

User Guide

November 2009

SDMX PS/2 Mini Extender Range

Dual Video Channel Kits

Model SDMX/S2

Model SDMX/SA2

Dual Video/Local Access Channel Kits

Model SDMX/D2

Model SDMX/DA2

Dual Video Remote Units

Model SDMX/R2

Model SDMX/RA2

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.*

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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.
- 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.

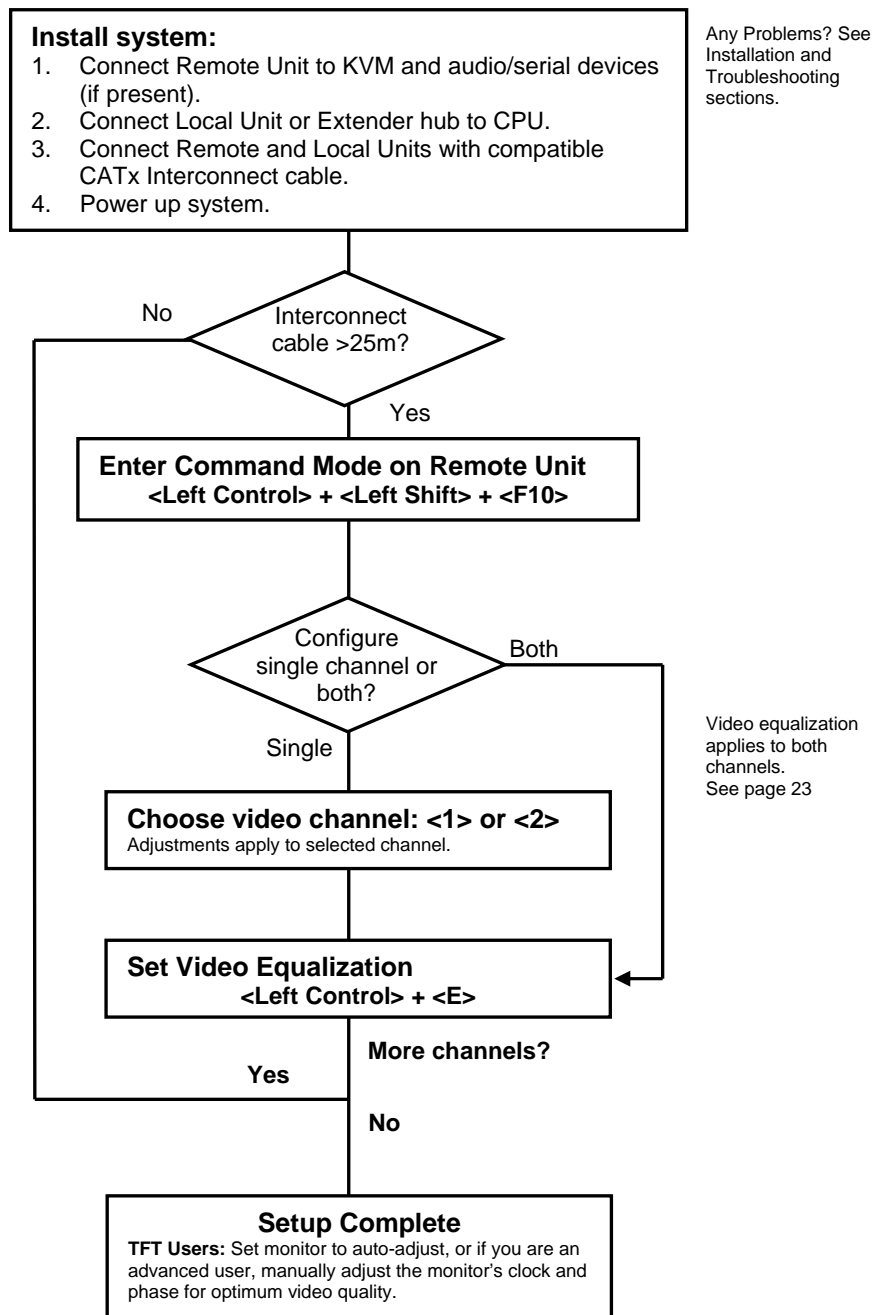
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1. Quick Setup

This section briefly describes how to install your KVM 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. Refer to the command summary on the next page when following this procedure.



Command Summary

By using a specific 'hot' key sequence, you can put the remote console keyboard into a Command Mode. From this, you can use various keys and key combinations to equalize the video signal and generally configure the extender system.

The following table summarizes the 'hot' key command sequences.

<i>Command Mode</i>	
Enter Command Mode*	<Left Control> + <Left Shift> + <F10>
Exit Command Mode & Save*	<ESC>
Exit Command Mode Without Save*	<Left Control> + <ESC>
<i>Video - Channel Selection, Equalization and DDC</i>	
Select Channel For Adjustment	<1>, <2>
Select BOTH Video Channels	<0>
Toggle Video Equalization	<Left Control> + <E>
Disable DDC Emulation	<Left Control> + <F2>
Enable DDC Emulation	<F2>
Transfer DDC from monitor to Local Unit	<Left Control> + <D>
<i>Reset Commands</i>	
Reset Mouse and Keyboard*	<F1>
Mouse Recovery*	<F3>
Set Extender To Default State*	<Left Control> + <F9>
<i>Private Mode</i>	
Toggle Private Mode*	<Scroll Lock>
Toggle Video Blanking State at other console*	<Left Control> + <Scroll Lock>

* Commands also available at local console in Dual Access Kits: SDMX/D2 and SDMX/DA2 (see page 27).

2. Overview

Introduction

The SDMX PS/2 Mini Extender Series enables two channels of 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 KVM 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 monitors) attaches to the Remote Unit. The Remote and Local Units communicate video and data information along the connecting CATx cables (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.

Glossary

The following terms are used in this guide:

<i>CATx</i>	Any Category 5, 5e, 6 or Level 7 cable.
<i>PSU</i>	Power Supply Unit.
<i>KVM</i>	Keyboard, Video and Mouse.
<i>Console</i>	A keyboard, monitor, and mouse, plus optional serial/audio devices.
<i>Dual Access</i>	A system allowing connection of local and remote user consoles.
<i>Single Head</i>	An extender system that supports one monitor.
<i>Dual Head</i>	An extender system that supports two monitors.

