly.

Command	Key Sequence
Mouse Recovery	*<Num-Pad Left Arrow>*

Use this command if you experience erratic movement of the mouse pointer or you have lost mouse movement after hot plugging the Local Unit into the CPU. In the case of erratic mouse movement, you may need to enter the command a number of times to re-synchronize the mouse signal. Alternatively, stop moving the mouse for a few seconds and the operating system's mouse drivers may automatically re-synchronize the signal. If the Local Unit has been hot-plugged, this command will issue a request to the OS to initialize the mouse. *Use this command with care*.

Dual Access Commands

The Mini Extender range does not include a Dual Access Audio/Serial Local Unit. However, if you use an Audio/Serial Mini Extender Remote Unit with a compatible Dual Access Audio/Serial Local Unit/Hub (for example, SDRK/6AD), the following commands are available at the remote console:

Command	Key Sequence
Activate Console	*Any key or mouse action*

Gain control of CPU from local console. Only operates if local console has been inactive for at least 2s.

Command	Key Sequence
Start/End Private Session at Remote Unit	*<Scroll Lock>*

Start/End 'Private Mode' at remote console. This prevents the local console from being used even if the inactivity timeout period expires.

During a Private Mode session, the extender system:

- Slowly flashes the Scroll Lock LED on the remote keyboard.
- Lights all three LEDs on the local keyboard.
- Locks the local console's keyboard and mouse.
- Displays a blank image on the local console's monitor.

To end the Private Mode session, press the Scroll Lock key on the remote console a second time.

5. *Local Unit Operation*

For more information about serial/audio port operation, see **Appendix B: Audio/Serial Ports: Operation & Multi-Port Configuration**, page 36.

Keyboard and Mouse Emulation

Local Units have keyboard and mouse emulation. The attached PC operates normally without requiring a keyboard or mouse to be attached to either the Remote or Local Units (in the case of a dual access system). You can therefore replace any keyboard or mouse attached to the extender system without disrupting the operation of the computer.

Power Requirements

Local Units normally take power from the keyboard connection to the computer. For video only applications, you must apply external power through this port. Use an external 5V PSU with PS/2 connector (Model: SDLink/PSL).

Contact Technical Support for further information.

Operation of Dual Access Local Units

Mini Extender kit: SDLink/DM only

Dual Access operates on a first-come, first-served basis. When one console is in use, the system blocks out the other console until there is no keyboard or mouse use at the active console for 2 seconds. Thereafter, any keyboard or mouse action at the other console switches console activity.

Scroll Lock Function

The Remote Unit supplied with the SDLink/DM Mini Extender kit redefines the function of the Scroll Lock key (on both the local and remote console keyboards) for system use (see page 22).

You can restore normal Scroll Lock activity by setting switch 2 on the Remote Unit's DIP switch block to ON (see page 22). In Dual Access systems, this will disable Private Mode operation. In addition, if you need to reset/recover a console's keyboard and mouse, you may need to reboot the system.

Command Summary

On a dual access system, you can issue the following commands at the local console:

Command	Key Sequence
Activate Console	Any key or mouse action

Gain control of CPU from remote console. Only operates if remote console has been inactive for at least 2s.

Command	Key Sequence
Start/End Private Mode	*<Scroll Lock>*

Start/End 'Private Mode' at local console. This prevents the remote console from being used even if the inactivity timeout period expires.

During a Private Mode session, the extender system:

- Lights the Scroll Lock LED on the local keyboard.
- Lights the Scroll Lock LED on the remote keyboard.
- Locks the remote console's keyboard and mouse.
- Displays a blank image on the remote console's monitor.

To end a Private Mode session, press the Scroll Lock key on the local console a second time. Remember that each press of the local console's Scroll Lock key also resets the keyboard and mouse.

Command	Key Sequence
Reset Keyboard and Mouse *press key twice to avoid starting/stopping* *Private Mode session*	*<Scroll Lock>*

Reset the remote console's keyboard and mouse. You may need to do this if you have plugged a keyboard or mouse into a powered Remote Unit and it has not initialized correctly.

