

GeNETics Product Information

A detailed guide to the GeNETics Generic Systems

- ◆ Concept
- ◆ Engineering Set-ups
- ◆ Networking
- ◆ Automation
- ◆ Details of Common Hardware

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Overview of the geNETics Platform

The geNETics Platform by Eyeheight Ltd is a totally new concept in digital peripheral product engineering for both Broadcast and Post-Production users. Eyeheight have employed a "Common Hardware Platform" enabling the same hardware to be programmed to perform a multitude of applications. For example, the same physical hardware can be a full RGB Legaliser or a Test Signal Generator with embedded audio depending on the contents of Proms.

The general features of this system are as follows:

1. A compact 1RU Frame which can hold up to 6 PCB devices.
2. Each of the above devices can be configured as either a "Dual" unit each with 1 input and 1 or 2 outputs OR a more complex single product with up to 2 inputs and 3 outputs. If all 6 devices are configured as dual units this gives the possibility of up to 12 simple products in a 1RU Frame.

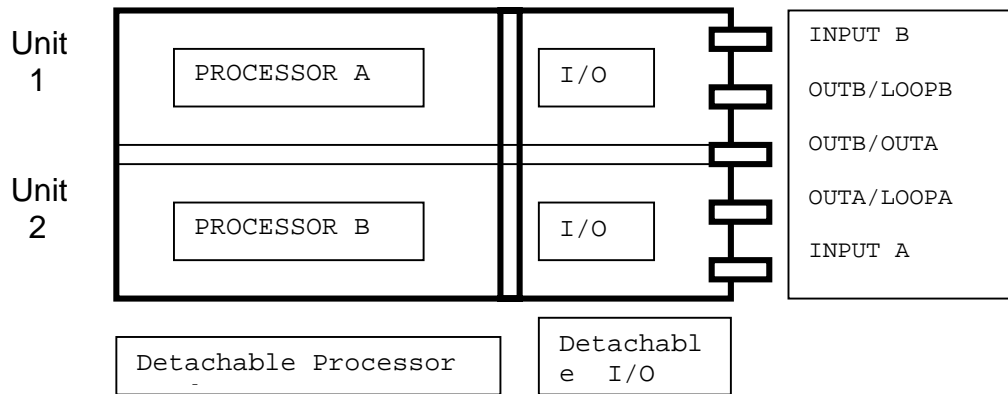


Fig 1 - Outline of a typical geNETics Product

(Note. Each channel of the above system is called a "Unit")

3. Detachable Input / Output card which can for example be a Dual SDI I/O (Shown above) or a dual AES Audio card or a Timecode and GPI Card. A common processor unit in which the individual products are Downloaded. (A TRUE common hardware platform which can be programmed to do a multitude of tasks).
4. A generic 1RU Control panel (Flexi-Panel, FP-9) which is a common control panel for all the. The 1RU Flexipanel can be mounted locally on the 1RU Chassis (Flexi-Box) or mounted remotely from the chassis. This control panel is very easy and intuitive to use and features LCD Self legending buttons with multi-colour backlights. A single panel can control up to 16 products on the i-Bus network.

5. Specialist Control panels offer more specific control for certain products, for example, "Stereo Audio Fader" panels, "Video Mixer Control" Panels and various "legendable In-line" button panels.
6. PS2 Computer Keyboard interfaces for easy input of text into a system product.
7. Full multidrop networking of up to 192 products using the I-Bus network.
8. Generic Automation Protocol for all 192 possible products from a single RS422 Port.
9. Redundant "Hot Swap" Power supplies with independent mains inlets for true redundant PSU requirements.

Typical geNETics Platform Applications

Some typical geNETics platform applications that are available now are:

- ◆ Logo Inserter with animation and post legalisation (BA-2, BB-2)
- ◆ Dual/Quad Input Audio Mixer (AM-2, AM-4, AM4E)
- ◆ Single Channel RGB Legaliser with excellent transient suppression system and Integral Proc Amp. (OL-2, OL2A, OL2C)
- ◆ Combined Legaliser and Safe Area Generator (SL-2)
- ◆ Safe Area Generator with on screen illegal colour indication system (SA-1)
- ◆ Single and Dual Channel Loss-Ident system. (On video input loss the system will produce a user selectable Test signal with user defined text overlaid) (LD-2)
- ◆ Single and Dual Burnt-in Time code readers to display on screen time code from VITC or LTC. (BT-1, BT-2)

A full range of products is available from sales at Eyeheight Ltd

Customisation of Products

Due to the unique way in which these products are developed we are able to do a very high degree of customisation with remarkably short development times. This is due to the extreme standardisation we have used in our "Building Blocks" Both Hardware and software. Both our software and hardware are highly re-configurable. Please contact Eyeheight Ltd for further information.

Eyeheight geNETics Networking

Up to 96 boxes can currently be networked together over a single 2-wire system. A typical set-up is as follows:

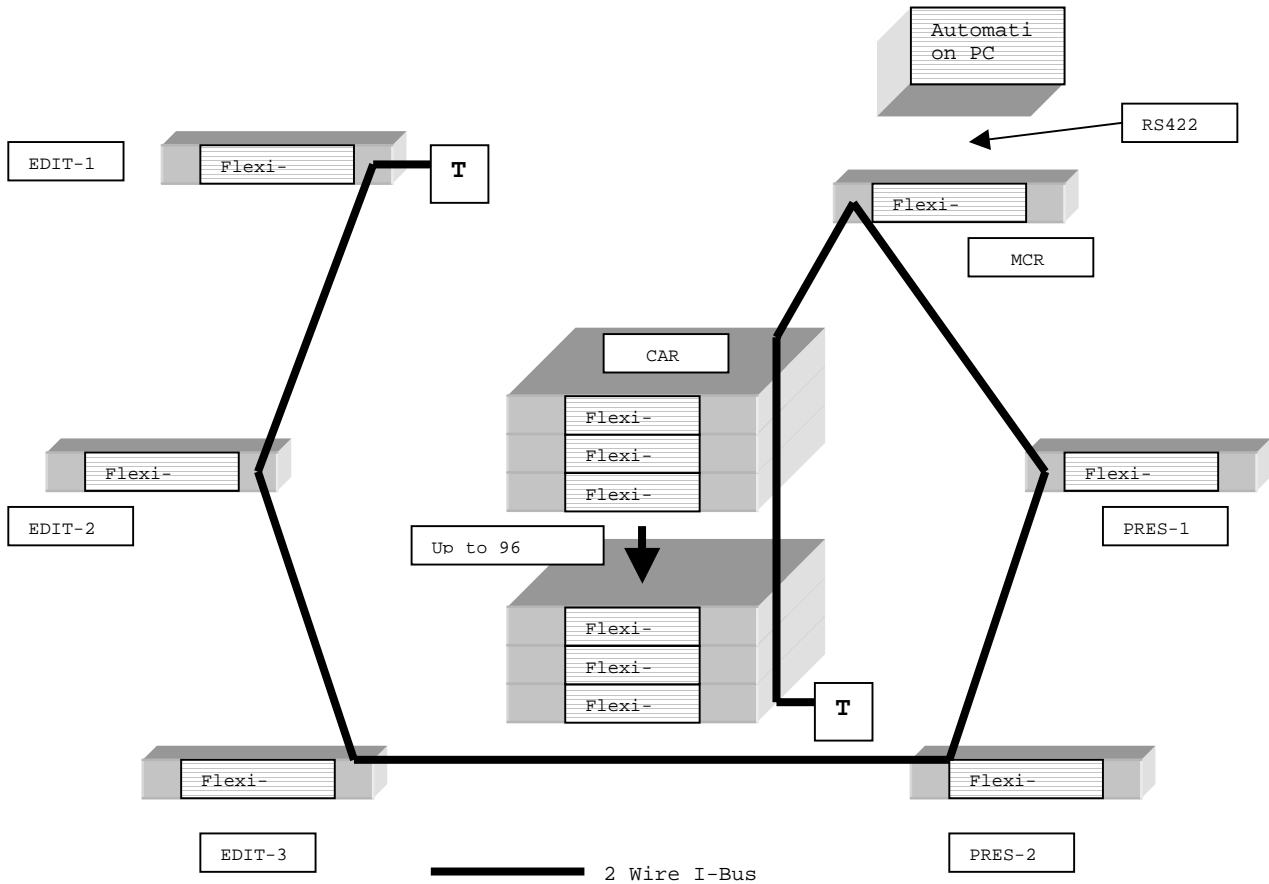


Fig 2. Typical geNETics Network Configuration

Each panel can be remotely sited and each product in each of the Flexi-Boxes is available to all the panels enabling sharing of devices. An RS422 port to an automation system provides control for all products on the network.

Flexi-Panel Overview

The Flexi-Panel is the common control surface, which can control most of the Eyeheight geNETics products. The panel can be mounted on the front of a Flexi-box or sited remotely up to 250 meters from the Flexi-Box. If the panel is sited remotely then a Blank front panel for the Flexi-Box is required (order code FF-9) and also a rear cover for the Flexi-Panel is required (order code RR-9). The Flexi-Panel has two control ports these are as follows:

1. Can-Bus (Which is also called the i-BUS). This is a 2-wire bus, which connects all of the Eyeheight geNETics products together on a single network. This will loop through up to 96 Flexi-Boxes enabling any panel to connect to any one of up to 192 products within the 96 Flexi-Boxes.
2. RS422. Each Flexi-Panel contains an RS422 port for connection to Automation systems. This RS422 port will receive commands from an automation system, which will then be broadcast over the i-Bus network to any of the 192 possible products. This means that an automation system can control all devices on an i-Bus network using a single RS422 port.

Up to 58 Flexi-Panels can be attached to a single i-Bus network. Each Flexi-Panel can acquire up to 16 units. The user can decide to "drop" or "pick up" a new device on the network at will.