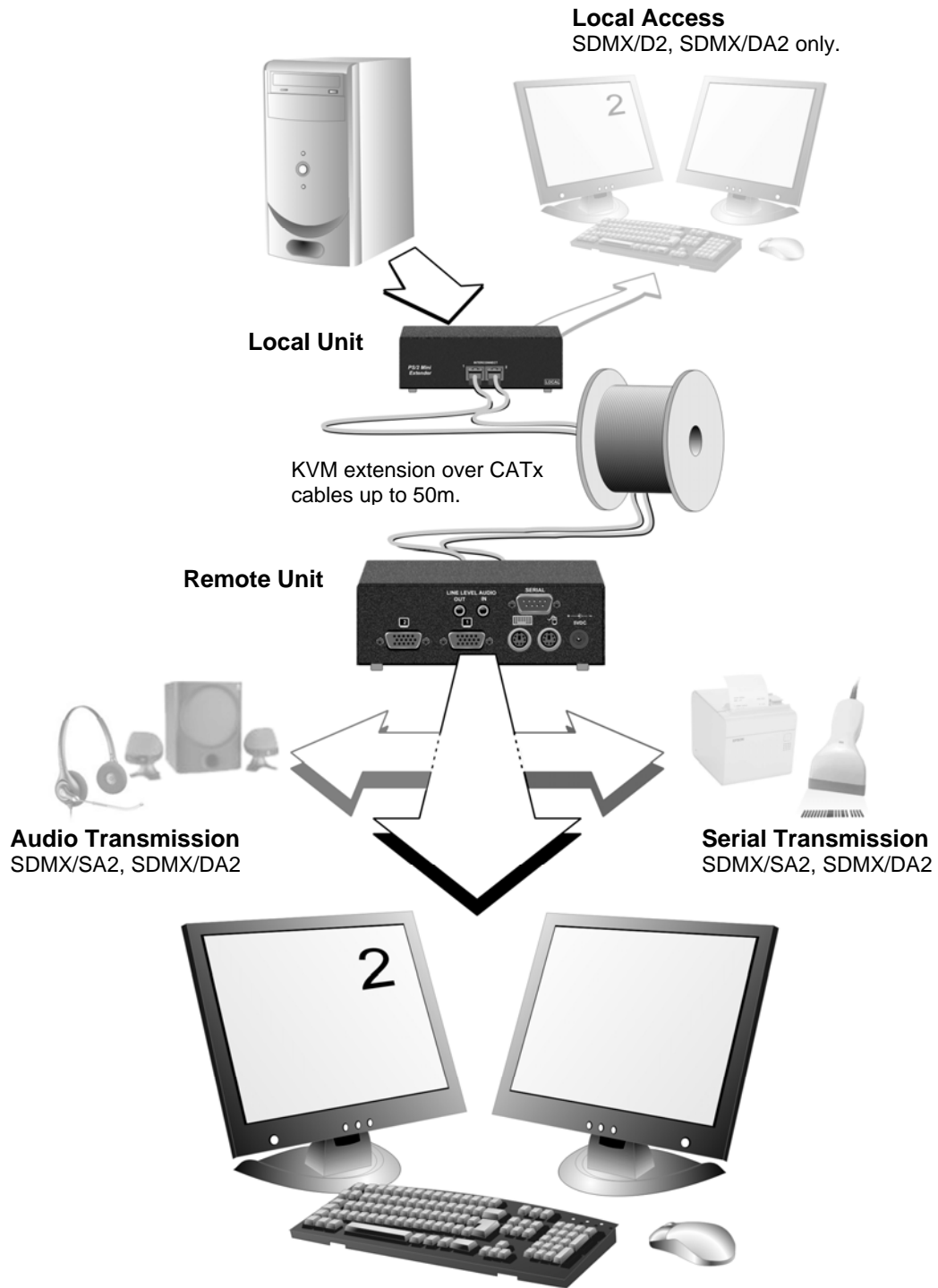


Figure 1 SDMX PS/2 Mini KVM extender system

Features

Members of the SDMX PS/2 Mini Extender Series offer the following features:

- Supports high video resolution for use with TFT displays:
1600x1200@75Hz up to 50m
- All control and video tuning made through attached keyboard.
- Settings stored in EEPROM memory.
- Local and Remote Units are flash-upgradeable.
- Emulated DDC (Display Data Channel) on both video channels
Extender Local Unit emulates a universal monitor; ensures compatibility with multi-head graphics cards
- Transparent DDC
Remote Unit reads DDC table from attached monitor, transfers and stores data in Local Unit to support non-standard displays.
- Dual-Head local access
(*SDMX/D2 and SDMX/DA2 only*)
- Private Mode on dual-access models allows users to lock out other console.
Monitor on locked console can be enabled or blanked.
(*SDMX/D2 and SDMX/DA2 only*)
- Status indicator LEDs on each RJ45 port.
- Small footprint chassis.
- Rack mount option: plate available to mount three units across 1U.
- External PSU Overvoltage protection
Extender unit will not operate if an incorrect PSU is connected.
- Surge-protected CATx interfaces
- 5V universal PSU (supplied for Remote Unit)
- Optional 5V PSU connector on Local Unit. Local Units are normally powered directly by the connected PC (or switch)
- 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).
SDMX/SA2, SDMX/DA2 and SDMX/RA2 only
- Bi-directional stereo audio (16-bit digitized) support on certain models enables high-quality audio extension.
SDMX/SA2, SDMX/DA2 and SDMX/RA2 only

Product Range

There are six products in the range:

<i>Dual Video Channel Kit (Standard)</i>	
SDMX/S2	Dual Video Channels, PS/2 KB & Mouse Local Unit (Single Access) + Remote Unit
SDMX/D2	Dual Video Channels, PS/2 KB & Mouse Local Unit (Dual Access) + Remote Unit
<i>Dual Video Channel Kit (Audio)</i>	
SDMX/SA2	Dual Video Channels, PS/2 KB & Mouse, Serial, Stereo Audio Local Unit (Single Access) + Remote Unit
SDMX/DA2	Dual Video Channels, PS/2 KB & Mouse, Serial, Stereo Audio Local Unit (Dual Access)+ Remote Unit
<i>Dual Video Remote Units</i>	
SDMX/R2	Dual Video Channels, PS/2 KB & Mouse
SDMX/RA2	Dual Video Channels, PS/2 KB & Mouse, Serial, Stereo Audio

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 UXGA. Separate sync, composite sync, or sync-on-green. Maximum resolution and refresh rates depend on cable length and cable type (see **Appendix G: Specifications**, page 43).

Extender Compatibility

The SDMX range of PS/2 Mini extender products offer enhanced performance while maintaining complete compatibility with existing SDLink standalone and rack mount CAT5 extenders.

You can use SDLink and SDMX products belonging the same family in any combination. However, it is not possible to mix Standard and Audio products within a system except for video only applications. SDMX units are not currently compatible with SDLink SUN or SDLink Serial (no audio) products.

<i>Standard Family</i>		<i>Audio Family</i>	
SDMX/S2, SDMX/D2, SDMX/R2		SDMX/SA2, SDMX/DA2, SDMX/RA2	
SDLink1	SDLink2	SDLink1/AU	SDLink2/AU
SDLink/LC	SDLink/DM	SDLink/AM	SDLink/RA
SDLink2/SW	SDLink/RLC	SDLink/MAR	SDRK/6A
SDLink/R	SDLink/RSW	SDRK/6AD	SDRK/6RA
SDRK/6	SDRK/6D	SDBX/SA1	SDBX/SA2
SDRK/12	SDRK/6R	SDBX/RA1	SDBX/RA2
SDBX/S1	SDBX/S2	SDBX/RA4	SDBX/DA1
SDBX/R1	SDBX/R2	SDBX/SA2-1	SDMX/DA2
SDBX/R4	SDBX/D1		
SDBX/S2-1	SDBX/D2		

How to Use This Guide

This guide describes the installation and configuration of the SDMX PS/2 Mini range of KVM 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 *SDMX 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 *SDMX Remote Unit*, ensure that it is compatible with your Local Unit (see **Compatibility**, page 10).

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

Interconnection Cable

You will need CATx (any category 5, 5e, 6 or higher) 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, it is *essential* that you adjust the SDMX PS/2 Mini 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 **Adjusting Video**, page 23.

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 extender package. If anything is missing, please refer to **Appendix F: Obtaining Technical Support**, page 42.

