

IRT Eurocard

Type HDS-4500

5x1 HD/SD Digital Video Switcher

Designed and manufactured in Australia

IRT can be found on the Internet at: http://www.irtelectronics.com

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Instruction Book

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This instruction book applies to units later than S/N 0605001.

Operational Safety:

WARNING

Operation of electronic equipment involves the use of voltages and currents that may be dangerous to human life. Note that under certain conditions dangerous potentials may exist in some circuits when power controls are in the **OFF** position. Maintenance personnel should observe all safety regulations.

Do not make any adjustments inside equipment with power **ON** unless proper precautions are observed. All internal adjustments should only be made by suitably qualified personnel. All operational adjustments are available externally without the need for removing covers or use of extender cards.

IRT Eurocard Type HDS-4500 5x1 HD/SD Digital Video Switcher

General Description



The HDS-4500 HD/SD digital video switcher is part of a family of "smart" switchers in Eurocard format that may be linked and configured by the user to cover a wide range of switching and monitoring functions.

The HDS-4500 will switch up to five 1.485 Gb/s High Definition (HD) or 270 Mb/s Standard Definition (SD) signals, or a combination of both HD and SD to two identical outputs.

The switcher may be slaved to operate in conjunction with similar switchers for analogue & digital video, audio and RS422 or similar control signals.

This makes the switchers ideally suited to situations where a mixture of analogue and digital signals are present.

The CPS-3050 local control switch panel kit converts the switcher for stand-alone operation.

The CPS-9001 provides a 5-button remote control in a panel the same size as the CPS-3050.

All panels have tally LED's and switch label inserts. Multiple panels may be used with tally to each panel.

An optional SNMP (Simple Network Management Protocol) plug in module is available for remote monitoring and switching when used in conjunction with IRT's 4000 series frame fitted with SNMP capability.

The HDS-4500 is designed to fit IRT's 4000 series frame for use with IRT's SNMP system as well as being suitable with IRT's standard 1000 and 3000 series Eurocard frames and may be used alongside any other of IRT's analogue and digital Eurocards.

Standard features:

- 5 x 1 1.485 Gb/s HD or 270 Mb/s SD switching.
- Input equalisation > 100 m for HD, > 250 m for SD.
- Local or remote control options.
- Universal wire per crosspoint or binary coded remote control.
- Optional plug-in SNMP monitoring and control module.

Technical Specifications

IRT Eurocard module Type HDS-4500

Signal input	ts:			
Number			5.	
Туре			1.485 Gb/s HD or 270 Mb/s SD.	
Equalisation			Automatic, > 100 metres at HD, > 250 metres at SD	
			for Belden 8281 or equivalent cable.	
Impedance			75 Ω.	
Signal outpo Number	uts:		2	
Туре		HD or SD	800 mV $\pm 10\%$ into 75 Ω .	
Control inp	uts/o	outputs:		
Туре		•	5 bit BCD coded parallel TTL level.	
•••			or	
			individual grounding contacts.	
Number			1 input & 1 output.	
Performanc	•••			
Switching			Timing may be derived from a local monostable signal or synchronised to	
Swittening			another switcher.	
Return loss			>15 dB 5 MHz to 1.485 GHz.	
DC offset			$0 V \pm 0.1 V.$	
Derrer Deerring			29 M_{eq} CT (14.0, 14) as \pm 16 M_{eq}	
Power Requirements			$28 \text{ vac C1} (14-0-14) \text{ or } \pm 16 \text{ vac.}$	
r ower consum	ption		<0VA.	
Connectors	:	HD/SD	BNC.	
		Control	Plug in 10 pin HE14 dual IDC.	
Other:				
Temperature range			$0 - 50^{\circ} \text{ C}$ ambient.	
Mechanical			Suitable for mounting in IRT 19" rack chassis with input, output and power	
	-		connections on the rear panel.	
Finish: H	ront p	panel	Grey background, silk-screened black lettering & red IRT logo.	
r	kear a	ssembly	Detachable slik-screened PCB with direct mount connectors to Eurocard	
Dimensions			6 HP x 3 U x 220 mm IRT Eurocard	
Dimensions				
Supplied acces	sories		Rear connector assembly including matching connectors for control inputs & outputs.	
Optional accessories			CPS-3050 local control conversion with 5 pushbuttons & tally LED's. CPS-9001 remote control panel with 5 pushbuttons & tally LED's. CPS-1050 remote control panel with 10 pushbuttons & tally LED's.	
			SMU-4000 plug in SNMP Management Information Base (MIB) module.	

Due to our policy of continuing development, these specifications are subject to change without notice.

Link Settings:

Links LK 1 & LK 2: Not used.

- Link LK 3: Local / remote control selection. If the switchers on the front of this unit are to be active, then install LK3-A, otherwise install LK3-B.
- Link LK 4: LK4-A: Always use incoming switch pulses. LK4-B: Normal selection of switch pulses (default position).

