Installer Manual

for

Systemline 4.4

Systemline **QED AUDIO PRODUCTS LTD**, Unit 16, Woking Business Park, Albert Drive, Woking, Surrey. GU21 5JY.
Tel: +44 (0) 1483 747474 **Fax**: +44 (0) 1483 545600 **Email**: panic@qed.co.uk **Internet**: www.qed.co.uk

Contents

1 SYSTEM OVERVIEW 4
1.1 Basic Architecture 4
1.2 Controlling the Remote Zones 4
1.3 System Highlights 5
1.3.1 Any mix of sources 5
1.3.2 Party Mode 5
1.3.3 PC Communications 5
2 COMPONENT DESCRIPTION 6
2.1 RHS4 IR Remote Control Handset 6
2.2 DMS4 Module (Dot Matrix/Sensor) 6
2.3 CMS Module (Compact Mini/Sensor) 7
2.4 KMS Module (Keypad Manual System) 8
2.5 NMS (Numeric Manual System) Add-on module 8
2.6 Controller 9
2.7 Commander 10
3 COMPONENT CONNECTION 12
3.1 Data Cable and Connectors 12
3.1.1 Commander to Controller Zone Connections 14
3.1.1.1 Patch Cables 14
3.1.2 Upgrading 4.3 wiring 14
3.1.3 Ad-hoc additions to an existing data link wiring harness 15
3.2 Speaker and Cable Connections 16
3.3 Window Emitter Connections 16
3.4 RC-5 Bus Connections IR1, IR2. 16
3.5 Trigger Connections 17
3.5.1 TG Format Block 17
3.5.2 TG1-4, central triggers 18
3.6 Back-to-Zone Connections 18
3.6.1 IR Back to Zone – Global pin 7 (white/brown) 18
3.6.2 Trigger Back to Zone – Individual pin 8 (brown) 18
3.7 RS232C Connections 18
3.7.1 PC/Laptop 18
3.7.2 Kramer VS-4X4YC Switch Matrix 19
4 SYSTEM PLANNING 20
4.1 Initial Considerations 20
4.2 Source Components to be avoided 20
4.3 System Basic Setup 20
4.3.1 Wakeup Alarm Sources 22
4.3.2 Connections 22
4.3.2.1 Controller Connections 23
4.3.2.2 Commander Connections 23
4.4 Zone Configuration 24
4.4.1 Basic Zone Complement 24
4.4.2 Control Modules 25
4.4.3 Loudspeakers 26
4.4.4 Zone Splitters and additional speakers 27
4.5 A/V Wiring 28
5 SYSTEM SETUP 29
5.1 Source Connections 29
5.2 Speaker Cable Connections 30
5.2.1 PRE/LINE OUT to Power Amplifiers 30
5.2.2 Preamp Outputs (per zone) 31

5.3 Zone Connection Strategies 32
5.4 AC Line Considerations 32
5.4.1 AC for the Controller 32
5.4.2 AC for Source Components 32
5.4.3 Multi-System Controller Link & Commander Ribbon Link 32
5.4.3.1 Control Link Cable 33
5.4.3.2 Commander Ribbon Link Cable 33
5.4.4 External Control of AC Mains Outlets 33
5.4.5 AC Power Recommendations 33
5.5 Source Component Setup 34
5.5.1 DMS Controls & Functions 34
5.5.1.1 Volume Control Indications 35
5.5.1.2 Display Brightness 35
5.5.1.3 Engaged Indication 35
5.5.1.4 Internal Battery Indication 35
5.5.2 Connecting Wall-Mount Modules 35
5.5.2.1 Cable Testing 36
5.5.3 Using Pro's Kit 3PK-NT008 37
5.5.4 Setting Up DMS Modules 37
5.5.5 Configuring the DMS for source displays by Zone 38
5.5.5.1 Flexible labelling 38
5.5.5.2 Engaged Operation 38
5.5.6 Setting the DMS Alarm & Clock functions 39
5.5.7 Configuring the DMS to control a Zone Splitter 40
5.5.7.1 Zone Splitter Box Functional Description 40
5.5.7.2 Zone Splitter Box Connections 41
5.5.8 Manual Programming of the Commander 42
5.5.9 PC-Link programming of the Commander 43
5.5.10 IR System 44
5.5.10.1 Back to Individual Sources 44
5.5.10.2 Back to central components - Non-Routed (Pass-through) IR 44
5.5.10.3 GLOBAL IR, centrally, or Back-to-Zone 44
5.5.11 Individual Triggers 45
5.5.11.1 Back to Zone 46
5.5.11.2 At the central point 46
5.5.12 IsoLink Connection 47
5.5.13 Paging Operation 47
5.5.13.1 Paging Inhibit 48
5.5.14 Configuring the Pre/Line Out Sockets 49
5.6 Multi-Zone Systemline 4.4 Systems 50
5.6.1 Multi-Zone Systems 50
5.6.2 Commander Ribbon LOOP Links 51
5.6.3 Controller Links 52
5.6.4 Source Connections 53
5.6.5 RC-5 Bus Connections 53
5.6.6 Triggers in Multi-Zone Systemlines 54
5.6.7 Trigger Activation via Commander 54
5.6.8 DMS operation in Multi-Zone Systems 54
6 OPERATION 55
6.1 RHS4 Handset 55
6.1.1 Usage of Keys 55
6.1.2 Defining ergonomic usage of each Source Input 56
6.1.3 Multiple RHS4 Handsets 56
6.2 KMS Keypad 57
6.2.1 Linkage with RHS4 operation 57
6.3 CMS Keypad 58
6.3.1 Useful applications replacing DMS/KMS operation 58
6.3.2 Linkage with RHS4 operation 58
6.4 NMS Keypad 58

6.4.1 Combinations for MultiDisc, MultiChannel operation 58
6.4.2 Useful 'Macro A' facility 59
6.4.3 Useful SEL button 59
6.4.4 Linkage to RHS4 operation 59
6.5 DMS Display Module 60
6.5.1 Slave Operation 60
6.5.2 The Personal Input Strategy 60
7 TROUBLESHOOTING 61
7.1 Basic Function 61
8 SUPPORT CONTACTS 62
8.1 Website access and resources 62
8.2 Telephone/Fax Contact 62
8.3 Fault Report System 62

References

SEPARATELY AVAILABLE DOCUMENTATION INCLUDES:

PC LINK SOFTWARE MANUAL
COMMANDER MANUAL

DISCLAIMER

QED AUDIO PRODUCTS LIMITED SHALL NOT BE LIABLE FOR OMISSIONS OR FOR TECHNICAL OR EDITORIAL ERRORS CONTAINED IN THIS INSTALLATION MANUAL. QED AUDIO PRODUCTS LIMITED SHALL NOT BE HELD LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE SUPPLYING OR USES OF THE INFORMATION. QED AUDIO PRODUCTS LIMITED SHALL NOT BE HELD LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE PERFORMANCE OR USE OF MATERIALS CONTAINED IN THIS MANUAL.

The information contained in this installation manual may be subject to change without prior notice.

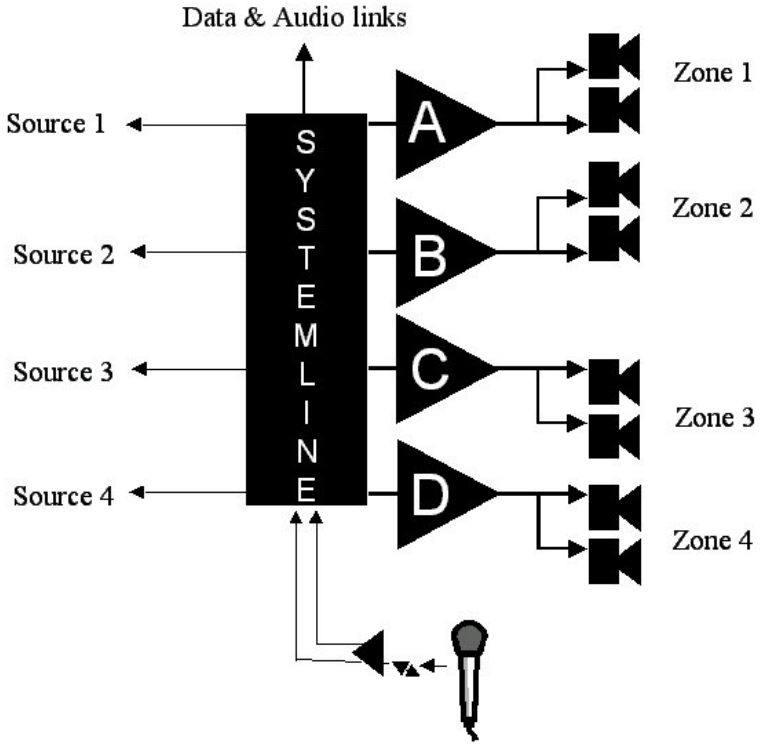
WARNING:
Dangerous voltages, capable of causing death are present in the Controller unit. ONLY qualified personnel should attempt to access the internal circuitry, for configuration or repair of this unit. Use extreme caution when the cover is removed, when testing and adjusting internal components, and observe anti-static and standard high-voltage safety precautions.

There are no installer-serviceable components in the Commander. This product is sealed with a QA sticker to detect unqualified access which would void the Systemline Warranty.

1 SYSTEM OVERVIEW

1.1 Basic Architecture

The MultiRoom A/V Control System comprises a dual-component Commander/Controller solution which can distribute audio and video signals from a single set of source components to four separately controlled remote zones or listening/viewing areas. To add more remote zones, simply add more Systemline 4.4 Systems.



The centrally located S4.4 system contains source selection, communications circuitry, IR source routing and independent preamp/power amplifier sections for all zones. Each zone has a preamp output which can be fixed or variable. The Commander unit is the central IR learning and routing device, able to learn or upload IR codes for almost all types of equipment operating with universal, B&O or 1.125Mhz frequencies [a fourth frequency has been provided for, as investment protection].
Currently only 'games-compatible' irDA codes are known to be beyond its scope, and this is unlikely to change for technical signalling reasons. With this one exception, instant compatibility with the most popular source equipment components is assured.
Furthermore, although the number of inputs is limited to four sources simultaneously, if each source is itself a multi-component device, such as a "stack system" or "midi tower", controlled by a single IR handset, then the number of components available for selection increases accordingly. (See Section 6.5.2, The Personal Input Strategy).

1.2 Controlling the Remote Zones

Three ways of remote zone operation are available.

1. The RHS4 hand-held remote generates the IR codes to be read by wall-mounted sensors.
2. Wall-Mounted Keypads, Displays and IR Sensors transmit commands back to the S4.4 System via a dedicated hard-wired DATA bus (using standard CAT5 FTP structured wiring).
3. A laptop or PC is locally connected to the Commander's RS232C port (cable supplied) and selects and operates the zone with "Virtual RHS4 Handset" software

(downloadable).

1.3 System Highlights

The S4.4 System is exceptionally flexible. As well as the ability to use multiple RHS4 remote handsets, and sophisticated combinations of keypads and displays, the learning technology is enhanced by permitting optional interface to third party systems by using:

1. The Commander's RS232C port
2. Global IR signalling back to Zone
3. Triggers, (voltage or current-sinking) centrally or routed back to a particular Zone

Additionally, an optional 'Zone Splitter' can be used in any Zone to create a SubZone enabling both the Main Zone and SubZone pairs of speakers to be activated from the DMS display module. This module also features an alarm facility which allows a zone to be awakened by a chosen source at a predetermined volume level.

Multiple S4.4 Systems can be cascaded to provide up to 20 Zones (with 20 optional SubZones) in a large MultiRoom MultiZone A/V System. A control link on the Controller enables the a.c. mains outlets to be controlled from any zone on any controller.

A built-in (line level mono) Paging input allows Zones to receive Public Announcements or mute when the doorbell rings. Each Zone can be configured to prevent participation in the Paging facility if required. (See Section 5.5.7.1).

A universal IR link remains active even when a zone is in standby. Simply point any remote at an IR sensor module to relay the command back to the relevant components, which may be located centrally or in the zone.

1.3.1 Any mix of sources

Because the S4.4 System uses routed IR outputs and window emitters, four identical source components can be used, including multiple high capacity CD players and DVDs. RC-5 Bus control is also offered as an alternative on the first two Source Inputs, if required.

1.3.2 Party Mode

Selecting the desired source, and pressing zero four times in quick succession, will enable all zones to be set and controlled as a single entity. This continues until Standby is held depressed for 3 seconds to turn all zones OFF.

1.3.3 PC Communications

Connecting a PC or laptop to the Commander using a (supplied) RS232 cable enables Systemline's Virtual RHS4 Handset software, once installed, to be used to carry out all the zone control functions of a single S4.4 system.

Optional PC-Link software can be used to upload and download IR Code (*.irc) files for all kinds of source equipment, Startup Volumes per Zone can be configured, together with BASS and TREBLE equalisation settings, and a Customer Backup File (*.cbf) can be created and stored as a record of a client's installation. A separate Programming manual is available for use with PC Link software.

2 COMPONENT DESCRIPTION

2.1 RHS4 IR Remote Control Handset

The RHS4 works with the S4.4 system by using a special high intensity IR transmitter to communicate with the IR sensor modules located in the zones, which in turn relay data back to the Commander/Controller over the CAT5 data cables.

As they are relatively inexpensive, multiple RHS4 handsets may be used if required, as all the code intelligence is held in the Commander for onward transmission to the Controller.

The RHS4 handset has been ergonomically designed to enable a large number of disparate devices to be handled intuitively by the 38 buttons on the keypad. Four are used to select the source inputs, leaving 34 buttons, the meaning of which can be learned by the Commander.

Some of the buttons on the RHS4 are already "hard-wired" with system functions, such as Input Source selection, Volume + and -, Standby, and mute. These directly drive the logic and amplification circuitry of the S4.4 System. Nevertheless, even these keys (with care!) can be 'soft-loaded' with additional functions.

See Section 6, Operation, for further details.

2.2 DMS4 Module (Dot Matrix/Sensor)

This module is an IR Sensor Module. At least one IR Sensor module is required in each zone if the RHS4 or an 'Original Equipment' Remote Control Handset is to be used in that zone.

The wall-mounted DMS (Dot Matrix/Sensor) display module receives commands from the RHS4 hand-held remote and, after verifying receipt of error-free data, sends these codes to the S4.4 Commander.

When a zone is active, the DMS normally displays the selected source. During volume change, muting, or receipt of a Paging signal, the DMS displays relevant status indications. Pressing the Alarm button (when the zone is active) will display the time for a few seconds.

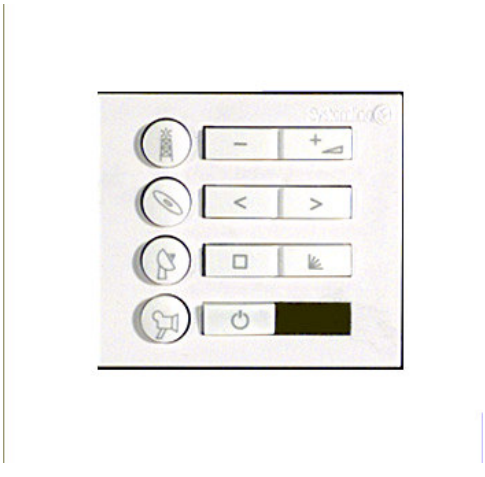
When a zone is at standby, the DMS normally displays the time. During activation or shutdown, an appropriate message is displayed.

The DMS enables "A/B" speaker switching when a Zone Splitter is installed. Also the DMS is necessary in any zone requiring the Alarm wakeup facility. DMS modules are also available in black with white legends.

You will find details of the DMS module setup and operation in Sections 5 and 6.

2.3 CMS Module (Compact Mini/Sensor)

This module is an IR Sensor Module. At least one IR Sensor module is required in each zone if the RHS4 or an 'Original Equipment' Remote Control Handset is to be used in that zone.



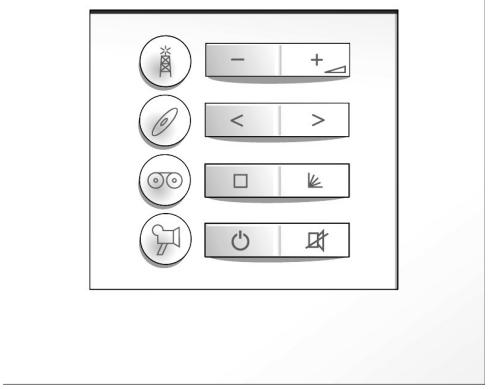
The wall-mounted CMS (Compact Mini/Sensor) module receives commands from the RHS4 hand-held remote and, after verifying receipt of error-free data, sends these codes to the S4.4 Commander.

The CMS module provides maximum zone control flexibility since its keypad can act both as an alternative to the RHS4, where only a limited set of control functions on the wall are necessary, and also complements the RHS4 by providing an IR sensor for remote operation as well. The NMS Numeric add-on keypad can also be used to increase the flexibility of the CMS. CMS modules are also available in black with white legends.

The four left-hand keys are each used to select a pre-programmed source. When a selection is made, the zone is activated automatically, if necessary. Of the four right-hand keys, the upper keys provide volume control, and the lowest key provides standby for any selected source. The IR Sensor operates next to the lowest right hand key.
The functions of the two centre keys change automatically depending on the source selected. See Section 6 for further information.

2.4 KMS Module (Keypad Manual System)

The wall-mounted KMS (Keypad Manual System) provides a manual remote zone control alternative to the RHS4. Key depression sends appropriate codes to the S4.4 Commander.



The KMS module provides basic zone control where only a limited set of control functions on the wall are necessary. The NMS Numeric add-on keypad can be used to increase the flexibility of the KMS. KMS modules are also available in black with white legends.

The four left-hand keys are each used to select a pre-programmed source. When a selection is made, the zone is activated automatically, if necessary. Of the four right-hand keys, the upper keys provide volume control, and the lower keys provide standby and mute for any selected source.

The functions of the two centre keys change automatically depending on the source selected. See Section 6 for further information.

2.5 NMS (Numeric Manual System) Add-on module

As its name implies, the wall-mounted NMS (Numeric Manual System) module provides a manual remote zone control alternative to the RHS4 by adding numeric functions to the other wall-mounted keypads. This is important for multiple disc devices, satellite and cable boxes and digital tuners of all kinds.

The functions of the keys change automatically depending on the source selected. (See Section 6 for further information). The module cannot be used in isolation, but may be combined with DMS/KMS or CMS modules. NMS modules are also available in black with white legends.