Command	Key Sequence
Mouse Recovery *(press keys simultaneously)*	*Hold down **Left and Right Mouse** **buttons** then press and release* *<Scroll Lock>*

Use this command if you experience erratic movement of the mouse pointer or you have lost mouse movement after hot plugging the Local Unit into the CPU. In the case of erratic mouse movement, you may need to enter the command a number of times to re-synchronize the mouse signal. Alternatively, stop moving the mouse for a few seconds and the operating system's mouse drivers may automatically re-synchronize the signal. If the Local Unit has been hot-plugged, this command will issue a request to the OS to initialize the mouse. *Use this command with care.*

6. *Troubleshooting*

Video

The image is not sharp, or is badly smeared.

Check that the cable length DIP switch is correct for the length of your Interconnect cable (see page 15).

Check the Interconnect cable between the Remote and Local Units. Is it of the recommended type (see page 14)? Is it intact along its entire length and securely connected at both ends? Is it wired correctly?

Ensure that all video connections throughout the system are attached securely.

Are you using an LCD panel? You need to adjust its clock and/or phase.

Colors appear to be separated and there are colored borders on text and icons.

Check the Interconnect cable between the Remote and Local Units. Is it of the recommended type (see page 14)? Is it intact along its entire length and securely connected at both ends? Is it wired correctly?

Are you using low skew cable (see page 14)?

I only need video extension – not keyboard or mouse - but I can't get a picture

Have you powered the Local Unit? The Local Unit gets its power from the CPU through the keyboard connection and it will not operate without it. Use an external 5V PSU as described on page 25.

The monitor sometimes goes blank for a second or two.

Check that the interconnect cable is not routed near power lines or other sources of electrical interference. Use shielded STP/FTP cable instead of UTP cable ensuring that the shield connection is maintained between the Extender Units.

Check system grounding. If your remote monitor has an external PSU you may need to consider grounding the Remote Unit chassis (to power ground)..

If this is a persistent problem, contact Technical Support.

The PC won't boot into the correct graphics mode

> The extender includes DDC emulation for all standard resolutions and there should not normally be any issues.

> For non-standard resolutions, you will need to explicitly set the resolution in your operating system configuration ignoring the DDC data read from the Local Unit.

> Contact Technical Support if you have problems selecting your required graphics mode.

Jitter is evident on video

> Adjust the clock and/or phase on your flat-panel. Contact Technical Support if this fails to improve the situation.

> Are you testing a system using a coiled drum of CATx cable? Try uncoiling the cable. If this solves the video jitter, you should not have a problem after full installation.

The image is not stable and is blanking regularly.

> Re-power the Remote Unit.

Can the extender be used with RGB video?

> Yes.

Audio

The audio is very quiet.

> The audio I/O is line-level and requires amplified speakers and connection to devices providing line-level I/O.

The audio is loud but distorted.

> Check that the audio input is not greater than line level (4V peak-to-peak). Mini Extenders accepts line-level audio input only.

The microphone output is barely audible.

> See **Appendix B: Audio/Serial Ports: Operation & Multi-Port** Configuration, page 36.

Serial

My serial device does not function.

The extender supports serial devices at data rates not exceeding 19.2K Baud (although 38.4K operation might be possible with certain equipment).

Check the type of flow control used by the device and CPU. The extender supports RTS, CTS, DTR, and DSR. Some systems may require a wiring adapter to transfer RI and DCD.

Attach the device directly to the serial port on the PC and test whether the problem is a PC or extender problem.

Some serial devices cannot be hot-plugged. Try connecting the device to a powered Remote Unit prior to booting the system.

Keyboard & Mouse

When I am typing, I get wrong or missing characters on the screen.

Your keyboard may be in the wrong mode. Use the appropriate commands to reset the keyboard and mouse as described in the sections covering local and remote operation.

The PC comes up with 'keyboard error'.

Press **<F1>** or **<ESC>**. If the keyboard now operates correctly, you need to adjust the BIOS setup to disable keyboard testing during booting.

The system does not detect a PS/2 mouse.

If connecting the Local Unit to a live system, connect the mouse cable to the CPU *before* keyboard connection to ensure the mouse is enabled correctly. Try issuing the Mouse Recovery command.
Check that the mouse cable is connected properly and securely. Reboot the system.

The mouse pointer moves erratically.

> Reset the keyboard and mouse as described in the previous sections.
> Issue the Mouse Recovery command up to three times.
> Ensure that you have the latest driver for your mouse.
> If you are using the extender with a KVM switch, command the switch to reset the mouse.
> Quit and restart the application.
> Reboot the PC.

When I 'hot-plug' the Local Unit, the mouse no longer moves.