Wire per crosspoint operation

In most cases, the BCD encoded remote control system offers the most satisfactory way of controlling one or more switchers. There are, however, situations where it is necessary to provide a wire per crosspoint access for control and / or a line per crosspoint tally system. Both of these facilities may be made available on the HDS-4500 in a number of ways.

To change to WPX mode the WPX links should be installed on the PCB where indicated on the PCB overlay and all of the "Universal" links should be removed.

A momentary contact closure to ground on the relevant control input will now cause the switcher to operate in the same way as it would have if the switch on the local control panel type CPS-3050 had been depressed.

Pin connections are as follows:

	PL 4	PL 5
1A	+12 Vdc out.	N/C.
1B	Ground.	Ground.
2A	Switch 5 contact.	Switch 5 contact.
2B	Switch 4 contact.	Switch 4 contact.
3A	Switch 3 contact.	Switch 3 contact.
3B	Switch 2 contact.	Switch 2 contact.
4A	Switch 1 contact.	Switch 1 contact.
4B	N/C.	Vert. out
5A	N/C.	N/C.
5B	N/C.	N/C.



Note that no tally is available on the switch lines.

Location of links & user settings

The following location diagram is not to scale and is intended only to assist in finding the location of links and other settings, which may need to be changed by the user during *Configuration*.



What Is It?

SNMP stands for Simple Network Management Protocol. It is an application layer protocol for managing IP (Internet Protocol) based systems. SNMP enables system administrators to manage system performance, and to find and solve system problems. SNMP runs over UDP (User Datagram Protocol), which in turn runs over IP.

Three types of SNMP exist: SNMP version 1 (SNMPv1), SNMP version 2 (SNMPv2) and SNMP version 3 (SNMPv3). It is not the intention here to discuss the differences between various versions, only to bring attention to the fact that IRT Electronics modules, fitted with SNMP capability, use SNMPv1.

An SNMP managed network consists of three key components: Network Management Systems (*NMS*), *agents*, and *managed devices*.

An *NMS* is the console through which the network administrator performs network management functions, such as monitoring status (e.g. alarm states) and remote controlling, of a set of managed devices. One or more *NMS*s must exist on any managed network. Generally the *NMS* is a computer running third party SNMP control software. There are a number of third party SNMP software applications currently available on the market.

An *NMS* polls, or communicates with, an *agent*. An *agent* is a network management software module that resides in a *managed device*. An *agent* has local knowledge of management information and translates that information into a form compatible with SNMP. The *agent*, therefore, acts as an interface between the *NMS* and the managed devices. The *NMS* sends a request message, and control commands for the managed devices, to the *agent*, which in turn sends a response message, containing information about the *managed devices*, back to the *NMS*.

A *managed device* contains an SNMP *agent* and resides on a managed network. *Managed devices* collect and store management information and make this information available to *NMSs* using SNMP.

Managed device agent variables are organised in a tree structure known as a Management Information Base (*MIB*). Within the *MIB* are parameters pertaining to the *managed device*. An Object Identifier (OID) number within the *MIB* defines the managed device type. This is a unique number specific to the model of *managed device*. Other information relating to the device is also stored, information such as alarm states, controllable settings, etc. The *MIB* tree is organised in such a way that there will be no two *MIB* files with conflicting placements.

Normally an *NMS* polls an *agent* for information relating to the *MIB* in a managed device to be sent back to the *NMS*. When certain conditions are met within the *MIB*, such as major alarm conditions, for example, the *agent* automatically sends what is known as a *trap* to the *NMS* without any prompting from the *NMS*. This allows automatic notification of a predetermined event.



SNMP Block Diagram

SNMP with IRT Products

IRT Electronics currently employs SNMPv1 with its 4000 series frame. The frame acts as an *agent* when fitted with a CDM-4000 module. This module has its own designated slot next to the power supply so as to not affect the number of modules that the frame will take. Communication between the *NMS*, the frame and its loaded modules are via this CDM-4000 module. Note that the *NMS* software is third party and not supplied by IRT Electronics.

Ethernet connection for SNMP operation is via an RJ45 connector on the rear of the frame, below the mains inlet. Ethernet rate runs at either 10 baseT or 100 baseT.

Frame parameters, such as Name, Address and Location, are set via an RS232 interface, a D9 connector on the rear of the frame below the mains inlet. A software terminal emulator, such as Tera Term or HyperTerminal, is used for setting and reading the parameters of the frame.

IRT modules that are SNMP compatible need a plug-in SMU-4000 module programmed with a *MIB* relevant to the module that it is plugged into. Depending on the module, besides the module identification, parameters such as alarm states, inputs and controls etc. are communicated to the CDM-4000 *agent* via a data bus on the rear of the frame. Thus the CDM-4000 collects information on what is loaded within the frame, what positions they occupy, and their current status for communication to the *NMS* when the *NMS* sends a request for information.

In the event of a major alarm from any of the SNMP compatible modules, or power supplies, a *trap* is automatically sent by the CDM-4000 *agent* to the *NMS* without any prompting by the *NMS*. This alerts the operator to any fault conditions that may exist that need immediate attention.