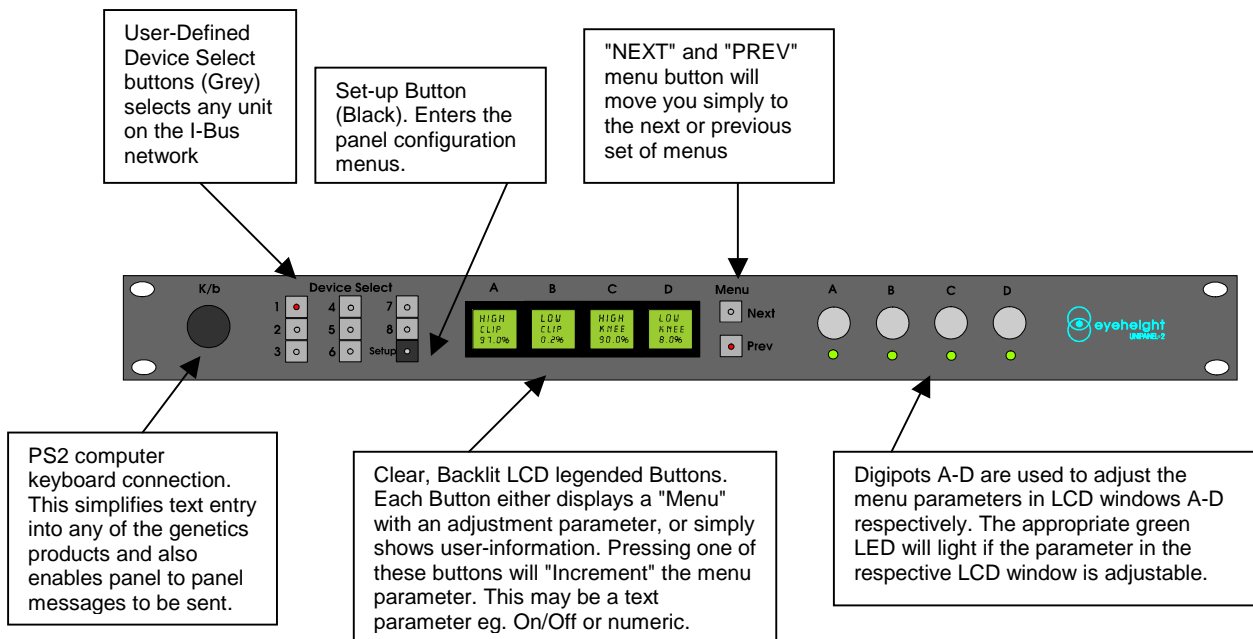


Fig 3. The Flexi-Panel

Operation of the Flexi-Panel

The following describes the operational features of the Flexi-Panel.

Device Select Switches

There are 8 grey device select switches with central LED indicators. Whilst in normal operation these allow the user to select between the products on the I-Bus network that have been assigned to this panel. The central LED indicator in the appropriate button will indicate the selected device. Up to 8 products can be selected at any one time (8 products - If each product is a "dual unit" then up to 16 units can be easily controlled from any panel) The "set-up" button will be described later.

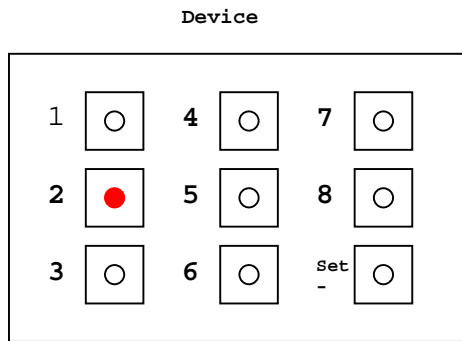


Fig 4. Device Button cluster with device #2

LCD (Menu) Switches A,B,C,D

There are 4 LCD windows on the Flexi-Panel. These LCD Windows are also pushbuttons. Pressing the LCD Window will activate the button. The LCD Windows are Backlit by a multicolour LED array allowing up to 16 colours. Whilst in normal (Not Set-up) operation the colour of the Window indicates the function of that window as follows:

LCD Window Colour	Function of the LCD Window
Bright Amber/Yellow (Information)	The LCD is for user information only. There are no adjustable parameters displayed in the window.
Bright Green (Adjustable single parameter menu)	The LCD Contains ONE adjustable parameter. This parameter can be adjusted by the respective digipot (i.e If window "C" is green, then window "C" will have a parameter that can be adjusted by digipot "C"). Also, pressing the window will "increment" the parameter in the LCD window. This is of particular use when the parameter is a "text list" for example

	On/Off, or 14:9/15:9/16:9.
Bright Red (Adjustable multiple parameter menu)	This LCD contains either TWO or THREE adjustable parameters. However, while the window is red the user cannot adjust the parameters. If the Window is pressed it will change to Bright Green and all other previously, bright green, windows on the Flexi-Panel will change to Dark Green. The user can now adjust the two or three menu parameters in this window by using the respective digipots with the green LED above them lit.

The LCD Graphic display normally shows 3 lines of 6 Characters on each line. The graphic display will show information about the status of the product and also provide some user information. Each window of information is called a "Menu". A menu will have from 0→3 Adjustable parameters within it. Because the Flexi-Panel contains 4 LCD windows, it can display 4 menus at one time. The menu structure is normally "Flat". This means that there are no "Menu Trees".

The "NEXT" and "PREV" Buttons

Access to further menus is obtained by using the "NEXT" and "PREV" buttons.

Pressing the "NEXT" button will display the next four menus. Pressing the "PREV" button will display the last four menus. If the central LED within the "NEXT" or "PREV" buttons are lit, then it indicates that there are no more menus in that direction.

Rotary Digipots A, B, C, D

The rotary digipots are the main method for adjusting parameters. These will normally adjust the parameter in the respective menu LCD Window unless there are no parameters to adjust, or a window with a multiple parameter adjustment is selected (Red window). The Green LED's below each digipot indicates whether the digipot is currently selected to adjust a parameter.

The Rotary digipot is also equipped with a pushbutton action. This is used to "default" numeric values in a green window.

The Flexi-panel Set-Up Button

Pressing the Black "Set-Up" button which is located in the "device select" cluster of 9 pushbuttons will cause the panel to enter the set-up mode. Set-up provides a method of "acquiring" and "dropping" products on the I-Bus network and assigning them to one of the 8 device select buttons.

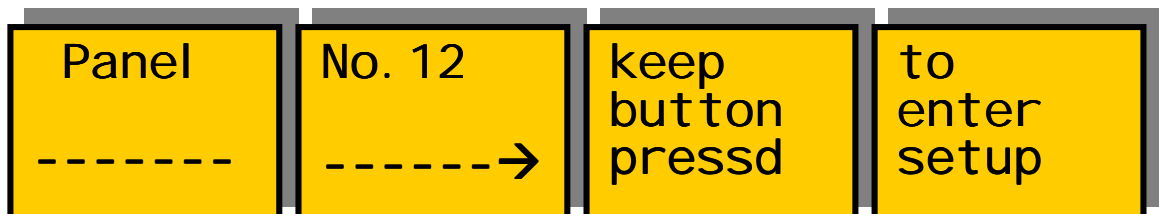
Firstly it would be a good idea to mention and explain the concept of "Ownership" when applied to the geNETics platform.

Ownership of products

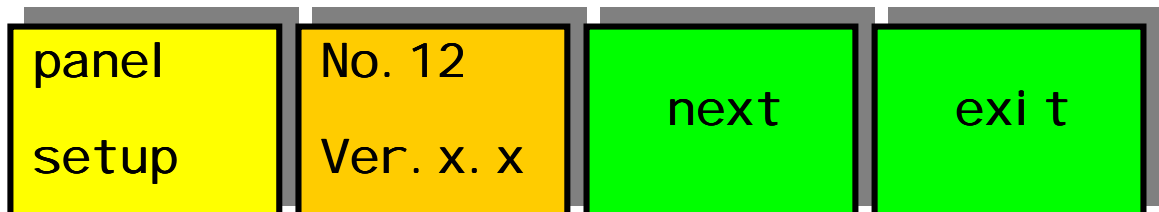
If we refer to Fig 2 (A Typical geNETics Network Configuration) there can clearly be many Flexi-panels on the I-Bus network this means that the products in the Flexi-boxes will be controlled by these panels. It is important, however, not to have a situation where the product (say for example a Legaliser) which is in use by EDIT 3 does not suddenly get taken away by EDIT 2. To avoid this we introduce the idea of "Ownership". Generally speaking once a panel "acquires" a product it cannot be acquired by another panel. This panel "owns" the product. There is a 1:1 relationship between a product and a panel. The product knows that it belongs to a particular panel.

The Set-up Menu

Upon entering the Set-up menu the following message will be seen:



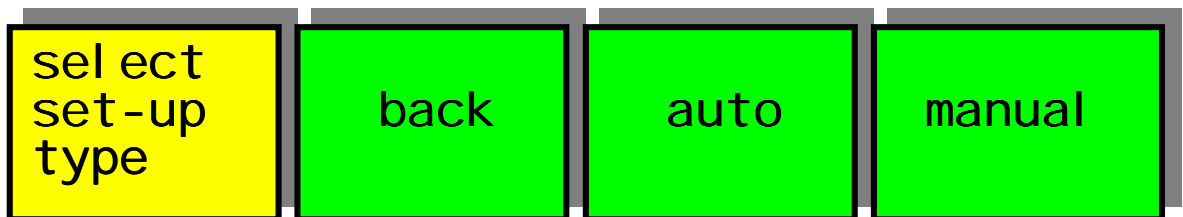
The panel informs you of it's panel number. If you require to enter set-up, keep this button pressed until the display changes to the following



Panel Numbers

It is worth discussing panel numbers at this point. Each Panel must have a unique "Panel Number". This number is a number from 1→58. This uniquely identifies each panel on the system. The panel number assigns itself AUTOMATICALLY when a panel is first powered up on an I-Bus network. (In other words when it is in either a box with some products in it or in a more elaborate network with perhaps several boxes and panels). The panel number can always be found by pressing the set-up button momentarily, upon which it will appear in the LCD Displays. When a new panel is added to the network always ensure that you perform an engineering "First Birthday" to reset it.

The user is again prompted to press the "NEXT" button or exit from set-up.

