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# 1 Introduction

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## 1.1 What is Halo?

Halo is a self-contained digital video router, available in three builds, 32x32, 16x16 and 8x8 for either SDV or HDTV signal formats. The product is designed as a cost effective, 'out of the box' router, to which control panels may be directly connected, or for immediate inclusion into an existing Snell routing system. The unit is contained in a 3U 'sealed' box, where all user connections and configuration options are available on the rear panel. The router is available in Master and Slave configurations, the Master version has a built-in **Nebula** control system, as used by the Freeway, Axis and Sirius router products, and therefore may control any of these systems. Consequently, the Slave version may be connected to any Master Freeway, Axis, Sirius or Halo system. Also, common to Freeway and Sirius, the user may configure their own system database if the provided configuration does not match their requirements.

Several features have been designed into Halo to add flexibility and competitiveness. An Ethernet port is available for both control and status monitoring purposes, this is achieved by supporting Snell's General Switcher protocol over SNMP. Two serial control ports are pre-configured for connecting to Snell router control panels and a router control system, such as Aurora. The router control port is disabled if the Ethernet port option is selected. To add a degree of flexibility, the 32x32 version of the router may be logically split into two 16x16 levels, using a rear panel switch setting, which allows the two routers to be allocated as any level numbers in a multi-level matrix. Finally, the 32x32 version Halo may also be configured as a 32x16 dual output router, again, with a configurable level number.

Halo is a single standard system, only one video reference signal may be connected to the router, which is auto-detected and provides frame or field synchronous switching for the entire system. All versions of Halo have non-reclocked outputs, which means the SDV router is also suitable for ASI signals.



## 1.2 Introducing Nebula

With the Introduction of Halo, Snell now make four 'self contained' router products: Freeway, Axis, Sirius and Halo. The key to these routers is that they all include a control system, meaning that control panels and under-monitor-displays may be directly connected to the router frames without the need for an external control system. Snell's other router products, like Eclipse and HD, due their large scale capability, do not include a control system, and must be controlled by an external system, such as Aurora. Aurora is a powerful, expandable, highly flexible control system with a range of features and options to solve most routing requirements, and therefore would not be a cost-effective method of controlling a single, small router. Aurora can, of course, control the small router types as well, and include them as part of a maximum system size of 20 matrices, each with up to 16 levels. This structure is further enhanced by the ability of the small routers to use their own control systems in parallel with Aurora, thereby offering flexibility and redundancy.

To simplify the marketing and documentation process, the control system included in a master Freeway, Axis, Sirius or Halo router has now been given the name Nebula. Nebula is not available as a standalone router controller, but is always an integral part of a master Freeway, Axis, Sirius or Halo. Therefore all these routers have similar control features and options, and any Nebula system may have its control database edited by the user to match their own requirements. Consequently, a single Nebula user guide will be provided to users of these systems, and database details will not be included in future versions of the router user guides.

The Nebula control system is contained on a control module, and it is this module that is at the heart of a master Freeway, Axis, Sirius or Halo router. The term 'master' refers to the router frame that contains the Nebula control card, if other frames are required for additional levels of routing, these need only be 'slave' frames, and require no control module. Nebula will control up to 8 levels of routing, using any router types from the Freeway/Axis/Sirius/Halo range. Slave frames connect to master frames with a 37way control cable, which effectively extends the control bus of the Nebula Control module.

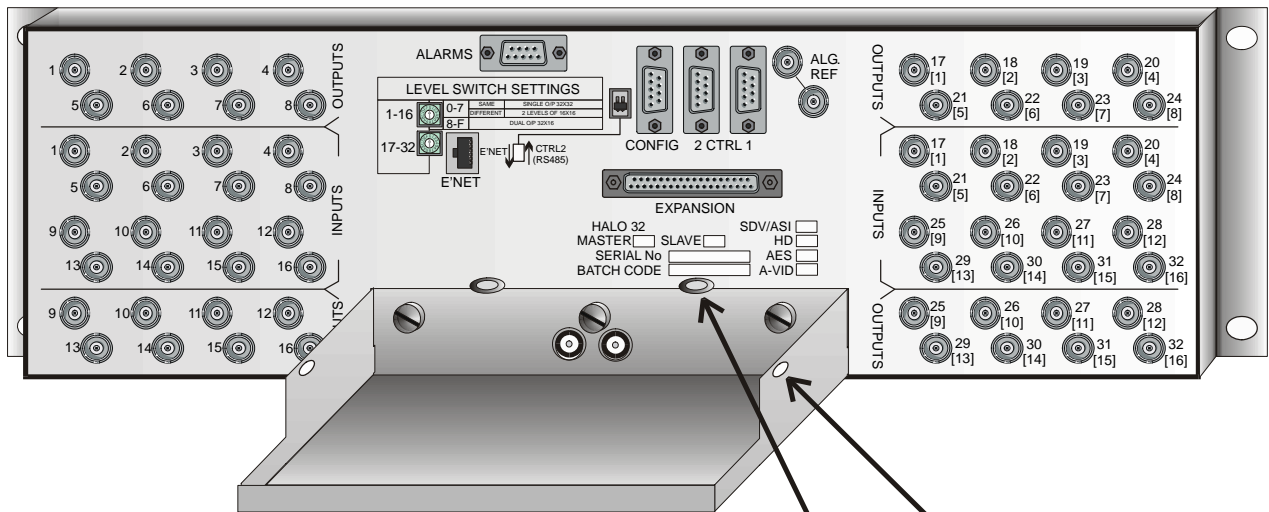


## 1.3 Installation

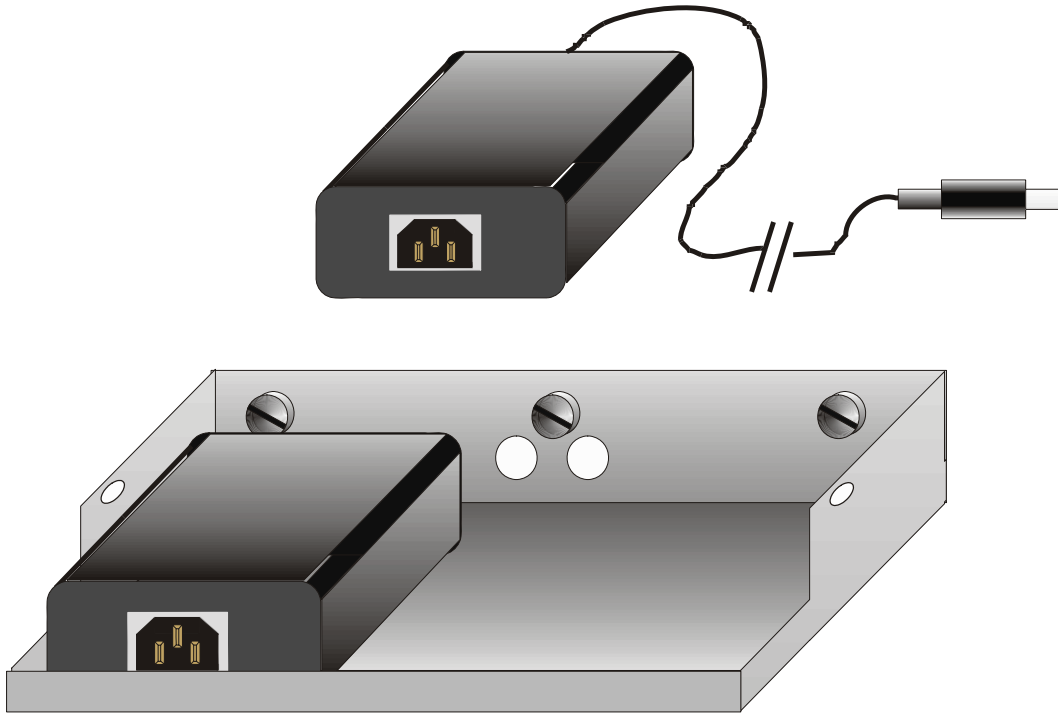
All Halo routers are contained in a 3U chassis and have a depth of about 6cm, all connections are made on the rear panel. Halo is cooled by convection and radiation, forced air cooling is not necessary, which not only makes the unit silent in operation, but means other equipment may be installed directly adjacent to it. The unit requires at least one external power supply, a backup power supply is optional. Each power supply is a sealed unit, with an IEC mains input and a 5.5 V DC output provided on a coaxial type connector at the end of a 1 metre flexible cable. The coaxial connector plugs into either power socket on the rear of the unit, and the presence of a voltage is indicated by an LED on the front of the unit.