- Extender Remote Unit.
- 5V DC universal power supply for Remote Unit.
- Extender Local Unit.
- 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.
- CPU video cable (1.0m) with VGA video (HD15 male/female) connectors.
- Serial cable (1.0m, DB9 male/female connectors, 1:1 connections).
Models: SDMX/SA2 and SDMX/DA2 only.
- Dual audio cable (1.0m, 3.5mm stereo plugs).
Models: SDMX/SA2 and SDMX/DA2 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 (see page 39).

One CATx cable is required for each video channel.

- The *Primary* interconnect cable connects INTERCONNECT Port 1 on the Local and Remote Units. This carries the main video channel and all data (plus audio/serial).
- The *Secondary* CATx cable (connected to INTERCONNECT Port 2) carries the second video channel.



In order to send Keyboard, Mouse, Audio and Serial signals to the PC, the Primary interconnect must be connected.

The Primary interconnect does not have to be connected in order to use the keyboard attached to the Remote Unit for set-up. However, if the Primary interconnect is disconnected, the keyboard cannot be used for configuration for 15 seconds after disconnection (to maintain data integrity).

*With some cables, video performance may be improved by using a cross-over patch cable at each end or an alternative RJ45 pin-out (see **Appendix D: Cable Pinning**, page 39).*

Remote Unit Installation

To install a Remote Unit:

1. Switch off all devices.
2. Connect your keyboard, monitor(s) and mouse to the Remote Unit as shown in Figure 2.



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:

<i>Remote Unit</i>	<i>Audio Device</i>
Audio Out	Speakers
Audio In (MIC)	Microphone

See page 41 for further information.

4. Connect the Primary CATx cable to the INTERCONNECT (1) socket on the front of the Remote Unit. If required, connect the Secondary CATx cable to the INTERCONNECT (2) socket on the front of the Remote Unit (see Figure 3).
5. Connect the 5V power supply to power the unit.



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

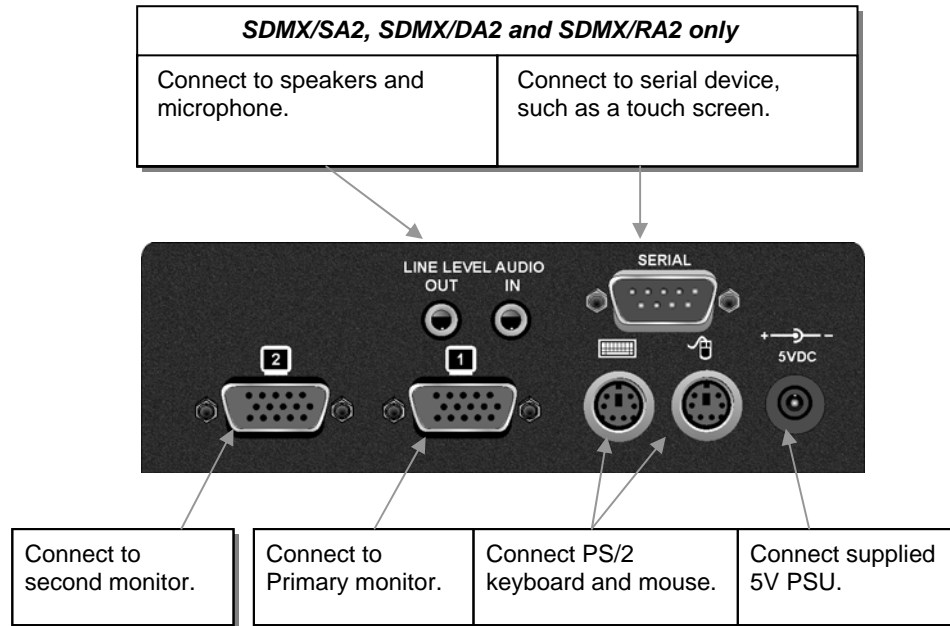
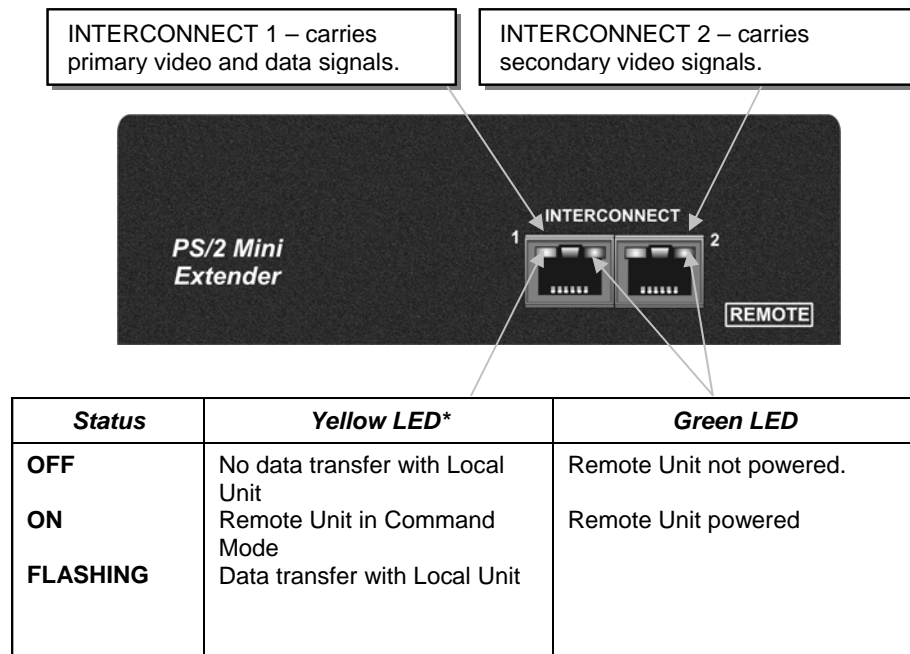


Figure 2 Remote Unit – rear view



* Yellow LED active on primary INTERCONNECT socket (Channel 1) only

Figure 3 Remote Unit - front view

Local Unit Installation

To install a Local Unit:

1. It is recommended that the PC and other devices are switched off 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 4.

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 and serial enabled system, connect the audio cables between the computer and Local Unit as follows:

<i>Computer</i>	<i>Local Unit</i>
Audio Out (green)	Audio In
Audio In/Microphone (pink/blue)	Audio Out

5. If appropriate, connect the supplied serial cable between the serial port on the computer and the Local Unit.
6. Connect the CATx cables from the Remote Unit to the corresponding INTERCONNECT ports (1&2) on the Local Unit.
7. Power up the PC.



The Local Unit normally takes power through the PC's keyboard port. In video only applications, this connection is not used and so an external PSU is required. Please contact Technical Support to obtain a suitable power supply.