2.6 Controller

The Controller contains the switching logic and amplification circuits for the S4.4

MultiRoom System. It features:

- Four separate microprocessor controlled stereo preamplifier/power amplifier sections, one for each remote zone
- RCA/PHONO inputs for four sources with "buffered loop through" PHONO outputs for connection to additional controllers or host/main system amplifier.
- Four PHONO line level preamplifier outputs, configured by dual-operation plug-in modules (fixed or variable) per zone
- Quick Fit speaker plugs and sockets (supplied)
- PHONO line level input/output (mono) for Paging audio source with PHONO for closed-contact 'trigger'

- Compatibility with industry standard (EIA/TIA 568B, AT&T 258A) structured wiring systems with screened FTP CAT-5 cable using 6-way IDC and 8 pin RJ45 connectors (supplied)
- One IEC320 a.c.mains outlet with 460W capacity, providing remote control power switching for central source components if desired
- Front Panel LED indicators for each zone showing power, status and command pulse processing

2.7 Commander

The Commander houses the interception, code translation and learning capabilities of the S4.4 MultiRoom System. It examines the origin of an incoming data code, routes an appropriate IR command to the source input concerned via individual window emitters, and then passes the necessary instructions to the Controller to carry out any switching logic and amplifier control functions.

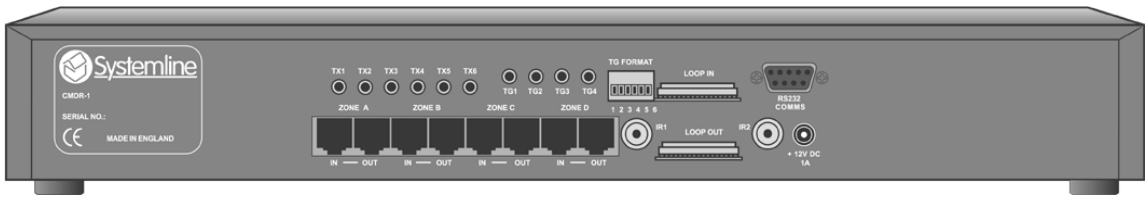
This IR routing enables multiple identical source components to be used, and maintains discrete IR signal integrity to each one. For Source Inputs 1 and 2, RC-5 Bus PHONO connections are provided as alternatives to the window emitter options.

The Commander also assumes responsibility for passing global IR signals, both to two additional window emitter sockets on the device itself, and also back to the zones over the data cable.

In addition, trigger voltages or current sinks are routed individually per zone, again either at trigger output sockets on the device itself, or back to individual zones over the data cable.

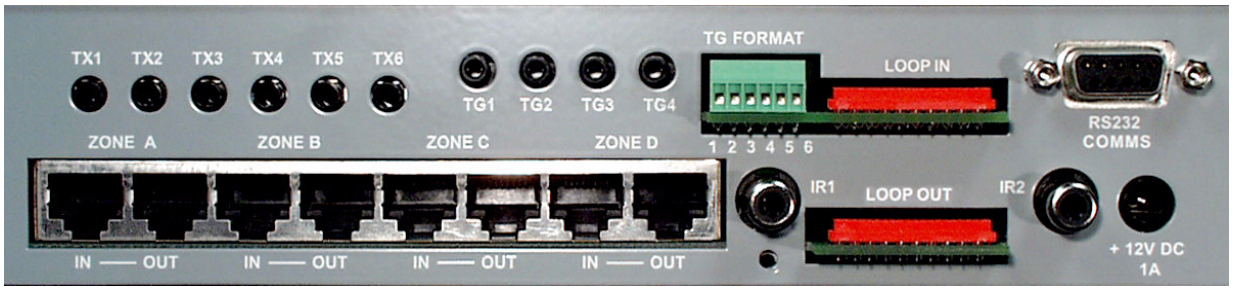
It also features an LCD panel and IR input port for learning a wide variety of IR source codes, to control the above IR routing, pass-through and trigger functions by direct manual programming. Alternatively an RS232C port is provided permitting these functions to be performed by Systemline's PC Link software. The RS232C port also enables the Systemline 4.4 System to be controlled in real-time by a simple "Virtual RHS4 Keypad" PC-based Windows™ program (supplied).

Most importantly, the RS232C port also provides the facility to control or be controlled by other systems and devices. More details of third party systems and devices which can interface with Systemline 4.4 can be found in separately available support documentation.



It features:

- Easy to understand user interface. Clear 32 character display prompts you with menus and instructions during installation of the Commander. A useful 'In programming' testing feature ensures codes are captured accurately.
- High speed IR learning and storage algorithm. No long waits between code captures.
- Enhanced operation of high capacity CD players and satellite systems with the addition of RHS4 handset and numerical keypad.
- Any brand can be programmed onto any input. You can even have four sources of the same type and brand.
- Wide IR capture frequency range 20kHz-80kHz, PPM (no carrier) + 455kHz B&O + 1.125Mhz + a spare IR frequency for future use.

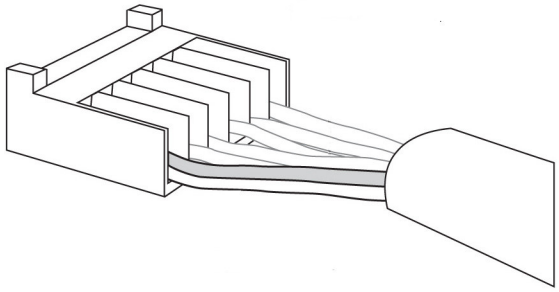


- Automatic detection of RC5 codes for automatic routing to RC5 Bus interconnection.
- RS232 Communications port for PC Remote Control and remote uploading and downloading of IR commands. (PC Link software required)
- Integral support for synchronized video switching, via RS232, with Kramer VS-4x4YC A/V switching matrix.
- Four independent Zone Triggers for activation of remote devices such as lights, powered curtains and amplifiers. Can be individually configured to provide current sink and current source over a wide voltage range 5-24VDC.
- Macro IR learning capability. 24 Macro commands per Source Page input. Each macro command can be programmed for length of, and pause between, transmissions.
- Embedded power toggle commands on each Source Input. Enables you to turn a source on if it's in standby mode.
- All zones ON command, allows you to turn four Zones ON to an input of your choice.
- Capacity to store over 150 control commands in addition to the embedded Macro and Power toggle commands.
- High capacity 2 Mega Byte Electrically Erasable (E^2) memory. No batteries are used to retain information. Information is secure even when power is disconnected for many years.
- Easy to install multiple Commanders using LOOP Link ribbon cable. Commanders automatically route IR commands to a single set of IR window emitters.
- Future compatibility with other home automation systems such as Lutron™ lighting controllers.

3 COMPONENT CONNECTION

3.1 Data Cable and Connectors

The connection between the keypad/sensor modules and the Commander must be made with a shielded eight core (+ drain wire) cable. Cores 7 & 8 (not shown) are reserved for "back to zone" connections, and should therefore be present and terminated/isolated from each other for potential use (See Section 3.5).

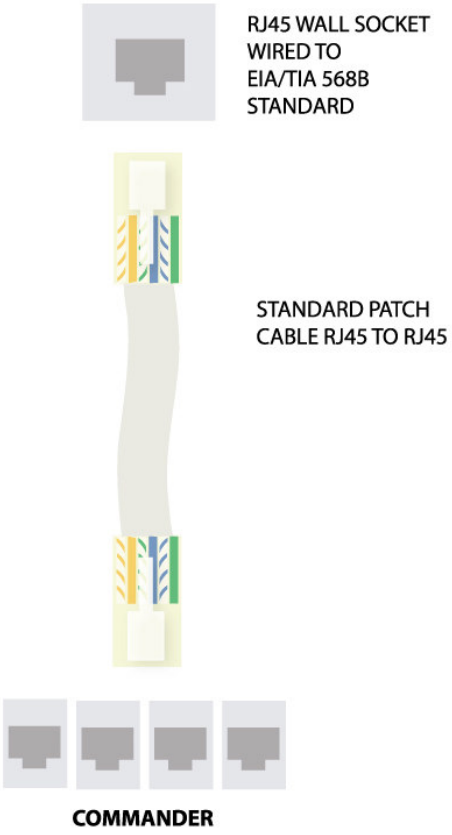


QED recommends screened foiled CAT-5 FTP cable for optimum performance. Other cables may work satisfactorily provided they have an overall screen, and eight 24-26 awg conductors + drain. The drain wire connects to pin 1 of the IDC 6-pin connector (see next paragraph). STP cable (braided shield) is not recommended or necessary, but may be used if care is taken to ensure all braids terminate cleanly, and are soldered or otherwise connected (sleaving is appropriate) to a suitable single drain wire.

WHITE/ORANGE	PIN 1
ORANGE	PIN 2
WHITE/GREEN	PIN 3
BLUE	PIN 4
WHITE/BLUE	PIN 5
GREEN	PIN 6
BROWN PAIR	N/C

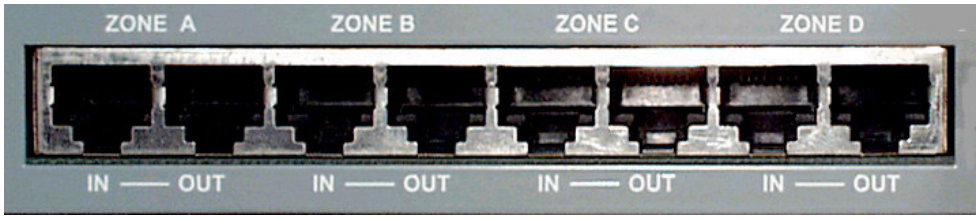
Drain connection at the keypad/sensor modules is mandatory. Unshielded cable (UTP) is not recommended between wall-mounted modules and the central system. Such cables act as antennae to ambient electrical "noise", particularly including core 8 which may be unconnected if not active, and should NOT BE USED when wiring zones.

The central system end of the cable terminates in a standard RJ45 patch panel, with the drain wire also connected with core 1 (white/orange).



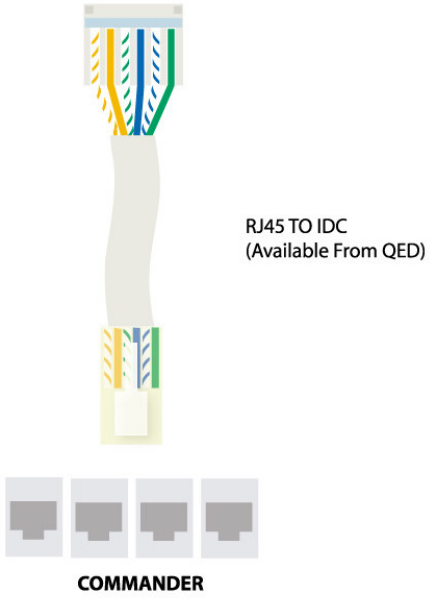
So Zone data cable is shielded by drain connection at both the IDC and RJ45 socket connections. The PATCH CABLE is not shielded (CAT5 UTP, industry standard) and is not supplied with Systemline, but such cables are almost universally available from all major communications cabling manufacturers, electrical warehouses and stockists.

Zone data is connected to the Commander via the RJ45 ZONE IN sockets at the rear of the Commander, using a standard UTP patch cable.



3.1.1 Commander to Controller Zone Connections

QED provides cables with the Systemline 4.4 System to connect the ZONE OUT sockets on the Commander (RJ45) to the data IN (IDC six-pin) connector for each zone on the Controller.



This cable does not use cores 7 & 8, but cores 1-3 are essential for keypad operation and provide power to the Commander itself (1 & 3). Cores 4 & 5 are needed to update DMS displays. Core 2 returns IR data to the 4.4 System; Core 6 is 'spare', to provide some redundancy where installation snags (such as an inappropriately placed nail) might short out two of the other conductors.

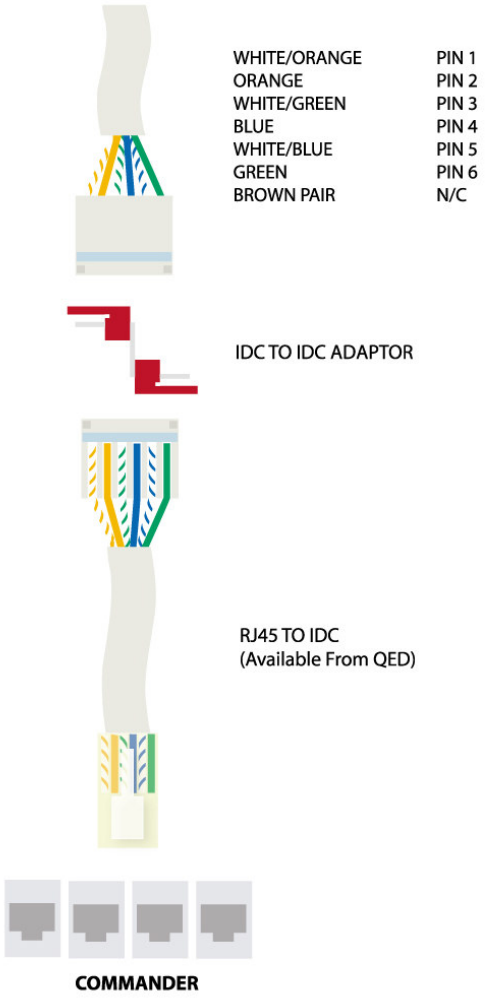
To summarise:
The standard UTP patch cable is NOT provided by QED, but all pins are connected in the ordinary way. Drain continuity is NOT REQUIRED after the zone data cable has reached the punch-down block of the RJ45 patch panel socket. Do NOT use FTP and silvered RJ45 plugs for patch cables as these are unsuitable and could introduce ground loops.

3.1.1.1 Patch Cables

The standard UTP patch cable is NOT provided by QED, but all pins are connected in the ordinary way. Drain continuity is NOT REQUIRED after the zone data cable has reached the punch-down block of the RJ45 patch panel socket.

3.1.2 Upgrading 4.3 wiring

For customers upgrading an existing S4.3 installation using QED's former wiring schedule, an IDC to IDC (male to male) adaptor is provided to enable conformance with EIA/TIA 568B.



3.1.3 Ad-hoc additions to an existing data link wiring harness

All keypad modules (except the DMS), actually require only cores, 1-3 in the data link wiring, to provide full functionality; the remaining wires are used for DMS display updates and Back-to-zone signals.

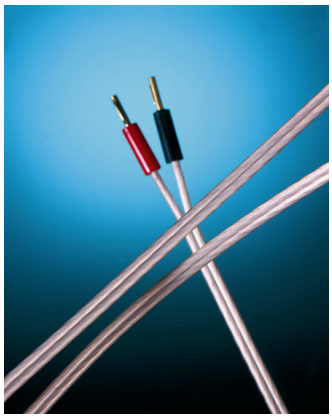
This is particularly useful where clients have built an annexe to the house, or wish to add Systemline operation in a listed building, or in any other location where the fabric of the building is complete and must remain undisturbed.

Using a single pair 24-26awg cable with a drain wire (FTP), it is possible to connect non-DMS modules to an existing data link harness, and run the cable (just like telephone cable in thickness) out of sight around door frames, or in the case of listed buildings with wooden floors and skirting boards, in the gap which develops over time (as the wood dries out and shrinks) between the skirting board and the floor. Connect the drain wire (foiled mylar wrap) to core 1, pin 1 (earth/chassis GROUND). [Pin 2 = IR data received, Pin 3 = 12VDC].

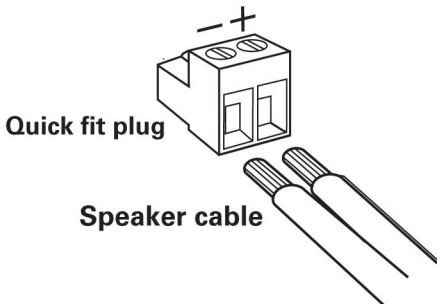
3.2 Speaker and Cable Connections

QED Micro speaker cable (two conductor) is the minimum acceptable standard for connections between the Controller and zone loudspeakers. Where individual cable runs exceed 20 metres, performance will be best maintained by QED Original speaker cable.

QED Micro



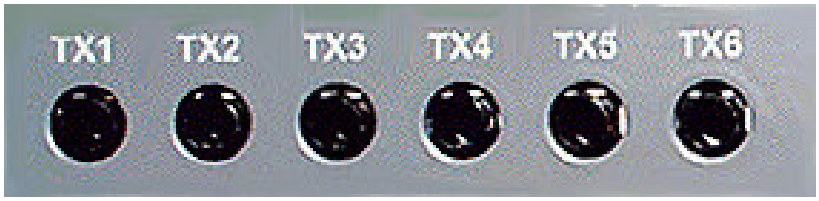
QED Original



QED provides Quick-fit 2-way speaker plugs with screw terminals, accommodating wire guages up to 2.5mm^2.

3.3 Window Emitter Connections

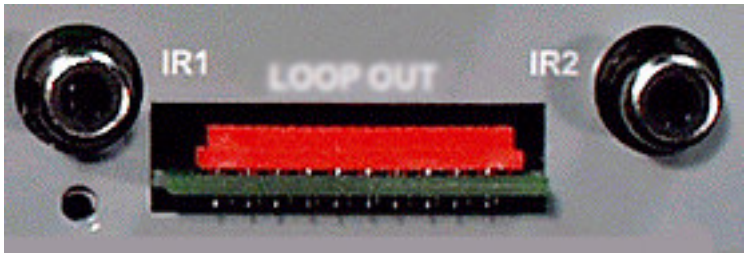
On the rear of the Commander is a set of six IR window emitter 3.5 mm mono jack sockets, labelled TX1 - TX6. As the Commander performs both routed IR and global IR, it is important to realise that window emitters TX1-TX4 are for central source components on Source Inputs 1-4 respectively.



TX5-TX6 are provided for IR pass-through, for IR-controlled devices located at the central point. Global IR is also available in each zone using core 7.

3.4 RC-5 Bus Connections IR1, IR2.

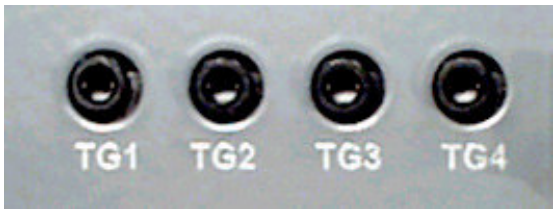
These PHONO connectors may be used to provide routed RC-5 coaxial control bus connections to Input Source 1 or Input Source 2.



Each Bus connection is enabled separately by programming the Commander, and if activated, replace the window emitter IR outputs of TX1 and TX2 respectively. Note therefore that any RC-5 coaxial bus source components MUST be connected as Input Source 1 or Input Source 2.