**Note:** The maximum length of the Earth screw is 6mm. Using a longer screw will damage the Halo router.

Power supplies may be mounted anywhere within 1 metre of the unit, or if space is available, the power supply tray may be used. The tray screws onto the rear of the unit and is designed to hold two power supplies; holes are located on the tray to allow the use of a cable-tie to secure the power supplies. Metal loops are also provided on the rear of the router in order that the power supply cables may be secured with cable-ties to avoid accidental disconnection.



REAR OF FRAME SHOWING FITTED PSU TRAY AND CABLE-TIE LOOPS AND HOLES



Power supply units and tray.

## 1.4 Front panel indications



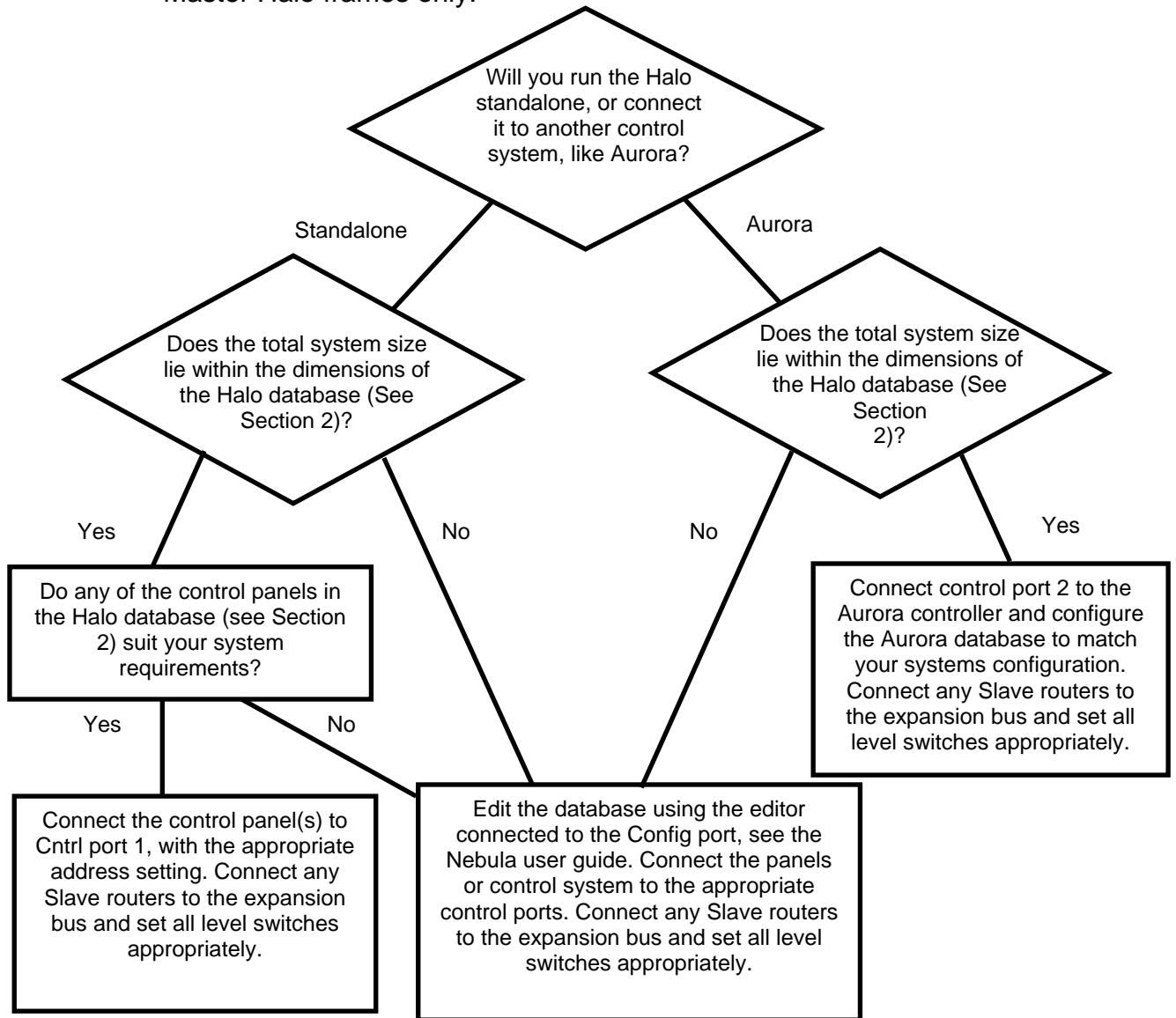
Green 'Hello' LED flashes to indicate that control module is communicating with crosspoint card.

Green PSU A and B LEDs indicate that active power supply units are connected to inputs on rear of frame.



## 1.5 Quick start guide to controlling Halo

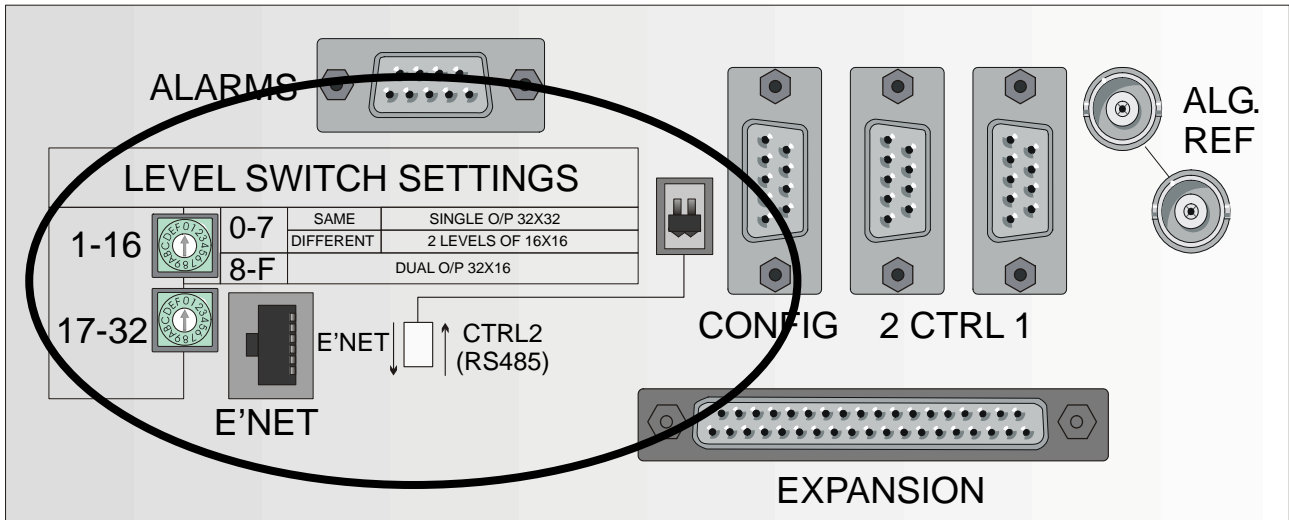
Master Halo frames only:



Slave Halo frames only:

Using a control bus expansion cable, connect the Halo to a Master frame. Set the Halo level switches appropriately and refer to the user guide for the Master router type in order to configure it.

## 1.6 Halo configuration switches



Halo is configured using switches on the rear panel. These settings are fundamental to the operation of the system and the user must know what level number, or numbers, the router is to occupy in the overall system in order to set the switches correctly. The user must also know whether the Halo is to be a standalone system, with control panels connected directly, or if it is to be controlled by another control system such as Aurora.