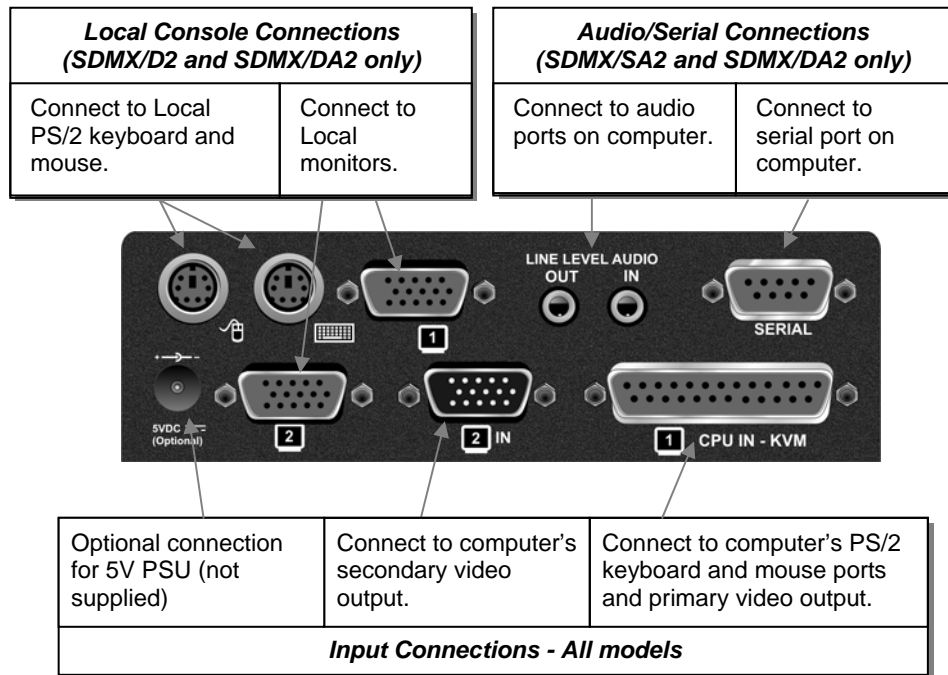


Figure 4 Local Unit - rear view

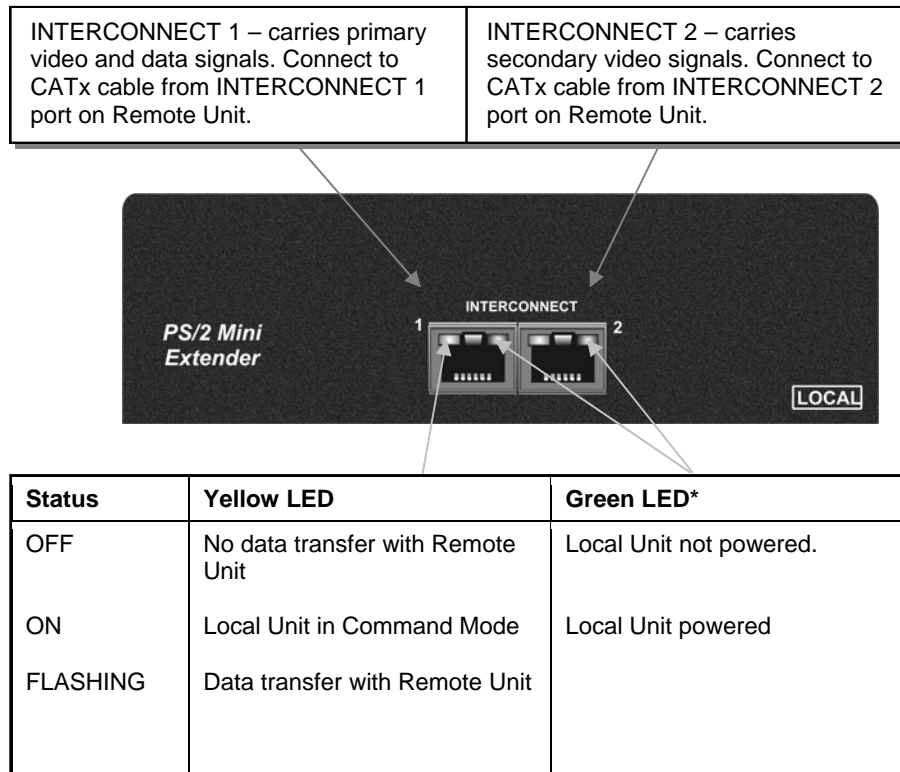



Figure 5 Local Unit – front view

Connection to Rack Mount Hub Local Units


Remote Units are compatible with CAT5 KVM Extender Local Hubs belonging to the same family:

<i>Family</i>	<i>Remote Units</i>	<i>Compatible Local Rack Hubs</i>
Standard	SDMX/R2	SDRK/6, SDRK/6D, SDRK/12
Audio	SDMX/RA2	SDRK/6A, SDRK/6AD Video only: SDRK/6, SDRK/12

 *The following features may not be available when Remote Units are used with these Rack Hubs: DDC Transfer (see page 26) and Private Mode Video Blanking Toggle (see page 21). Please contact Technical Support.*

You can connect adjacent hub ports to a Remote Unit to transmit the primary video/data and secondary video signals (see Figure 6).

Additional video channels do not require the Extender Hub to be of the same family. For example, an SDRK/12 could be efficiently used to transmit multiple secondary video channels to SDMX/RA2 Units, see Figure 7 in **Appendix A: Example Applications**.

 *Individual Rack Hub operation is not covered in this guide. Please refer to the documentation supplied with your Rack Hub Unit.*

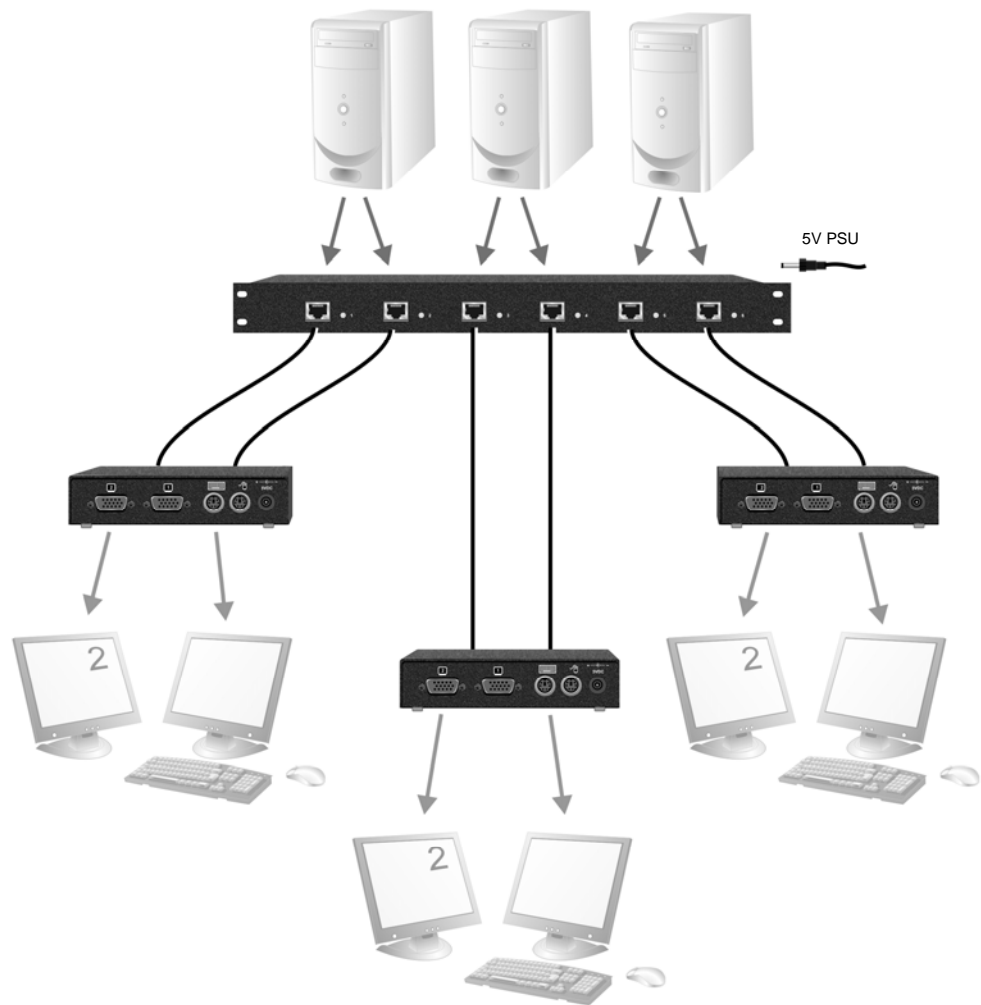


Figure 6 *SDRK/6 rack used with SDMX/R2 Remote Units to extend dual video*

4. Remote Unit Configuration & Operation

Cat5/5e/6 cables are specifically designed for networking applications and not for transmitting analog video. Your SDMX PS/2 Mini Extender includes, and requires, advanced technology to enable its use at high screen resolutions. This section describes how to optimize the video signal, configure the Extender system and operate the Remote Unit.