3.5 Trigger Connections

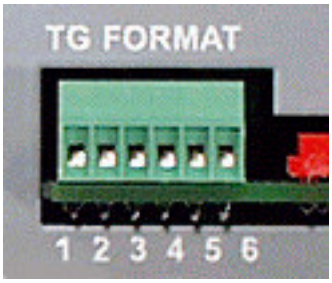
On the rear of the Commander is a set of four 2.5mm stereo jack sockets, labelled TG1 - TG4. The Commander performs routed triggering, so these outputs provide for current source or sink triggers to be activated centrally, near the source equipment. Each number, 1-4 corresponds to Zone A-D respectively. An alternative trigger circuit is provided back to each zone (see Section 5).



The precise nature of the triggers is determined by external components or use of the TG Format Block. Trigger activation is determined by programming the Commander. Current levels should not exceed 100mA. Failure to observe this typical load rating will involve replacing fixed motherboard circuit protectors (A Return-To-Base, Non-Warranty Repair).

3.5.1 TG Format Block

The TG Format Block on the rear of the Commander provides six screw terminals, 1-6 from left to right. Use a 2mm flat screwdriver to secure any connections.



Terminal 1 is earth/chassis ground/negative, Screws 2-5 are potential voltage feeds for Zones A-D respectively, and screw 6 is a feed from the internal 12V DC 2.1mm centre pin connector below the RS232C socket. (Nominally 12V DC, tip positive).

Nominal 12 V Trigger Supply Input

See Section 5 to set up individual triggers back to zones.

3.5.2 TG1-4, central triggers

TG (2.5mm stereo jack) plug connections are as follows:

Tip	External supply on TG connector	Input to Opto Coupler
Middle Ring	Trigger Output	Output of Opto Coupler
Outer Ring	Commander Ground	Used with Internal supply

3.6 Back-to-Zone Connections

Provision is made via cores 7 & 8 of the data cable to send signals back to zones, if required. It is good practice to insulate these wires at the wall termination if they are not to be used, or fit standard terminal blocks to pick up the feeds.

It is quite useful to remember that pin 1 of the IDC connector provides signal/chassis ground, and pin 3 provides 12VDC. Therefore a spare IDC connector, connected to a free "IN" data socket on a wall module, can be used to pick up ground (1) and 12VDC (3).

3.6.1 IR Back to Zone – Global pin 7 (white/brown)

All zones can operate a standard SL-WE window emitter by connection between core 7 of the data cable (-) and 12VDC (+), available on pin 3 (white/green).

3.6.2 Trigger Back to Zone – Individual pin 8 (brown)

Each zone can receive a voltage by using core 8 (+, brown) with ground on pin 1 (-, white/orange). Remember current levels should be 100 mA or less. (This is normally sufficient to drive a typical 12V relay, for example).

DO NOT USE COMMANDER TG OUTPUTS AND CORE 8 **ON THE SAME ZONE** CONCURRENTLY.

3.7 RS232C Connections

A separately available document (see website) RS232.doc, contains details of using the RS232 port for third party products, and how the port can be addressed by programs.

3.7.1 PC/Laptop

Using the Comms cable provided, connect the COM1 port (9-pin D connection) of a PC or laptop to the RS232 COMMS port on the Commander. The cable is a simple 2-3 crossover cable, with signal ground on pin 5.

The port on the Commander needs to be enabled. (See separate Commander Manual).

3.7.2 Kramer VS-4X4YC Switch Matrix

With the Comms cable provided, and using a (9-pin D connector) MALE to MALE gender changer (available from most computer stores) connect the RS232 port of the Kramer Switch to the RS232 COMMS port on the Commander. The port on the Commander needs to be set up for Kramer communication.

4 SYSTEM PLANNING

The System can be used in either of two basic ways:

a) Dedicated Source Components
The S4.4 System becomes the central amplification resource for all areas of the installation and all source components are linked to it directly.

b) Shared Source Components
The S4.4 System is a MultiRoom addition to an existing Hi-Fi or Home Theatre system. In this case, Source Components already being controlled directly by the host system are to be fed to Systemline's Source Inputs and provided with control feedback (using IR window emitters or RC-5 Bus connections). Systemline provides source output connections if these need to be fed back to the host amplification system as well.

4.1 Initial Considerations

If source components are to be shared with other systems, then the functionality of the other system needs to be taken into account.

If, for example, the host system is a collection of Hi-Fi separates with individual IR handsets, each feeding into a main preamp/amplifier, then more flexibility in source selection will be achieved by rerouting each separate source into the Systemline and feeding the source outputs back to the main preamp/amplifier. Providing Systemline is powered up, (including Standby [inactive] mode), Source Inputs are buffered back to the Source Outputs.

On the other hand, if the sources in a "Mini/Midi" stack system are already controlled by a single IR handset, then the LINE OUT/AUX OUT/TAPE OUT socket could be used as a one-way Source Input connection to the Systemline. This would enable a greater number of sources to be selected, but obviously only one source from each stack system can be active at any one time.

4.2 Source Components to be avoided

The choice of source components for Systemline has never been wider, and the integration possibilities with other systems offer considerable scope for individual ingenuity and innovation. However, there are still SOME things which are fundamentally unhelpful in a MultiRoom control environment. The following list is by no means exhaustive, but suggests features/functions to be avoided:

a) CD players with integrated play/pause.
b) CD (and other) players that return to the beginning of the track they are playing when the Play command is re-issued, as they will always return to the beginning of the current track when the input is selected in any zone.
c) If you prefer to use the a.c. mains switching feature, avoid components with a soft toggle mains standby. Soft toggle mains standby is best handled by Commander Programming.
d) Games, cable and digital boxes which employ irDA codes in their IR remote handsets. Look for "games compatible" in the handbooks. This coding technique was originally devised to transport streaming data in a very distinctive wave format over IR links between computers and peripherals. It is unsuited to use in a MultiRoom system with inherent delay between short code sequences. This is a fundamental incompatibility which has no simple resolution.

4.3 System Basic Setup

There are some simple issues which need to be resolved before commencing installation, and affect system configuration. The Systemline Commander and Controller enclosures are designed to complement high quality home entertainment components cosmetically.

Place the units in a stack on a stable surface in an equipment rack or cabinet. If multiple Systemlines are to be cascaded (daisy-chained) to provide MultiZone operation, be aware that the shortest cable between two systems is the ribbon LOOP cable (supplied) between Commanders. This cable is 30cm long. Plan any rack spacing accordingly (don't forget that each Systemline 4.4 system comprises a Commander AND a Controller unit).

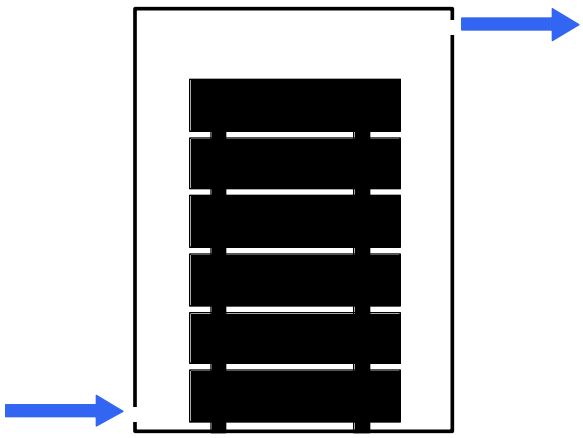
Note that the Controller/Commander stack is slightly deeper than most sources (tuners, CD's DVD's cassette decks etc) and should not generally be placed on top of these units.

The exact location may be governed by existing wiring such as Satellite or TV points, or the location of the existing Hi-Fi system. Alternatively, the wiring plan may require the MultiRoom system to be hidden away in a recess, hallway cabinet, or understair cupboard.

Some front access will be required to change discs or tapes occasionally.

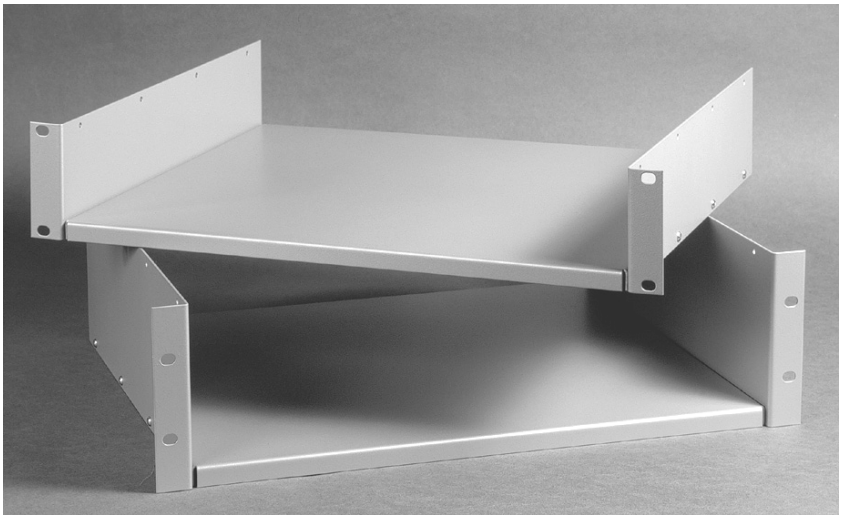
IMPORTANT
The System comprises switching and signalling logic and 4 stereo power amplifiers which can generate significant amounts of heat. Adequate ventilation will be necessary, and all ventilation slots, top and rear, must be kept clear of obstruction. If the System is to be fitted in a cabinet with other devices, ensure that cooling air can circulate when doors are

Diagram showing ideal airflow



closed. Ventilation slots/holes should be provided at the top and bottom of the cabinet.

If using a standard 19inch rack mount enclosure, units can be accommodated in a suitable tray, one for the Controller or MRA-4 Power Amplifier, and a smaller unit for the Commander.



4.3.1 Wakeup Alarm Sources

The master DMS module in any zone controls which source may be selected as the wakeup programme. The options available are to select either Source Input 1 or Source Input 2. Typically, clients choose Tuner or CD, but any source mix is permissible.

[Note: Source Inputs 1 & 2 are also the only sources where RC-5 Bus control is supported].

4.3.2 Connections

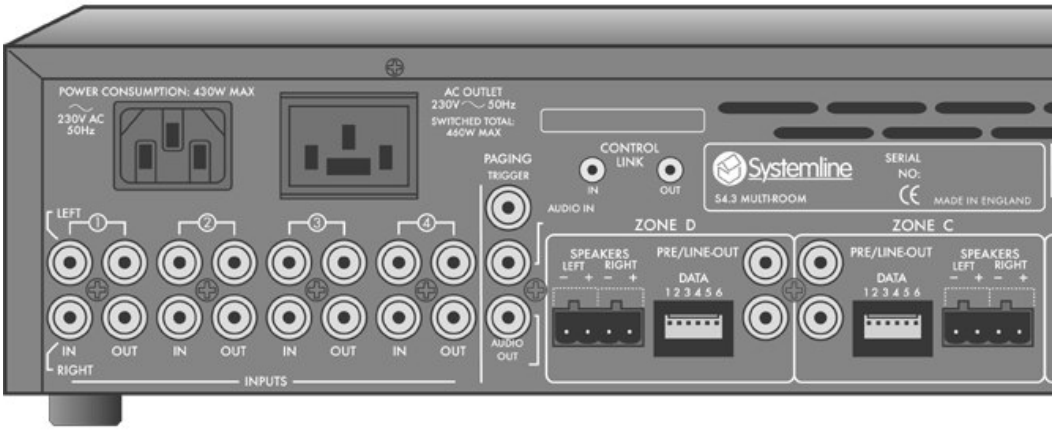
There will be a large number of connecting cables to attach at the rear, both to the Controller and the Commander, and some interconnecting cables between the two units. There could also be up to four Zone Splitters for each Controller. Once these are attached, it will be much more difficult to move the system. Plan accordingly.

Both the Zone Splitters and the Commander draw their power from the Controller, and approximately 80% of this will be dissipated as heat. Ventilate appropriately.

We STRONGLY RECOMMEND that you attach a tag or labelling strip to each cable and any Zone Splitter, which permanently and positively identifies it and the Zone to which it applies. This will aid any troubleshooting immediately after installation and make future service calls or upgrades much less frustrating.

Avoid vague identifiers ("Tape", for example) in favour of fully defined labels such as "S1=DVD1"," S2=CD1","SpkA=Lounge", etc. You will be glad you did this when you later return and discover your forgetfulness.

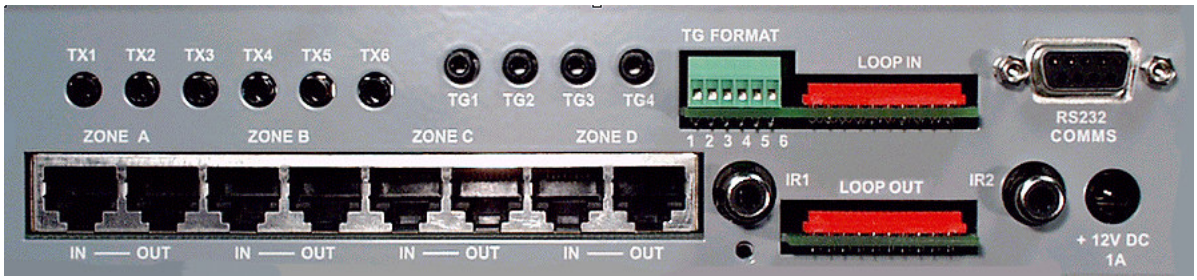
4.3.2.1 Controller Connections



Here is a checklist of possibilities for source, speaker and control connections:

a) Four pairs of PHONO to PHONO interconnects - one from each source.
b) Four more pairs of PHONO to PHONO interconnect cables - for "looping through" to the main system's preamplifier (not needed if Systemline is the principal amplification system, but may also be needed if Multi-Systemlines need to receive the looped input signals).
c) Eight speaker cable pairs (two for each zone) terminated with QED quick-fit plugs.
d) Up to four pairs of PHONO to PHONO interconnects to power amplifiers from the corresponding zone's "PRE/LINE OUT" terminals (if required)
e) 3.5mm to 3.5mm stereo jack lead. Only tip and middle ring contacts are connected at each end, Outer ring ("earth") is not connected, to prevent earth loops. This lead is used when a.c. mains outlet control is required from multiple Systemline systems. Connection of this control link also enables all zones to be turned off from any zone on any Systemline.

4.3.2.2 Commander Connections



Here is a checklist of possibilities for data in/out and IR/RC-5 control connections:

a) Four eight-conductor pairs of CAT-5 data cables, terminated with RJ45 plugs, coming from wallmount modules in each zone, and connecting to the RJ45 ZONE IN sockets. These may be UTP patch cables coming from a patch panel, or UTP cables with adapters to prewired zones.
b) Four eight-conductor pairs (NO drain connection) of CAT-5 data cables, terminated with IDC plugs, coming from Controller data sockets for each zone, and connecting to the RJ45 ZONE OUT sockets on the Commander.
c) Up to six 3.5mm mono jack window emitter sockets for IR source control.
d) Up to two RC-5 Bus PHONO connections for RC-5 coaxial bus control.
e) Up to four 2.5mm stereo jack trigger sockets for locally triggered devices.
f) Up to two (LOOP IN, LOOP OUT) ribbon cable connections if operating a Multi-Systemline installation.

g) One RS232 COMMS 9-pin D-sub plug socket for external controls such as PC/Laptop or third party systems.
h) One optional 2.1mm centre pin power socket connection (nominally +12VDC) for supplying an internal trigger voltage.

4.4 Zone Configuration

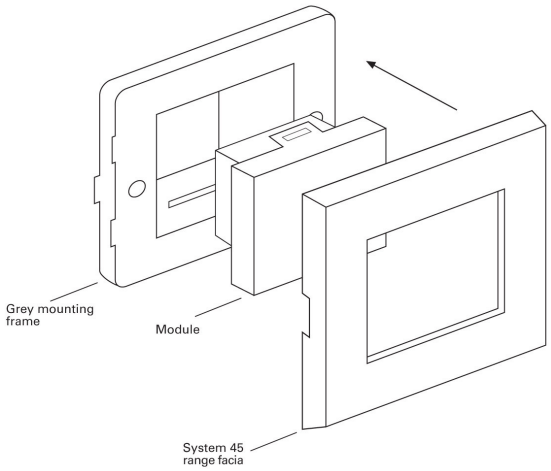
4.4.1 Basic Zone Complement

Each remote zone includes at least one pair of loudspeakers and one wall-mounted control module. Note, however, that any back box for modules MUST be at least 44mm deep, to accommodate rear circuitry and wiring loops.

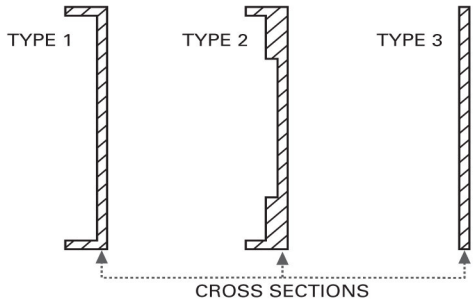
The 'System 45' and 'Sistema 45' facias are trade marks of R Hamilton Ltd., England and Ave Spa Italy. Alternative versions of mounting plates and facias are available to fit a wide variety of European back-boxes, including the round type. Ask your distributor for details.

Three elements comprise the assembly of System 45 modules,

1. Grey Mounting frame
2. The Module itself
3. The Clip-On System 45 Facia plate.



Although there is a vast selection of System 45 facias available in numerous colours and finishes, it is still possible to use other facias, but you will first need to determine the category and type of plates you wish to use.



Most conventional "lipped" plates (Type 1) sit comfortably over the grey mounting plate, secured simply by fitting the mounting screws in the conventional way.

Type 2 plates require the mounting frame to be milled to fit. Suitable guideline milling drawings are available on request.

Type 3 plates are completely flush and therefore require the grey mounting frame to be inset into the back-box. Suitable frames are available to special order.

4.4.2 Control Modules

Control codes are generated and sent back to the Systemline 4.4 either manually, using keypads, or remotely, using the RHS4 hand-held remote and IR sensor modules.

Additionally the DMS module uses a dot matrix display to provide visual clues to system operation, as well as controlling the Alarm facility and clock displays. It also controls a Zone Splitter if SubZones are being used.

IR Sensor modules read infra-red signals generated by the RHS4 hand-held remote and, after translating them into a digital code resistant to interference, send them back to the Systemline 4.4 Commander's zone data inputs. The manual keypads simply translate key depressions into digital code before sending them back in the same way.