The Halo configuration switches are:

- one HEX switch for configuring the level number for the first 16 outputs
- one HEX switch for configuring the level number for the second 16 outputs
- a DIP switch for selecting Ethernet or serial control of the router

These are described in detail in the following sections:

### 1.6.1 Halo 8 and Halo 16 configurations

Any Halo 8 or Halo 16 router may only be configured as a single 8x8 / 16x16 level in a routing system, whether it is a Master or Slave frame. Only the first HEX switch is present on the Halo 8 and Halo 16 routers, which may be set to be any level between 1 and 8, as follows:





Halo 8 /16 level	Switch 1-16	Switch 17-32
1	0	NOT USED
2	1	
3	2	
4	3	
5	4	
6	5	
7	6	
8	7	

## 1.6.2 Halo 32 configurations

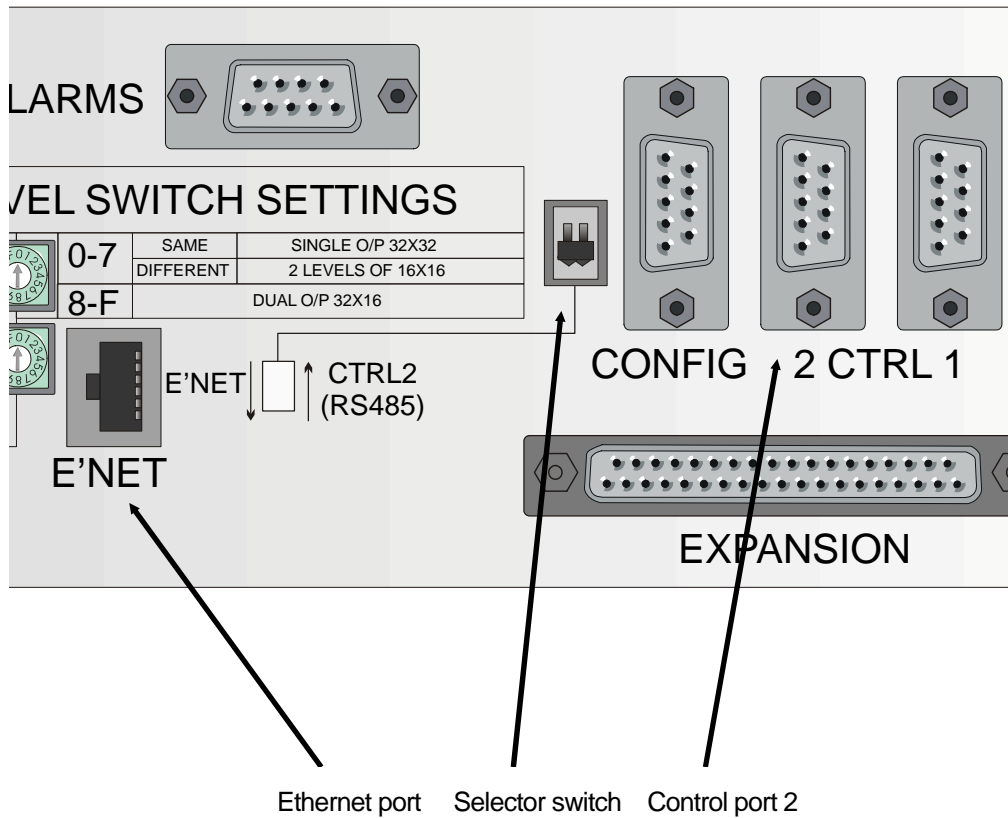
The Halo 32 router may be configured in one of three basic ways:

- A 32x32 router set to be a level between 1 and 8
- Two 16x16 levels each set to be a level between 1 and 8
- A 32x16 router with dual outputs, set to be a level between 1 and 8

This is achieved using both HEX switches as follows:

Size	Switch 1-16	Switch 17-32	Example
32x32	Set to level number minus 1	Set to the same as switch 1-16	Level 1, switch 1-16 = 0, switch 17-32 = 0
16x16 and 16x16	Set to first level number minus 1	Set to second level number minus 1	Level 1 and 2, switch 1-16 = 0, switch 17-32 = 1
32x16 with dual outputs	Set to level number plus 7	Not used, but recommended to be set the same as switch 1-16	Level 1, switch 1-16 = 8

## 1.6.3 Selecting the Ethernet port



**Note:** The Halo router has a label on the rear panel indicating whether it is an Ethernet enabled model or not. Check which model is being installed.

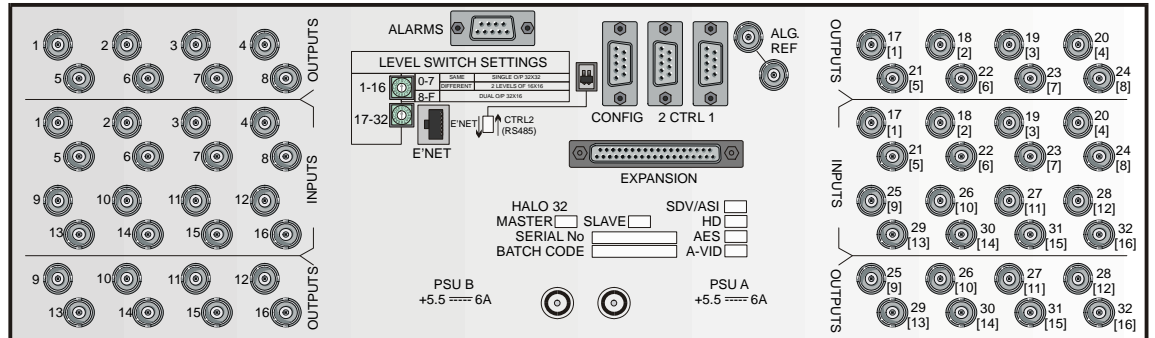
If the Halo router is not capable of Ethernet connectivity the Ethernet port is still present on the Halo router but cannot be used. In this case CTRL 2 (RS485 must be selected).

The Halo database configures control port 2 as a General Switcher port, which is the protocol used by Snell's Aurora control system. However, an Ethernet port may alternatively be used to control the router, or monitor its status, by setting the selector switch as indicated above. The Ethernet port supports General Switcher protocol (SW-P-02) over Simple Network Management Protocol (SNMP). Section 3 of this guide describes the use of the Ethernet port in detail and only applies if the 2449 Nebula controller was ordered.

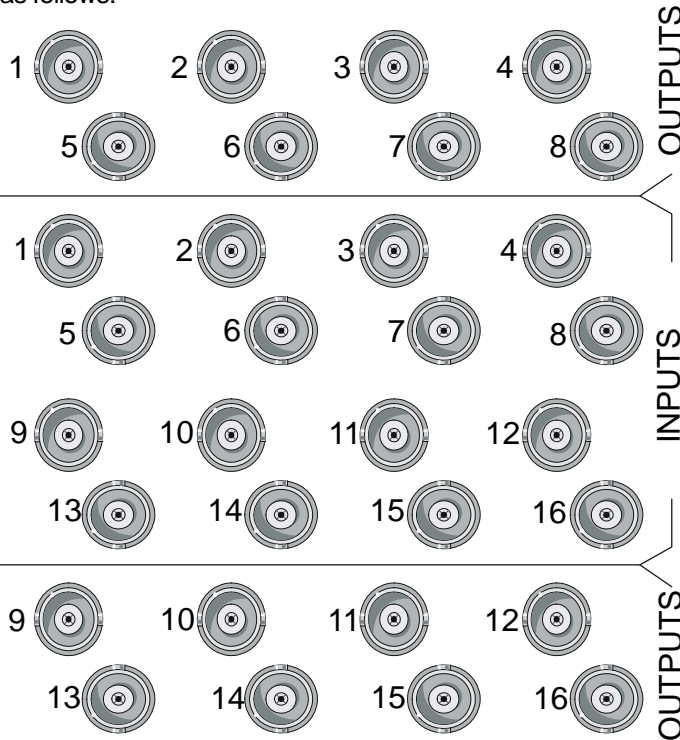


## 1.7 Signal connections

All video signals are connected to the rear panel, as follows:



Halo32 and Halo 16 configurations have the first 16 inputs and outputs on the left side of the panel, as follows:

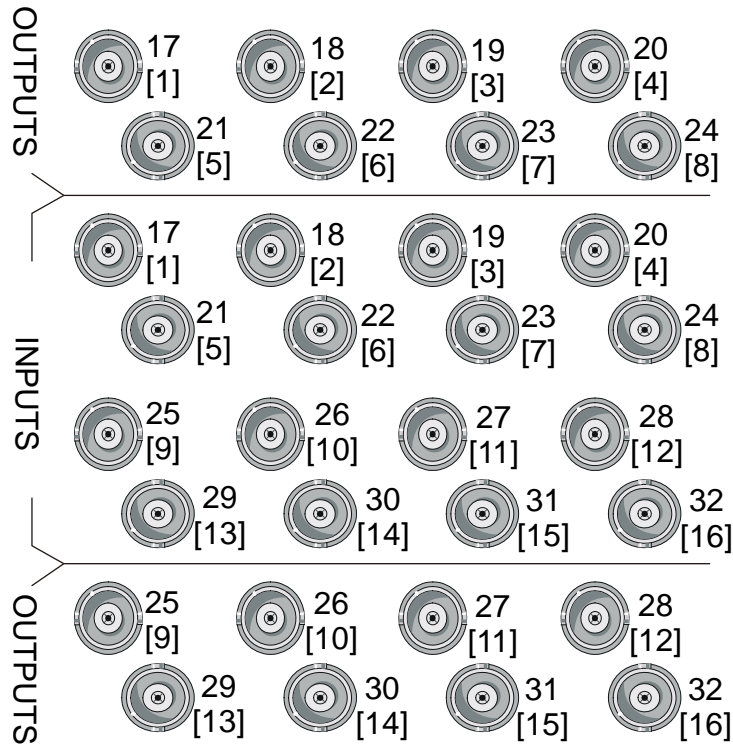


Halo 8 has only inputs and outputs 1-8

The Halo 32 uses signal connections on the right side of the panel, and the connector numbering reflects the three possible configurations, as follows:

- 32x32 uses standard numbering
- two levels of 16x16, second level numbering in [brackets]

- 32x16 with dual outputs, inputs use standard numbering, second outputs use numbering in [brackets]



## 1.8 Connector pinouts

### 1.8.1 'Config' connector

This RS232 9pin 'D' type socket is configured so that it may be directly connected, pin for pin, with the COM port of a PC running the Router Editor.