For details about flash upgrading and external configuration see **Appendix C: Flash Upgrading & External Configuration**, page 38.

For information about serial/audio port operation, see **Appendix E: Audio/Serial Ports: Operation & Multi-Port Configuration**, page 40.

Command Mode

During normal use, the remote console keyboard functions in the usual manner. However, by using a specific ‘hot’ key sequence, you can set the keyboard into a Command Mode. From this, you can use various keys and key combinations to tune the video signal and generally configure the extender system.

To enter Command Mode:

1. Ensure that you have installed and powered up the system according to the instructions in Section 3.
2. Press the following key combination on the remote keyboard:

<Left Control> + <Left Shift> + <F10>

From Command Mode you can use one or more of the ‘hot’ key sequences shown on page 6 to configure the system. The next section gives a full description of the video optimization procedure.

To exit Command Mode:

- Press **<Esc>** to exit Command Mode and save the configuration settings, or
- Press **<Left Control> + <Esc>** to exit Command Mode without saving changes made in the current session.



The Remote Unit automatically exits Command Mode after 30 sec of inactivity, saves all settings to EEPROM and returns normal function to the keyboard.

Status LEDs in Command Mode

In Command Mode, the Remote Unit:

- Illuminates the yellow Interconnect 1 LED continuously (see Figure 5).
Note. The Yellow LED on Interconnect 2 is not lit.
- Flashes the status LEDs (Num Lock, Caps Lock, Scroll Lock) on the connected keyboard to indicate the selected video channel (to which adjustments will be applied).

The number of flashes indicates the selected video channel:

<i>Keyboard LED flashes</i>	<i>Video channel</i>
1	Channel 1
2	Channel 2
Slow Flashes	Both channels (<i>Channel 0</i>)

Adjusting Video

PS/2 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. Ensure that you have installed and powered up the system according to the instructions in Section 3.
2. Enter Command Mode by pressing the following key combination on the remote console keyboard:

<Left Control> + <Left Shift> + <F10>

3. By default, both channels are selected for adjustment and this is indicated by slow flashing of the keyboard status LEDs (Num Lock, Caps Lock, Scroll Lock). If you want to select a single channel press the corresponding numbered key:

<i>Video channel</i>	<i>Command</i>	<i>Keyboard Status LED action</i>
Channel 1	<1>	Single flashes
Channel 2	<2>	Double flashes
Both channels	<0> (default)	Slow single flashes

4. Press the following key combination to change the video equalization setting:

<Left Control> + <E>

Note: This command toggles the video equalization setting; repeat the procedure to revert to the original setting for a shorter interconnection cable length (<25m).

5. **If you are using one or more flat panel monitors in the remote console, carry out auto-adjustment as described in the monitor's documentation. Sometimes manual adjust of clock and/or phase is also required for optimum results and minimization of jitter.**



Technical Note: This video compensation does not correct color separation (skew). Although skew 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 PS/2 Mini Extenders. You can check whether skew is a problem in your system by viewing the test card at: <http://testcard.kvmextender.info>.

Other Remote Configuration & Operation Options

The SDMX PS/2 Mini Extender Series has additional commands to reset the keyboard and mouse, to restore the factory default configuration, change DDC settings, and to initiate and control a Private mode session (*Dual Access models only*).

<i>Command</i>	<i>Key Sequence</i>
<i>Reset Mouse and Keyboard</i>	<i><F1></i>
Resets the remote console's keyboard and mouse and then automatically exits Command Mode. You may need to do this if you have hot-plugged a keyboard or mouse and it has not initialized correctly.	
<i>Mouse Recovery</i>	<i><F3></i>
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. <i>Use this command with care.</i>	
<i>Set Extender To Default State</i>	<i><Left Control> + <F9></i>
Sets ALL extender settings (video, configuration & DDC) back to the factory defaults and then exits Command Mode.	
<i>Toggle Remote Unit Private Mode</i>	<i><Scroll Lock></i>
Use this command to begin or end a Private Mode session at the remote console (see page 25).	
<i>Toggle Local Video Blanking State</i>	<i><Left Control> + <Scroll Lock></i>
Use this command to determine whether the local console monitor will be blanked (default setting) or enabled during a Private mode session at the remote console.	
<i>Disable DDC Emulation</i>	<i><Left Control> + <F2></i>
By default, the Local Unit provides DDC emulation on both video channels. Use this command to disable DDC emulation (see page 25).	
<i>Enable DDC Emulation</i>	<i><F2></i>
Use this command to restore DDC emulation.	
<i>Transfer DDC to Local Unit</i>	<i><Left Control> + <D></i>
Read DDC from monitor connected to Remote Unit video channel 1 and apply to selected video channels in Local Unit (see page 26).	

Private Mode

On dual access systems, a user at one console can lock out the other console by triggering a 'Private Mode' function. This prevents the other console from being used even if the two-second inactivity timeout period expires.

To indicate that the Private Mode session is active, the extender system:

- Slowly flashes the Scroll Lock LED on the user's keyboard.
- Illuminates all three LEDs on the other console's keyboard.
- Locks the other console's keyboard and mouse.
- Displays a blank image on the other console's monitor. If you want the other console monitor(s) to remain active during Private Mode sessions, use the **Toggle Blanking State** command.

To cancel the Private Mode, enter Command Mode again and press <**Scroll Lock**>. This command also closes Command Mode.

DDC Emulation

Modern graphics cards use VESA DDC (Display Data Channel) to identify the capabilities of connected monitors. Some cards will not operate correctly unless they communicate with a DDC-enabled monitor.

By default, the Local Unit emulates a universal monitor (on both channels) and reports that it is capable of all standard screen resolutions and refresh rates. This ensures that the vast majority of graphics cards and monitors should operate correctly with the extender system.

The DDC emulation can be optionally disabled but this would only be required in special applications.

It is also possible that the default DDC emulation may not report a non-standard graphics mode, for example, if an HDTV monitor is connected. In this case, the Local Unit's DDC emulation data could be flash-upgraded with a custom DDC table. Please contact technical support to discuss your application.

Alternatively, the DDC from the remote monitor(s) may be read and stored in the Local Unit using the Transfer DDC command (see page 26).



Always reboot Windows after adjusting a DDC parameter.

Transferring DDC Information

To support non-standard screen settings or other features, it is possible to read and store DDC information into the Local Unit directly from the monitors connected to the Remote Unit. You only need to carry out this procedure once; the extender units store the DDC information in non-volatile memory and restore it at power-up.