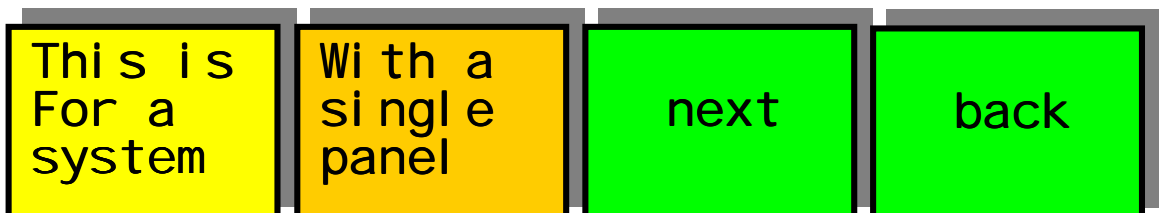


The user is prompted to press a green button. Button "BACK" will move back to the previous menu. Button "AUTO" will enter the automatic set-up routine. Button "MANUAL" will enter the manual set-up routine (For experienced users with complex networks).

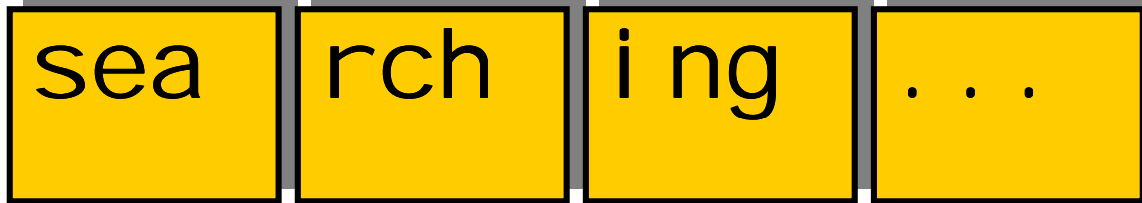
AUTO SET-UP

Auto set-up is provided for users who have products in a single box (Or two boxes with a maximum of 8 devices [products] installed and only one control surface. (Typically small systems are delivered with 2 or three products in a single box and a single control panel mounted on the front. This is the kind of situation that auto set-up is designed for.)

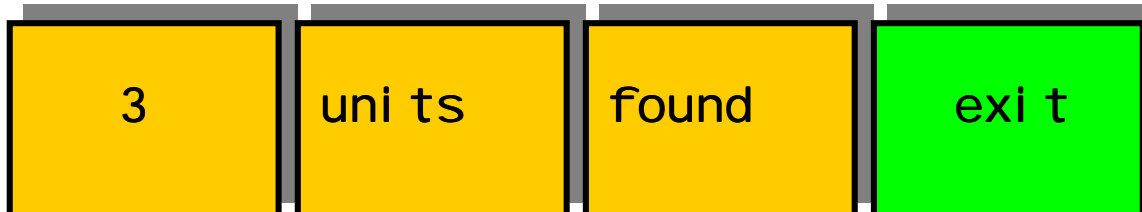
Upon pressing the "AUTO" button the next menu set is seen:



This menu informs you that for a successful auto set-up you must have only ONE control surface, (And less than 8 devices)
To continue, press "NEXT". The following message will be seen.



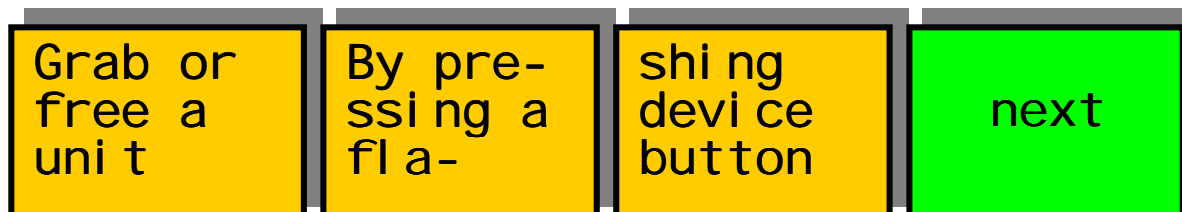
After the panel has scanned all the possible devices, the next message will be seen:



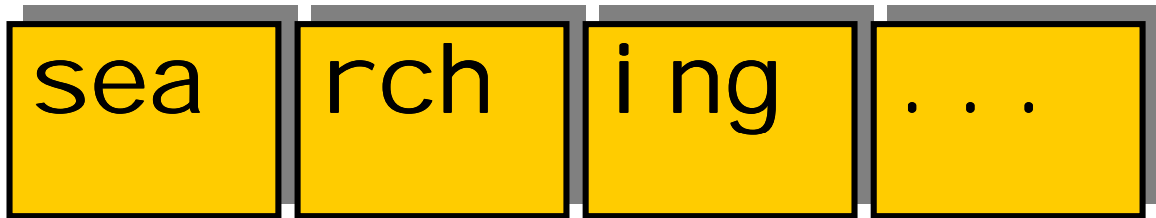
In this case this message indicates that 3 devices have been found. After this you are invited to press "EXIT". The panel can now control the three devices. Device#1 will be activated by pressing the "device 1" button. Device#2 will be activated by pressing the "device 2" button. Device#3 will be activated by pressing the "device 3" button. After pressing each device button, the device user name will be shown in the LCD windows in large letters. These each have default names that can be changed by the user. (see xxxxx).

Manual set-up

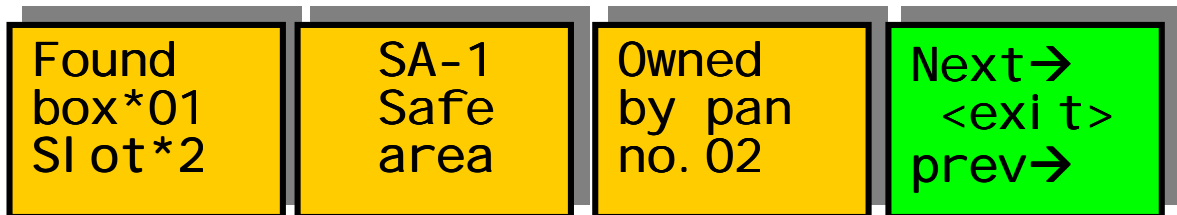
Manual set-up is provided for the management of a system consisting of more than 1 Flexipanel. A typical arrangement might be a system with 4 products, say 2 Legalisers and 2 safe area generators, which are shared between 4 Edit suites. Each edit suite would have a Flexipanel and each user has to share the Legalisers and Safe area generators. Manual set-up provides the flexibility to acquire products when they are required, and to release the product afterwards. After entering Manual Set-up the following message is seen. The message below will be explained in more detail after this section. Press "NEXT" to continue.



The following message will be seen.



When the Flexipanel finds a device something like the following display will be seen:

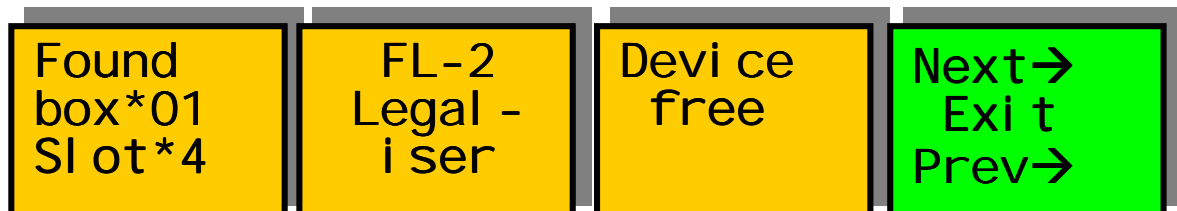


The first three windows (A, B and C) contain information about the unit found. The information is in the following form

Information window "A"	This shows the location of the PCB (device) within the box. (Slot Number 1→6, Box number 1→16).
Information window "B"	This shows the device product number on the top line. (In this case SA-1). The lower Two lines show the device user name.
Information window "C"	This shows the current "Owner" of this device. In this case it is the panel #1
Information window "D"	This prompts you to continue to scan for more devices or to stop.

In the above example of a device that has been found, that is not owned by this panel, no action can be taken. You are not allowed to acquire a device that is owned by another panel.

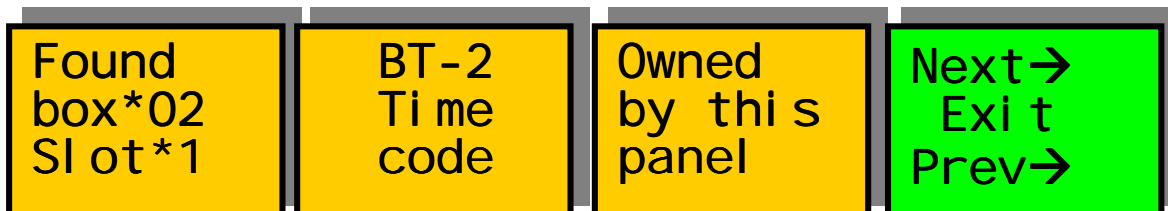
Another situation of a device found, is shown below:



In this case, a panel does not own the device (DEVICE FREE). This panel can therefore acquire it. In this case you will most likely notice that some of the central LEDs in the device button cluster (8 buttons) will flash. The ones flashing are the ones that are currently not assigned to any device. In order to

assign this device to a "flashing button" simply press the button. Repeated button presses will result in Acquire/Un-acquire toggling.

Yet another situation of a device found, is shown below:



In this case, the panel owning this device is "THIS PANEL". This panel can therefore "Free" this device should the user wish to do so. In this case you will notice that one of the central LEDS in the device button cluster (8 buttons) will be flashing. The one flashing is the one that is currently assigned to this panel. In order to "free" this device and therefore enable another panel to acquire it. Simply press the "flashing button".

Repeated pressing of the "NEXT" or "PREV" buttons will enable the user to "scan" up and down products on the network. The user will be prompted to continue scanning the network, or to exit.

Exiting Panel Set-Up mode

To exit panel set-up mode at any time, simply press the black button marked "Set-up" which is in the device button cluster. The system will exit and select the first device in the button cluster that has a product associated with it.