Pin	Function
1	N/C
2	Rx
3	Tx
4	N/C
5	0V
6	DTR COMMON
7	RTS
8	CTS
9	N/C



## 1.8.2 'EXPANSION' connector

The 37 way 'D' type Parallel control connector provided on both Master and Slave frames, extends the internal crosspoint control bus to the rear of each frame. This permits Master and Slave frames to be interconnected using the control cable supplied with Slave frames to construct multi-level routing switchers.

Pin	Function	Pin	Function
1	Enable	20	H/Shake
2	Level A3	21	Level A2
3	Level A1	22	Level A0
4	Dest A6	23	Dest A5
5	Dest A4	24	Dest A3
6	Dest A2	25	DestA1
7	Dest A0	26	A6 Source
8	A5 Source	27	A4 Source
9	A3 Source	28	A2 Source
10	A1 Source	29	A0 Source
11	Aud 0	30	Aud 1
12	Aud 2	31	F/Sync
13	Strobe	32	N/C
14	N/C	33	N/C
15	N/C	34	N/C
16	N/C	35	N/C
17	N/C	36	N/C
18	N/C	37	Chassis
19	Chassis		

## 1.8.3 'CTRL 1 and 2' connectors

These 9 pin 'D' type sockets may be configured in the database as either 'General Switcher' or 'Multi-drop' protocol. The pinout for these modes is as follows.

Pin	Pinout of socket when configured as:	
	Multi-drop	General Switcher
1	CHASSIS	CHASSIS
2	Rx-	Tx-
3	Tx+	Rx+
4	0V	0V
5	n/c	n/c
6	0V	0V
7	Rx+	Tx+



8	Tx-	Rx-
9	CHASSIS	CHASSIS

## 1.8.4 'ALARM' pinout

9 way 'D' type fixed socket on frame. Note that the following states are for a powered frame which is functioning correctly:

Pin	Function
1	CHASSIS
2	PSU 1 RELAY COMMON
3	PSU 1 RELAY NORMALLY CLOSED
4	PSU 1 RELAY NORMALLY OPEN
5	PSU 2 RELAY COMMON
6	PSU 2 RELAY NORMALLY CLOSED
7	PSU 2 RELAY NORMALLY OPEN
8	NOT USED
9	NOT USED

The relay contacts will change state to indicate any power failure within the master frame

## 1.9 Using the video reference

The Halo router is designed for SMPTE RP168 compliant video switching. Halo is a single standard system and therefore only one reference may be supplied to the router. Either a 525 NTSC or 625 PAL analogue reference can be plugged to the 'ALG. REF' BNC, which is a looping connection and therefore must be terminated directly on the unused BNC connector, or continued through to other equipment. Ideally colour-black, the reference signal may also be any stable analogue video signal. The Halo control module will auto-detect the reference connected and use this to switch all crosspoints in the router, as follows:

- A 625 PAL system will switch half way through line 6
- A 525 NTSC system will switch half way through line 10

In the absence of a reference signal, Halo will 'crash' switch as soon as it receives a connect instruction.

It should be noted that for 625 line systems the database must be configured for 525 line reference in order that the reference is auto-detected.



As Halo has a single 525/625 reference, to allow SMPTE RP168 compliant switching of HD signals, the SD reference applied to the Halo must be offset relative to the HD signals entering the Halo, to produce a switching pulse at the correct point.

The offsets required on an SD reference to switch at the correct point in a HD signal are listed below:

**50Hz Systems (using 625/50 reference):**

1080i/50	119us/1 line 55us early
720p/50	177us/2 lines 49us early

**59.94Hz systems (using 525/59.94 reference):**

1080i/59.94	218us/3 lines 27us early
720p/59.94	267us/4 lines 12us early

**Note:** these figures are approximate as there are timing tolerance windows on all standards, and some variation on the Halo itself. Therefore, minor adjustments may be required around these values, specific to each system.



## 2 The Halo database

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Every Master Halo is supplied with a pre-configured database, which is held in non-volatile memory on the control module, inside the unit. Halo uses the **Nebula** control system, just like the Freeway, Axis and Sirius router products, and in common with these systems, this database may be edited to suit the users exact requirements. However, unlike these systems, the user does not have to choose between a 'fixed' and 'editable' database, because in Halo only one database is accessible, which is pre-configured, but may also be directly edited. The user must refer to the **Nebula** user guide for instructions on editing the database.

### 2.1 Database configuration

The pre-configured Halo database has the following parameters:

Parameter	Setting
Level Types	4 levels of 32x32 each level 1 and 2 Sirius/Freeway 128 Normal SDV level 3 and 4 Sirius/Freeway 128 Normal Audio mix
8 Character Source Names	'SRC 1' - 'SRC 32'
8 Character Dest Asc. Names	'DEST 1' - 'DEST 32'
Route Inhibits	None
Salvos	None
Source Associations	1 to 32 are 1 to 1, 33 to 192 not configured
Destination Associations	1 to 32 are 1 to 1, 33 to 192 not configured
Trigger Method per source	Set to 525 in order to auto-detect video reference
Source Audio Parameters	All set for normal stereo
Destination Audio parameters	All set to normal stereo

Control port 1 is configured as a multi-drop port with control panels configured as follows:





<b>Control Port 1 – Multi-drop</b>						
<b>Panel address</b>	<b>Panel Name</b>	<b>Panel type</b>	<b>Destinations</b>	<b>Sources</b>	<b>Overrides</b>	<b>Levels/ Brightness</b>
1	PNL 1-1	6276-XY	All	All	None	All/6
2	PNL 1-2	6276-XY	All	All	None	All/6
3	PNL 1-3	6276-XY	ALL	All	None	All/6
4	PNL 1-4	6277-8	1-8	All	None	All/6
5	PNL 1-5	6277-8	9-16	All	None	All/6
6	PNL 1-6	6277-8	17-24	All	None	All/6
7	PNL 1-7	6277-8	25-32	All	None	All/6
8	PNL 1-8	6705	1	1-32	1 to 8	All
9	PNL 1-9	6705	2	1-32	1 to 8	All
10	PNL 1-10	6705	3	1-32	1 to 8	All
11	PNL 1-11	6705	4	1-32	1 to 8	All
12	PNL 1-12	6705	5	1-32	1 to 8	All
13	PNL 1-13	6705	6	1-32	1 to 8	All
14	PNL 1-14	6705	7	1-32	1 to 8	All
15	PNL 1-15	6705	8	1-32	1 to 8	All
16	PNL 1-16	6705	1-16	1-16	None	All



The default dial-up keypad layout for the 6276 panel is as follows:

Protect						7	8	9
Line-up						4	5	6
	UP					1	2	3
	DOWN					DEST SRC	0	CLEAR

The default dial-up keypad layout for the 6277 panel is as follows:

Protect				7	8	9
Line-up				4	5	6
	UP			1	2	3
Dest ident	DOWN			SRC	0	CLEAR



## 3 Using the Ethernet port

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<b>Important Note:</b>	This section only is only applicable if the Halo router is an Ethernet enabled model. See the label on the rear panel of the Halo router for details.  If the Halo router is not Ethernet enabled then the Ethernet port is still present on the rear panel but cannot be used and so this section does not apply.
------------------------	--

### 3.1 Introduction

The Halo rear panel has one RJ45 type Ethernet connectors fitted. The following must be configured to activate the Ethernet port:

- The rear panel selector switch must be set to 'E'NET'
- RS485 port 2 protocol must be set to General Switcher protocol in database

The port is configured for connecting to a 10 Base T Ethernet Hub, and when configured correctly, will allow the router to be controlled, and for status information to be requested, using Snell's General Switcher protocol over SNMP.