1. Ensure that you have installed and powered up the system according to the instructions in Section 3.
2. Connect the monitor to the 'monitor 1' socket on the Remote Unit (see Figure 2).
3. Enter Command mode (see page 21).
4. Select the video channel to which you want to apply the DDC settings by pressing either <1>, <2> or <0> (both channels).
5. Press the key combination:

<Left Control> + <D>

6. The DDC information is read from the monitor and applied to the selected video channel(s) in the Local Unit. This may take a few seconds. The remote console keyboard LEDs flash twice to indicate a successful transfer.



Always reboot Windows after adjusting a DDC parameter.

5. Local Unit Operation

Overview

For more information about serial/audio port operation, see **Appendix E: Audio/Serial Ports: Operation & Multi-Port Configuration**, page 40.

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

Local Units (SDMX/S2 and SDMX/SA2) may require an external 5V PSU (SDLink/PSK):

- For video only applications.
- If the PC cannot provide sufficient power through the keyboard connection.

Dual Access Systems

SDMX/D2 and SDMX/DA2 models offer dual access from consoles at both Remote and Local Units. This 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 two seconds. Both monitors show the current activity on the computer irrespective of which console is in use.

Only Reset and Private Mode commands are available at the Local Unit. If you want to configure the Extender system (for example, change DDC emulation) or tune the video signal, see page 21; these commands can only be issued from the remote console.

To enter these commands:

1. Press and release the initial 'hot' key sequence.

<Left Control> + <Left Shift> + <F10>

2. Press and release the command key (see opposite).

Local Console Commands

After pressing the initial ‘hot’ key sequence on the local keyboard, you can issue a number of commands by pressing additional keys. These commands allow you to control a Private mode session on the local console, reset the keyboard and mouse or restore the Local Unit’s factory default settings.

<i>Command</i>	<i>Key Sequence</i>
<p><i>Toggle Local Unit Private Mode</i></p> <p><i>SDMX/D2, SDMX/DA2 only</i></p> <p>Use this command to begin or end a Private Mode session at the local console (see page 21).</p>	<i><Scroll Lock></i>
<p><i>Toggle Remote Video Blanking State</i></p> <p><i>SDMX/D2, SDMX/DA2 only</i></p> <p>Use this command to determine whether the remote console monitor will be blanked (default setting) or enabled during a Private mode session at the local console (see page 21).</p>	<i><Left Control> + <Scroll Lock></i>
<p><i>Reset Local Keyboard and Mouse</i></p> <p>Resets the local console’s keyboard and mouse. You may need to do this if you have hot-plugged a keyboard or mouse and it has not initialized correctly.</p>	<i><F1></i>
<p><i>Mouse Recovery</i></p> <p>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. <i>Use this command with care.</i></p>	<i><F3></i>
<p><i>Exit Command Mode and Save</i></p> <p>Exit Command Mode and save all settings to EEPROM.</p>	<i><Esc></i>
<p><i>Set Local Unit to Default State</i></p> <p>Restore Local Unit factory defaults (configuration and DDC).</p>	<i><Left Control> + <F9></i>

6. Troubleshooting

Video

The image is not sharp, or is badly smeared.

Have you adjusted the video equalization? Follow the instructions on page 23.

Check the Interconnect cable between the Remote and Local Units. Is it of the recommended type (see page 13)? Is it intact along its entire length and securely connected at both ends? Is it wired correctly (see page 39)?

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 a recommended 'low skew' type (see page 14)? Is it intact along its entire length and securely connected at both ends? Is it wired correctly (see page 39)?

You can check whether skew is a problem in your system by viewing the test card at: <http://testcard.kvmextender.info>.

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 27.

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 this is a persistent problem, contact Technical Support.

The PC won't boot into the correct graphics mode.

Check that DDC Emulation is enabled (see page 25). If you are using a non-standard resolution, transfer the monitor's DDC information to the Local Unit (see page 26).

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.

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.

Issue 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.

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.

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.

As standard, the extender only 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.

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). The KVM extender accepts line-level audio input only.

The microphone output is barely audible.

See **Audio Interface – Using a Microphone**, page 41.

Serial

My serial device does not function.

The extender supports serial devices at data rates not exceeding 19.2K Baud (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.

General Questions

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

It might be possible to use a longer cable at lower resolutions but video quality will degrade substantially beyond about 75m. However, we do not recommend this and cannot guarantee that it will work.

Can the extender be daisy chained?

In certain circumstances, it is possible to cascade extenders, though we do not recommend doing so. Careful consideration needs to be given to extender setup, and the electrical environment. If you plan to cascade extenders, please contact Technical Support.

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. 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 section illustrates three specific applications using SDMX PS/2 Mini Extender units:

- Six dual-monitor consoles with serial and audio extension (Figure 7). Requires six SDMX/RA2 Remote Units, and SDRK/6A and SDRK/6 Local Hubs.
- Remote serial touch screens with local access through a KVM switch (Figure 8). Requires two SDMX/DA2 kits.
- Extender system with second screen for security monitoring (Figure 9). Requires one SDMX/S2 kit.