IRT 4000 Series SNMP Setup

HDS-4500 SNMP Functions:

With the HDS-4500 fitted with the optional plug-in SMU-4000 SNMP module, programmed with firmware to suit, and installed in an IRT 4000 series frame with SNMP capability, it is possible to remotely monitor the presence of inputs and which input is currently switched to the output, as well as to remotely select desired input to output, using an NMS.

Installation

Pre-installation:

Handling:

This equipment may contain or be connected to static sensitive devices and proper static free handling precautions should be observed.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Power:

AC mains supply:	Ensure that operating voltage of unit and local supply voltage match and that correct rating fuse is installed for local supply.
DC supply:	Ensure that the correct polarity is observed and that DC supply voltage is maintained within the operating range specified.

Earthing:

The earth path is dependent on the type of frame selected. In every case particular care should be taken to ensure that the frame is connected to earth for safety reasons. See frame manual for details.

Signal earth: For safety reasons a connection is made between signal earth and chassis earth. No attempt should be made to break this connection.

Installation in frame or chassis:

See details in separate manual for selected frame type.

Digital Video Connections:

Inputs and outputs are 75 Ω BNC type for connection with high quality 75 Ω coaxial cable. Inputs are self-terminating. No loop through facility is available. For applications requiring multiple destinations, a 1.485 Gb/s digital type distribution amplifier should be used.

CPS-3050 - Local control:

All switchers are sold with a plain front panel with DC power LED and printed with the switcher type number and IRT logo. The CPS-3050 provides the necessary components to add control buttons and tally to the front panel.

Before fitting the CPS-3050, the original front panel and LD 1, LED DC indicator, must be removed.

The CPS-3050 PCB should then be pressed carefully into place making sure that the pins on the CPS-3050 plug mate correctly with the socket on the main module PCB. The front plate is then fitted using the screws and spacers provided.

For local switching, to take effect link LK 3 must be placed in the "A" position. See Configuration for details.

TPS-3010 - Local tally panel:

All switchers are sold with a plain front panel with DC power LED and printed with the switcher type number and IRT logo. The TPS-3010 provides the necessary components to add tally LED indicators to the front panel. This is desirable when switchers are controlled only by remote connections that are distant from the switcher.

The TPS-3010 provides confidence that a slave switcher has responded to the master command and can therefore greatly assist in finding faults in inter-module wiring.

Before fitting the TPS-3010, the original front panel and LD 1, LED DC indicator, must be removed.

The TPS-3010 PCB should then be pressed carefully into place making sure that the pins on the TPS-3010 plug mate correctly with the socket on the main module PCB. The front plate is then fitted using the screws and spacers provided.

Front & rear panel connector diagrams

The following front panel and rear assembly drawings are not to scale and are intended to show connection order and approximate layout only.



Maintenance & Storage

Maintenance:

No regular maintenance is required.

Care however should be taken to ensure that all connectors are kept clean and free from contamination of any kind. This is especially important in fibre optic equipment where cleanliness of optical connections is critical to performance.

Storage:

If the equipment is not to be used for an extended period, it is recommended the whole unit be placed in a sealed plastic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to deter corrosion.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Warranty & Service

Equipment is covered by a limited warranty period of three years from date of first delivery unless contrary conditions apply under a particular contract of supply. For situations when "**No Fault Found**" for repairs, a minimum charge of 1 hour's labour, at IRT's current labour charge rate, will apply, whether the equipment is within the warranty period or not.

Equipment warranty is limited to faults attributable to defects in original design or manufacture. Warranty on components shall be extended by IRT only to the extent obtainable from the component supplier.

Equipment return:

Before arranging service, ensure that the fault is in the unit to be serviced and not in associated equipment. If possible, confirm this by substitution.

Before returning equipment contact should be made with IRT or your local agent to determine whether the equipment can be serviced in the field or should be returned for repair.

The equipment should be properly packed for return observing antistatic procedures.

The following information should accompany the unit to be returned:

- 1. A fault report should be included indicating the nature of the fault
- 2. The operating conditions under which the fault initially occurred.
- 3. Any additional information, which may be of assistance in fault location and remedy.
- 4. A contact name and telephone and fax numbers.
- 5. Details of payment method for items not covered by warranty.
- 6. Full return address.
- 7. For situations when "**No Fault Found**" for repairs, a minimum charge of 1 hour's labour will apply, whether the equipment is within the warranty period or not. Contact IRT for current hourly rate.

Please note that all freight charges are the responsibility of the customer.

The equipment should be returned to the agent who originally supplied the equipment or, where this is not possible, to IRT direct as follows.

Equipment Service IRT Electronics Pty Ltd 26 Hotham Parade ARTARMON N.S.W. 2064 AUSTRALIA

 Phone:
 61 2 9439 3744
 Fax:
 61 2 9439 7439

 Email:
 service@irtelectronics.com
 Fax:
 61 2 9439 7439

Drawing List Index

Drawing #	Sheet #	Description
804708	1	HDS-4500 5x1 HD/SD serial video switcher schematic connection diagram.