Ethernet support for Halo is provided using a 'SC12' chip, which is a 80186 processor system complete with RAM, NVRAM, serial and Ethernet ports all in one package. The chip has system software and configuration files which may all be loaded and edited using a software tool supplied with the system. This tool may also be used to test the Ethernet connection, control the router and view the status.

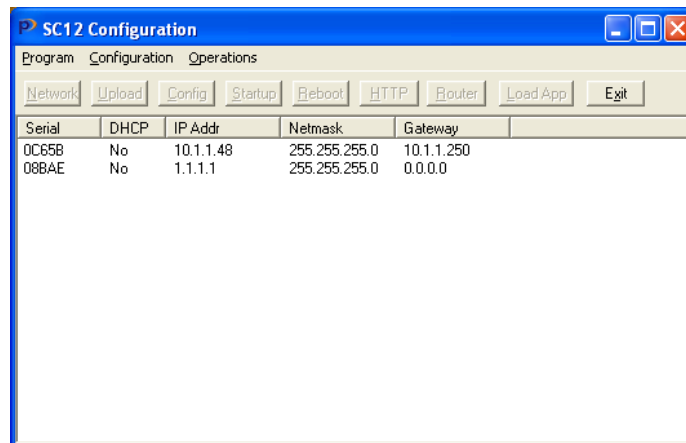
This chapter describes the software configuration of the SC12 chip using the supplied configuration tool.

### 3.2 Connecting Halo to a network

A standard CAT5 patch cord may be used to connect the Halo active Ethernet port to a 10 Base T hub or switch. By default, the SC12 chip is configured for DHCP, meaning that a DHCP Server must be present on the same network segment in order an IP address to be assigned. Without this, the Snell configuration tool must be used to manually assign an address. The SC12 chip includes TELNET and FTP servers in order to support the configuration tool.

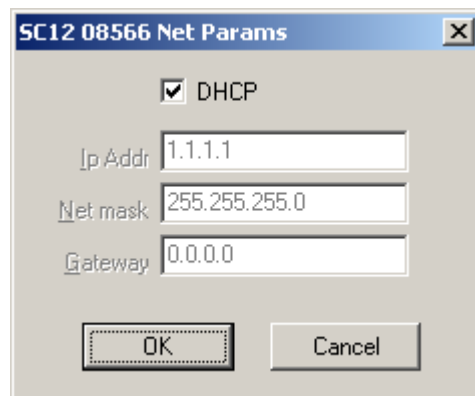
### 3.3 Using the configuration tool

The user requires a PC running the Windows NT, 2000 or XP operating system. The supplied software should be copied into a new directory, along with the 'uploads' subdirectory. The tool may then be launched directly from the 'SC12Config.exe' file, or from a shortcut created from this file. Providing the Halo is on the same network segment, the configuration tool will search the network and show the following:



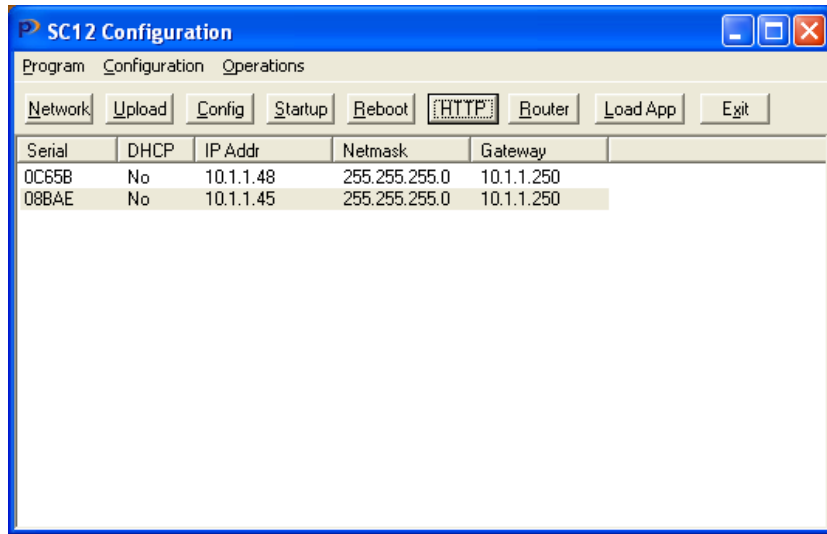
The serial number will match that printed on a barcode label on the SC12 chip.

The IP address of 1.1.1.1 means that no address has been assigned to the SC12 chip, this must be done by highlighting the required device (if there are more than one), and clicking on 'Network', the following window will appear:

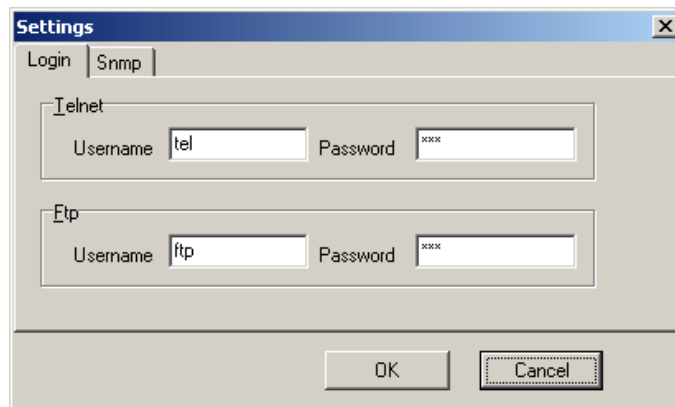


If a DHCP Server is present on the network (recommended), leave the box checked. If not, uncheck it and assign a unique IP Address.

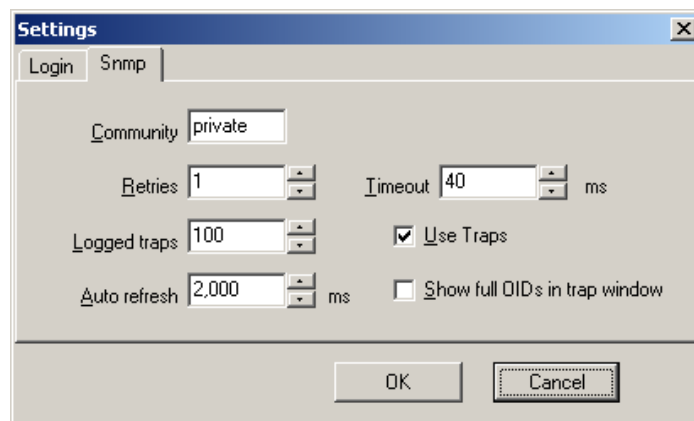
Click OK, this will force the SC12 to fetch an address or take the assigned one. If successful, the following will appear after a few seconds:



If any problems are encountered up to this stage, the user should check the application settings by selecting Program\Options from the toolbar. The Windows should appear like this:

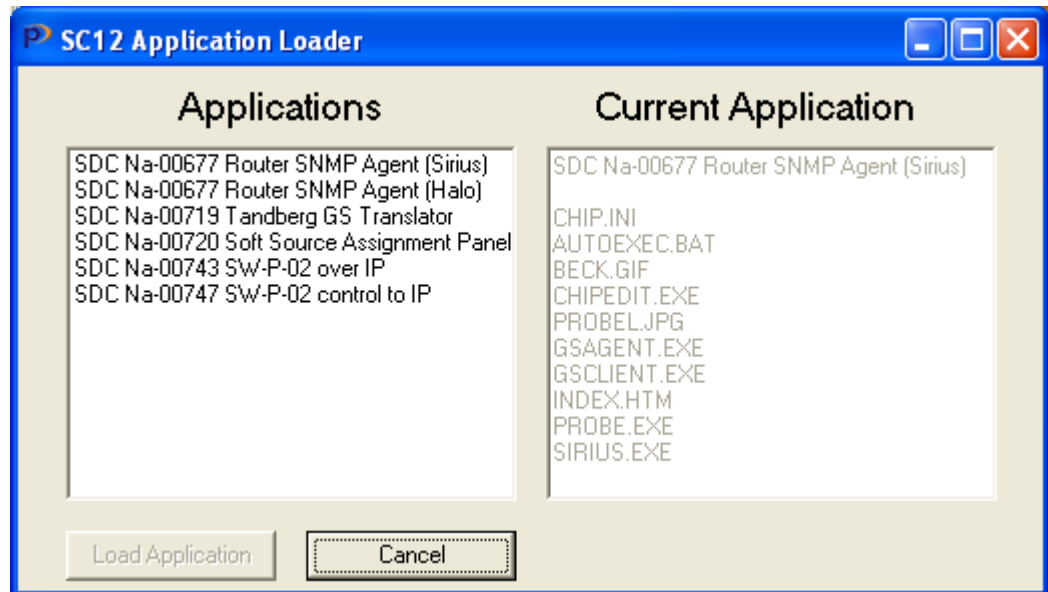


The passwords for 'tel' and 'ftp' are identical to the usernames





The user may now check what software exists on the SC12 chip by clicking on 'Upload', the following will appear:



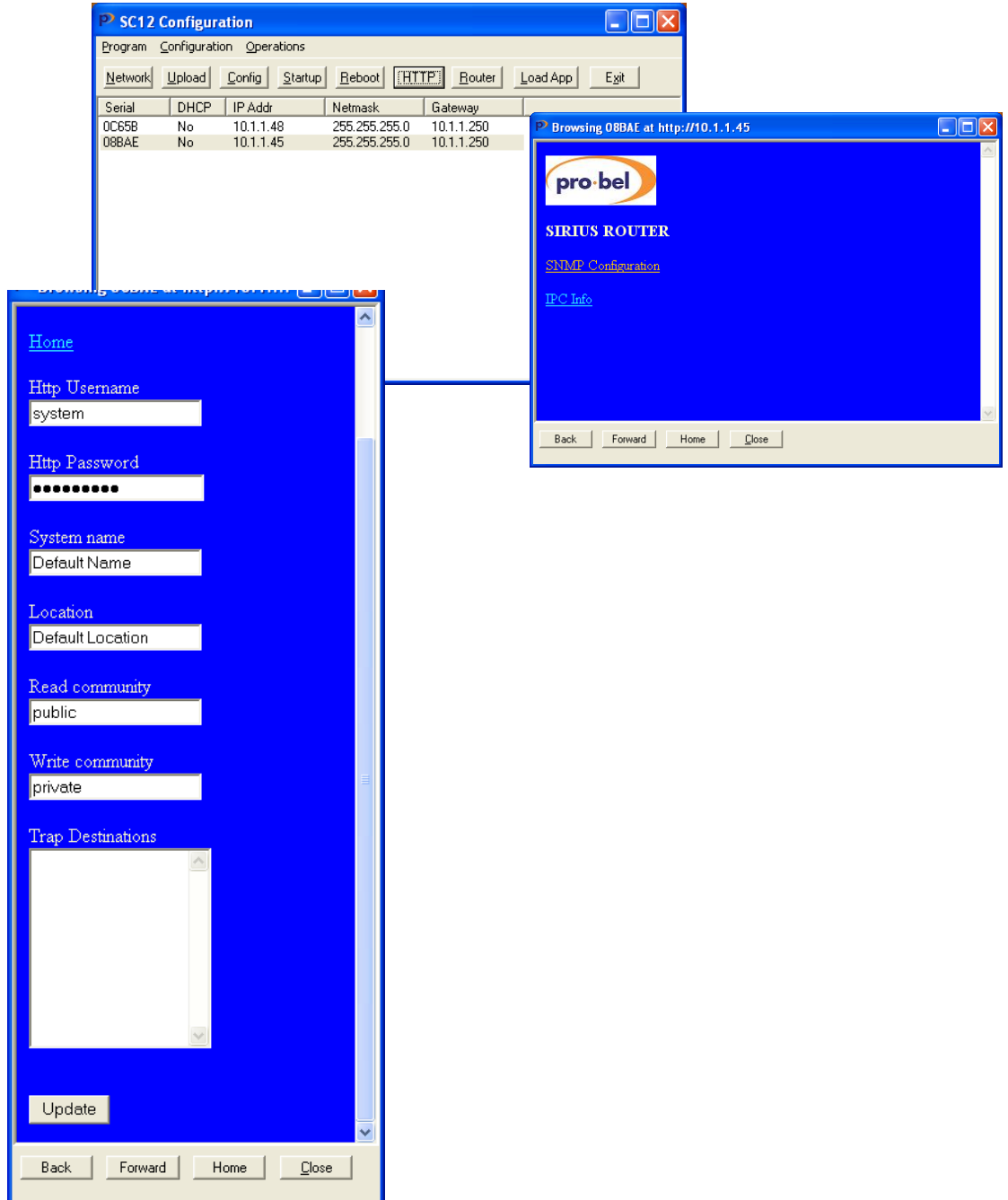
In the right window are the elements already existing on the device, in the left are the elements in the PCs 'uploads' directory. To load all elements, click 'All', to load a selection, highlight the required element and click 'Selection'. The recommended files for loading are:

Autoexec.bat	must contain the line 'gsagent'
Beck.gif	graphic
CHIP.INI	the configuration file for Gsagent.exe
CHIPEDIT.EXE	a tool for viewing and editing CHIP.INI
Pro-bel.jpg	graphic
Gsagent.exe	The Sirius SNMP agent, this is essential
Gsclient.exe	SNMP agent
Index.htm	configuration web page
Probe.exe	a debug tool, not required on production systems
Sirius.exe	identifies the router type as Sirius

When complete, close the window which returns to the configuration tool.



To test the SNMP agent, the user can configure their PC as a 'trap destination'. From the main window, click on HTTP:



Click on SNMP Configuration, the HTTP Username and Password are:

- 'System' and 'masterkey'
- Enter the IP address of the PC you are using in the list, followed by 'update'.
- Close the window and Reboot the chip from the configuration window.



The user may check the contents of the configuration file by clicking on 'Config', the file may be edited here as well, although this is not usually necessary:

```
[GSAGENT]
SYSOID=1
SYSDDESC=Pro-bel Sirius router

ENABLEAUTHTRAP=2
HTTPUSER=system
HTTPPASSWORD=tdwyhsslz
SYSNAME=Default Name
SYSLOCATION=Default Location
READCOMMUNITY=public
WRITECOMMUNITY=private
[WEB]
MAINPAGE=index.htm

[IP]
DHCP=0
ADDRESS=10.1.1.45
NETMASK=255.255.255.0
GATEWAY=10.1.1.250
[MISC]
BIOS_INI_BUG=NO
```

Before the system can be tested any further, the SNMP Trap Service must be installed on the PC. This is described next:

## 3.4 Installing the Windows Trap Service

### 3.4.1 Windows NT

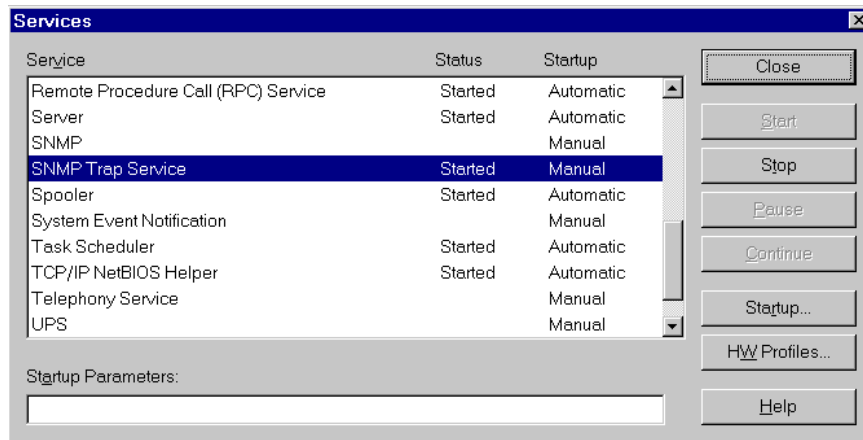
To check to see if the SnmpTrap service is running under Windows NT, open the control panel then double click on the 'Services' icon. Look for 'snmptrap' in the list of services and check to see if it is running.



Services

Double click on Services

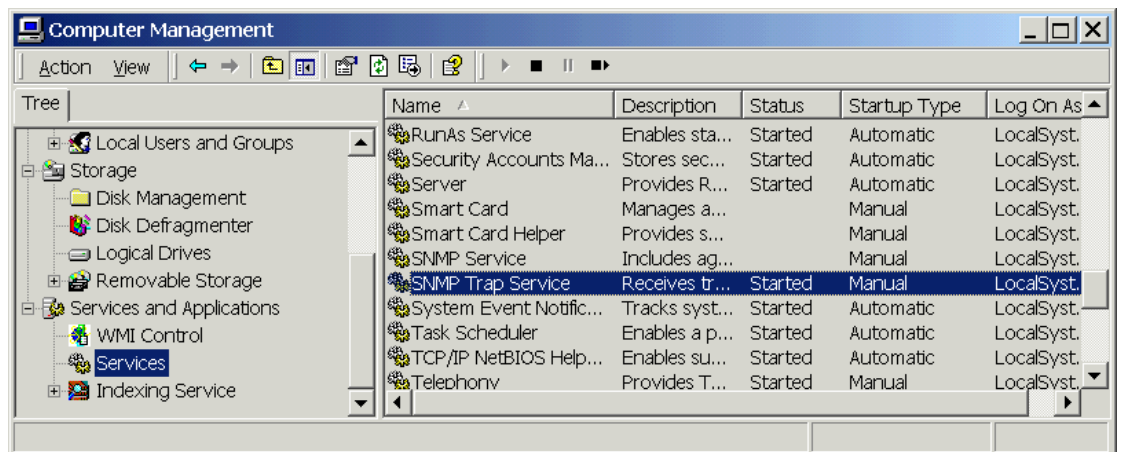




And check that 'SNMP trap service' is started. To install the service, use the 'Network Setup' wizard: Right click on 'Network Neighbourhood', choose Properties. Select the 'Services' page, then click the 'Add' button. Select the 'SNMP service' from the list. You may need to provide your original Windows NT setup disk to complete the installation.