Remember, some codes are "hard-wired" as they perform Systemline-specific functions such as Source Input selection, volume +/-, standby and mute. These should function even without any programming of the Commander. So basic checks (for example that the correct sources are connected to the correct inputs, correct speakers to correct zones, keypad volume controls, mute and standby are operational, etc.) can be done quite quickly after physical setup and wiring has been installed.

Typical single module use is where a KMS (no IR sensor) or CMS provide simple keypad controls such as those described above, with some basic track/station selection capabilities. Such operation might be suitable for a bathroom or small study, with the control module located in a wall setting similar to normal lighting switches.

Fuller functionality is achieved by modules in combination, typically CMS/NMS or DMS/KMS in a double-gang box.

Where Dot Matrix readout and full functionality is required, a triple-gang solution is available.

4.4.3 Loudspeakers

Two types of speakers may be optionally ordered with Systemline, according to customer's requirements:

Ceiling Speakers: Hi-Fi standard 8 ohm impedance (CS230HQ series, white) featuring low headroom of 78mm.

Bookshelf Speakers: wall-mount, or freestanding discreet 4 ohm speakers (Arias series; white/silver) deceptively small appearance but with full range output and bass adjustment.

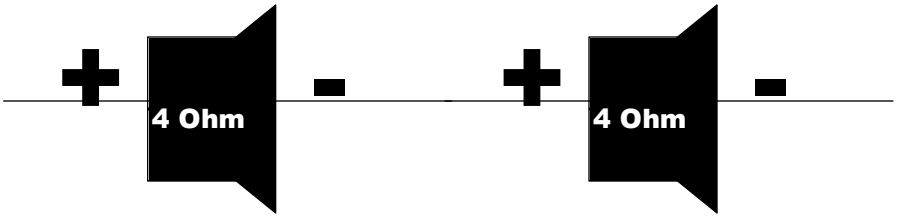
Alternatively user expectations and requirements can be met from an extensive range of independent speaker manufacturers, since Systemline's speaker outputs are optimised for impedance loads of 4 ohms or higher.

4.4.4 Zone Splitters and additional speakers

Zone Splitters divide any zone into two distinct areas, the Main Zone and the SubZone. The Zone Splitter acts as a remote speaker switch, controlled by a DMS module in the Main Zone, and directs a chosen source input to either or both sets of speakers.

To split a zone, a DMS in the Main Zone, plus a second set of speakers for the SubZone, and a Zone Splitter are required.

Note: The Zone Splitter is a **parallel** speaker switching device. Therefore only speakers (such as QED CS230HQ ceiling speakers) with 8 ohm impedance **or higher** MUST be used in both Main Zone (A) and SubZone(B).
QED Arias speakers (and any other 4 ohm [or 6 ohm] impedance speakers) should NOT be used in a split zone in single units. If necessary, use 2 left channel and two right channel speakers WIRED IN SERIES, to provide 8 ohm [or 12 ohm] impedance back to the Zone Splitter.

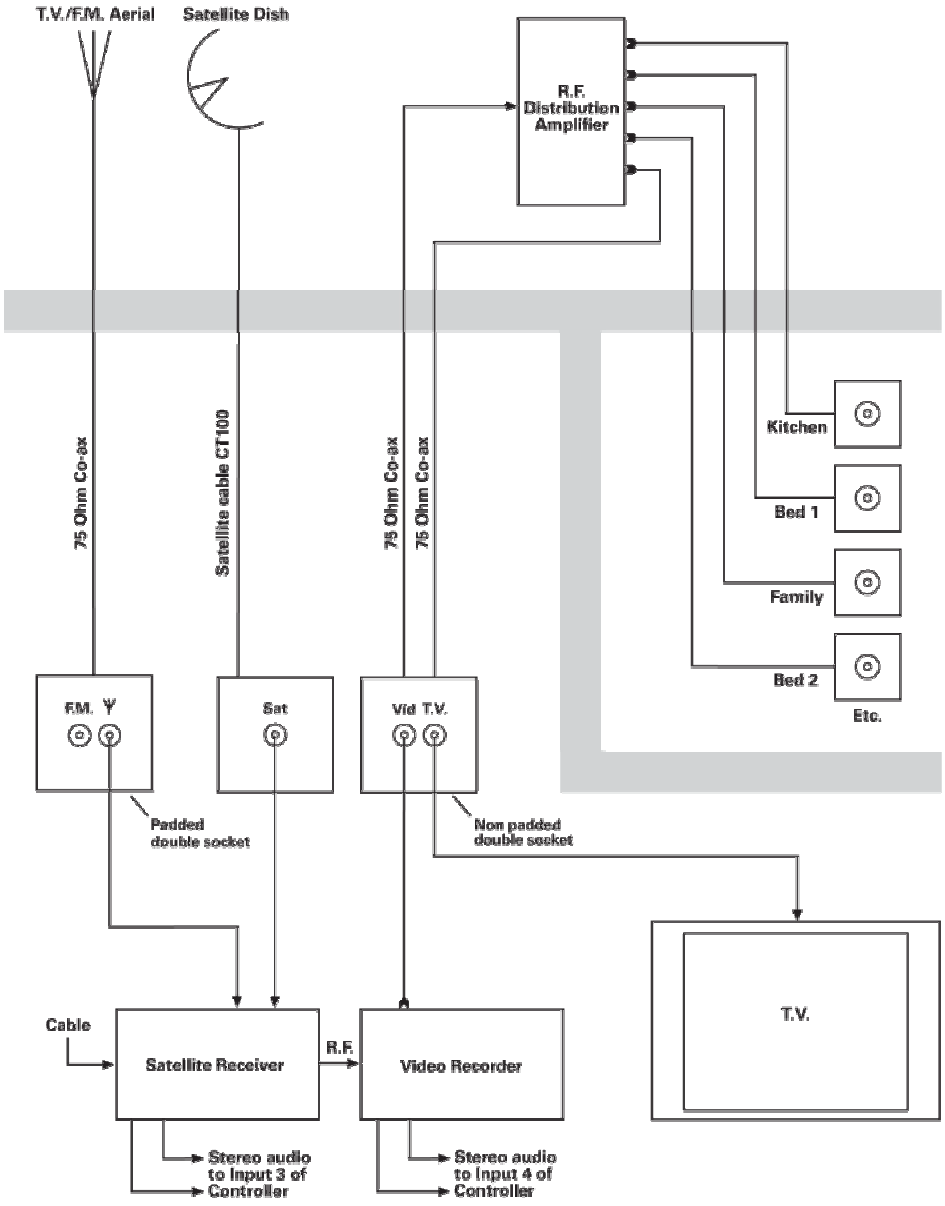


Only ONE Zone Splitter per zone may be used. In use, both pairs of speakers will share the same volume level and source. See Section 5, System Setup, for greater detail.

4.5 A/V Wiring

If a video switch matrix goes beyond the needs or specifications of the client, a perfectly satisfactory inclusion of VCR, Satellite and Cable distribution can be achieved quite simply by using the example shown as a guide.

This example assumes the client requires Tuner and CD on Source Inputs 1 & 2, but of course Systemline 4.4 will allow 4 sources in almost any mix.



5 SYSTEM SETUP

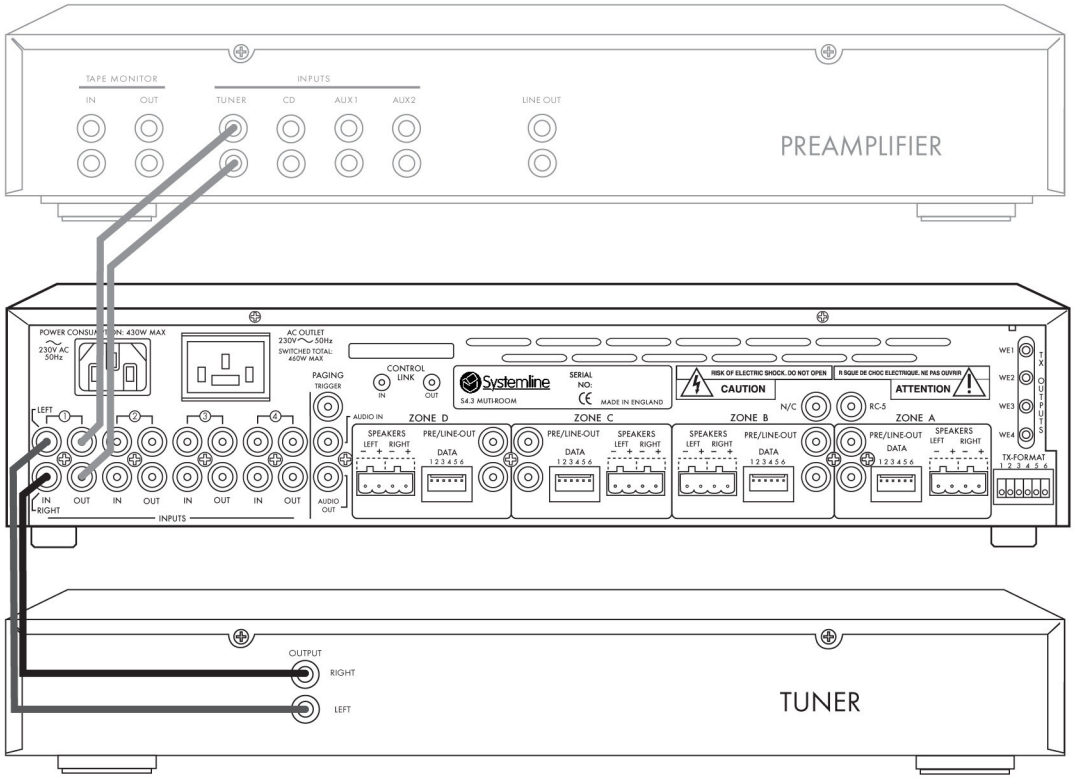
NOTE: Configuration to inhibit the Paging facility (see Paging Inhibit) or to change the zone PRE/LINE OUT from variable to fixed (see Configuring the Pre/Line Out sockets) will require removal of the top cover of the Systemline 4.4 Controller. See Controller Top Cover Removal.

Therefore read these sections, and carry out any internal setting or adjustment, prior to installing the controller with the remaining units.

Disconnect the mains supply to the Controller before removing the top cover.

5.1 Source Connections

Connect LINE LEVEL sources to the Controller's rear panel. These sources should provide FIXED LEVEL outputs, as variable outputs need to be 'capped' to prevent overloading the Controller source inputs.



Tuner connected to Source 1 input with optional pass-through to preamp for shared use with separate system.

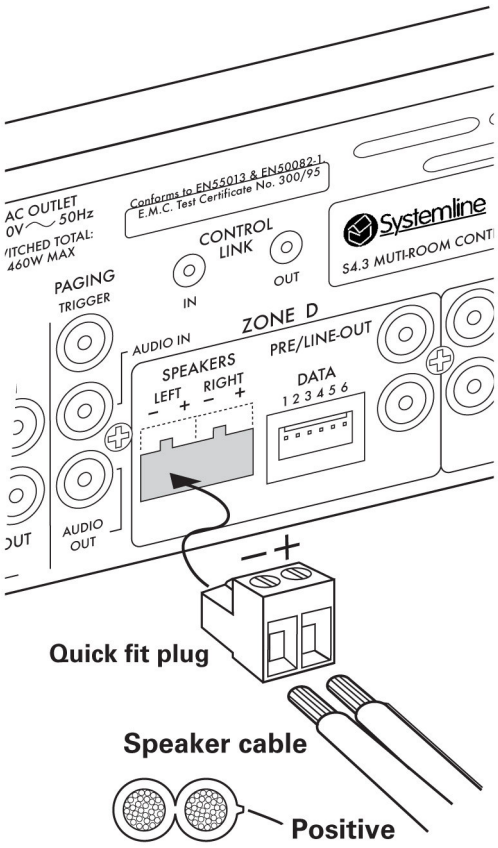
Be sure to observe correct channel continuity from source to Controller. The Controller's PHONO inputs are labelled for easy identification with Left Channel connections on the top row and Right Channel connections on the bottom row.

If the source is shared by another system, connect the appropriate Controller source output to the appropriate input of the main system's preamplifier, etc.

5.2 Speaker Cable Connections

NOTE: These zone connections deal with one zone only. Connections for all other zones are identical except that zone sockets are paired in mirror image to each other, D with C, B with A.

Use the supplied quick-fit terminals for all speaker cable connections. Loudspeaker cable runs over 100m require the use of Power Amplifiers.



Strip back each conductor's outer insulation by 6mm, insert bare wire into the quick-fit plug and secure with the screw terminal fixing. Take care to ensure correct polarity (cable "+" is normally identified by red, or striping, or a fine rib running along one edge).

"Out of phase" loudspeaker hook-ups (where "+" and "-" have been transposed on one speaker in a stereo pair) may not be immediately noticeable, but the sound stage will not reflect the recorded performance, remaining unpleasantly "hollow".

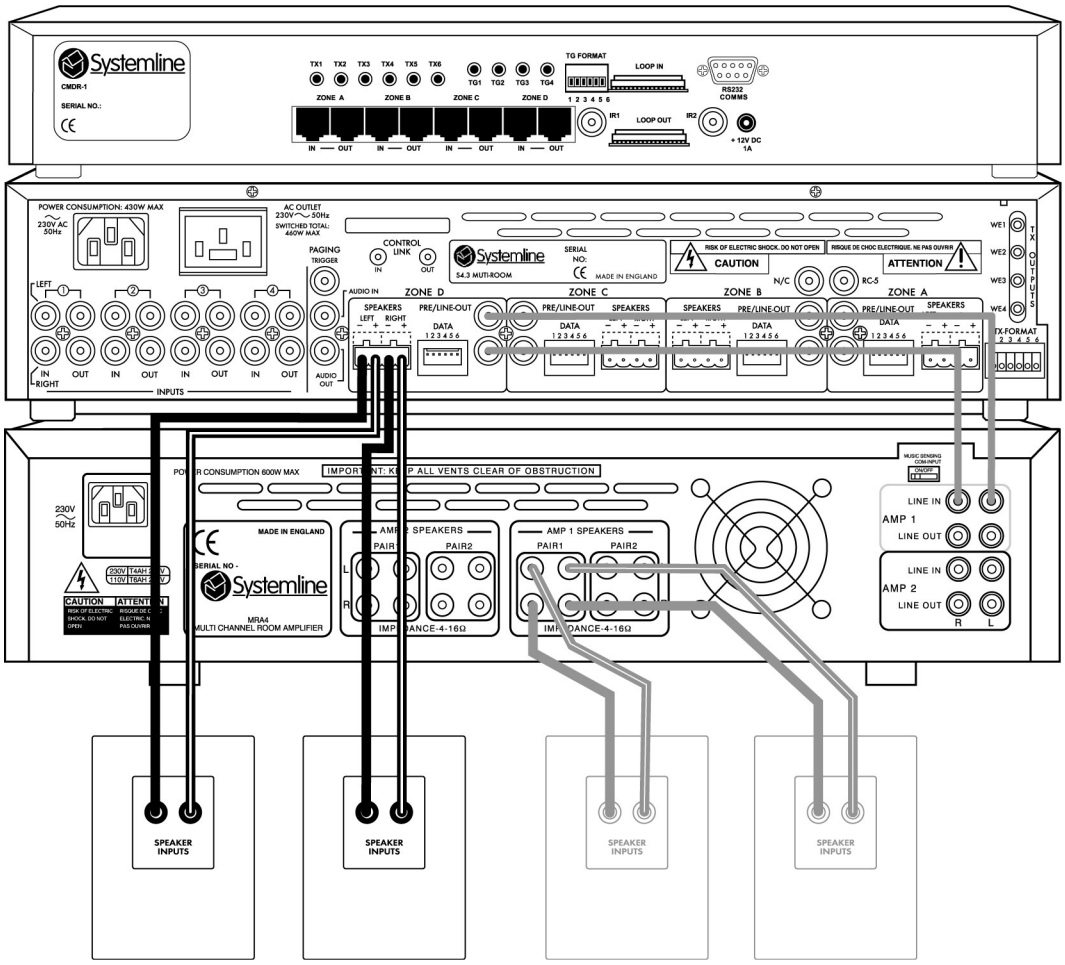
5.2.1 PRE/LINE OUT to Power Amplifiers

As well as speaker outputs, the PRE/LINE OUT (Left & Right) PHONOS may be used to provide higher levels of amplification, particularly with long speaker cable runs. The Systemline MRA-4 Power Amplifier is shown providing 95W RMS per channel power output. A separate Installation Manual is available for the MRA-4, and will be included when ordered.

Note: to improve conductivity at these high power levels, the MRA-4 is fitted with BFA sockets, and BFA plugs are included with the power amplifier. The connection procedure is exactly the same; strip back 6mm of insulation, connect (using the screw terminal in the plug itself) red plug to positive speaker wire, black plug to negative speaker wire.

The MRA-4 matches the appearance and footprint of the other Systemline enclosures, and features Music Sensing, Independent level, bass and treble controls, with super cool operation via a microprocessor-controlled fan.

The MRA-4 includes two stereo power amplifiers in a single enclosure, with switchable outputs for a second speaker pair on each output stage. LINE OUT sockets permit daisy-chaining of additional power amplifiers.



5.2.2 Preamp Outputs (per zone)

The two PHONO jacks (left and Right Channel) labelled PRE/LINE OUT provide line level output regulated by the RHS4/keypad control modules.

Each zone's preamp output is fully buffered and may be used either independently or with the Controller's internal 23W RMS amplifiers to provide additional flexibility for more sophisticated installations.