The PS2 Keyboard Interface

The Flexi-panel has a keyboard interface and this has many uses:

1. Text entry for products such as the "Video typewriter" (WR-2), or Loss Ident unit (LD-1/2). This is covered in the manuals for the individual products.
2. The "geNETics" Messaging system, which can send messages to products that requires limited text entry and also for sending messages from panel to panel as a limited communications system.
3. Entering personalised "User names" for each individual products so as to provide easy identification of that product.
4. Entering personalised "Memory names" for the user memories on individual products.
5. Provides the ability to Lock or Hide individual menus on individual products for security or ease of operation. (It may be convenient to hide certain menus from operational users for security or to simplify the

operation of the individual products. It is possible to hide all the menus apart from the memories, which can then be individually named for specific user applications).

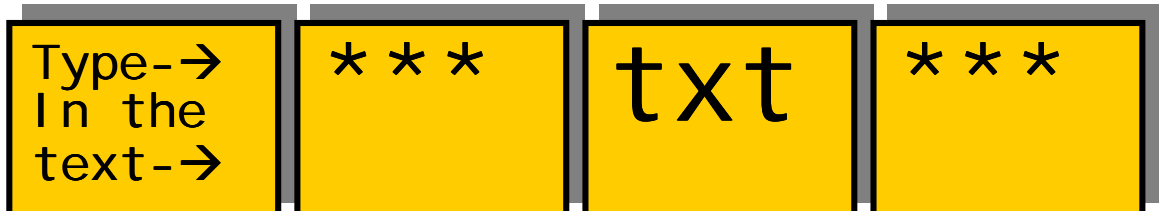
6. Sending Messages from Panel to Panel.
7. It is possible to do some engineering maintenance and diagnostic work using the keyboard.

The interface is a standard PS2 six-pin mini-din connector mounted on the front left-hand side of the Flexi-panel. Refer to Fig 3 for the position of this keyboard interface. Some W95 (Windows 95) keyboards may not work at the time of writing.

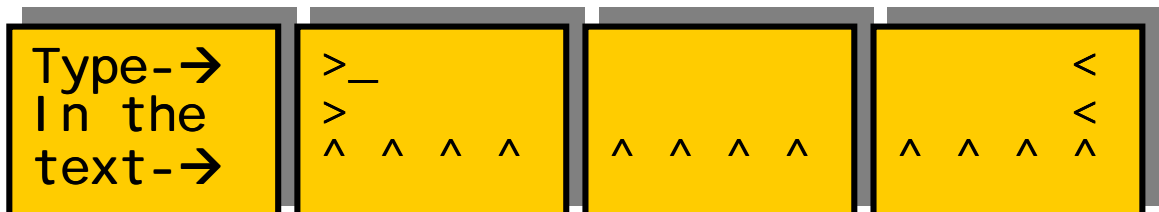
GeNETics messaging system

The geNETics messaging system is used to send text messages from the Flexi-panel to a particular product. The system works like this:

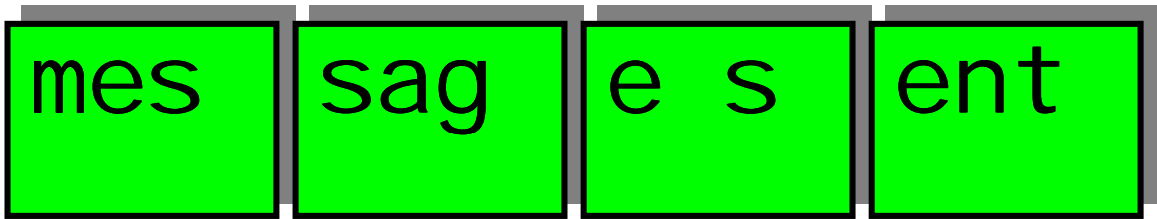
1. Plug in a standard PS2 keyboard into the Flexi-panel. The flexi-panel must be currently controlling the product to which you wish to send the message.
2. Press "F9" on the keyboard.
3. At this point the LCD Windows A,B,C,D on the flexi-panel should look like this for one second:



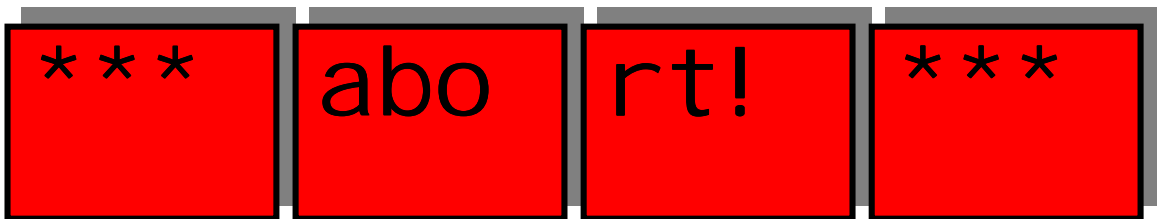
And then change to this:



4. In windows B,C,D are space to type up to a 32 character message. The flashing cursor indicates the current text position. A message can now be typed in via the keyboard. Press "Enter" at the end of the message. If the product has acknowledged the message the following will then be seen: (Message Sent)



If the product does not acknowledge the message, the following will be seen:



The above message is also seen if the "escape" key is pressed during text entry. In this case the "user" is aborting the message.

Text editing of the message window

The following table shows the commands for text editing in the geNETics messaging system:

Keystroke	Function
Backspace	Deletes the last character written
Enter	Sends the message in the LCD Windows B, C, and D to the currently selected Product.
Escape	Aborts the current message and exits the messaging system

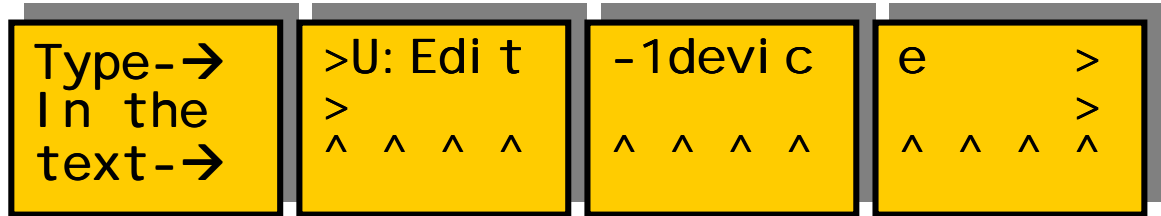
Using the messaging system for giving products user names

There is a special format of message that sends a new user name to a product. The user name of a product appears on the "front" set of menus when the flexi-panel selects a product. Setting up user names such as "EDIT 3 dev" or "PRES-A" makes it easy for the user of the flexi-panel to know which device is which, particularly when several products in different areas are controlled by one panel.

The following describes how to set up a new user name for a product:

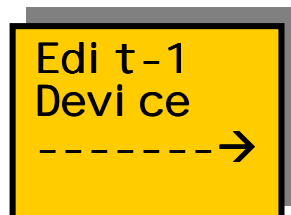
1. Ensure that the flexi-panel has the product which requires it's name changing, currently selected.
2. Press "F9" to enter the messaging system.

3. Type "U:" or "u:" followed by up to 12 characters (e.g. "Edit-1Device" which make up the new user name. The LCD Windows should look like this:

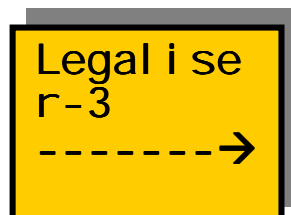


4. Press enter. If the green "Message Sent" display occurs, the message has been successfully sent and the user name changed.

Note that the user name normally appears in a LCD window as 2 lines of 6 characters. It is important to remember this when deciding on a new user name. For example "Edit-1Device" is a good user name and will appear like this in a menu:



Another example is "Legaliser-3". This is a bad user name and will appear like this in a menu:

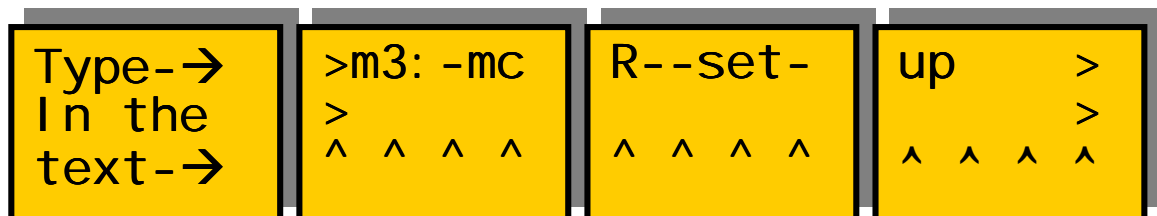


Using the messaging system for giving the "Memories" names in a given product

Nearly all of the Eyeheight GeNETics products have at least 4 user memories associated with them. Each of these memories can be named individually with a name of up to 12 characters.

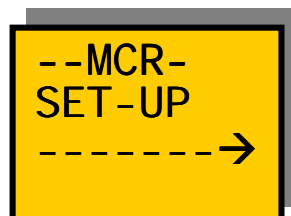
The following describes how to set up a new name for a given memory for a product:

4. Ensure that the flexi-panel has the product, which requires its name changing, currently selected.
5. Press "F9" to enter the messaging system.
6. Type "Mn:" or "mn:", where n is the memory number, followed by up to 12 characters for example, "m3:--MCR -SET-UP" which will make memory#3 be named as "--MCR-SET-UP". The LCD Windows should look like this:



4. Press enter. If the green "Message Sent" display occurs, the message has been successfully sent and the memory name changed.

Note that the user name normally appears in a LCD window as 2 lines of 6 characters. It is important to remember this when deciding on a new user name. For example "--MCR-SET-UP" is a good user name and will appear like this in a menu:



Note that the "-" signs could be spaces if desired.