### 3.4.2 Windows 2000/XP

To see if the Snmp trap service is running, Right-click on 'My Computer' and choose 'Manage' to open the WMI console. Select 'Services and Applications', then 'Services' and see if the 'Snmp trap service' is listed on the right hand side of the window.

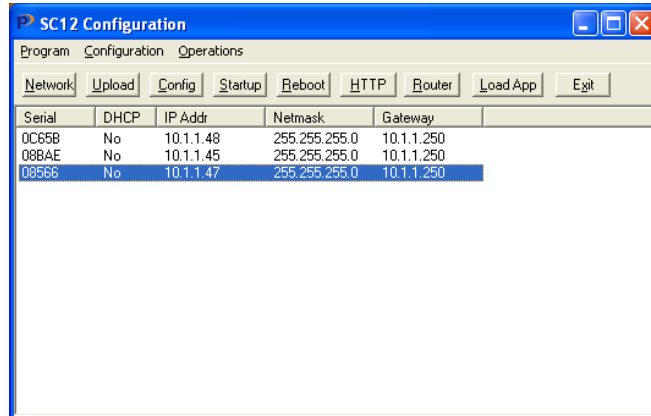


To install the SNMP service in Windows 2000/XP use the 'Add/Remove Windows Components' function of the 'Add/Remove programs' control panel applet. The SNMP service is listed under 'Management and Monitoring tools'.

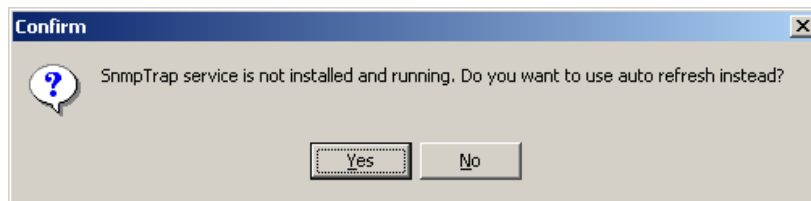
The final step, once you have ensured that the Snmp Trap service is running, and that the IP address of your management station is listed in 'Trap Destinations' on the agent, is to enable the use of traps in the SNMP manager by checking the 'Use Traps' checkbox on the SNMP page of the Program Options dialog. (Program|Options).

### 3.5 Controlling the router

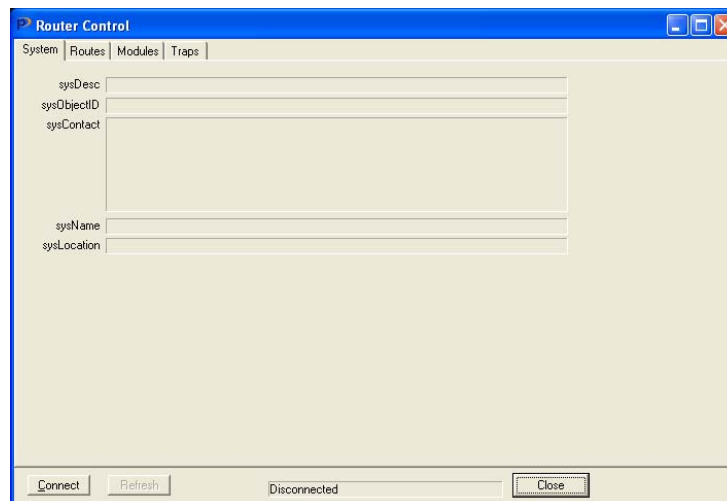
From the main window, click on 'Router':



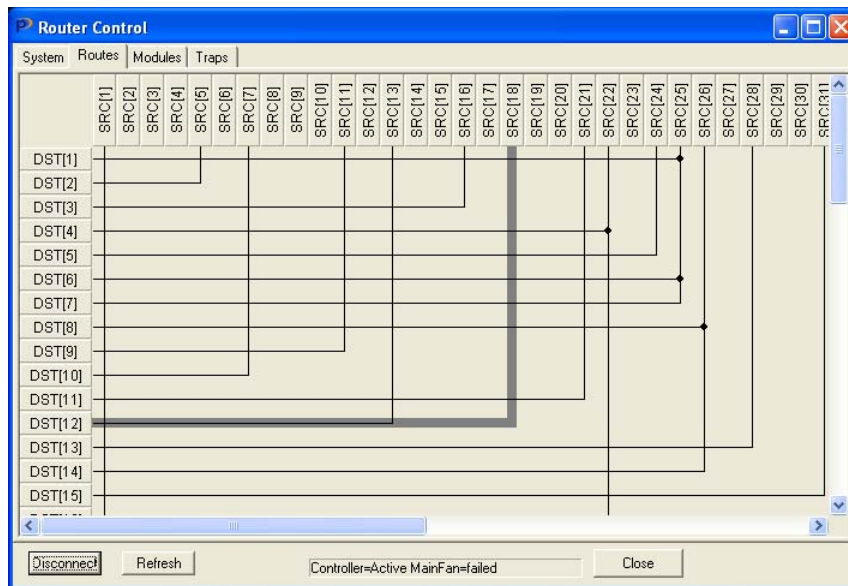
If the following window appears, you need to install and start the SNMP Trap service on your PC for full functionality, see the previous section



When the following window appears, click 'Connect':



If the connection is successful, the 'Routes' tab may be selected and the following will appear:



This screen shows the route status, with a shadow representing the mouse cursor position, clicking will activate this route, which will indicate as a new black line. This action confirms that General Switcher protocol is functioning over SNMP. The user may also check the module and PSU/fan status by selecting the 'modules' tab.

## 3.6 Configuration tool router control screens – SNMP responses to the level switch settings

The router control screens are intended to show that the router controller is operational, and setting routes on this screen uses confirmation of setting the crosspoint from the Nebula controller.

The router control “routes” screen only shows level 1 routing information. The “modules” screen shows all the modules in place, irrespective of their level usage. Each module represents 16 destinations on the router.

The “routes” screen assumes that the number of sources is the same as the number of destinations available, for the sake of simplicity. The number of destinations available is taken from the Nebula controller. The number of destinations returned by the controller depends on correct setting of the database in the editor, and on the level switch settings: 32 is returned when both switches are set to “0”, 16 when only one is set to “0” and 16 when both set to “8”. Either of these quantities will be reduced to the number of destinations set in

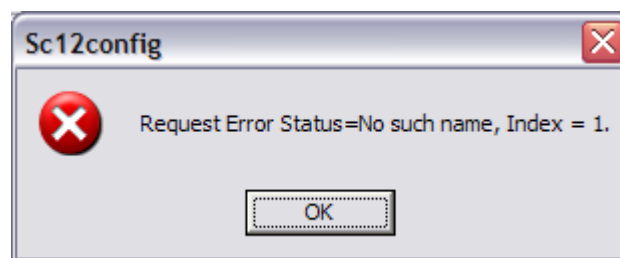


the database, if that figure is lower. Other switch settings realise zero destinations as none exist at level 1.

Although the square router assumption is made by the configuration tool's display, the Nebula controller will have also informed the Ethernet controller of the number of sources as set by the configured database. This limit determines the SNMP response to a particular destination-source routing request:

- 16x16 router: The user should reduce the number of sources from 32 to 16, in the Nebula editor, otherwise source values 17-32 will be affirmed by the SNMP trap incorrectly.
- 32x16 router: The user should set the number of sources to 32 in the Nebula editor. The source values 17-32 cannot be entered from the configuration tool, but they can be set from other SNMP interface tools, and an affirmative SNMP trap will be sent.