> When connecting the Local Unit to a live system, connect the mouse cable to the CPU before keyboard connection to ensure the mouse is enabled. Try issuing the Mouse Recovery command (see page 6).

Some of the mouse buttons don't work.

> The Extenders support standard 2/3-button mice (with or without a wheel). Additional buttons will not operate.

I have an enhanced keyboard with extra keys and indicators. Everything works apart from these additional features.

> The extender emulates a generic PS/2 keyboard. To support other keyboards (or cascaded KVM switches), special firmware offering a *transparent mode* may be required. Please contact Technical Support to discuss your application.

General Questions

Is it possible to use a cable longer than 50m?

It might be possible to use a cable of up to 100m at lower resolutions. However, we do not recommend this and cannot guarantee that it will work.

Can the Mini Extender be daisy chained?

No, we do not recommend doing this.

Which interconnection cable is best?

The extender will operate with either shielded (STP/FTP) or unshielded (UTP) CATx cable. However, correctly installed shielded cable is preferred, especially in electrically noisy environments, because it resists interference more strongly, limits ground potential differences, and reduces emissions. To benefit from shielded cable the shield connection *must* be maintained from end to end through any intervening patch cables, panels and RJ45 connectors.

Please note that shielded cable is advised in order to maintain regulatory EMC compliance.

Can the extender system be used between buildings?

No. Ground loops could damage the extender system and attached equipment.

Can multiple Local/Remote Units be used by swapping the interconnection cable?

Local Units provide full keyboard and mouse emulation, so it is possible to swap or switch the local-remote interconnection to create a KVM matrix-switch system. Sometimes you may need to reset the keyboard and mouse (by entering the appropriate command) after a swap or switch. Please call Technical Support before deploying such a system.

Can the extender be connected into our network?

Absolutely not. Regardless of the cable similarities, the data signals and voltages used by the extender are different from those used by Ethernet and other types of networks. Connecting the extender to a LAN hub, switch, repeater, or other network device, or exposing it to the signal levels present on network data lines may damage the extender and other devices.

Appendix A: Example Applications

This appendix shows three specific applications using CATx KVM Mini Extender units:

- Simple system using SDRK/6A Hub and SDLink/MAR Remote Units to extend audio, serial and KVM for up to six PCs (Figure 9).
- Six remote serial touch screens with local access through a KVM switch (Figure 10).
- Integration of two SDLink/DM kits with KVM matrix (Figure 11).
- SDRK/6R 6-port mini Remote Hub used with SDRK/6 local rack for 'three desk', dual video extension (Figure 12).

For more specific information about these, or any other complex applications, please discuss suitable extension architecture with Technical Support.
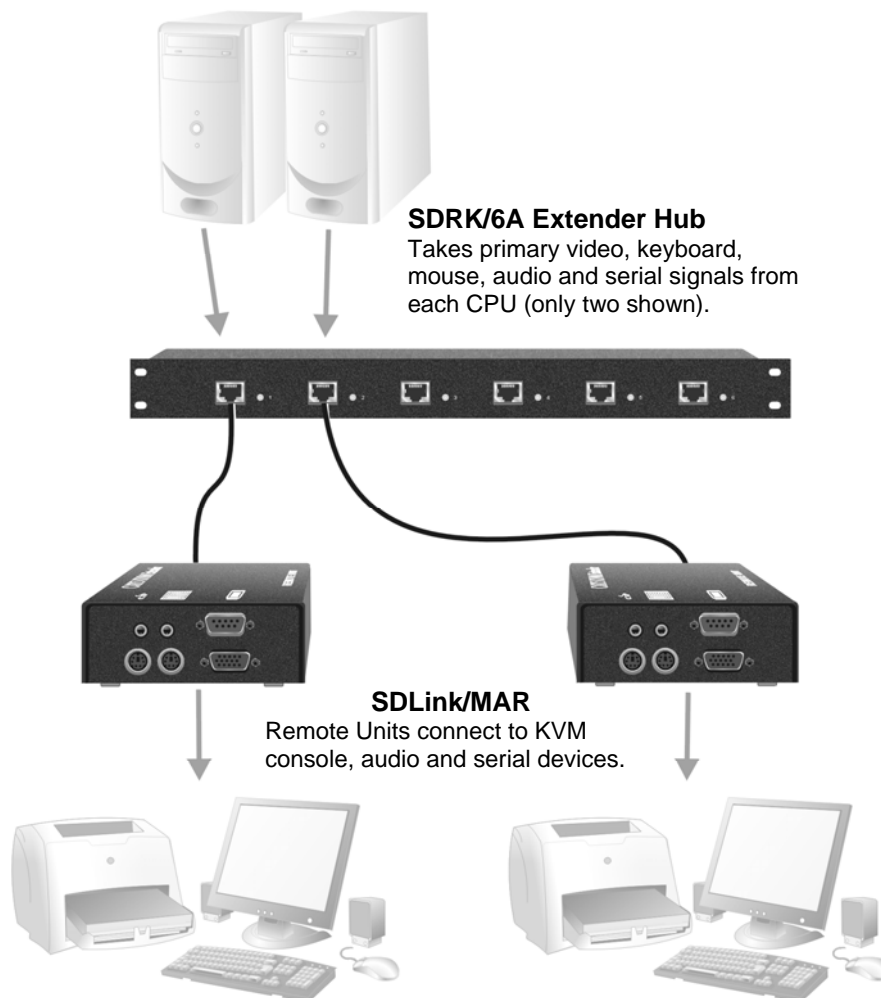