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

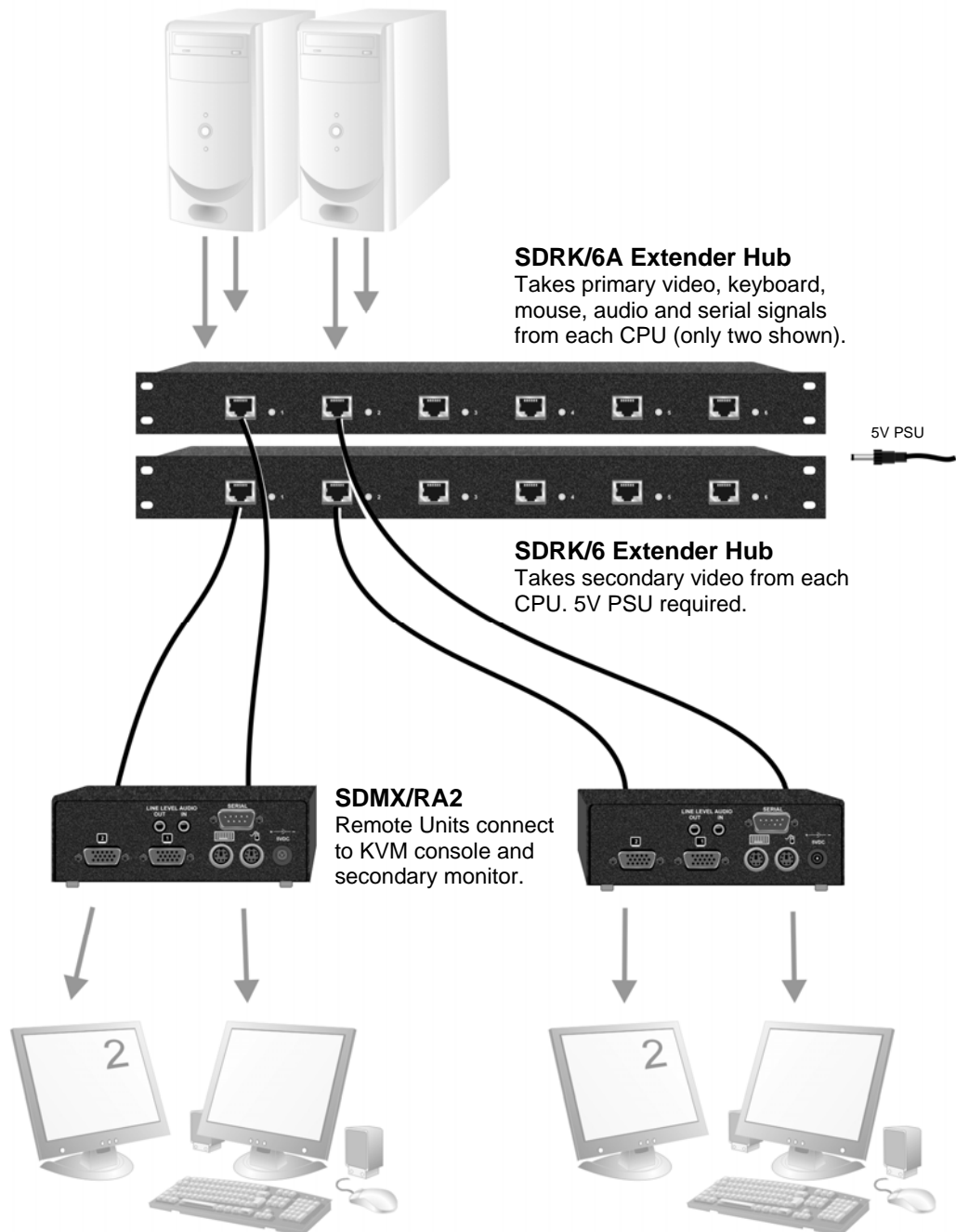


Figure 7 Dual-monitor consoles with serial and audio extension

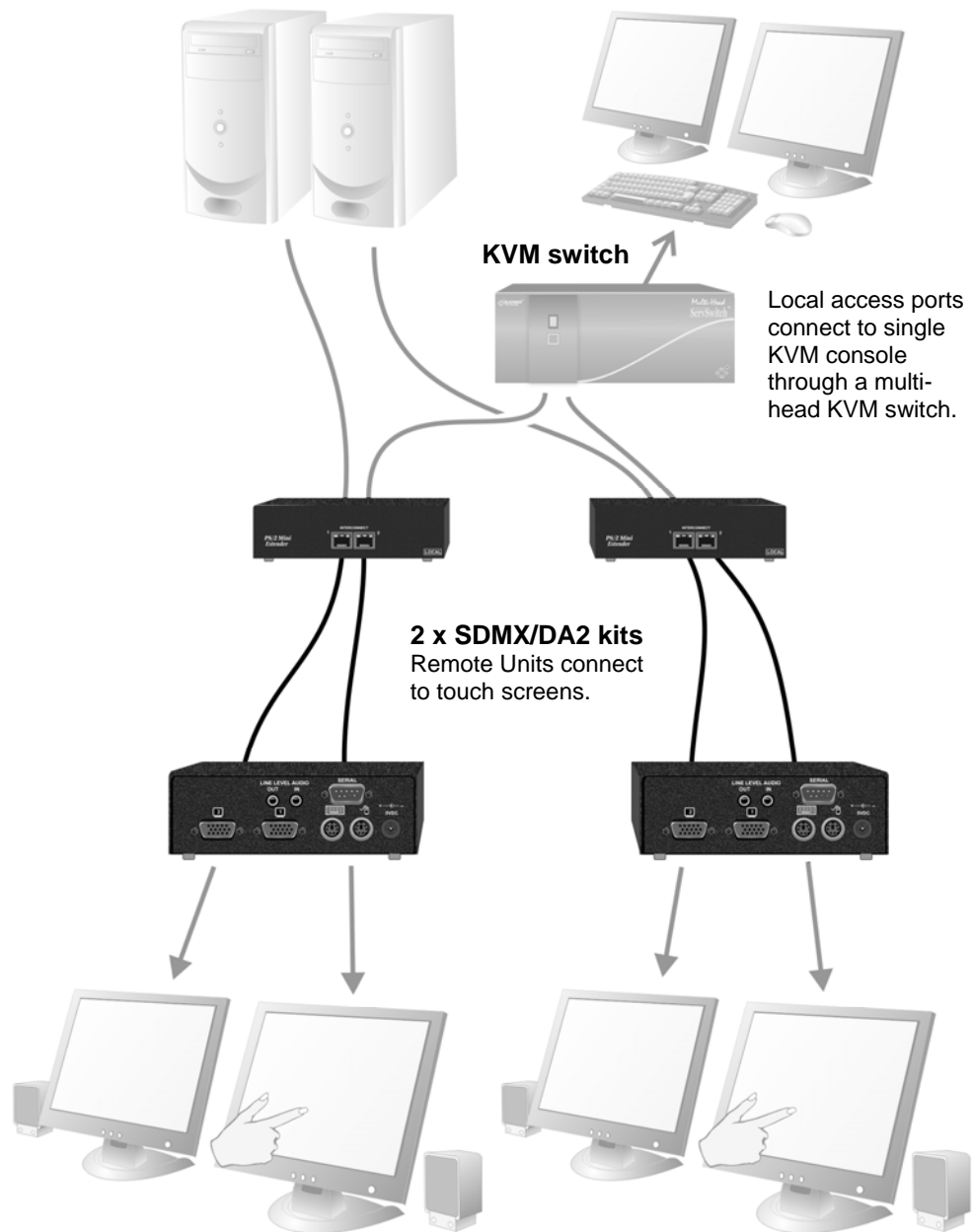


Figure 8 Touch screen network with local access to CPU through KVM switch

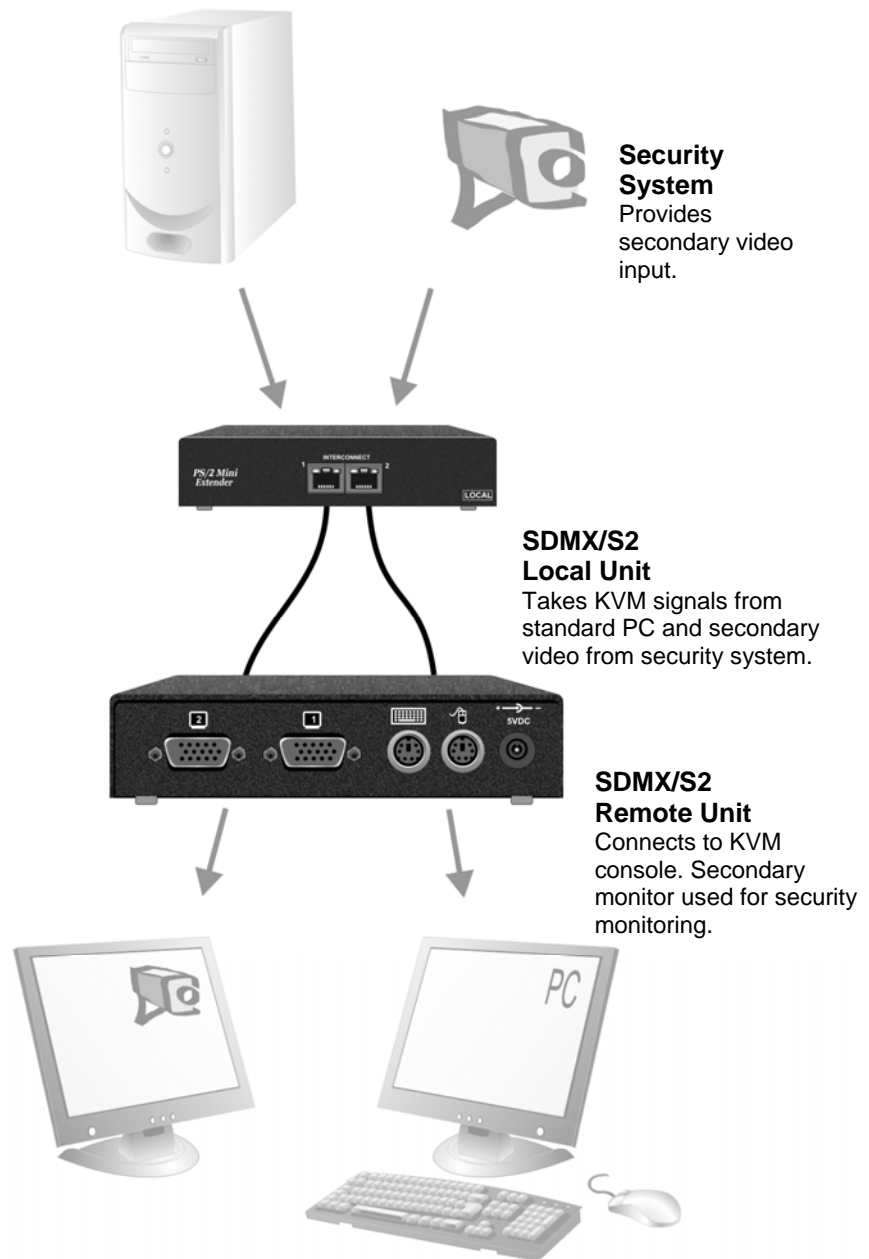


Figure 9 Extender system using SDMX/S2 kit with second screen for security monitoring

Appendix B: Rack Mount Options

Up to 3 extender units can be mounted in a 19" rack using the SDBR3 mounting kit

The kit contains one rack plate and M3 countersunk mounting screws.

To mount a unit:

1. Remove the feet from the extender unit.
2. Align the holes on the base plate with the vacant screw holes on the base of the extender unit.
3. Fasten the base of the unit to the plate of the mounting kit using the supplied screws.

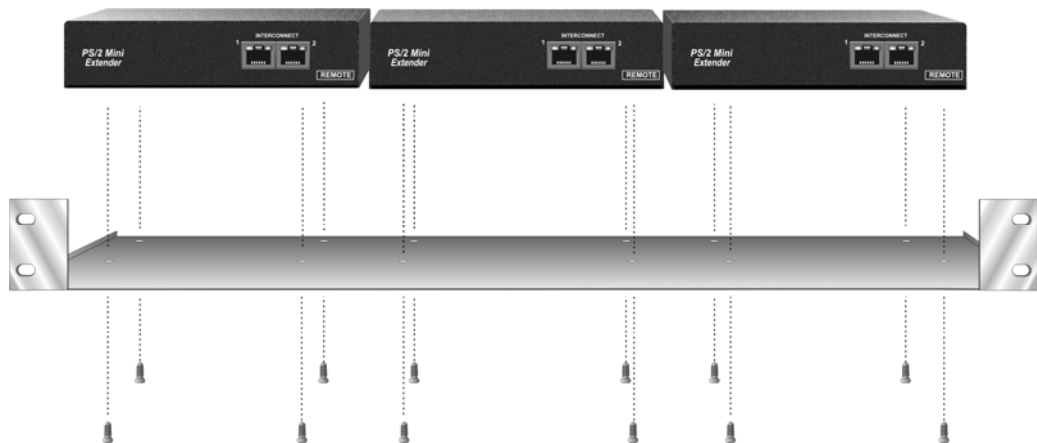


Figure 10 SDBR3 Mounting Kit

Appendix C: Flash Upgrading & External Configuration

Each extender unit contains a service port. This can be accessed through the mouse port on a Remote Unit or through the 25-way D-connector on a Local Unit. By attaching an upgrade cable between the appropriate port and the serial port on any PC (or laptop) a unit's firmware may be upgraded.

To operate the configuration port, you need:

- A laptop or PC close to the extender unit running Windows. The extender unit only has to be powered.
- An upgrade cable connected between the Extender's service port and the laptop or PC's serial port (Part No: SDBX/UC2).
- A software utility called 'ConfigXt'.
- The firmware upgrade file.

The application, detailed instructions and firmware upgrades may be downloaded online. Please consult Technical Support for details on how to do this.

Appendix D: Cable Pinning

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.

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

Using a crossover cable (at each end) will put the green video on the orange colored pair and the blue video on the green colored pair. This can be useful in reducing the visible effects of skew on the green channel over longer cable runs.



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

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

This appendix details audio & serial interface operation for those models that have this feature:

- SDMX/SA2
- SDMX/DA2
- SDMX/RA2

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 - Set Up and Operation

No setting up or user adjustments are required. Please note that on dual access Local Units, the serial link is always active.