The SNMP response to setting a destination or source greater than the quantity available is to send an SNMP "no such instance" alarm. The alarm is also returned for negative or zero source values. From the SC12 configuration tool, it is seen as a Windows error message: "Request Error Status = No such name, Index 1" (see below). It will only be seen if the Nebula configuration has been set with the number of sources less than the number of destinations, therefore showing out-of-range source values on the screen, and an attempt is made to set to one of these values.



The number of destinations returned by the Halo 8 will be 16. This is due to the fact that the Halo 8 is effectively a cut-down version of the Halo 16. Routing destinations 1-8 to a source that is greater than 8 will disable that destination. Routing any source to a destination greater than 8 will have no effect. In both cases no alarm will be sent.



## 3.7 SNMP terminology

SNMP is a complex subject and cannot be fully described within this manual. The following is a summary of terms that may be encountered:

### **Manager and Agent**

The terms 'client' and 'server' tend not to be used when discussing SNMP. Instead, the terms 'Manager' and 'Agent' are used. The agent is the device being managed, normally some sort of network infrastructure such as a router or hub. The manager is the software that is using SNMP to communicate with agents. The reason that the terms 'client' and 'server' are not appropriate is that these terms imply a central server supplying services to a number of clients. With SNMP normally one manager is used to manage a number of agents, although it is perfectly possible for an agent to be connected to more than one manager at once.

### **MIB**

SNMP is a 'variable-based' protocol. An agent provides an interface comprising a number of variables, these can be scalar variables (a single value, for example 'SysLocation' a string describing the physical location of the device) or tables, which are lists of structured records, like database tables. Each device will want to provide data that is structured in accordance with the type of the device. The structure of the information provided via SNMP for a particular device is called a "management information base2" or MIB. In the case of SNMP the MIB is stored in a file – wherein the structure of the information is described using a language called ASN.1.

### **MIB2**

Although a specific type of device will have a MIB that is particular to its function there are some variables that are deemed to be common to all devices managed by SNMP. These variables are stored in the 'MIB2' branch of the overall MIB tree. All SNMP managed devices are supposed to support these variables.

### **OID**

Variables within a MIB are identified with an OID, or 'OBJECT\_IDENTIFIER'. This is a long sequence of numbers, separated by dots. These numbers are globally unique and are managed by the IANA on behalf of the IETF. In practice the IANA does not approve every OID, but assigns an OID to an organisation, which then becomes a 'branch' of the global namespace. Pro-bel's OID is 1.3.6.1.4.1.6419.1 . The OID for the Halo router is 1.3.6.1.4.1.6419.1.1.2.



## **PDU**

PDU stands for 'Protocol Data Unit' and is a UDP packet conforming to SNMP format specifications sent between manager and agent. There are three four basic PDU types: GET, GETNEXT, SET and TRAP. For example, to retrieve a variable from an agent, a manager sends a GET PDU then waits for a GET response from the agent. Similarly with GETNEXT (which retrieves the 'next' variable in the MIB from the one asked for) and SET.

## **TRAP**

A manager initiates GET, GETNEXT and SET transactions, by sending an appropriate PDU. A TRAP, on the other hand, is send unsolicited by the Agent. The manager does not have to respond to a TRAP. TRAPs are intended to allow an agent to inform a manager that something requires attention. It is then up to the manager to decide what action to take. A TRAP can include variable bindings, but it doesn't normally include a lot of data – normally it is sufficient to indicate to the manager what has changed, so the manager can then use a GET to retrieve the information.



## 4 Troubleshooting

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The following information is intended as a brief guide for diagnosing faults associated with a Halo router.

It should be noted that Halo frames are sealed units and contain no user serviceable parts, therefore should this product require servicing, you should refer to Snell or your local distributor.

All the following assume that at least one power supply is powered and functioning in each frame in the system.

### Check the front panel LEDs:

- At least one power supply LED must be on
- A Halo must have a flashing 'hello' LED to indicate communication with the Master controller

### The PC Editor will not connect 'on-line'

- Check that the cable is connected to the Halo 'CONFIG' port
- Check that the router is a Master frame
- Check the Editor is configured for the correct PC COM port
- Check the baud rate setting in the editor for 38400
- Check cable continuity

### The Network connection doesn't work

- Check the label on the rear panel to make sure the Halo router is an Ethernet enabled model.
- If a non Ethernet enabled Halo router was ordered/supplied Ethernet is not supported.

### The control panels connected to Halo do not function

- Check that the panels are connected to a Master frame
- If using the pre-configured database, check the panels are connected to Control port 1
- If the database has been edited, check the database configuration with an editor
- Check the HEX address of the control panels matches the database setting
- Check the control panel DIP switch settings in the Nebula user guide
- Check cable continuity



## The external control system does not control Halo

- Check that the control system is connected to a Master router
- Check the Halo level configuration HEX switches are correct
- If using the pre-configured database, check that the external control system is connected to Control port 2
- If the database has been edited, check that the database configuration has a General Switcher port configured with an editor
- Check cable interconnections
- Check electrical characteristics and protocol of controlling device are compatible with that configured into the database

## The panel is communicating but there are no (or incorrect) responses to button presses - panels not in self-test

- Check cable interconnections
- Check that the panel has been configured in the database as the correct type
- Ensure that each panel on the multidrop chain has a unique serial address
- Check that the panel configuration switches are set correctly, see the Nebula user guide
- Check all level switches on routers are set correctly

## Video routes do not switch 'cleanly'

- The Halo router is designed for SMPTE RP168 compliant video switching
- Check that a suitable video reference is plugged to the rear connection
- Check that the analogue video reference is correctly terminated
- Check settings in database for 525 reference, which configures auto-detect

## The panel controls the wrong destination

- Check that the panel is assigned correctly in database
- Check the panel is set to the correct address

## The panel cannot select a crosspoint?

- If the database has been edited, check for:
  - panel assignment
  - level active
  - route not inhibited
  - no override active
  - level controllable
- Check router level HEX switch setting





The Master unit is switching but Slave levels are not following

- Ensure that the SLAVE bus cable is fitted correctly
- Check that the Master and Slave routers have the appropriate level mappings set
- Check the database is set up for a multi-level system



## 5 Specification

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### 5.1 General

#### 5.1.1 Control

RS485 ports:	2; independently configurable for either; driving chains of 16-multidrop devices (panels/under monitor displays) OR for external control
RS232 ports:	1; for system database configuration
Parallel ports	1; for control of slave Halo, Sirius, Freeway or Axis routers
Ethernet	Only available if the label on the rear panel indicates it is an Ethernet enabled model. 1 used instead of RS485 port for external control, supports General Switcher protocol (SW-P-02) over SNMP

#### 5.1.2 Reference

Analog video	1; 525/625 line PAL/NTSC looping, auto sensing, high impedance
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#### 5.1.3 External Power Supplies

Supply:	100Vac to 240Vac auto sensing
Power:	25W max

#### 5.1.4 General

Frame size:	3U x 19' rack mounting x 60mm deep (340mm deep including PSU tray)
Weight:	4Kg max

#### 5.1.5 Temperature range

Operating:	0°C to +40°C
Storage:	-10°C to +70°C



## 5.2 Standard Digital Video

### Inputs

Number and type:	up to 32 serial to EBU Tech 3276E, SMPTE 259M
Data rate:	50Mbit/s to 400Mbit/s
Impedance:	75 Ohm
Return Loss:	>15dB 10MHz to 300MHz
Equalisation:	>200 metres low loss video cable (typ. Belden 8281 or PSF 1 / 2) .

### Outputs

Number and type:	up to 32 serial to EBU Tech 3276E, SMPTE 259M
Data rate:	50Mbit/s to 400Mbit/s
Impedance:	75 Ohm
Return Loss:	>15dB 10MHz to 300MHz

### Performance

Reclocking:	No reclocking is applied to any outputs
Transition timing:	525 operation, Line 10; 625 operation, Line 6



## 5.3 High Definition Television video

### Inputs

Number and type:	up to 32 to SMPTE 292M Unbalanced serial digital interface for high definition television systems
Impedance:	75 Ohm
Data rate:	10 Mbit/s to 1.485 Gbit/s
Return loss:	>15dB 5MHz to 1.485GHz
Amplitude:	800mV p-p nominal
Equalisation:	Up to 100m of Belden 1694A

### Outputs

Number and type:	up to 32 to SMPTE 292M Unbalanced serial digital interface for high definition television systems
Impedance:	75 Ohm
Data rate:	10 Mbit/s to 1.485 Gbit/s
Return loss:	>15dB 5MHz to 1.485GHz
Amplitude:	800mV p-p +/-10%
Equalisation:	Up to 100m of Belden 1694A