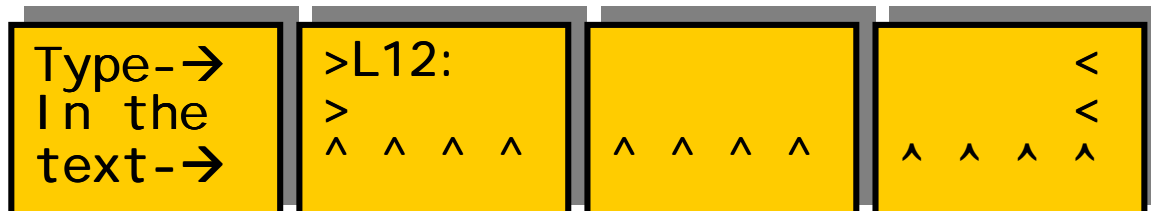
Using the messaging system to Lock or Hide Menus from the user

Each GeNETics product is controlled using a Flexipanel with a set of "Flat" Menus. Each "LCD Window" (A, B, C or D) contains a menu. The "Next" and "Prev" buttons will cycle the user through more menus. Repeated pressing of the "Prev" button until the LED in the "Prev" button light will bring the user to menus 0→3 respectively. If the user presses "Next" menus 4→7 are visible and so on.

Provision has been provided to "Lock" or "Hide" menus from the user. Locking menus can prevent inadvertent mis-operation of the product in some circumstances. Hiding menus can be used to ease the use of a product where certain menus are not applicable to the user. It is also possible to, for example, hide all the menus except for the user memories (Which can be individually named by the user) and program the memories only for specific functions relevant to the user so effectively making a "Custom" system.

The following describes how to set up a new user name for a product:

1. Ensure that the flexi-panel has the product which requires it's menus locked or hidden, currently selected.
2. Press "F9" to enter the messaging system.
3. Type "Lnn:" or "Hnn:" where nn is a 2 digit number which is the menu number (e.g. "L12:" which will lock menu#12). The LCD Windows should look like this:



4. Press ENTER. If the green "Message Sent" display occurs, the message has been successfully sent and menu number 12 will be locked from use. A small Padlock symbol will appear in menu#12.

Similarly the message H12: will result in menu 12 appearing as asterisks. If the user hides a bank of 4 menus (i.e. 4,5,6,7 which would normally appear as a visible bank of four) the menus will completely disappear from the user rather than appear as a bank of asterisks.

To "unlock" or "un-hide" a menu using the above general procedure, type "Ann:"

Global Lock

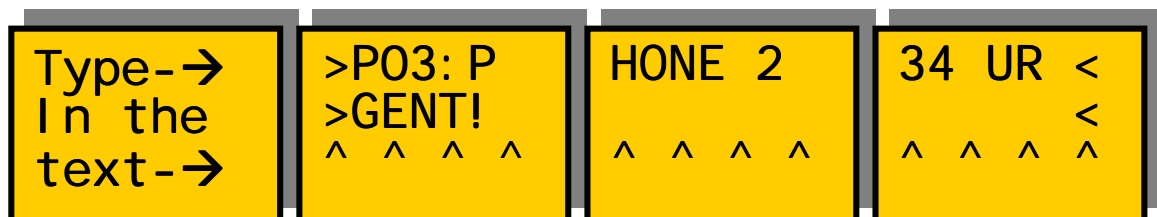
If the user types "L:" with no 2 digit number, a "Global Lock" is applied to the whole of the device. A global lock can be "undone" by typing "A:" to access all the menus again.

Using the messaging system send "panel to panel" messages

There is a special format of message that sends a message to another panel. When this message is sent it will appear in the LCD Windows of the destination panel in "Alarm Red".

The following describes how to set up a new user name for a product:

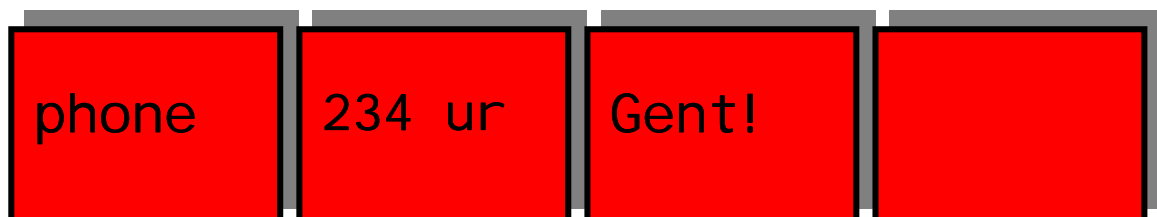
1. Press F9 to enter the messaging system.
2. Type "P<nn>:" where <nn> is a 2 digit decimal panel number (from 1→58) followed by up to 18 characters (e.g. "PHONE 234 URGENT!". The LCD Windows should look like this:



3. Press "ENTER".

Note that the message normally appears in the LCD windows as a line of 18 characters. It is important to remember this when sending a message.

The above message will appear like this in the destination panel #3 window:



The destination panel can press the "NEXT" or "PREV" buttons to clear the display back to normal.

Engineering Functions Using the Messaging System

The following commands are also available to the user. These are mostly for Engineering and system purposes.

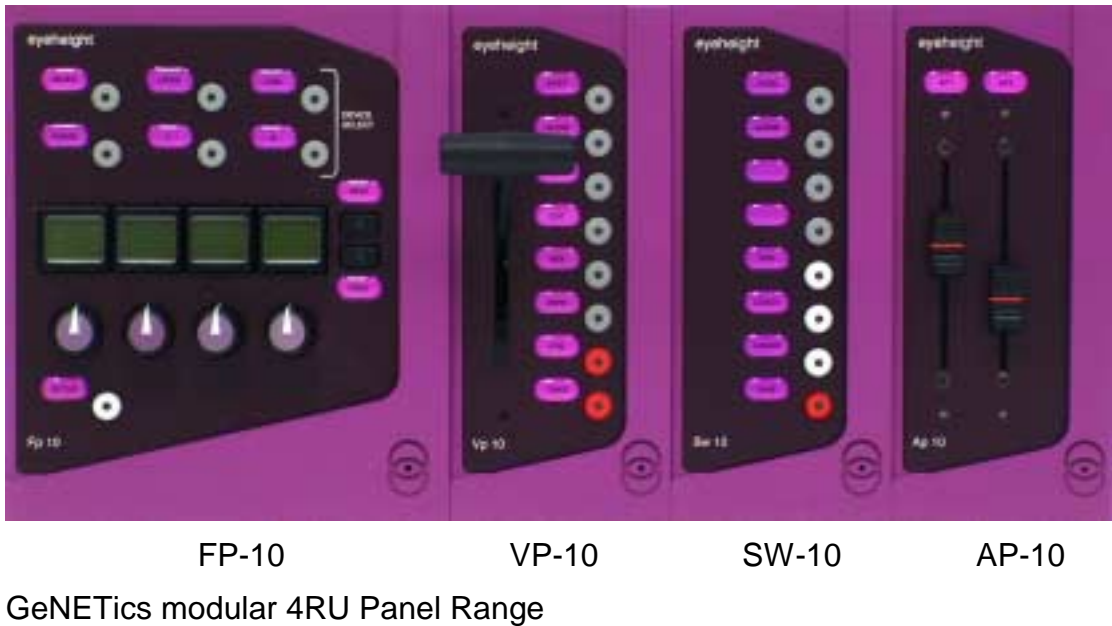
"!?:%"	Engineers First Birthday of the device (Factory Reset)
"!mbx"	This Informs the device that it is to be installed in an Eyeheight "Mini-box".
"!nbx"	This Informs the device that it is to be installed in an Eyeheight "Flexi-Box" and will be controlled by a Flexi-Panel in a normal I-BUS network.
"P!",<nn>	This will <u>force</u> a panel to take on the panel ID <nn>, where <nn> is a number between 1 and 58.
"F:fb"	Engineers First Birthday of the Flexi-Panel.
"P99:"	Locks the set-up button.
"P00:"	Unlocks the set-up button.

The above commands should only be used by qualified engineering staff

Specialised Control Panels

A number of specialised control panels are also available and provide necessary control features for certain Eyeheight products. These are as follows:

- FP-10 desk mounting 4RU Control panel. This panel has most of the features of the FP-9 but has been put into a 4RU Format for a more operational feel. It has only 6 device buttons rather than the 8 on an FP-9. This unit also has no RS422 interface.
- VP-10 desk mounting 4RU Control panel. This panel has a Traditional Video T-BAR as well as 8 extra switches and is used for products requiring manual video transitions such as the MW-3 Mixer wipe unit
- AP-10 desk mounting 4RU Control panel. This panel has a two traditional Audio faders and is used for products requiring manual audio transitions such as the AM-2 Audio Mixer unit.
- SW-10 desk mounting 4RU Control panel. This panel has 8 auxiliary switches.



Flexi-Box Overview

The Flexi-Box is the chassis in which the geNETics products are mounted. Each Product is mounted into the rear of the Flexi-Box chassis. Up to six cards can be fitted into the rear of the unit. The section in this manual titled "Overview of the geNETics Platform" gives a more detailed description of a rear mounting PCB.

The chassis can hold a main and redundant PSU. These are front mounting and are exchanged by removing the front panel. The power supplies are "Hot Swappable" and have independent IEC mains inlets. Power supplies are of the "wide input a/c. variety" and so require no adjustment to work on mains voltages from 110-250V a/c. The only "setting" inside the chassis is the Flexi-Box Network box number. This is a set of four dip-switches which determines the box number. This box number changes the Network ID of the products mounted in the box. If more than one box is to be connected to an I-Bus network they will normally be required to have unique Box numbers.

Installation the Flexi-Box

The Flexi-Box is normally mounted in a standard 19 inch racking bay. Mounting is in no way unusual. There are one or two points, however, worth mentioning.

1. The Flexi-Box relies on forced air (fan) ventilation from side to side. It is important to allow at least 1cm on the left (looking from the front) for the ventilation slots. It is also important to leave at least 4cm on the right (looking from the front) for the fan to blow out the warm air.
2. It is highly advisable that the unit is given support at the rear. Generic 1RU sliding mounts, or rear-mounting brackets can give this support.