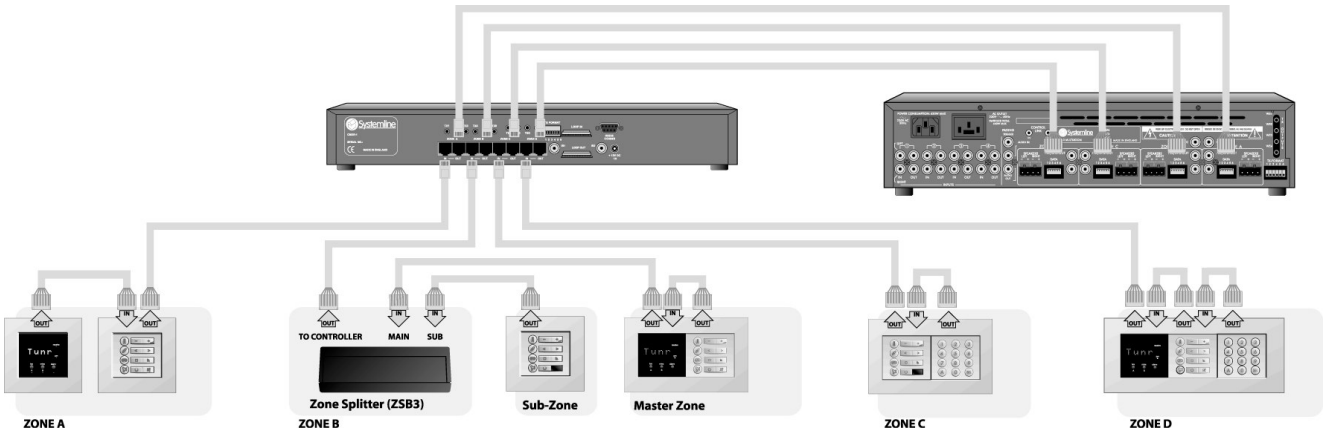
The preamp output for each zone can be configured as a fixed level output, independent of the zone's volume level. This is useful where fixed levels need to be fed to a sound desk, for example. See Configuring the PRE/LINE OUT Sockets.

Note: Reconfiguring for fixed output requires removal of the Controller top cover. Observe safety precautions by disconnecting the power supply to the Controller beforehand.

5.3 Zone Connection Strategies

Each zone will support up to 5 modules, with a maximum of two DMS's. One DMS must be the master, and any second DMS must be a slave.

NOTE: irrespective of the zones actually in use, ALL the (supplied) RJ45/IDC patch cables between the Commander ZONE OUT sockets and the Controller DATA IN sockets MUST be connected to load-balance the power supply from the Controller to the Commander.



5.4 AC Line Considerations

5.4.1 AC for the Controller

Connect the Systemline Controller to an **unswitched** a.c.source only.

5.4.2 AC for Source Components

At the rear of the Controller is a switched IEC 320 a.c. mains outlet. This can be used to power source components in installations where the user wants to power down source components from a remote zone. The maximum loading is 460W, protected by an internal fuse which is not user-accessible.

When the front panel switch of the Controller is Off, the Commander and the switched a.c. outlet is also off. When the front panel switch is turned On (i.e. when the Controller first powers up to "Standby" mode, and the Commander LCD panel lights up with its version number on display), the switched outlet remains off until the S4.4 System receives a zone activation command (an Input is selected, for example).

The switched a.c. outlet then remains on until the front panel power switch is turned Off or (more usually) the System receives a "power down" command (Standby held depressed for 3 seconds or more) from a remote zone.

5.4.3 Multi-System Controller Link & Commander Ribbon Link

In a Multi-Systemline environment, the Control link cable between Controllers, and the Ribbon LOOP cable between Commanders (supplied), enables the control of all Controller-switched outlets from any zone in the Systemline installation. With these link and loop

cables in place, it is also possible to turn all zones off from a single zone anywhere in the Systemline installation.

5.4.3.1 Control Link Cable

Each Controller has two 3.5mm stereo jack sockets marked (CONTROL LINK) IN and (CONTROL LINK) OUT on the back panel. To enable the enhanced a.c. link, connect the CONTROL LINK OUT socket on the first Systemline 4.4 Controller to the CONTROL LINK IN on the second Controller, and if necessary repeat this connection in the same way between every Controller in the Multi-Systemline stack. Do NOT link the last Controller in the stack back to the first, this is unnecessary and will cause malfunction.

A suitable 'S4.3 Control Link Lead' may be ordered for this purpose.

UNDER NO CIRCUMSTANCES should you use a mono 3.5mm jack or a stereo 3.5mm jack with OUTER RING (ground/earth) connected. All control to the Systemline will "lock up", and although some damage protection has been provided, prolonged mis-connection may cause data link circuitry to fail. (see Section 5.6.3)

5.4.3.2 Commander Ribbon Link Cable

Each Commander has two ribbon sockets marked LOOP IN and LOOP OUT on the back panel. To enable correct Multi-Systemline operation, including the enhanced a.c. link, connect the LOOP OUT socket on the first Systemline 4.4 Commander to the LOOP IN on the second Commander with the 30cm long LOOP ribbon cable provided for this purpose, and if necessary repeat this connection in the same way between every Commander in the Multi-Systemline stack. Do NOT link the last Commander in the stack back to the first, this is unnecessary and will cause malfunction.

Do not extend the length of the ribbon cable beyond that provided, as ribbon cable is unshielded and in certain unfavourable operating conditions such tampering could cause heightened susceptibility to ambient "noise", which in turn could cause unwanted transmission delays on data link cables. A longer cable is available but advice should be sought from Systemline Technical Support before ordering.

5.4.4 External Control of AC Mains Outlets

The TX FORMAT block on the rear panel of the Systemline 4.4 Controller may be used to enable this feature. No other connections using this block should be made in a Systemline 4.4 installation.

When external control of the IEC320 a.c. mains outlet is required, connecting terminal 6 of the TX FORMAT block to terminal 1 (ground) will switch on all Controller a.c. outlets permanently and the "power down" (Standby key depression for 3 seconds or more) command will have no effect. In a Multi-Systemline installation, "daisychain" all the TX FORMAT terminal 6's on the Controllers, so that they will respond similarly to the first unit when it is grounded to pin 1, enabling full remote control of a.c.switching.

Once terminal 6's have been interconnected in this way, if the external control switch between terminals 1 and 6 is turned Off, then all the a.c. outlets will be turned Off UNLESS any zone of any Controller is On (Active LED is lit). In this case, the a.c. outlet(s) will remain On, awaiting the "power down" command to switch off all a.c. outlets.

5.4.5 AC Power Recommendations

An IEC320 mains plug is provided with the Systemline 4.4 so that switched mains can be fed to a suitable mains distribution unit.

Remember that the total power consumption per switched a.c. outlet should NOT exceed 460W.

Power amplifiers, and source components featuring a standby mode (i.e. a soft toggle Power On/Off button), are NOT suitable for connecting directly to the Controller's switched a.c. mains outlet.

5.5 Source Component Setup

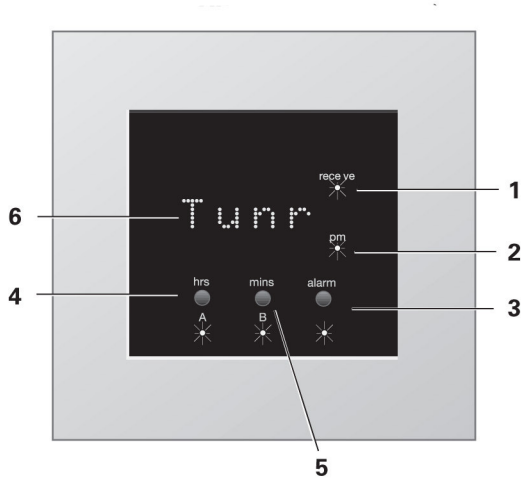
Most source component manufacturers change their codes from time to time. The learning capabilities of the Commander make any code changes very easy to programme, and PC Link software facilitates "drag and drop" code amendment.

However, if you are unsure whether the remote control system uses any of the standard frequencies (Normal=20kHz-80kHz, B&O=455kHz, high end = 1.125mHz), check the Service Manual of the equipment (this is also a good time to locate the IR sensor of the device if not already known). Remember irDA codes ("games compatible") are unsuitable for Systemline operation. If in any doubt, try loading the codes into the Commander using the device's remote IR handset and testing NORMAL operation before specifying the source component to a client.

NOTE:- Be aware that the "test code" function is known to be unable to work with some codes; always persist beyond the test stage and check the Commander in Run-Time (normal) operation before assuming that the codes are "unlearnable".

5.5.1 DMS Controls & Functions

When the zone is active, any DMS module installed in the zone will respond to control commands from the RHS4 handset (and other IR-emitting devices) or the wall-mounted keypad modules. It displays appropriate system status messages.



1 Receive LED: this lights when the DMS receives a signal (infra-red code) from an IR Handset or keypad in the same zone.

2 pm LED: this lights up between 12 noon and 12 midnight.

3 alarm button and LED: the button is used when setting the alarm and clock time. The LED is lit when the alarm is set.

4 hrs / A button and LED: this button is used as the hours button when setting the time or alarm. If a Zone Splitter is in use, this button controls connection to the A speaker output of the Zone Splitter.

5 mins / B button LED: this button is used as the minutes button when setting the time or alarm. If a Zone Splitter is in use, this button controls connection to the B speaker output of the Zone Splitter.

6 Dot Matrix Display: this is used to display the time and status messages. It is used to identify Source Components and provides flexible source component labelling (see Section 5.5.3)

When a zone with a DMS is in standby mode, the time is displayed in a 4-digit 12hr format. When the zone is activated, the DMS shows a scrolling greeting 'Good Morning', 'Good Afternoon' or 'Good Evening' as appropriate. At shutdown and between 10pm and midnight the DMS shows 'Good Night'. When a zone is active, pressing the alarm button will display the time.

5.5.1.1 Volume Control Indications

When a Volume control command is sent, the DMS will display a 2-digit number incrementing or decrementing between vo00(min) and vo63(max) volume level. When a Mute ON signal is sent the volume level decreases to zero and the DMS displays the message "Mute". On receipt of a Mute OFF, or source select, or volume up/down command signal, the display will return to its previous level.
If a zone is active and a Paging signal is received, the volume level decreases to zero and the DMS displays '(())'.

If the zone is in standby mode and a Paging signal is received, the DMS will display the appropriate greeting for the time of day and then '(())'.

5.5.1.2 Display Brightness

An ambient light sensor in the DMS module adjusts the brightness of the display as the background lighting varies, to maintain a steady perceived brightness.

5.5.1.3 Engaged Indication

If the flexible labelling of a source has been done correctly, with the first character of the label in upper case, then the DMS can indicate, by changing the first letter to lower case, that a selected source is already engaged by one or more other active zones.

SOURCE SELECTED ZONE ENGAGED

5.5.1.4 Internal Battery Indication

If the time display flashes when a DMS module is first connected, this indicates either that the clock has not been set or that the battery switch has not been set to ON to charge the backup battery.

5.5.2 Connecting Wall-Mount Modules

Data cable terminations at wall modules are made in the same way as described in Section 3.1, and zone connection strategies are described in Section 5.3. Note that each module has two data terminals (labelled IN and OUT) located at the rear of the module. When 'doubling up' or using triple modules, be aware that short CAT-5 link cables will be required

between adjacent modules. A suitable short link cable is supplied with every IR Sensor module.

The OUT data terminal normally "points" in the direction of the next module's IN terminal, with the DMS or CMS being the last in line with its OUT terminal connected to the Commander via RJ45 connectors. DRAIN WIRES ARE CONNECTED TO PIN 1 in all zone wiring.

It is not necessary to connect any modules in order to programme the Commander (See separate Commander Manual). However, when installing a Systemline it will be necessary to test the data cables, either by the installation and operation of modules, or by using an integrity tester for EIA/TIA 568B wiring schedule.

5.5.2.1 Cable Testing

Suitable cables for testing the RJ45 to IDC connections are supplied with the S4.4 Commander (normally used to adapt existing 4.3 installations to the new EIA/568B colour coding). Examples of suitable cable testers are shown below. One tester is MOD-TAP SLT35 (Farnell Part no.648-930, RS part no 215-6391). The other (less sophisticated) unit is a Pro's Kit 3PK-NT008.

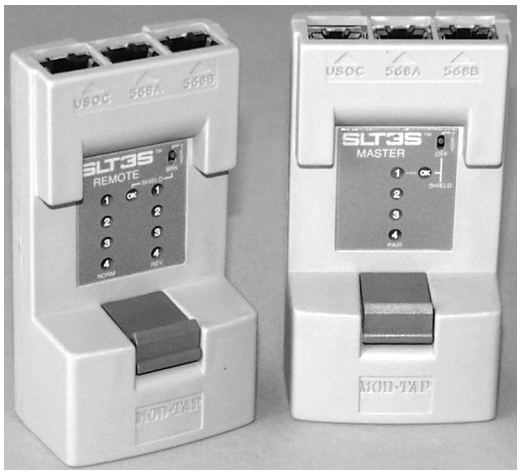
The cable testers come in two parts, a master and a slave, with both units showing a series of LEDs to indicate correct termination. The displays on the slave and the master are used together to indicate correct terminations together with shorts or reversed pairs.

Full instructions are included with the units.

MOD-TAP SLT35

Wiring configuration - USE 568B sockets

Pin 1 White/Orange
Pin 2 Orange
Pin 3 White/Green
Pin 4 Blue
Pin 5 White/Blue
Pin 6 Green



LEDs

LED 1 = Pin 4 & 5
LED 2 = Pin 1 & 2
LED 3 = Pin 3 & 6

Reading the LEDs

All OK
LEDs 1, 2 and 3 flashes on, in order, on BOTH master and slave units.

Master	Remote	Diagnosis
LED on (Green)	LED Green	Good channel
LED on (Green)	LED Red	Reversal
LED on (Green)	LED off	Short within pair
2 LEDs on (Green)	2 LEDs on	Short between pair
LED off	LED off	Open
LED out of sequence	LED out of sequence	Transposed pairs

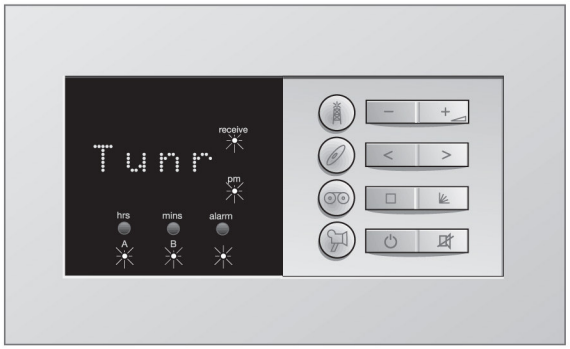
5.5.3 Using Pro's Kit 3PK-NT008

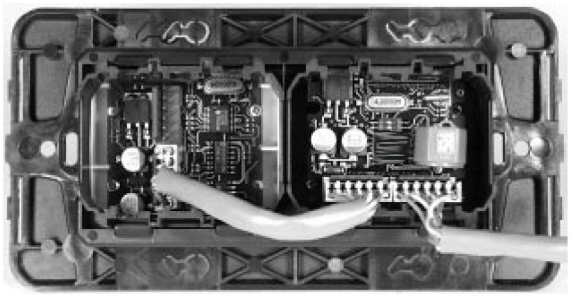
Basic operation as above, but the LEDs illuminate on the Network Cable Terminator ONLY.

LED 1 = Cores 1 and 2
LED 2 = Cores 3 and 6
LED 3 = Cores 4 and 5

5.5.4 Setting Up DMS Modules

DMS modules are seldom used in isolation. When installing a DMS with a KMS (and maybe also an NMS) keep the CAT-5 link cables short as shown, or use the short link cable supplied with every IR Sensor module.





5.5.5 Configuring the DMS for source displays by Zone

Please see the separately supplied Systemline S4.4 Quick Installation Guide, normally included with the packaging but also available as a pdf file on CD.

5.5.5.1 Flexible labelling

The only limitations imposed on the labelling are that it is advisable to commence all source labels with a capital letter (see 5.4.4.2 below), the total number of characters is limited to four, and the character set is restricted to A-Z, a-z, (blank), 1-9.

You may elect to have all DMS's identifying source components by the same name, "Dvd1", for example. If using individual "stack systems" per Source Input, each user zone could reflect the thinking of the household, so Zone A DMS might label Source Input 1 "Mine", Input 2 "Hers" Input 3 "Bobs" etc., and the same sources on the DMS in Zone B might be labelled "His", "Mine", "Kids" etc.

This might be quite advantageous for some users, but it is up to you as the Systemline Consultant to indicate a strategy which suits the client.

5.5.5.2 Engaged Operation

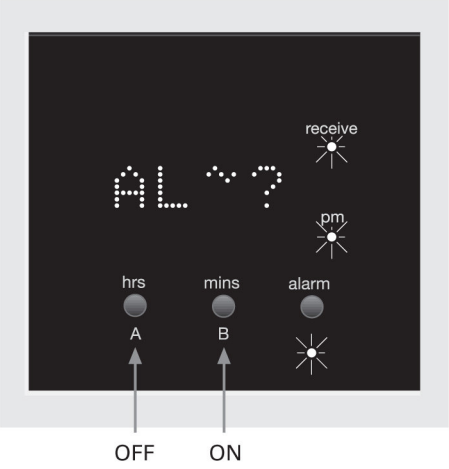
Providing the flexible labels commence with a capital letter, the engaged function will operate whenever the Source Component selected has already been engaged by another user. All DMS's involved in using the source will react instantaneously to warn users that they may disturb another user's enjoyment by changing tracks or programmes whilst the source is engaged elsewhere.

SOURCE SELECTED ZONE ENGAGED

Systemline does not permit priorities or contention algorithms to override user selections. It is an "open" system, and so no-one is prevented from altering programmes on source equipment as a matter of design philosophy.

5.5.6 Setting the DMS Alarm & Clock functions

With the DMS zone in Standby (inactive) mode, press the alarm button. The display will show the first 'Mode' function. Repeatedly pressing the alarm button will step through the remaining functions and return the DMS to Standby mode (a total of 5 steps).



1. Select Alarm
Press the hrs/A button to select alarm off, or the mins/B button to select alarm on.

2. Set Alarm Time
The display will show the last alarm time set. Use the hrs/A and the mins/B buttons to advance to the required alarm time.

NOTE: Make sure that the pm indicator is also showing the correct 12hr period for the alarm.

3 Select source

Select the source (Source Input 1 or Source Input 2) to play when the alarm is activated. The Startup Volume when an Input is selected can be adjusted by

programming the Commander (see separate manual). Press the hrs/A button to select Input 1, or the mins/B button to select Input 2.

4. Set Clock
Use the hrs/A and mins/B buttons to advance to the required clock time.

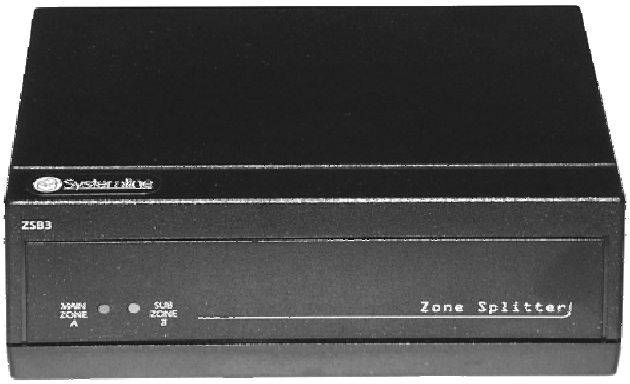
NOTE: The clocks in different zones may be slightly out of synchronisation due to drift or inaccurate setting. They will be synchronised automatically at 12 noon each day with the master system clock in zone A.