SDRK/6A Extender Hub
Takes primary video, keyboard, mouse, audio and serial signals from each CPU (only two shown).

SDLink/MAR
Remote Units connect to KVM console, audio and serial devices.

Figure 9   Serial and audio extension for up to six CPUs

KVM Switch
Local access ports connect to single KVM console through switch.

SDRK/6AD Extender Hub
Takes KVM and serial signals from each CPU (only two shown).

SDLink/MAR
Remote Units connect to touch screens.
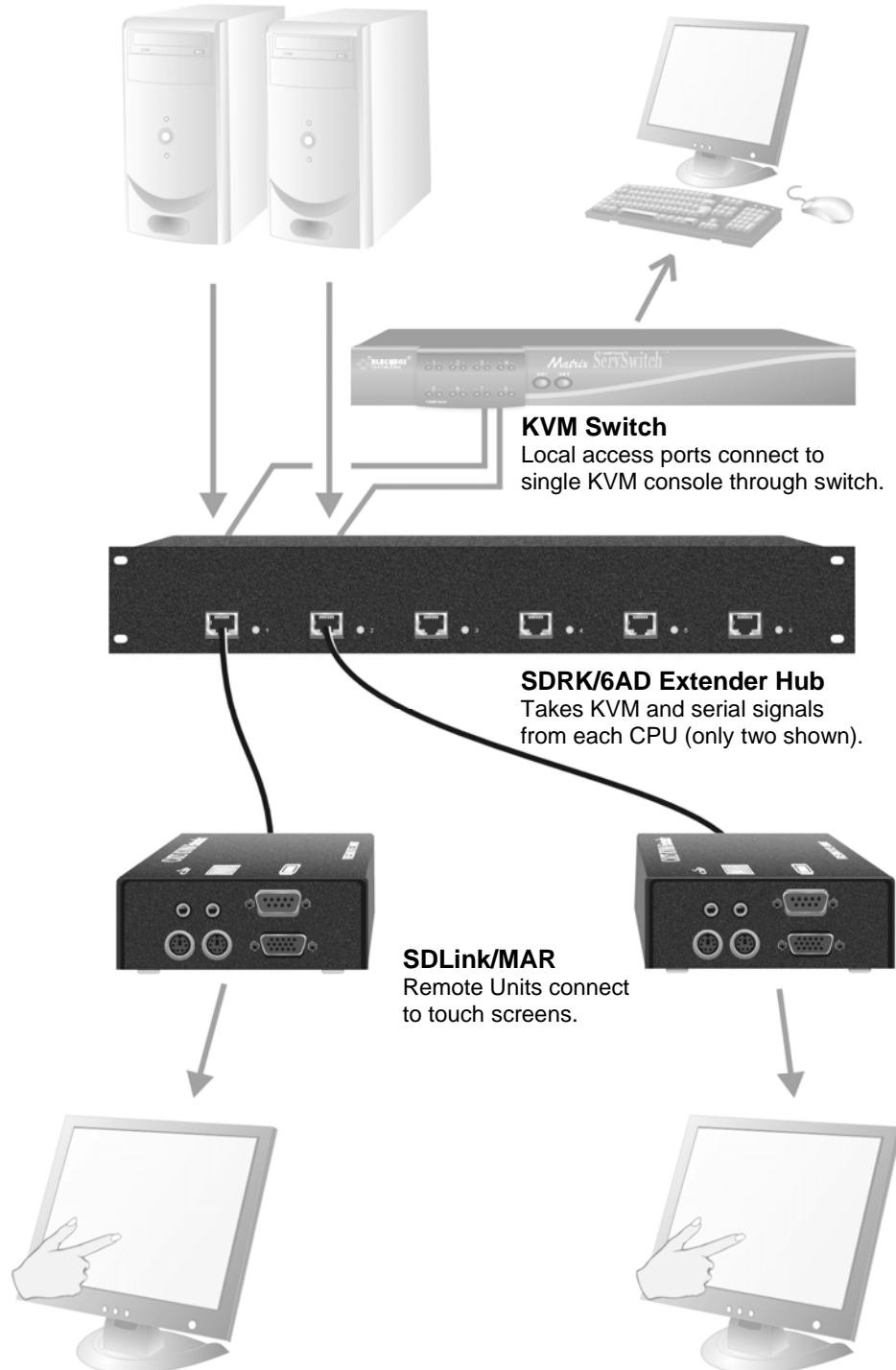
Figure 10   Touch screen network with local access to CPUs through KVM switch