Setting the Box Network ID Switch

The only internal set-up consideration inside the Flexi-Box is the Box Network ID switch. This will normally be set up at the factory, however it is important to describe the full function of this switch. The location of this switch is given in Fig 5. This switch gives the base "Network ID" for the products mounted in the box. All the products on an I-Bus network must have a unique network ID. The network ID is determined by two factors:

1. The Box Network ID switch setting
2. The slot location of a product in the box.

Fig 6 shows the rear of the Flexi-Box. In each of the six slots is shown the number 0,2,4,6,8,10. These are the "Slot Network ID" numbers.

Fig 7 shows the Dip-switch inside the Flexi-Box which sets the "Box Network ID" number.

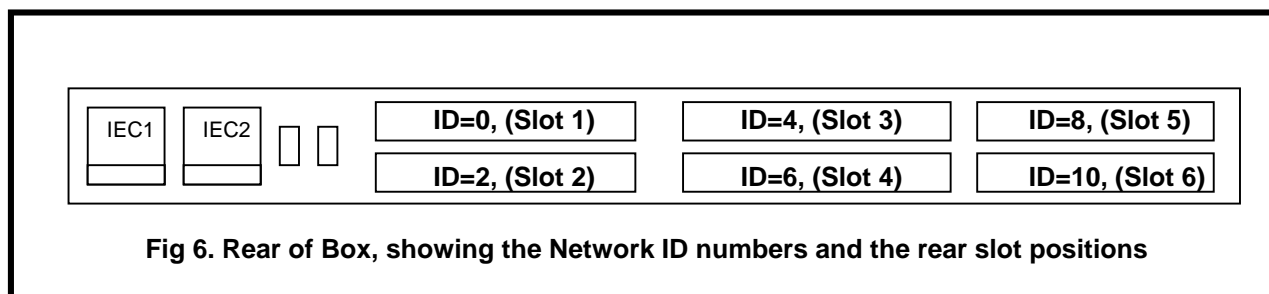
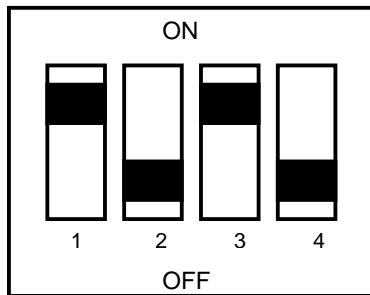


Fig 6. Rear of Box, showing the Network ID numbers and the rear slot positions

Fig.5 Flexi-Box
Overview



Switch number	Off Position contribution	On Position contribution
1	1	0
2	2	0
3	4	0
4	8	0

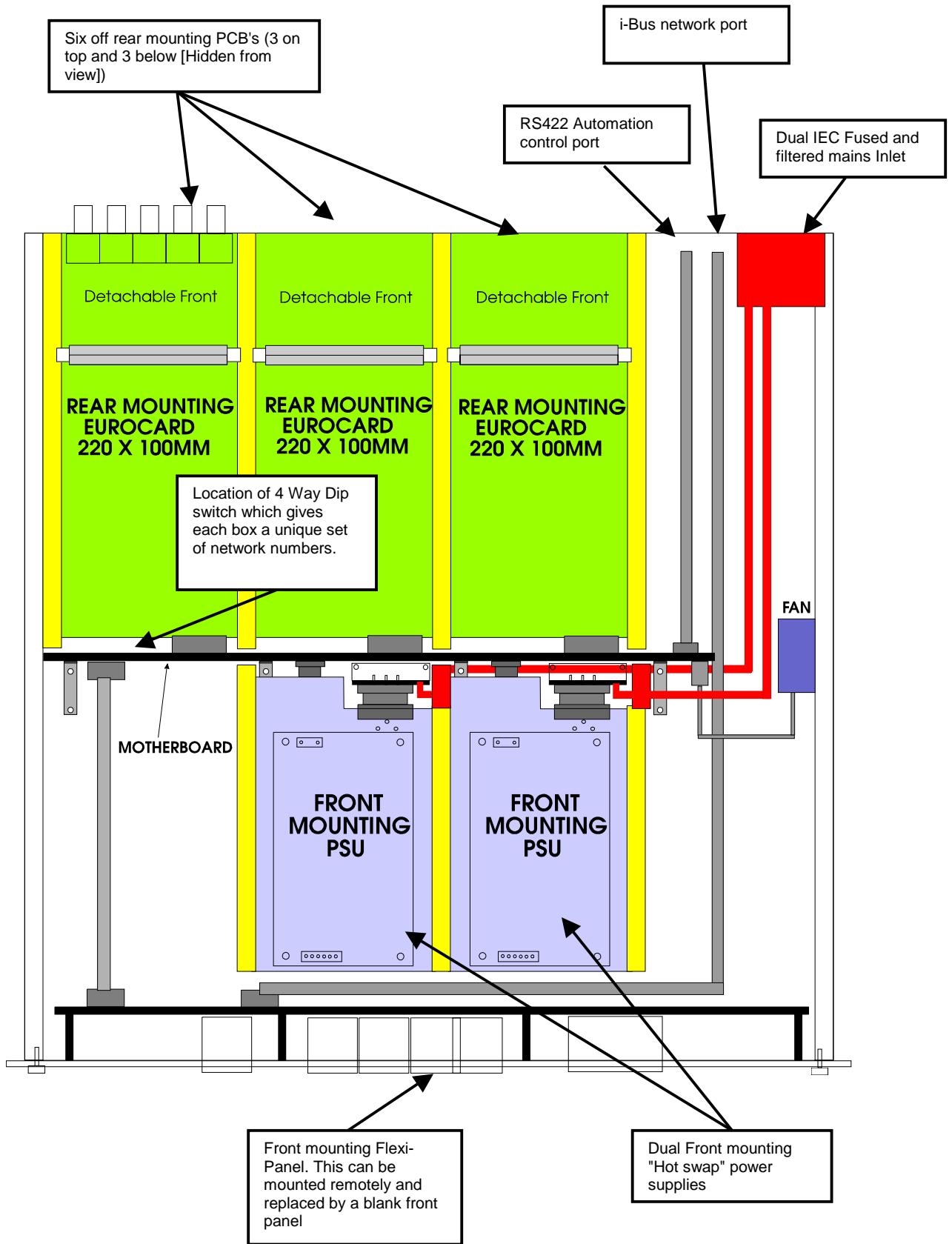
For the positions shown in Fig 7. The Box Network ID is 0+2+0+8=10

Fig 7. Diagram of Dip Switch showing a "Box Network ID" of 10

To calculate the "Product Network ID" you must use the following formula:

$$\text{Product Network ID} = (\text{Box Network ID}) \times 12 + (\text{Slot Network ID})$$

The "Product Network ID" is always an even number. The odd numbers will be used in a future planned software upgrade.



Detail of a Flexibox

Networks using more than 16 Flexi-Boxes

In principle it would seem that 16 Flexi-Boxes are the maximum numbers of boxes that can be used on a network, each Flexi-box with a different "Box Network ID". This however may not be very convenient for a user that requires, for whatever reason, only to have, say, one or two products per box. (possibly due to physical location, or for transmission planning where it is not desirable to have main and reserve feeds or indeed too many transmission paths going through one box).

Fortunately, there are ways around this situation because as long as the "Product Network ID's" of each Product do not conflict, the number of boxes does not actually matter.

Example:

48 Flexi-boxes with Two cards per Box.

The following table shows a situation where 48 Boxes can be used on a network as long as only 2 Cards per box are used. This leaves 4 slots empty per box.

Physical Box #	Box Network ID (set by Dip Switch)	Slot Network ID's (set by Slot Position)	Product Network ID's (Unique!)
1	0	0,2	0,2
2	0	4,6	4,6
3	0	8,10	8,10
4	1	0,2	12,14
5	1	4,6	16,18
6	1	8,10	20,22
7	2	0,2	24,26
8	2	4,6	28,30
9	2	8,10	32,34
"	"	" "	" "
"	"	" "	" "
"	"	" "	" "
"	"	" "	" "
"	"	" "	" "
48	15	0,2	180,182
48	15	4,6	184,186
48	15	8,10	188,190

Similar Examples can be drawn for 32 boxes with 3 cards per box. It is also clear from these examples that a mixed situation with different numbers of products per box will also hold as long as each product on the network has a unique "Product Network ID" which is calculated by the formula:

$$\text{Product Network ID} = (\text{Box Network ID}) \times 12 + (\text{Slot Network ID})$$

Physical connection of the I-Bus Network

The physical connection of the I-Bus network is achieved using shielded Twisted pair. Any twisted pair suitable for digital audio will be adequate. Each panel and box must be looped through the twisted pair and each end of the network must be terminated in 110 Ohms. The termination can either be provided by the user or by making a jumper on the Products or panels at each end of the network. The neatest way to install a network is to use a "Drop cable" from the main network length. This is shown in Fig 8 below.