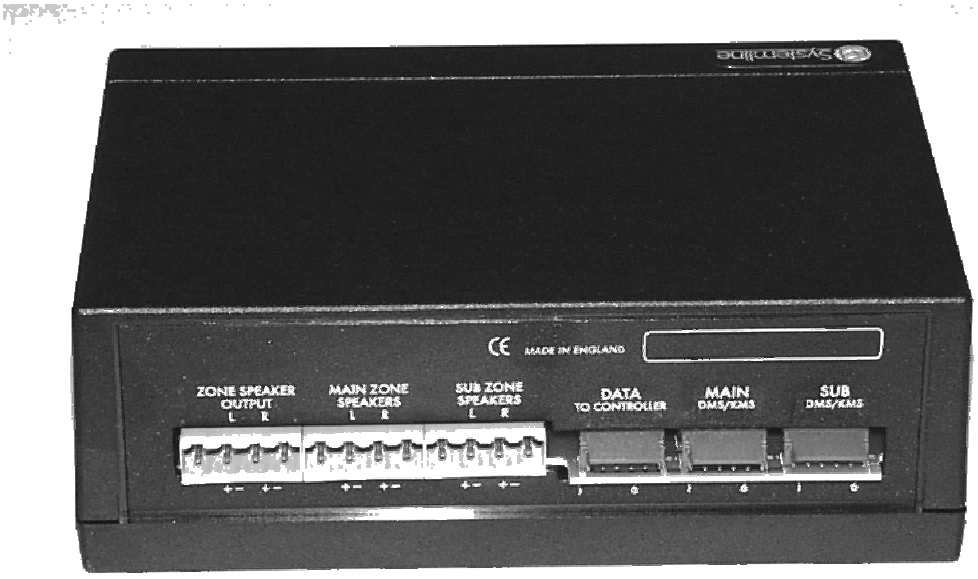
Note: If a DMS is set as a slave only the clock can be set. Only one alarm in each zone is permitted, set by the master DMS.

5.5.7 Configuring the DMS to control a Zone Splitter

If a zone is divided into two separate areas through the installation of a second set of speakers and a Zone Splitter, the master (main) DMS within that zone is used to control the Zone Splitter and direct a selected source input to either or both zones (Main Zone[A] and SubZone[B]).

5.5.7.1 Zone Splitter Box Functional Description





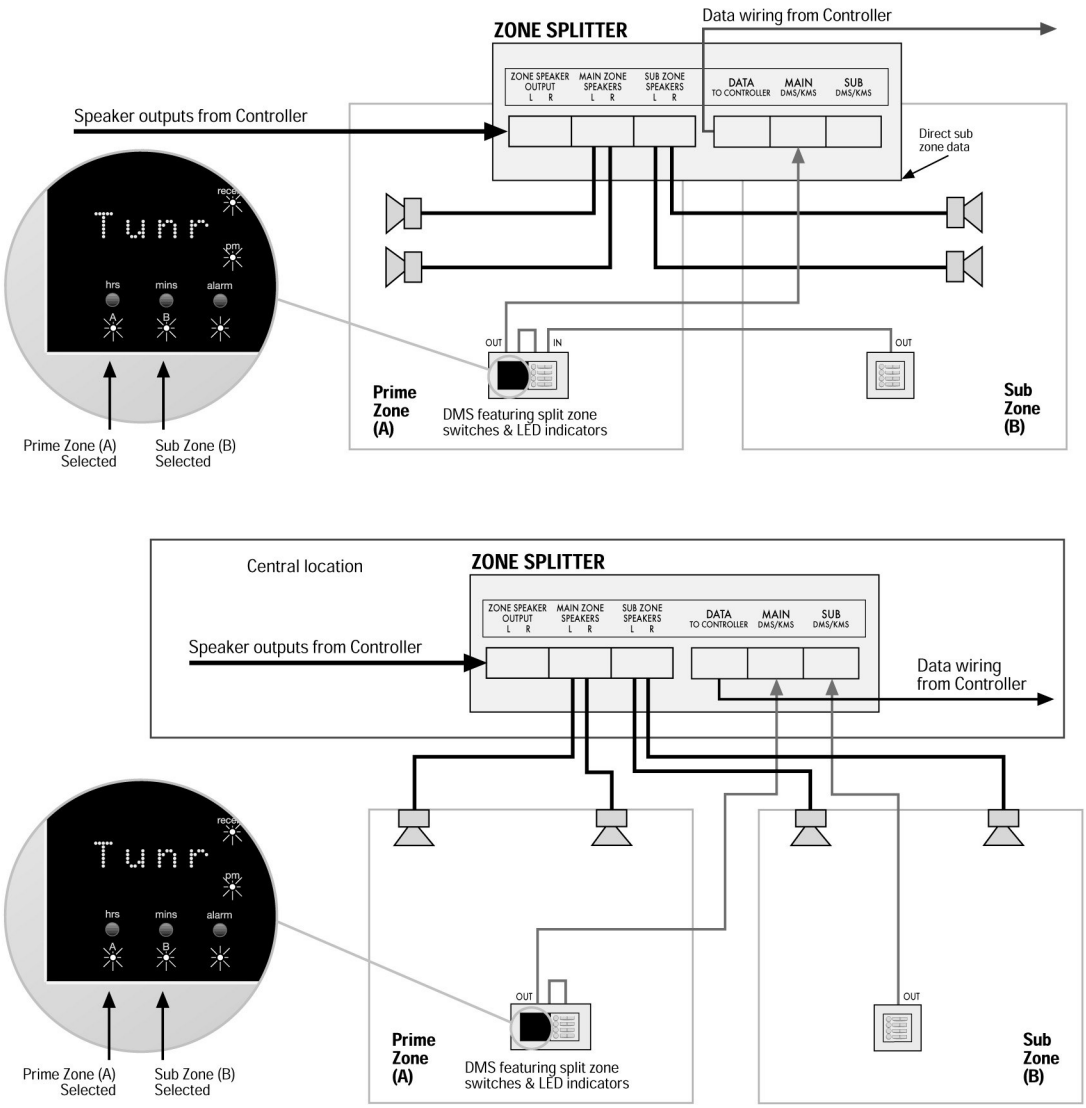
The Zone Splitter, ZSB3, allows a 2nd set of speakers to be connected, **in parallel**, to any zone to allow a switchable SubZone to be created. The most obvious use of this is a Master Bedroom and en-suite bathroom. The Main Zone and SubZone share the same source and volume and the Master DMS allows you to switch between pair A speaker, pair B speakers or A & B together. The DMS will not allow you to switch both pairs off. **Remember the SubZone will be the same source and volume as the main zone.**

Note: The SubZone does not require any DMS or KMS although a CMS may be suitable if both keypad and IR sensing is required in the SubZone (to operate the system with an IR handset whilst in the bath, for example). If a DMS is used in a SubZone it should be noted that it will NOT provide any speaker switching.

In operation the master DMS will permit the selection of speakers before input selection and zone activation. (So that on arising from bed, for example, you may select the en-suite bathroom speakers before turning on the zone).

5.5.7.2 Zone Splitter Box Connections

1. Wire up the primary DMS to the Main DMS/KMS socket. The Zone Splitter is powered by the DATA – TO CONTROLLER socket (IDC connector to Systemline), so connect this also.
2. Connect the speaker cables to MAIN and SUB ZONE sockets, and attach the speaker output from Systemline to the ZONE SPEAKER OUTPUT sockets.
3. To set the main DMS in 'Zone Splitter' mode, press both the A and B buttons on the MAIN DMS and hold them pressed down for at least 8-10 seconds. The A and B LEDs illuminate, and then A, B or both zones can be selected by pressing the appropriate button.
4. The appropriate LED lights for the zones switch on. If both pairs of speakers are ON, (both pairs illuminated) then one pair can be switched off by pressing the appropriate A or B button.
5. The A and B button Zone Splitter control function works whether the zone is Active or in Standby, allowing for example someone in a bedroom to switch on the en-suite bathroom speakers BEFORE selecting a source, making the SubZone Active without disturbing the bedroom.
6. If one speaker pair is switched ON, the other set can also be switched ON by pressing the appropriate A or B button. Alternatively, to switch from one set to the other, both A & B speakers must be switched ON before turning the other set OFF.



NOTE: Selecting Standby from a keypad turns audio output OFF for the Main Zone and SubZone. REMEMBER the Zone Splitter is a **parallel** switch – speakers must be a minimum of **8 ohms** to avoid overloading the Systemline audio outputs (minimum load 4 ohms).

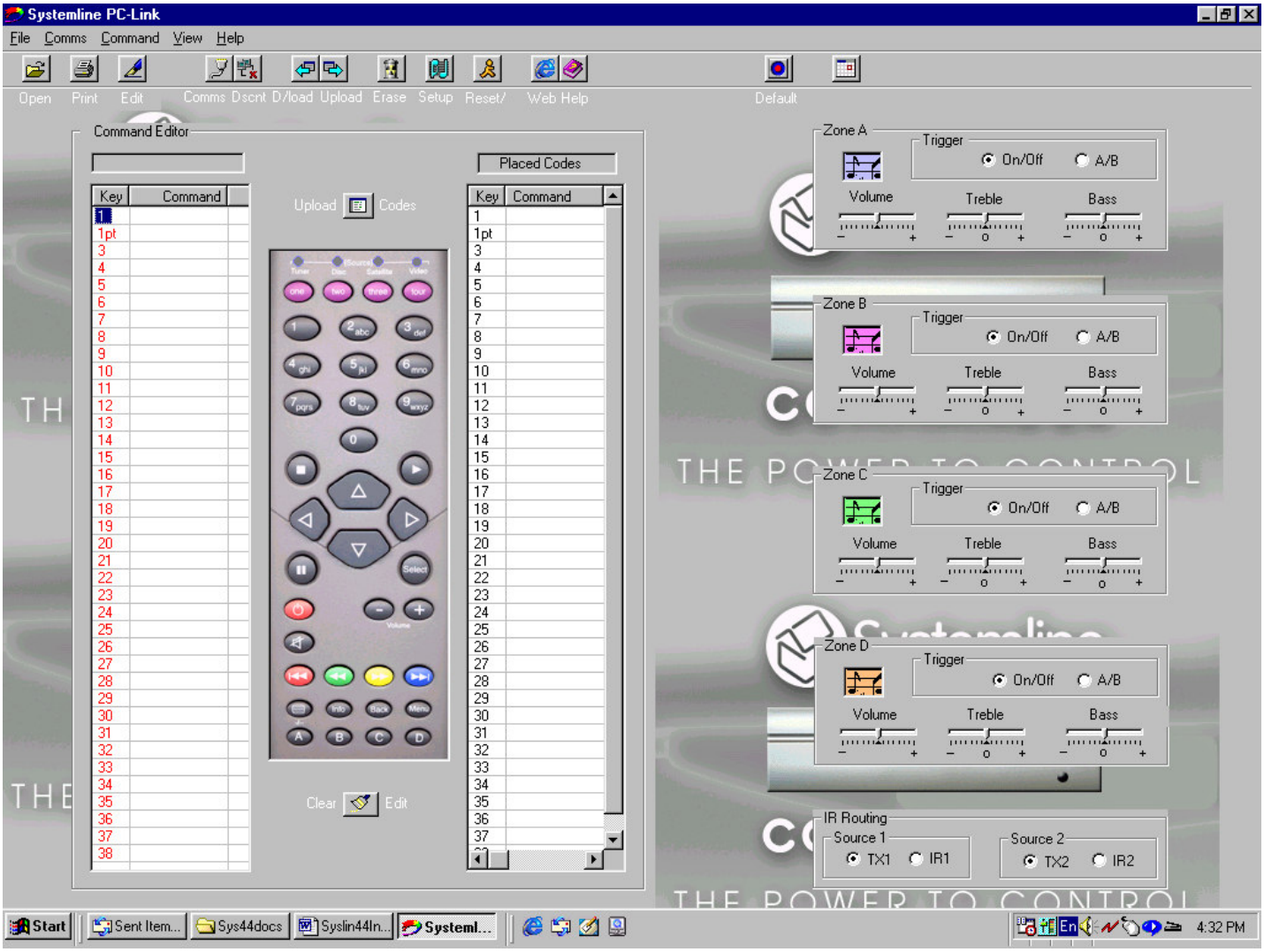
5.5.8 Manual Programming of the Commander

A substantial number of IR codes (in special Systemline™ *.irc format) will be found provided with the PC-Link Software. However, new codes can be added for any IR controlled device (excluding irDA codes) by taking the original equipment handset and firing the desired codes at the Commander's IR Sensor Port. Full details of this procedure is explained in the separately available Commander Manual.

If you already have CCF files loaded into a programmable handset such as the Philips Pronto/Marantz RC5000 or similar, you can use this as the source handset to load the Commander's code tables for a source component. In this way, you can collect published CCF files from internet sources, download them to your learning handset, and then load them into the Commander. The PC-Link software will allow you to save these codes onto a PC or laptop via the Commander's RS232 Comms port.

Only Macros need to be stored manually, as these tend to be site-specific instructions best tested and installed at final commissioning stage. Full details will be found in the Commander Manual. Once final commissioning has been done, the complete software installation can be backed up to a Systemline™ *.cbf file (Customer Backup File), which includes all the Commander settings for IR codes, Startup Volume, Treble & Bass, Trigger Settings, RC5 Bus allocation, and Macros.

5.5.9 PC-Link programming of the Commander



Above is the main editor window of Systemline PC-Link. It is not necessary to use the powerful edit functions unless you wish to make amendments to standard code settings.

The simplest mode of operation is to enable the PC-Link option on the Commander's PC Communications port, attach the serial cable provided between the laptop Comms port and the Commander's RS232 COMMS port, then click on the PC-Link COMMS button to setup a software handshake between the two devices.

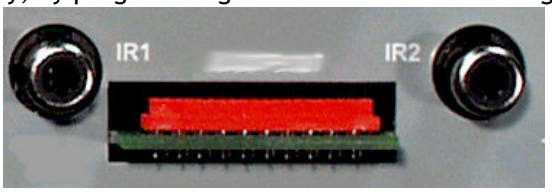
Upload/Download buttons then allow standard codes to be placed on sources 1 to 4 and retrieved and stored, and both *.irc and *.cbf files can be uploaded to the Commander or downloaded to the PC's file system.

Considerably more operational detail will be found in the Commander Manual, or the latest version of the Help File (*.chm, browser compatible) may be downloaded from the Systemline Dealer website.

5.5.10 IR System

5.5.10.1 Back to Individual Sources

Commander 3.5mm mono jack sockets TX1-TX4 are available for connecting window emitters attached directly to the IR sensors of source components. The Commander will route the appropriate data codes to the correct source component. If RC-5 Bus control is preferred, then TX1 routing and TX2 routing will be redirected to the RCA Phono sockets IR1 and IR2 respectively, and individually, by programming the Commander accordingly.



5.5.10.2 Back to central components - Non-Routed (Pass-through) IR

Non-routed (IR pass-through) IR data are available centrally, using the 3.5mm mono jack sockets TX5 and TX6. If more global sockets are required, order QED double window emitter pack SL-DE to obtain a Y-Adapter and two standard window emitters (SL-WE x 2).

Global IR output includes any codes from third-party handsets (IR pass-through), but EXCLUDES all codes sent individually to sockets TX1-4, which are the sockets for individual source MACROS. If Global IR (all codes, Systemline, Macros, and IR pass-through) MUST be available, use IR back-to zone outputs to provide GLOBAL IR control, either at the central, or zone locations.

NOTE: If an IR code is received in any zone and is not recognised by the Commander as being a Systemline command code already programmed for a particular source, then it is assumed that the code is an "alien" code, and subsequently will be sent by default to ALL TX (and IR1/2 if active) outputs. TX5 & 6 are provided specifically to pick up IR pass-through at the central location, and exclude MACROS, which are routed to the relevant source component socket(s). You may therefore need SL-DE window emitters (available separately) on several IR outputs, in order to connect all the client's IR-controlled equipment to Systemline.

ALSO THEREFORE: If using several identical source components, such as several identical Multi-CD players, for example, make sure the **RANDOM** function has been programmed into the Commander **for use with an RHS4 handset.** Otherwise selecting the RANDOM option with the **original equipment handset** in one zone will cause all identical sources to start RANDOM operation if already playing in other zones. It makes sense to **discourage use of non-RHS4** handsets in such circumstances.

5.5.10.3 GLOBAL IR, centrally, or Back-to-Zone

Global IR data as described in Section 5.5.9.2. above can be picked up from ANY of the zone connections (Commander RJ45 IN sockets) centrally, or transmitted back to the zone wall-mount modules, using core 7(white/brown) of the CAT-5 FTP data cable. This

carries the NEGATIVE component of a normal IR signal. By connecting a window emitter 3.5mm mono jack socket with TIP to core 3 (nominal +12V DC) and RING to core 7, any standard QED window emitter (SL-WE, SL-SE, SL-FE,) can be plugged in for reliable operation.

Be aware that all zones will receive the Global IR output, so if identical IR equipment is fitted in more than one zone, a single IR command received in a zone will be simultaneously relayed to all core 7 wires, operating all identical equipment.

This function differs from IR (TX5-6) outputs, by providing GLOBAL IR control both at the central and zone locations.

5.5.11 Individual Triggers

In some installations it may be useful to send a control signal to another piece of equipment when either a zone is active or when a particular command is issued. These outputs can be used to activate relays and 'compatible' voltage driven input triggers to activate Lamps, Motors and external Amplifiers etc.

Each Zone has its own central Trigger output as listed below, as well as core 8 (brown) of the CAT-5 FTP data cable feeding each zone's wall-mount modules:

Zone Trigger Table

Zone A	Zone B	Zone C	Zone D
TG 1	TG 2	TG 3	TG 4

Each Zone can be programmed to operate a 'TG' output in one of two ways.

1) The 'TG' trigger output is turned ON automatically when the Zone is active (out of Standby), and OFF when the Zone is put in Standby mode. Therefore the trigger only operates when the Zone is active.