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.

Serial Interface – 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.

Audio Interface – 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 F: 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 G: Specifications

Video

Maximum Resolution	1600x1200@75Hz up to 50m Operation at higher resolutions/refresh rates may be possible at shorter distances
Video Compatibility	Analog VGA to UXGA, RGB
VESA DDC	Emulated DDC for each video channel Local Unit reports as universal monitor capable of all standard resolutions and refresh rates. DDC information may be disabled, flash-upgraded or read from remote monitors.
Video I/O	0.7V P-P
Video Compensation	Separate LF & HF Equalizers
Video Coupling	DC
Sync I/O	Separate/Composite TTL Level Sync on green Sync Polarity is preserved
Video Input Connectors	DB25 female (CPU KVM; Video 1), HD15 male (Video 2)
Video Output Connectors	HD15 (female)

Keyboard and Mouse

KB Compatibility	All standard keyboards
Mouse Compatibility	2/3-button PS/2 mice Standard wheel mice
KB/Mouse Connectors (CPU)	DB25 (female) (Keyboard, Mouse and Video 1)
KB/Mouse Connectors (Device)	6-Pin MiniDIN Socket

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	47k Ω
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 250mA supplied by CPU. Connector for optional 5V PSU. 2.1mm DC Jack, center positive. Overvoltage protection: unit switches off if a PSU >6.0V is connected.
Remote Unit	5V DC, 0.75A (max) 2.1mm DC jack, center positive. Overvoltage protection: unit switches off if a PSU >6.0V is connected.
Remote Unit Power Supply	5V DC, 3A (18W), Regulated (certified to all relevant safety standards) Universal IEC Input 2.1mm DC jack, center positive.

Size and Shipping Weight

<i>SDMX/S2</i>	Local Unit: 145x100x29mm Remote Unit: 138x100x29mm) Shipping Weight: 1.9kg
<i>SDMX/SA2</i>	Local Unit: 145x100x44mm (1U) Remote Unit: 138x100x44mm (1U) Shipping Weight: 2.2kg
<i>SDMX/D2</i>	Local Unit: 145x100x44mm (1U) Remote Unit: 138x100x29mm Shipping Weight: 2.0kg
<i>SDMX/DA2</i>	Local Unit: 145 x100x44mm (1U) Remote Unit: 138x100x44mm) (1U) Shipping Weight: 2.3kg
<i>SDMX/R2</i>	Remote Unit: 138x100x29mm Shipping Weight: 1.1kg
<i>SDMX/RA2</i>	Remote Unit: 138x100x44mm (1U) Shipping Weight: 1.2kg

Environmental

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

Appendix H: 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.



Appendix I: 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 J: 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.