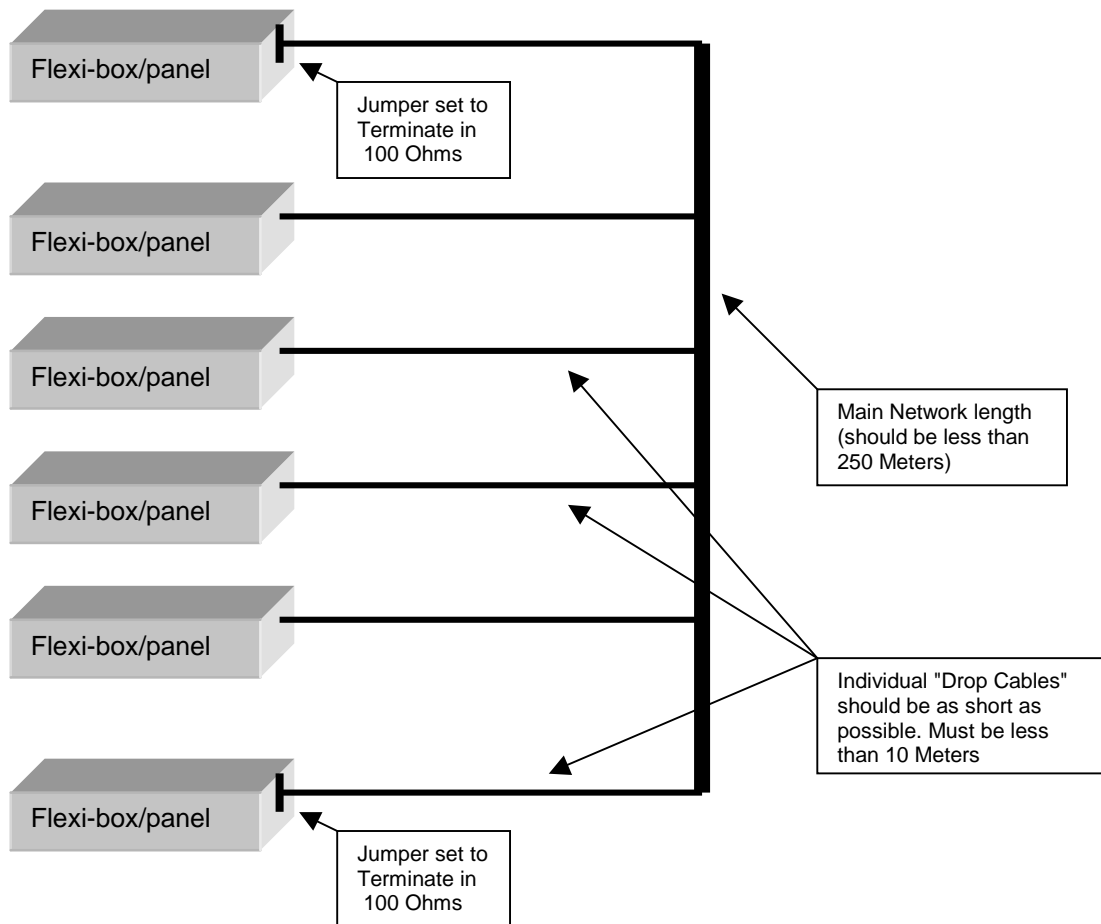


Fig 8. Suggested Network Installation

The connection from the Flexi-Box/Panel to the main network length may typically be a krone block.

Another alternative to the above is simply to "Loop" the network directly through each box and panel. This, although technically sound, can lead to a less reliable system because each plug to the Flexi-Box/Panel has the incoming and outgoing network feed for the whole network.

Automation Protocol on the geNETics Platform

The geNETics system runs a Common Automation Protocol. This takes advantage of the generic nature of the control system enabling all Eyeheight geNETics products on a single I-Bus network to be controlled by a simple RS422 commands.

Each geNETics product is controlled from a "Flat" Menu structure. On a flexi-panel four menus are displayed at any one time in each of the four LCD Windows. Each of these windows contains from 0→3 menu variables. For the automation system, the menus are numbered from 0→n where "0" is the first menu in the flat menu and "n" is the last menu, in this way the automation system specifies the menu number. The automation system specifies the variable parameter 0→3 in each menu window by starting the message with ASCII "A" for the first variable, ASCII "B" for the second variable, and ASCII "C" for the third variable. The Product Network ID is used to specify which Product the automation system is talking to. The last piece of information required is the new variable parameter itself. This is always a signed 16 bit value. For each product the range of values is given in the Menu Table for each product. It is shown in Square brackets, [.....].

Automation Control Bytes

The RS422 port runs at 19.2 Kbaud 8 bits no parity 1 stop and 1 start bit.

The automation system writes 6 bytes in sequence:

<Byte 1>,<Byte 2>,<Byte 3>,<Byte 4>,<Byte 5>,<Byte 6>

The general Automation protocol consists of 6 bytes as with all Eyeheight geNETics Platform Products. This is as follows:

Byte 1="A" (ASCII)

The automation is writing to the FIRST variable in a given menu window

Byte 1="B" (ASCII)

The automation is writing to the SECOND variable in a given menu window

Byte 1="C" (ASCII)

The automation is writing to the THIRD variable in a given menu window

Byte 1="D" (ASCII)

The automation is reading from the FIRST variable in a given menu window

Byte 1="E" (ASCII)

The automation is reading from the SECOND variable in a given menu window

Byte 1="F" (ASCII)

The automation is reading from the THIRD variable in a given menu window

Byte 2 <Network ID>

The Product Network ID. This number is a single byte BINARY number.

Byte 3 <Menu #>

This is the menu number of the geNETics product that the automation system wishes to adjust. This number is a single byte Binary number.

Byte 4, Byte 5 <Value>

This is the value of the menu parameter. This Value is a binary word consisting of two bytes in the order <High byte>,<Low byte> 2's compliment 16 bit number. For Automation read (Byte1="D"→"F"). This value can be any value.

Byte 6 <Checksum>

This is the 8 bit binary sum of all the bytes from Byte 1 to byte 5. Overflow is ignored. This number is a single byte Binary number.

After each command is sent the Automation system MUST wait for a reply which is dependent upon whether this is an automation read (B1=A,B,C) or an automation write (B1=D,E,F).

For Automation write the reply is "AOK" Three byte ASCII chrs indicating that Automation system "A" has processed the command and is "OK"

For Automation read the reply is "R", <dataH>,<dataL>,"AOK" Six bytes returning a 16 bit value in <dataH>,<dataL>.

If the system does not understand the command it will issue a reply-

"ER" <X> where X is an error number. "ER" is ASCII and X is a single byte binary number. If the system does not receive all of a command (6 bytes) within 50mS, the system will respond with "ER" <X> where X=0x00 and clear its command buffer ready for further commands.

To guarantee that the system is ready for a command the automation system can send a single ASCII "@" and wait until a reply "ER",<0x00> is returned. The command buffer will then definitely be clear for further messages.

Manual Update of Parameters

If a device is controlled by a manual "Panel" (Flexi-Panel). The following information is sent for automation update purposes.

"U", <network id>,<menu number>,<menu level>,<dataH>,<dataL>

(6 bytes in all).

Example: "U",<192>,<4>,"A",<1>,<123> (Numbers in decimal)

Means (U)pdate menu number 4 level "A" on device 192 to be 379.

Automation System Power-up Message

Upon power up of a Flexipanel the message "FP" will be transmit from the Flexipanel. This is to "Wake up" automation systems to be aware that a new power cycle has occurred.

Automation System Error Messages

Error Number	Meaning
00	Message has not been completed within 50mS
01	First chr is not "A,B,C,D,E OR F"
02	Network ID is greater than 192 (192-250 is reserved for control panels and automation systems)
03	Checksum is incorrect
04	There is no response from the device with this network ID (Device probably doesn't exist)
05	The Data value that the automation system is sending is not within the valid limits of the menu parameter.
06	The menu number was not within the valid range of menus OR the menu level (A, B or C) does not exist.
07	An unknown response was obtained from the device

Eyeheight geNETics RS422 Interface

This is the Pinout for the 9W D type on the IRU Box

Pin 1	Ground 0V
Pin 2	Tx-
Pin 3	Rx+
Pin 4	
Pin 5	
Pin 6	
Pin 7	Tx+
Pin 8	Rx-
Pin 9	Ground 0V

Eyeheight geNETics I-BUS (CAN-BUS) Interface

This is the Pinout for the 9W D type on the IRU Box
Labelled CAN-BUS:

Pin 1	Ground 0V
Pin 2	I-Bus-
Pin 3	+5V Local regulated Supply (From Flexi-box) 0.5 Amp*
Pin 4	Remote Supply (From Flexi-box) ** 7-12V 1 Amp
Pin 5	Ground 0V
Pin 6	+5V Local regulated Supply (From Flexi-box) 0.5 Amp*
Pin 7	I-Bus+
Pin 8	PSU Fail Tally ***
Pin 9	Remote Supply (From Flexi-box) ** 7-12V 1 Amp

*If a regulated +5V supply is used link J7 to 1-2 on the Flexi-panel. This is the configuration used if the panel is mounted Very close to (< 1Metre) or on the front of a Flexi-box.

**If an unregulated +7V-12V supply is used link J7 to 2-3 on the Flexi-panel. This is the configuration used if the panel is mounted remotely from or on the front of a Flexi-box.

***Upon a PSU Fail (Either Main or redundant +5V,-5V or +13V) this pin becomes a "Ground", 0V connection. While PSU's are OK this pin is "Open". Please note that with NO PSU Installed this indicates PSU's are OK !! which is (Technically) incorrect. A 5V relay (100mA) can be connected from pin 8 to pin 6 to indicate PSU Fail.

To connect a unit to the I-Bus network, only pins 2 and 7 need to be wired from box to box/box to panel/panel to panel. Each panel, however, must have a power supply. This can either be provided from a box. (1 box has sufficient current to feed up to 2 panels. Pins 4 AND 9 MUST to be connected together externally when panels are fed from this power source. Or it can be provided locally.

WARNING Take caution using this power supply feed because it is INTERNALLY fused (3A). The box must be disconnected and opened to replace this fuse.

Flexipanel (FP-9) Jumpers for Power Supply and I-BUS

The Flexipanel must be configured differently for use as a local panel (One mounted on the front of a Flexibox) than one used as a remote panel. (A remote panel is mounted together with a slim rear cover RR-9).

Finding the Jumper Links is straightforward. If the Flexipanel is mounted on the front of a Flexibox then do as follows:

1. Remove Power from the Flexibox.
2. Remove the panel from the box by unscrewing the two "finger screws" at each end of the panel. Keep hold of the panel and pull forward.
3. Disconnect the two Ribbon cable connectors taking note of their orientation and relative positions so that they can be re-inserted correctly.

If the Flexipanel is mounted remotely it will have a RR-9 rear cover attached to it. To remove the rear cover do as follows.

1. Disconnect any cables from the rear of the unit. Take note of their positions for re-assembly.
2. Remove the 6 M3 Screws, which connect the Front panel (FP-9) to the rear assembly (RR-9).
3. Carefully pull apart the rear assembly from the Panel Electronics. As you pull this apart disconnect the 2 ribbon connections taking note of their positions and orientations for re-assembly later.