KVM Switch

2 x SDLink/DM kits
Provides two local and two
remote consoles.
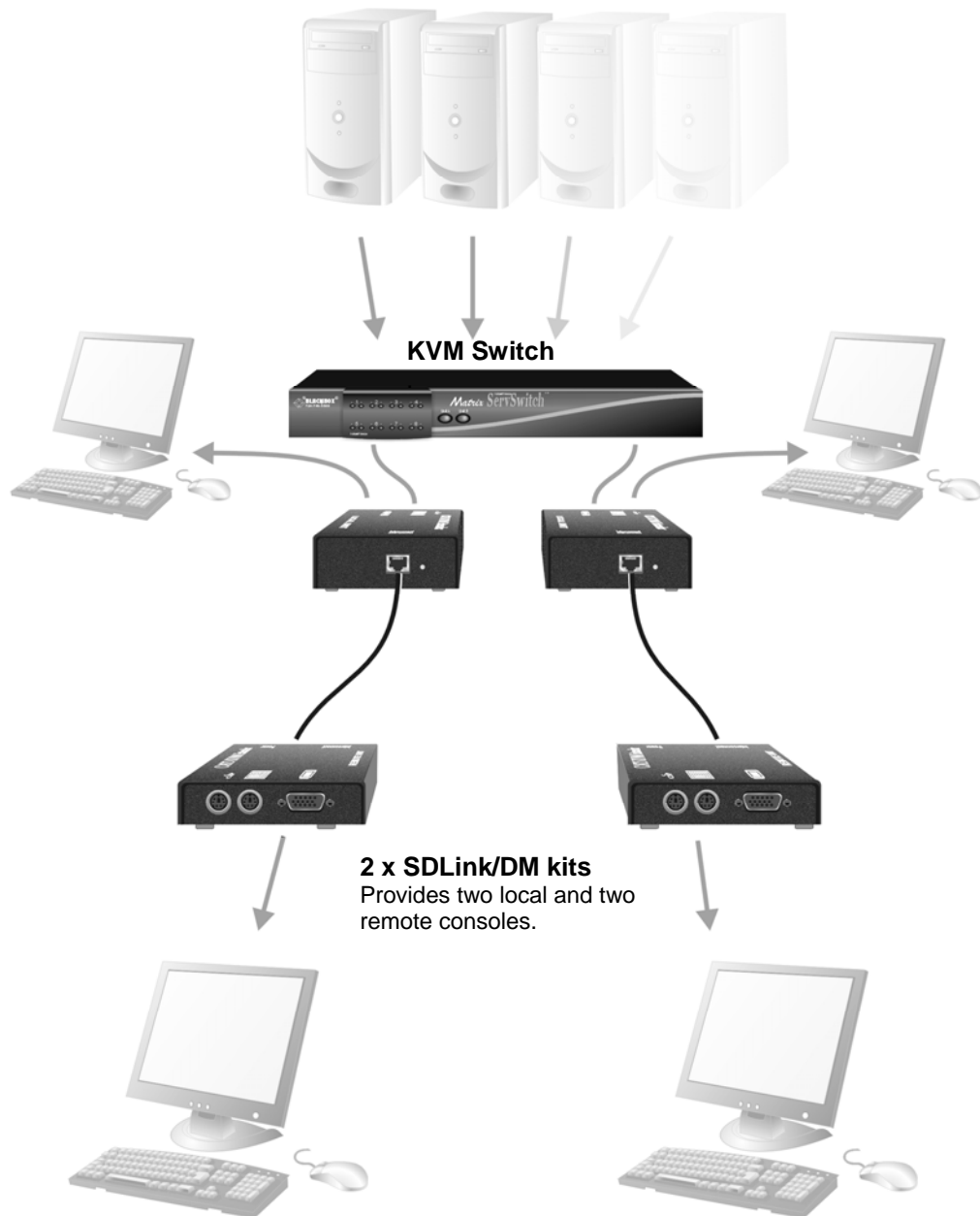
Figure 11   Extender integration with KVM matrix