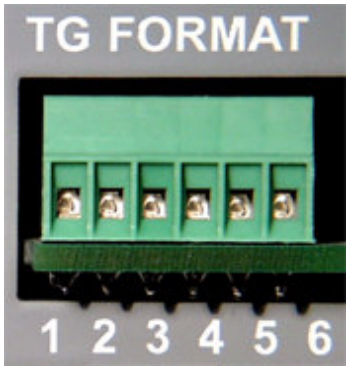
2) The 'TG' trigger output is turned ON automatically when the 'A' button is depressed on the RHS4 and OFF when the 'B' button is depressed (irrespective of the Source Input selected). If an NMS module is in use, depression of the A button will achieve the same result as that programmed for the RHS4 IR handset.
In this mode of operation, the TG outputs operate irrespectively of the Zone's ON/OFF status.

WARNING!
The trigger outputs are driven by opto couplers. You should not use the TG outputs to deliver more the 100mA of current.

This is more than sufficient to drive a 12V relay with a 270 Ohm coil.

FAILURE TO HEED THIS WARNING, OR ANTICIPATE POTENTIAL SURGES IN EXCESS OF 200mA, MAY RESULT IN NON-WARRANTY RETURN-TO-FACTORY REPAIRS (of the Commander).

The TG Connector block enables you to determine the output voltage that you require from the trigger output.



Each TG output has its own External supply input on the TG Connector as listed below:

TG Terminal Connection	Description	Notes:
1	Commander Ground	Not normally required
2	Zone A External Supply Input	5-24V DC Maximum
3	Zone B External Supply Input	5-24V DC Maximum
4	Zone C External Supply Input	5-24V DC Maximum
5	Zone D External Supply Input	5-24V DC Maximum
6	Supply from 12V DC Input	Only available if using Plug Top supply

There are many different ways of using the triggers; a few examples are described in the Commander Manual.

5.5.11.1 Back to Zone

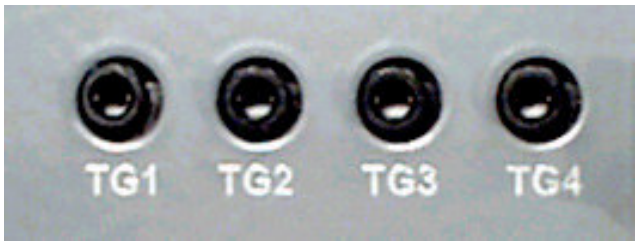
Individual voltage triggers (NOT current sinks) as described above can be similarly transmitted back to the zone wall-mount modules using core 8(brown) of the CAT-5 FTP data cable. This carries the POSITIVE component of the trigger voltage, which can be different for each zone if required, but within the range 5-24V DC. By connecting a voltage-triggered device to core 1 (earth) and core 8 (positive DC voltage) in any zone, 100mA of current can be provided to activate the device.

Unlike the IR-back-to-zone, it is NOT recommended to use central voltage triggers and back-to-zone triggers concurrently on the same zone circuits, unless you are very sure that the total load, including potential surge current, does not exceed 200mA, and quickly stabilises at 100mA constant load.

PRACTICAL NOTE: If you are using current-sink switching at one of the TG connectors on the Commander, you will not be able simultaneously to provide a voltage trigger back to the same Zone.

5.5.11.2 At the central point

Individual voltages and current sinks can be triggered centrally by using the TG1-4 outputs. Stereo 2.5mm Jack plugs should be used.



The following table shows the Connections:

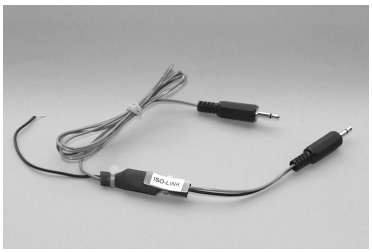
2.5mm Jack Plug	Description	Notes:
Tip	External Supply on TG Connector	Input to Opto Coupler
Middle Ring	Trigger Output	Output of Opto Coupler
Outer Ring	Commander Ground	Used with Internal Supply

Unlike the IR-back-to-zone, it is NOT recommended to use central voltage triggers and back-to-zone triggers concurrently on the same zone circuits.

5.5.12 IsoLink Connection

Some source brands such as Pioneer feature an IR CONTROL BUS similar in operation to the RC-5 Bus used on the Commander. QED can supply an optional ISO-Link adapter which enables equipment fitted with a suitable 3.5mm jack Bus socket to be controlled via an IR TX output on the Commander.

The ISO-Link is used with Pioneer equipment that does not have an IR receiver built in. The cable connects to one of the Commander Window emitter sockets and to the ground connection, terminal 1, of the TG-FORMAT block (or of the Controller's TX-FORMAT block, if the Commander's TG-FORMAT block is in use).

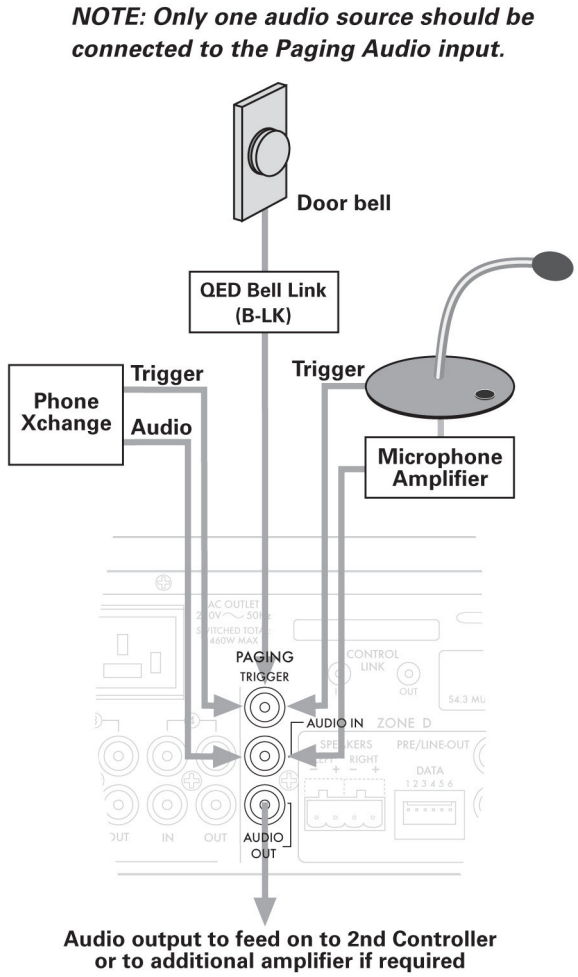


5.5.13 Paging Operation

The paging input allows public announcements to be made over ALL the Systemline zones (factory setting). If required, zones may be excluded from the Paging facility (see below).

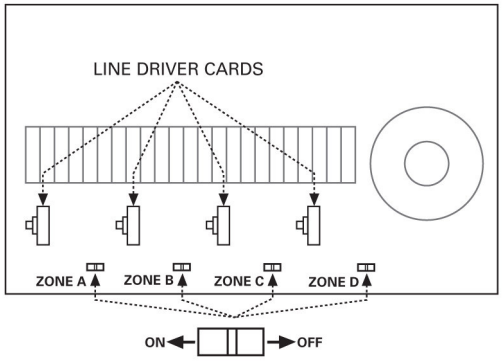
To function, the paging needs to be activated from an external source. This can be simply

achieved by closing the contacts of the "PAGING TRIGGER" phono socket, or using an optocoupling device such as QED's B-LK "bell-link".



5.5.13.1 Paging Inhibit

To perform this operation the top cover of the Controller must be removed to access the individual zone paging switches. Carry out this procedure, and then observe the location of the switches for each zone.



The paging switch for each zone is shown in the diagram. The default factory setting is ON, to the left. Select the switch for the Zone which is to be excluded from the Paging facility, and slide the knob to the RIGHT as far as it will go without forcing.

This Zone will now enjoy listening uninterrupted by the Paging facility.

5.5.13.1.1 Controller Top Cover removal

Before removing the top cover of the Systemline 4.4 Controller, remove the mains power supply connector, and observe standard anti-static precautions to protect the integrity of programmable devices on the motherboard.

Start by using a cross-head screwdriver to remove the two screws holding the back lip of the top cover to the rear of the Controller. Then use a 2.5 mm hex (Allen) key to remove the four retaining bolts on the sides of the unit. Standing at the front, place a hand each side of the cover and slide it carefully backwards. In cases of difficulty, place a soft cloth or foam pad on the front panel surface to protect the lens and metal finish, roll the unit onto this surface with the front panel facing downwards, and pull the top cover slowly upwards, using gravity to lift it away from the Controller housing.

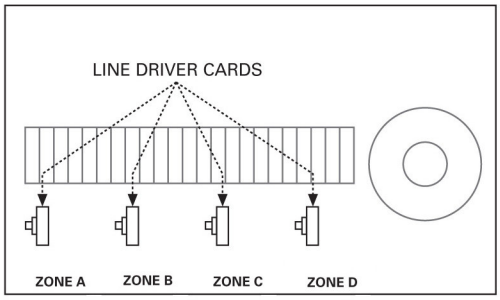
Place the unit back on its feet, still facing the front.

5.5.14 Configuring the Pre/Line Out Sockets

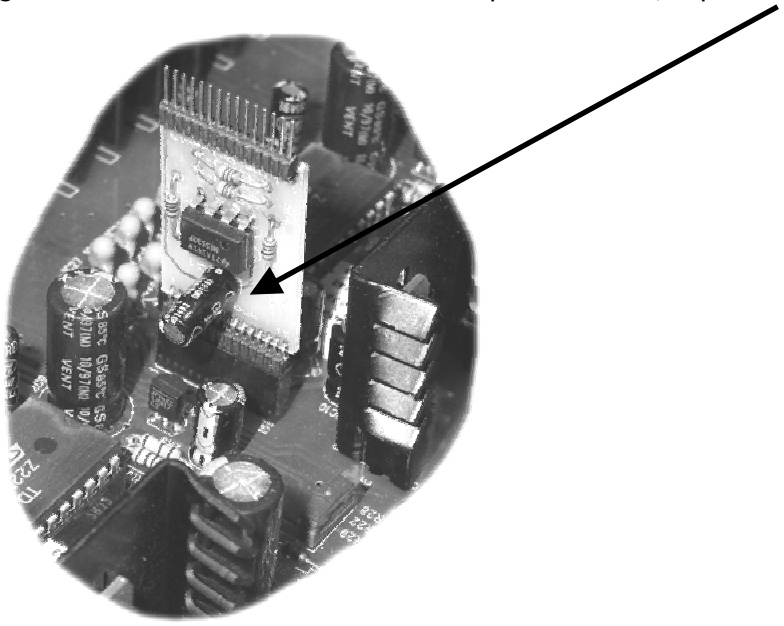
The default factory setting for each of the Zones' PreOut stereo phono connections is variable, in line with the volume control settings used for the speaker outputs. This is so a Systemline MRA-4 Power Amplifier can be directly attached, without further intervention, to these RCA outputs. If, however, a fixed level output is required, unaltered by the volume control settings for loudspeaker output (for input to a sound desk, for example), then the top cover of the Controller must be removed to make the adjustment.

NOTE: The level of the fixed output impedance is 220 Ohms.

Remove the top cover of the Systemline Controller as described in above; observe the location of the line driver cards, viewed from the front of the Controller.



The factory setting of the line driver cards is shown in the picture below, capacitor



downwards, towards the motherboard.

Note that both ends of the card provide a 15-pin connection to the motherboard. For international transport purposes, the card is often retained in the socket by an adhesive strip. This should be removed and discarded. Any residual adhesive can be removed with white spirit. To provide fixed level output for a selected Zone, simply rotate the line driver card 180° and insert the new set of 15 pins in the motherboard socket, with the capacitor now uppermost. The component side of the line driver card stays in the same plane as it started, that is, to the left when viewed from the front. Ensure that pin 1 is pointing to the rear of the Controller.

Reassemble the top cover as described above.

5.6 Multi-Zone Systemline 4.4 Systems

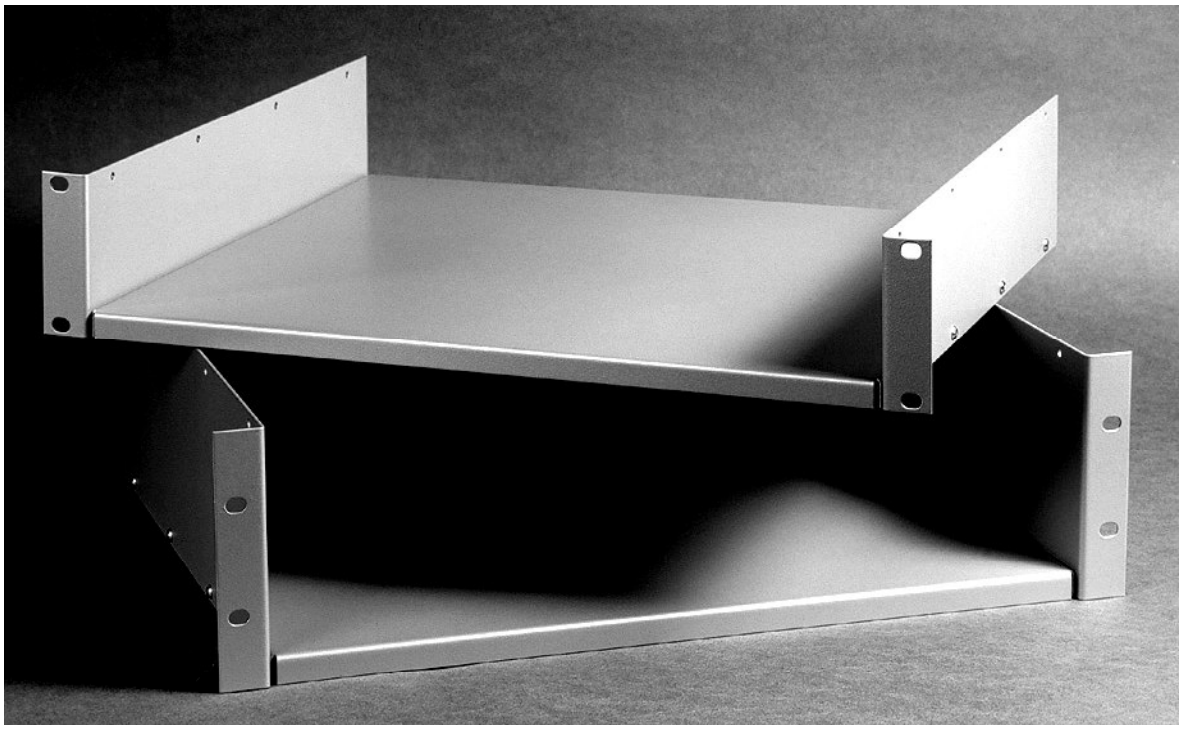
The basic system is designed to supply independently controlled sound and vision to four separate zones. In many instances, a complex system may require more flexibility. By use of the Personal Input Strategy (see Section 6.5.2) the logical constraint of 4 inputs can be expanded to make a wider selection of inputs available, although only four can be used concurrently.

To satisfy a greater number of zones, the dual-component solution can be cascaded to form 8, 12, or up to 20 independent zones in a Multi-Zone System.

5 systems may be daisychained to provide 20 Zones and 20 SubZones of music. In addition, each can support a Kramer Video Switch allowing four composite or s-Video signals to be shared among four viewing zones. So DVD multiplayers, and multiple DVDs, can be accommodated easily within the S4.4 system.

5.6.1 Multi-Zone Systems

The Systemline 4.4 dual component solution can be stacked in pairs (4 Components) providing systems are adequately supported and ventilated. More than 2 systems should not be stacked on top of one another. It therefore follows that a suitable rack tray should be considered. Systemline is able to fit in a standard 19inch rack mount system. Suitable trays are available, S-ARU (larger Systemline Controller/Amplifier Rack Unit) and S-CRU (smaller Systemline Commander Rack Unit).



Observe the following guidelines where Multi-Systemline installation is required:

1. Connect the zone data wiring exactly as described in the Sections 3.1, 4.3.2, and 5.3.
2. Connect each Commander to each Controller exactly as described in Sections 4.3.2.1 and 4.3.2.2.

Note: If you have observed cable labelling advice elsewhere, you should easily avoid mixing zone and data cables. Ensure ALL [supplied] interconnecting Zone data cables (RJ45 plug at one end, IDC at the other) run from the same Commander to the same Controller in each Systemline 4.4. If data cables are incorrectly distributed across multiple Systemlines, i.e. wrong Commander to wrong Controller, wrong zone data cable to wrong Commander, you WILL experience operational problems.

Use a logical, modular approach. Connect all zones IN to one Commander, which may entail the use of:
(old s4.3) termination plates with new adapter
adapter cables (supplied), or
RJ45 patch UTP patch cables.
Then connect that Commander's zone data (RJ45/IDC adapter) OUT cables to its Controller. Continue per system, until all zones' data connections have been accommodated. Now proceed to step 3.

3. IR Emitters MUST ONLY be connected to the last Commander TX outputs in the chain. This includes the IR1/IR2 RC5 connections. IR Emitter connection information is the same, but for the last Commander ONLY for outputs TX1 to TX4.

5.6.2 Commander Ribbon LOOP Links

A 30cm ribbon cable is supplied with every Systemline 4.4 for connecting between Commanders in a Multi-Systemline installation (see Section 5.4.3.2). It is recommended to adhere to this separation length between systems. Shielded and metre length cables are

available if absolutely necessary, but before ordering assess the ambient operating conditions to audit the levels of ambient EMI and RF interference; also note whether the system is shielded by metal enclosures which can be grounded; record how many levels of cascading are involved, and the number of cables which need to replace the standard unshielded 30cm length; then contact technical support for advice.

5.6.3 Controller Links

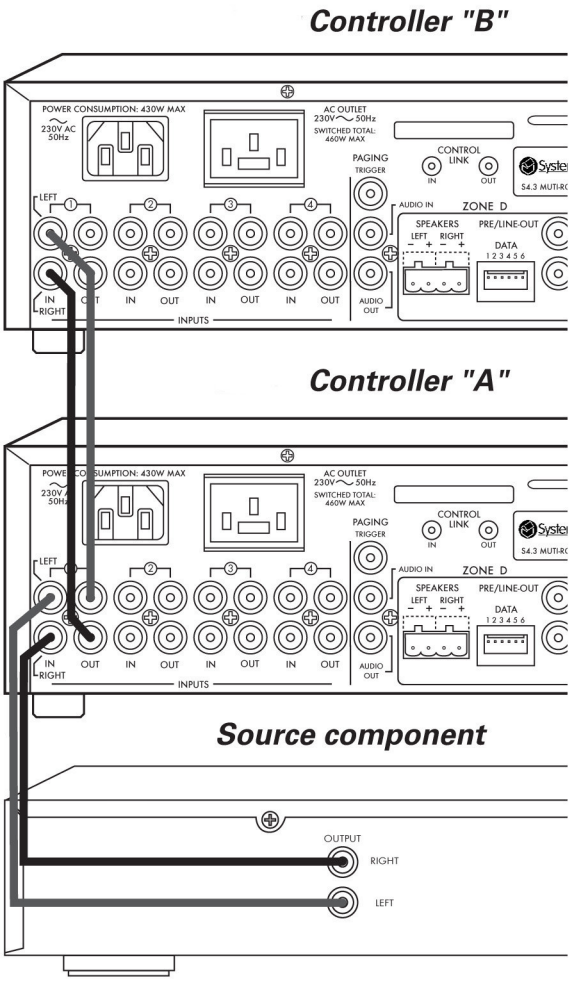
Using the stereo jack CONTROL LINK sockets, connect the OUT from the first Controller to the IN of the next, until connecting the last IN socket in the chain. No connection is required from the last Controller back to the first.