Now refer to the Diagram of the Flexipanel PCB Shown below. The diagram shows the location of the Jumper Links if you are facing the rear of the panel with the "Eyeheight Logo" on your left and the device switches on your right.

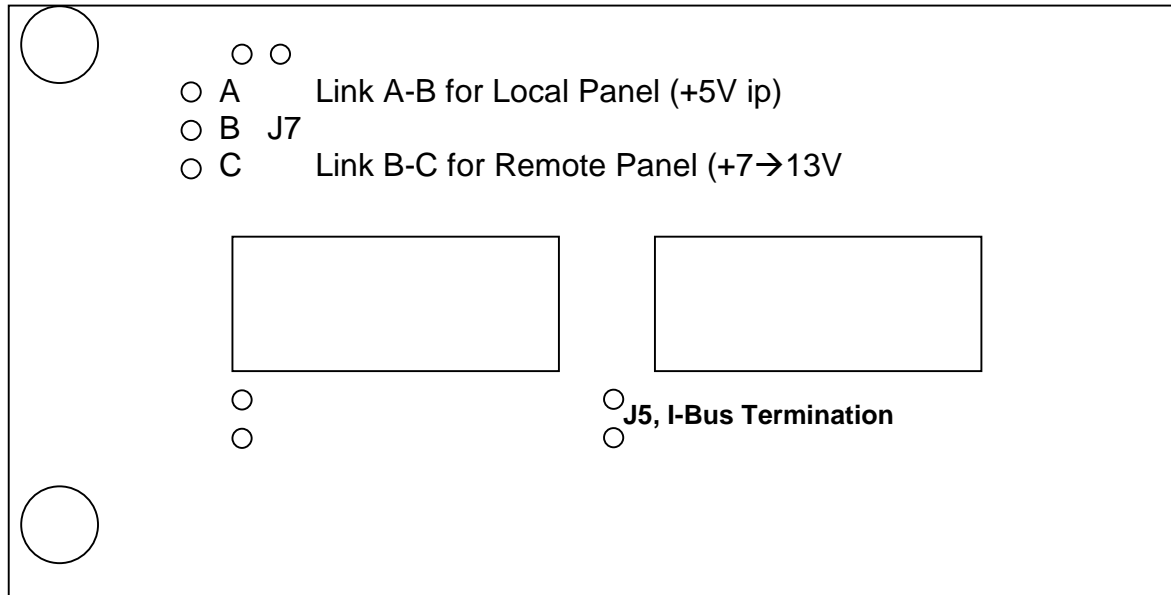


Diagram of the rear of a flexi-panel PCB showing the Position of J7 (Regulated/Unregulated Supply selection) And the position of J5 (I-bus termination link)

4RU Panel (FP-10) Jumpers for I-BUS

The FP-10 Desk Mounting 4RU Panel has an internal jumper for optional I-Bus Termination. To gain access to the jumper the user must take off the rear cover for the unit. To do this, unscrew the 6 cover mounting screws on the side of the unit (3 on each side). The rear cover can then be pulled off revealing the circuit board.

Locate Jumper J2. If this is Closed by a link the unit is terminated.

4RU Panel (VP-10, SW-10, AP-10) Jumpers for I-BUS

The VP-10, SW-10 and AP-10 Desk Mounting 4RU Panel has an internal jumper for optional I-Bus Termination. All of these units have a common Circuit board. To gain access to the jumper the user must take off the rear cover for the unit. To do this, unscrew the 4 cover mounting screws on the side of the unit (2 on each side). The rear cover can then be pulled off revealing the circuit board.

Locate Jumper J3. If this is Closed by a link the unit is terminated.

Technical Specification for the Eyeheight 1RU Flexi-box

Dimensions (With FB-9 Fitted)	D=450mm, W=442mm, H=44mm
Weight (With 1PSU, no products)	3KG
Power consumption	<30W
Power Supply Voltage	110-240V ac. (No adjustment req.)
Number of Card Slots	6
Max number of PSU's	2, CE, UL approved.
Mains IEC Inlets	2, each filtered with spare fuse
Other Fixed connections	9 Way D type, Fem. I-BUS connection
	9 Way D type Fem. RS422 connection
Cooling	Forced air side to side cooling

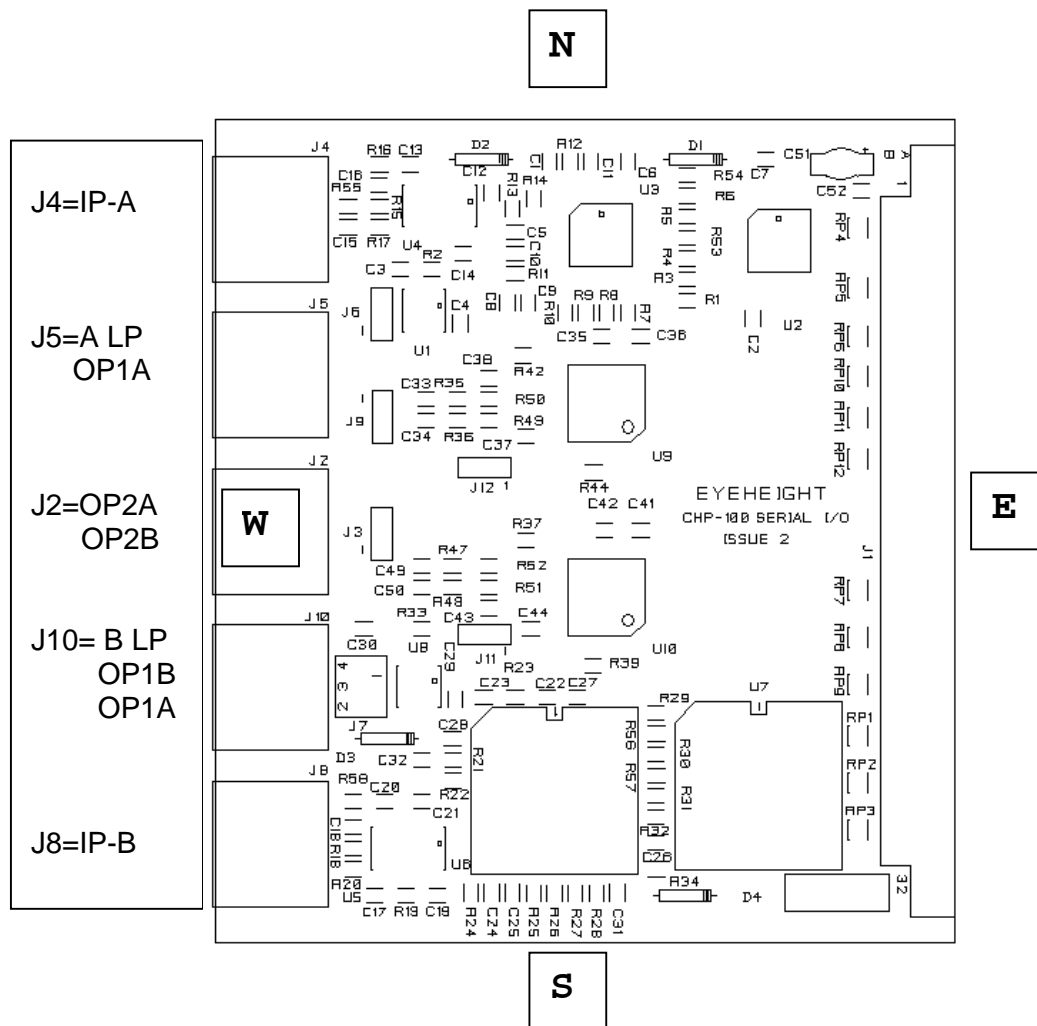
Technical Specification for the Eyeheight 1RU Flexi-panel

Dimensions (With RR-9 Fitted)	D=50mm, W=442mm, H=44mm
Weight (With 1PSU, no products)	1KG
Power consumption	<6W
Power Supply Voltage	+5V regulated input (from Flexi-box) or 7-12V unregulated input (from Flexi-box) (Selection of the above is by jumpers)
Power supply Current	500mA Maximum
Network connection	9 Way D type, Fem. I-BUS connection
Automation control port	9 Way D type Fem. RS422 connection
PS2 Keyboard port	6 Way Mini-Din PS2 Keyboard connector
Control Features	<ul style="list-style-type: none"> ◆ Control of up to 8 Products. (Single or dual units) ◆ Self Legending LED multicolour Backlit Pushbuttons ◆ Digital Rotary Digipot adjusters ◆ PS2 Keyboard interface for text entry

Appendix-A Configuration of the Serial Digital I/O cards SIO-1 and SIO-2

The SIO-1 and SIO-2 cards have the same configuration links. Both issue 1 and issue 2 cards also have the same link positions. The following configurations are possible.

Rear Legend	Explanation	Jumper settings
IP-A	SDI Input of channel A	None
A-LP	Channel A active loop through	Jumper J6 to N
OP1A	Channel A Output number 1	Jumper J6 to S, J9 to N
OP2A	Channel A Output number 2	Jumper J3 to N
OP2B	Channel B Output number 2	Jumper J3 to S
B-LP	Channel B active loop through	Jumper J7 to N
OP1B	Channel B Output number 1	Jumper J7 to S
OP1A	Channel A Output number 1	Jumper J7 to E, J9 to S
IP-B	SDI Input of channel B	None



Technical Specification for the SIO-1/2 Dual Serial Digital Card

Number of inputs	2 (SIO-2) or 1 (SIO-1)
Type of Inputs	270Mbit Serial Digital Video Inputs 75 Ohm
Line Length	At least 200 Meters of PSF1/3 (Typically 275 Meters)
Number of Outputs	3 Outputs per Card.
Type Of Outputs	270Mbit Serial Digital Video Outputs, 75 Ohm, 800mV
Total Number Of BNC Connections	5, consisting of 2 Fixed Inputs and 3 Jumper Configurable outputs. Outputs are configurable as either Channel A out/ Channel B out/ Channel A Active Loop or Channel B active Loop. (Channel B is only available on the SIO-2)
SDI Output Jitter	The system will add less than 0.2UI to the input Jitter.(This is only guaranteed on issue 2 or later cards)

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