SDRK/6 Local Hub
Takes primary video, keyboard,
mouse, and secondary video
from each CPU.

5V PSU

SDRK/6R Remote Hub
Remote hub connects to
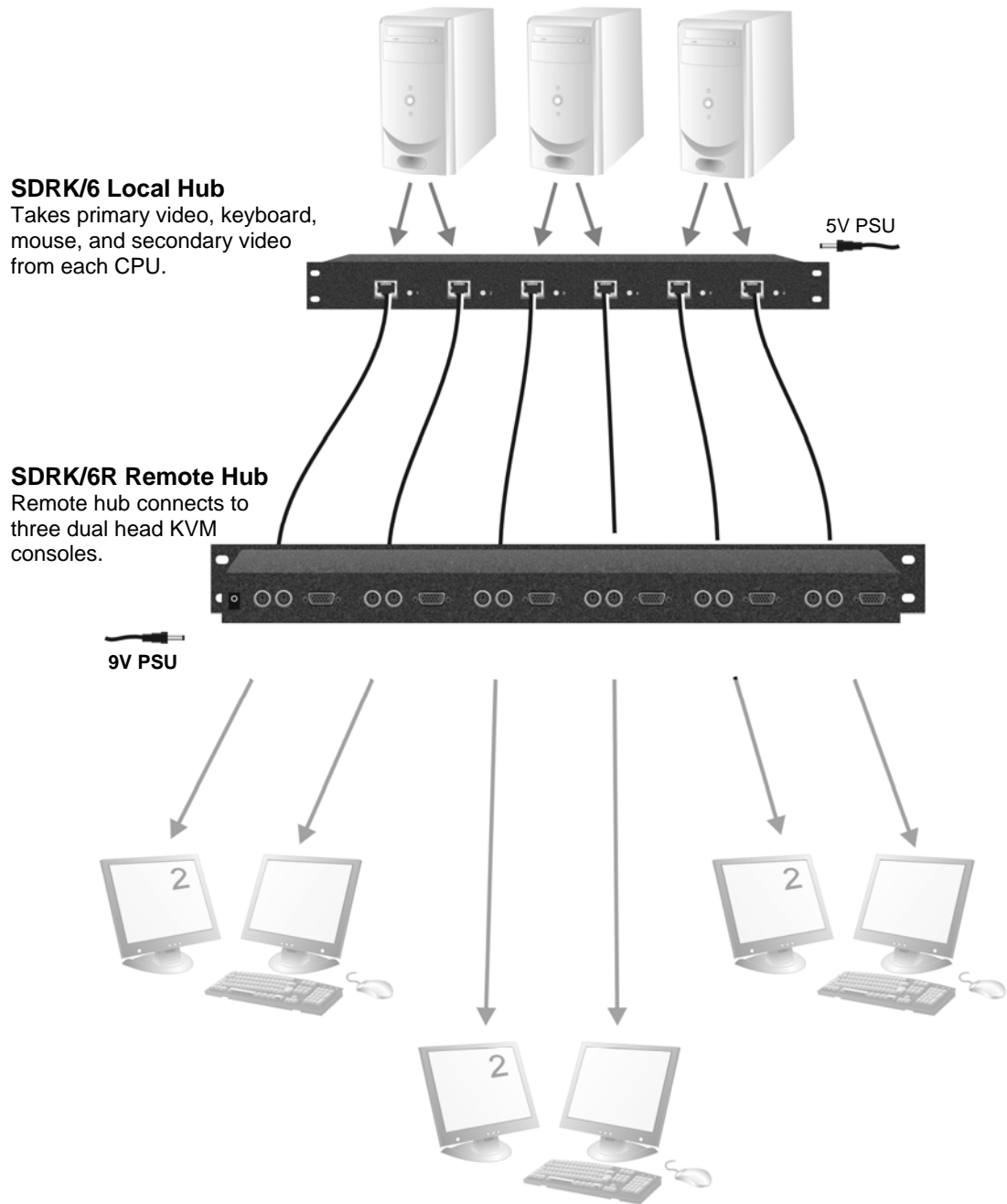three dual head KVM
consoles.