A suitable 3.5mm stereo jack plug cable can be ordered from QED if required, Part Number S-CLL, which is a purpose-built cable connecting only TIP to TIP and INNER RING to INNER RING, with a specially moulded plug surround to ensure an exceptionally snug fit in the Systemline Control Link sockets.

If you have inadvertently mis-connected these links, power down all Systemlines, remove the cables, fit the correct cables, and then power up Systemline. Remember that if the installation is new, any DMS's in the zones will not have had time to charge their batteries, so clocks will need to be reset.

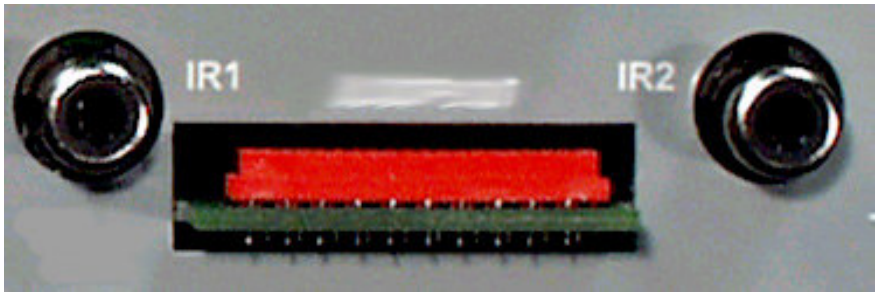
5.6.4 Source Connections

Simply daisychain the Source Outputs from the first Controller to the Source Inputs on the next, and so on, until the last Controller in the chain has its Source Inputs connected.



5.6.5 RC-5 Bus Connections

If the RC-5 Bus is required, only the last Commander in the chain should have the IR1/IR2 connections in use. The Ribbon LOOP cable must be in place between all Commanders for the RC-5 Bus to operate correctly.



5.6.6 Triggers in Multi-Zone Systemlines

Unlike IR signalling, the Trigger Outputs in a Multi-Zone Systemline remain independent, and operate "box-wide", that is, as per a single Commander installation.
In other words, each Commander retains responsibility for its own triggers and should be set up as discussed in Section 3.5.

So individual data cables connected to zone wall-mount modules will continue to feed back voltages in the normal way from their respective Commander connections. The central TG1-4 outputs may be also be used (but **NOT** concurrently with the **same** Zone's core 8 back-to-Zone circuit).

5.6.7 Trigger Activation via Commander

As discussed in the Commander Manual, triggers may be programmed into the Commander to operate in one of 2 ways:-

1. ON when the Zone is active, (a Source Input is selected), OFF when in Standby.

2. "A" key ON, "B" key OFF, irrespective of active Zone or Standby (RHS4 is the only control with a "B" key).

Case 1. enables a voltage to be triggered when selecting any Systemline source input, to dim the lighting and set a mood for music, for example.

Case 2. would enable someone to close curtains remotely by pressing "A", for example, and the trigger would remain on until the person with an RHS4 handset pressed the "B" key to switch it off. The status of Systemline operation is irrelevant.

The "A" button is available on the NMS keypad and the RHS4 handset only.

5.6.8 DMS operation in Multi-Zone Systems

The behaviour of DMS modules, like the Triggers, operates "box-wide", that is, as per a single Controller installation. This means that for each Systemline system in the installation, the Zone A clocks will need to be synchronised manually for all DMS's at the installation to remain synchronised. (All DMS's in other zones will reset to the Zone A clocks automatically).

Also be aware that the Engaged notification, changing the upper case Source label to lower case when sharing a programme with other listeners, only operates box-wide. In this case only the zones connected to the Same Controller/Commander Systemline are aware of the Engaged function. In other words, Systemline A is aware of the Engaged function within its sphere of operation, but the next Systemline, Systemline "B" etc, is also only aware of what is shared within its own jurisdiction. A Zone on Systemline B will have no way of knowing that it is sharing a Source Input with anything on Systemline A, or C, etc.

6 OPERATION

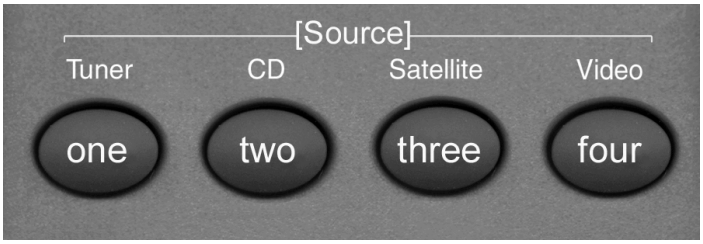
6.1 RHS4 Handset

All Commander Programming and system operation are linked back to the 38 buttons of the

RHS4 handset.

6.1.1 Usage of Keys

The RHS4 IR handset comprises 38 buttons, the upper 4 of which are Source Input selection buttons.



The remaining 34 buttons enable the fullest possible control of source inputs by permitting any key to be given a code relating to the control of the input selected.

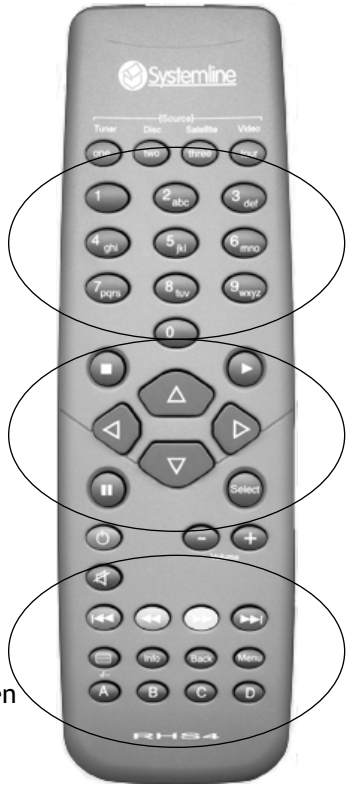
The Commander is programmed to accept codes of almost any type, and maps them to a specific key on the RHS4. Furthermore, PC Link SW will enable code "pages" (those keys relating to a specific Source Input selection) to contain a mixture of code frequencies among the encoded buttons. This means, for example, that a B&O television could change its channel to AV RGB input by pressing the "0" numeric key, whilst the PLAY key for the same Source Selected could activate a different brand, and signal frequency, DVD player.

6.1.2 Defining ergonomic usage of each Source Input

Numeric KEYPAD for Direct Access
(Tuners, Multi- Channel inputs)

Cursor Keys for CD, Satellite & DVD

Back track, REW, FF, Forward track,
for MD, Tape, standard 4-button screen
menu, etc



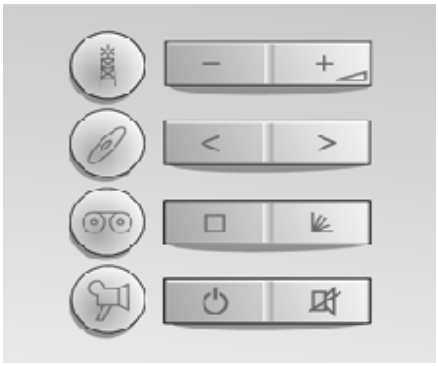
6.1.3 Multiple RHS4 Handsets

A single RHS4 handset can be used throughout an installation, if only one person requires full Systemline control. The handset itself is relatively inexpensive, as the Commander retains all the programmed intelligence to drive the Systemline. (The memory is designed to hold full configuration, once entered, for about 100 years).

Conversely, since it is the IR sensor modules which detect which zones are receiving IR codes, any number of RHS4 handsets may be used to accommodate multiple remote IR users. Should a household lose or abuse the Systemline remote handset (a common occurrence) no intelligence has been lost, only an easily replaceable IR handset.

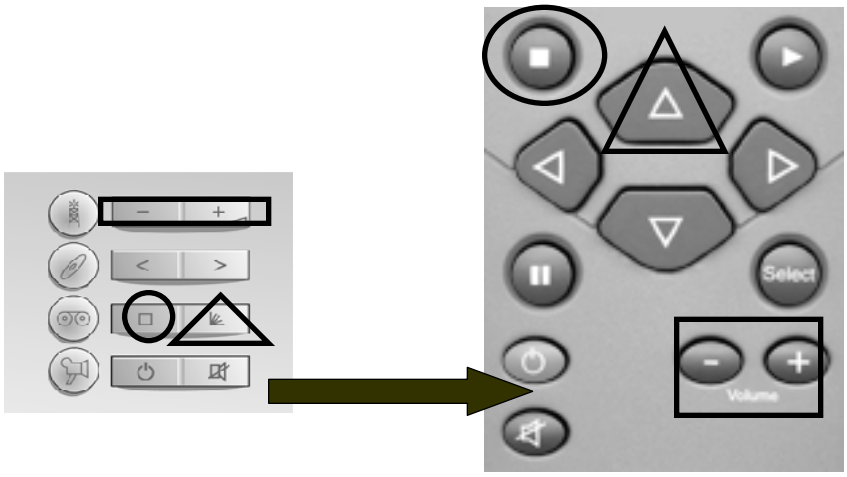
6.2 KMS Keypad

The KMS keypad is the only wall-mount module offering the MUTE facility - therefore it lends itself to installation where telephones or other interruptions are likely to occur (hallways and reception areas being common examples).



The KMS also lends itself to external areas, where an IR sensor module would not be appropriate because of direct sunlight.

6.2.1 Linkage with RHS4 operation

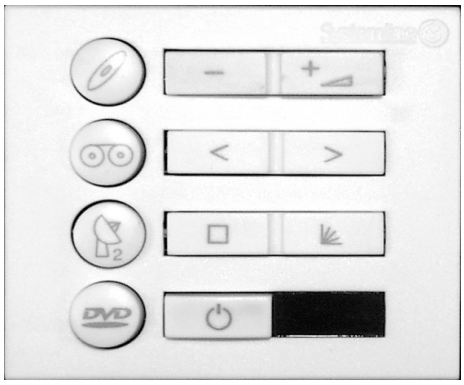


The KMS cursor left and right keys will respond in the same way, with the same codes, as those programmed into the Commander for the corresponding keys [LEFT ARROW, RIGHT ARROW] of the RHS4, for the selected Source Input.

The stop and fan-fold buttons on the KMS correspond similarly to the STOP and UP ARROW keys on the RHS4.

Note that the Volume -/+ , Standby and MUTE are all Systemline function keys, but it IS possible to assign codes to these buttons as well, if deemed appropriate. The Systemline functions are hard-coded, and cannot be removed.

6.3 CMS Keypad



6.3.1 Useful applications replacing DMS/KMS operation

This keypad flexibly offers both full source selection and volume control functions, with the advantage of an IR Sensor module. This is particularly useful in a bathroom, because the wall-mount module enables all normal manual operation. Since there is no display, there is no lens to get steamed up and illegible, but the IR sensor provides the facility to languish in the bath and operate the system with the RHS4 handset.

NOTE: Whilst the CMS is water-resistant in construction, it is not impervious to constant humidity and high temperature conditions to be found in saunas, Jacuzzis and steam baths. Under such circumstances use an enclosure with a waterproof membrane to keep it reasonably dry.

6.3.2 Linkage with RHS4 operation

The CMS keys operate in exactly the same way as the KMS, with the notable exception of the MUTE facility, which is absent. Please see section 6.2.1. The most useful purpose it has is when teamed up with the NMS in a double-gang back box to give full IR Sensor and keypad operation from a single wall-mount enclosure.

NOTE: Used alone, this module is backwards-compatible with Systemline 4.3 installations, adding IR sensor/keypad functions in a single module.

6.4 NMS Keypad

6.4.1 Combinations for MultiDisc, MultiChannel operation

The NMS has no intrinsic behaviour of its own. It adds high value numeric selectivity to the otherwise "pedestrian" selections available from the KMS and CMS keypads. Normal operations would include selecting an input with the KMS/CMS, and then perhaps using the SEL button to indicate a series of key depressions equating to a channel, disc, or track number.

The precise nature of this selection is governed by the Source Input selected, and Programming the Commander accordingly. The NMS operation is inextricably linked to the behaviour of the RHS4 keypad, and the same key identifiers. This will become clearer from detailed study of the separately available Commander Programming Manual.

The NMS also provides a Key, "A", which can be used to switch ON a voltage trigger (if suitably programmed), or alternatively may execute a macro (set of up to 6 code instructions) when the key is released after initial depression. It may also issue any single IR code when depressed.

This wall-mount module effectively extends the performance of the other keypad modules to provide an unlimited number of selection criteria for newer source components including DVD's and multi-channel music players.

6.4.2 Useful 'Macro A' facility

If the Commander has been programmed to provide a macro facility on the RHS4 "A" key, this is automatically available to the NMS user on the A key. Up to six codes, and intervening delays, can be pre-programmed into the Commander for sequential execution. The execution of the macro is performed upon **releasing** the key, after initial depression.

A macro enables a single keystroke to dim lights, lower a screen, draw curtains, activate a security device, switch on an AV amplifier, and select a specific entertainment programme from a Source Input, if a client so desires.

6.4.3 Useful SEL button

Many source components such as hard-disk audio devices and DVDs use the IR handset and a screen to offer menu-driven screen-based interaction with the user. For example, a menu is selected, which then enables the user to use cursor buttons (up, down, left, right arrows) to select from a screen-based menu.

The NMS SEL button can be programmed to perform the SELECT function for each of the Systemline's four Source Inputs, if necessary, and this complements the cursor keys available on the KMS/CMS modules.

6.4.4 Linkage to RHS4 operation

The NMS's number keys are attributed the same codes as those placed on the RHS4's numeric keypad by Commander Programming. The SEL button is attributed the same code as the RHS4 SEL button.

The "A" key performs in exactly the same way as that defined for the RHS4 "A" key (whether ordinary depression single-code, macro, or trigger ON are selected).

It is seldom practical, or advisable, to combine these three distinct functions on the "A" key simultaneously!

6.5 DMS Display Module

6.5.1 Slave Operation

It is permissible in each Zone to have a second DMS (as well as up to 3 keypad modules), as a Slave. This may be advisable in larger auditoria where IR detection would otherwise cause marginal performance and two potential users or user areas need to be aware of system status and operation.

All of the display information will update in line with the Master DMS, clocks will update with the Zone A master DMS, but a Slave does not perform Alarm or Zone Splitter control functions.

If display information is not a priority, but IR sensing is required, consider the CMS as a valid alternative, which adds the keypad functions in a single-gang module.

6.5.2 The Personal Input Strategy

Although the Systemline is designed to handle four Source Inputs concurrently, this does not necessarily mean that the selection of programme sources is limited to four; in fact the only real limitation is that whatever source components are attached to the Systemline Inputs, they should each respond to an IR handset, and only four programmes can be played simultaneously.

So Mini/Midi/Stack systems comprising several sources, such as combined tuner/tape/cd, or TV/VCR/Satellite Receiver racks, may each be labelled as one source on the DMS's in the zones, to reflect the customer's view of the equipment. For example, "Hers", "Mine", "Kids", "Gran" and so on. Each one of these labels could be different, depending whose zone the DMS is occupying. "Mine" in father's zone might be "Dads" in the Kids zone, for example.

In this way, it is possible to widen the selection of programme material beyond the basic four inputs. Obviously, in such systems, it will not be possible to select multiple inputs on the same Source Input socket, as they are by definition mutually exclusive.

7 TROUBLESHOOTING

7.1 Basic Function

After connecting all the wall-mount modules and connecting up the Commander and Controller, without any further setup it should be possible to test the basic Systemline functions, which should operate automatically if the data link wiring, source and speaker connections are correctly installed.

Input Select, volume up/down, mute, standby.

Check: correct source on correct input button
Correct channels L + R, both in (source) and out (speaker).
Correct polarity on channels - stereo sound image OK (if not, is one speaker out of phase with the other? - "hollow" sound stage)

Infra Red Reception: (DMS/CMS)

Module receive LED lights up when IR transmitted at module?
Systemline Controller CODE (amber) LED lights up confirming IR reception from zone data link cable?

If NOT:
RHS4 batteries OK? (Test on another zone?)
Wall mount module IDC connections intact? (if OK, why not GEL the connector wires to ensure durable long term continuity?)

8 SUPPORT CONTACTS

International Systemline Support
Help Desk for Systemline is available Monday -Friday 0900 - 1730 (UK time)
The dealer website is continuously updated with information as it becomes available.
The correct procedure of fault reporting is via your National Distributor Organisation, whose duty it is to provide first-line support.

Queries (by any means) are prioritised based on National Distributor needs and Time-Zone limitations. Individual enquiries directed to QED will be answered via national distributors, providing that the enquirer has identified the country from which the enquiry emanates.

National Distributors for Systemline can be found at any time on the website www.qed.co.uk.

8.1 Website access and resources

Accredited Systemline dealers may find it useful to browse

www.systemline.co.uk/dealer

before raising queries with National Distributors.

All QED/Systemline S4.4 software is made freely available to the entire distribution channel without any licensing requirements, strictly on the understanding that this information is subject to ongoing change without notice, and QED Audio Products Limited shall not be held liable for technical or editorial errors in the material provided.

Furthermore QED Audio Products Limited offers no specific warranty as to the suitability or efficacy of any material published on the web site, although best efforts are made to ensure serviceability and accuracy.

Finally QED Audio Products Limited shall not be held liable for incidental or consequential damages resulting from the supplying or uses of the website information, nor from the performance or use of the materials contained on it.

CD-ROMS are made available periodically, both from our Sales & Marketing and Training Divisions, and such availability is advertised on the Systemline Dealer web site.

8.2 Telephone/Fax Contact

8.3 Fault Report System