9V PSU

Figure 12   Dual Head extension using SDRK/6R Mini Extender Remote Hub

Appendix B: Audio/Serial Ports: Operation & Multi-Port Configuration

This appendix describes audio & serial interface operation for the following CATx KVM Mini Extenders:

- SDLink/AM
- SDLink/MAR
- SDRK/6AR

These extender products contain daughter boards that allow bi-directional stereo audio and a full-duplex serial data link to be sent across the CATx interconnection cable in addition to PS/2 keyboard, mouse and video.

Serial Interface Setup and Operation

Set up and Operation

No setting up or user adjustments are required.

The Remote Unit's serial port is wired as DTE - the same as that on a PC. To connect a serial printer or other DTE (rather than DCE device) to the Remote Unit, you will need a Null-Modem crossover cable between the Remote Unit and the printer. Select Xon/Xoff software flow control on the printer and PC.

A serial touch screen may be plugged directly into the Remote Unit.

Handling Multiple Serial Devices

The extender's serial interface transmits/receives six signals (3 signals in each direction).

Normally, four of these signals are used for hardware handshaking (in addition to TX & RX). However, because each handshaking line can support signals up to 19,200 Baud it is possible to configure the serial interface to handle up to three simple 2-wire (Tx/Rx only) serial links.

To do this, you will need to construct a custom breakout cable. Please contact Technical Support for further information.

Audio Interface

Set Up and Operation

The audio interface is line-level and is designed to take the output from a sound card (or other line-level) source and be connected to a set of powered speakers at the other end of the link.

Stereo audio may be transmitted either way across the link (simultaneously).

No setup is required unless a microphone is connected to the Remote Unit.

Connect the extender as follows:

- Take the line-level output from your sound card (green connector) and connect to 'Line In' on the Local Unit.

- Connect 'Line Out' on the Remote Unit to a set of powered speakers.

There is no output on the Local Unit to connect a set of speakers. If you require a set of speakers at the local console, use a 3.5mm stereo socket doubler on the audio input to the extender.

Using a Microphone

A microphone may be plugged into the 'Line In' connector on the Remote Unit.

There are two ways of setting up a microphone:

- The Local Unit's 'Line Out' connection should normally be wired to the microphone input (Pink) on your sound card. The sound card should then be set up to provide additional amplification (+17dB). This is the preferred connection method.

- Alternatively, the Remote Unit itself can provide microphone amplification. To set this, open up the Remote Unit and locate the jumper labeled 'MIC' on the daughter board. Connect this jumper across the pins. The Local Unit's 'Line Out' connection should then be wired to 'Line In' (Blue) on your sound card.

If your microphone is already amplified, follow the second method but DO NOT install the amplification jumper in the Remote Unit.

Appendix C: Obtaining Technical Support

If you have any problems or questions, contact your dealer for technical support.

To enable us to provide efficient and effective support, please make a note of the following information before you call:

- The KVM Extender's firmware revision level. This is printed on the base of both the Local and Remote Units:

   Version Number Format: *xxSyy/zz*
   xx is the hardware revision number
   yy is the firmware revision number
   zz is the auxiliary revision number

- The nature and duration of the problem and when it occurs.
- The components involved in the problem including manufacturer and model numbers.
- Results from any testing you have done.

If you need to return a unit for repair, please package carefully, preferably using the original box. Include everything you received with the unit. Before returning, contact Technical Support to get a Return Authorization (RA) number.

⚠️ **Do not attempt to repair the units. The KVM Extender set contains no user-serviceable parts.**

Appendix D: Specifications

Video

Maximum Resolution	1600x1200@60Hz up to 30m 1280x1024@75Hz up to 50m
	Operation at higher resolutions/refresh rates may be possible at shorter distances
Video Compatibility	VGA to UXGA, RGB
Video I/O	0.7V P-P
Video Compensation	2-stage
Video Coupling	DC
Sync I/O	Separate/Composite TTL Level Sync Polarity is preserved
Video Input Connectors	DB25 female (CPU KVM)
Video Output Connectors	HD15 female

Keyboard and Mouse

KB Compatibility	PC/AT, PS/2
Mouse Compatibility	Standard PS/2 two button Standard wheel mice Logitech 3-button PS/2
KB/Mouse Connectors	6-Pin MiniDIN Socket DB25 female (CPU KVM)

Serial Interface

Max Baud Rate Supported	19.2K Baud
Serial Data Format	Transparent
Signals Transferred	TX, RX, RTS, CTS, DTR, DSR
Local Unit Connector	DB9 Female (DCE)
Remote Unit Connector	DB9 Male (DTE)

Audio Interface

Description	Bi-directional stereo audio link
Transmission method	Digitized virtually CD quality audio (16-bit, 38.4kHz)
Signal levels	Line level (4 Volts Pk-Pk maximum)
Input Impedance	47kΩ
Local Unit Connectors	2x3.5mm stereo jack socket (Line In & Line Out)
Remote Unit connectors	2x3.5mm stereo jack socket (Line/Mic In & Line Out)
Microphone Support	Microphone may be connected to Remote Unit Pullup resistor provides bias for condenser microphone Option to set microphone amplification to +17dB

Power Requirements

Local Unit	5V at up to 200mA supplied by PC's PS/2 keyboard port. External PSU may also be connected through PS2 keyboard port
Remote Unit *All except SDLink/PS2*	9V, 2A (18W) Regulated (certified to all relevant safety standards) Universal IEC Input Isolated Output 2.5mm DC Jack (Center Positive)
SDLink/PS2 Remote Unit	5V, 3A (18W) Regulated (certified to all relevant safety standards) Universal IEC Input 2.1mm DC Jack (Center Positive)

Size and Shipping Weight

SDLink/RLC	Remote Unit: 84x110x26mm Shipping Weight: 0.74 Kg
SDLink/MAR	Remote Unit: 84x110x44mm Shipping Weight: 0.85 Kg
SDLink/PS2	Local Unit: 84x100x26mm Remote Unit: 84x110x26mm Shipping Weight: 1.20 Kg
SDLink/LC	Local Unit: 84x100x26mm Remote Unit: 84x110x26mm Shipping Weight: 1.30 Kg
SDLink/DM	Local Unit: 84x100x44mm Remote Unit: 84x110x26mm Shipping Weight: 1.38 Kg
SDLink/AM	Local Unit: 84x100x44mm Remote Unit: 84x110x44mm Shipping Weight: 1.82 Kg
SDRK/6R	6-port Remote Hub: 442x110x44mm Shipping Weight: 2.50 Kg
SDRK/6RA	6-port Remote Hub: 442x110x44mm Shipping Weight: 2.68 Kg

Environmental

Operating Temperature	0 to 40 °C
Storage Temperature	-30 to 65 °C
Relative Humidity	5-90% non-condensing
Chassis Construction	Fully shielded. Black painted steel

Appendix E: EU Regulatory Compliance

Warning

This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

This product complies with the following harmonized standards for Information Technology Equipment: EN55022:2006 (Class A), EN55024:1998 + A1:2001 + A2:2003.

To maintain compliance the use of correctly installed shielded (STP/FTP) interconnection cable is advised. Only use CPU cables and power supplies provided (or recommended) for use with this product.

When used in environments that have high levels of electromagnetic interference or excessive power ground noise, you may experience disturbances to video and/or data transmission. If this is the case, please refer to the Troubleshooting section of the User Guide for further information, or contact Technical Support. In electrically noisy environments, the use of shielded (STP/FTP) rather than unshielded (UTP) interconnection cable is recommended.

$$\epsilon$$

Appendix F: North American Regulatory Compliance

This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded cables must be used with this equipment to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All power supplies are certified to the relevant major international safety standards.

Appendix G: Disclaimer

While every precaution has been taken in the preparation of this manual, the manufacturer assumes no responsibility for errors or omissions. Neither does the manufacturer assume any liability for damages resulting from the use of the information contained herein. The manufacturer reserves the right to change the specifications, functions, or circuitry of the product without notice.

The manufacturer cannot accept liability for damage due to misuse of the product or due to any other circumstances outside the manufacturer's control (whether environmental or installation related). The manufacturer shall not be responsible for any loss, damage, or injury arising directly, indirectly, or consequently from the use of this product.