eyeheight

GeNETics Product Information

User Guide For:

The DG-9 Eyeheight Dongle and Setup Software

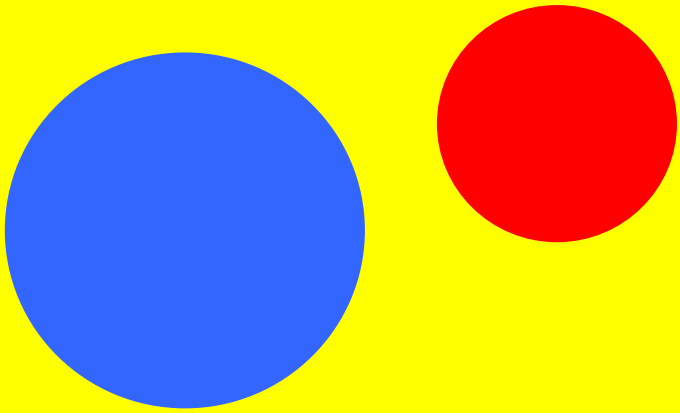

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Table Of Contents

The DG-9 Overview and Features 3
Protocol Modes 3
Communication Modes 3
Message Filtering 4
Installation of the DG-9 5
DG-9 Cabling 6
Resetting The DG-9 7
Programming The DG-9 8
Calculating a Network ID (NID) 12
I-BUS Protocol 12
Genetics Automation Protocol 19
PresTX Protocol 22
Diagnostic Protocol 33

Table Of Figures

Figure 1 Default State Of The DG-9 5
Figure 2 COM Port Settings 5
Figure 3 DG-9 to I-BUS Cable Connections 6
Figure 4 DG-9 to D-BUS Cable Connections 6
Figure 5 Resetting The DG-9 7
Figure 6 The 'Dongle Setup' Software, Set-up Screen 8
Figure 7 PresTX DG-9 Set up 9
Figure 8 Genetics Automation DG-9 Set up 9
Figure 9 D-BUS DG-9 Set up 10
Figure 10 I-BUS (BUGEYES) DG-9 Set up 10
Figure 12 Priority and Destination, PC to Chassis 11
Figure 13 Priorities and Destinations, Chassis to Chassis 11
Figure 14 Box 1 Slots and NIDs 12
Figure 15 Box 2 Slots and NIDs 12

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1 System Overview

This manual describes the function of the DG-9 Dongle and the operation of the DG-9 set up software. The DG-9 can be configured to allow a PC to connect to a chassis and directly control cards via the I-BUS, to allow high speed data transfer from an Eyeheight PC9 to a chassis via the D-BUS, or to allow filtered chassis to chassis connection.

Section 1 Protocol Modes

The Dongle can be programmed to recognise and validate 5 data protocols:

- I-BUS – Normal PC to chassis communications.
- PresTX – AU2 PresTX automation card.
- GeNETics Automation Protocol – Provided for upward compatibility.
- Diagnostic Protocol – Provided for backward compatibility.
- Byte Mode – Provided to cope with user defined protocols.

Section 2 Communication Modes

The DG-9 can be programmed to handle the following communication formats:

- RS232 to I-BUS – The normal communication mode between PC COM port and chassis I-BUS.
- RS232 to D-BUS – High speed data transfer mode between PC9 high speed COM port and chassis D-BUS.
- I-BUS to I-BUS –Filtered chassis to chassis connection via the chassis I-BUS

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Section 3 Message Filtering

The DG-9 can be programmed to only allow through, messages from or to, a specified address range.

See step 15 in “Programming the DG-9”.

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2 Installation

Section 1 Installation of the DG-9

The DG-9 is supplied with a “gender bender” to allow the DG-9 to be connected directly to a PC COM port.

Power for the DG-9 is picked up from the 7-12V pins on the chassis I-BUS or D-BUS.

The default state of the DG-9 when it has been reset is:

CAN Bus Baud Rate	100000
RS232 Baud Rate	38400
Format	RS232 to I-BUS
Mode	I-BUS
Destination	Box 1 Card 4
From Location	Panel 1
No Filtering	

Figure 1 Default State Of The DG-9

These settings can be altered using the “Dongle Setup” software. See the section entitled “Programming the DG-9”.

The PC COM port should be set to:

Baud Rate	38400
Parity	No Parity
Data Bits	8
Stop Bits	1
Flow Control	None

Figure 2 COM Port Settings

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Section 2 DG-9 Cabling

The DG-9 is connected to the chassis as follows:

1. Connect the Eyeheight Dongle to a COM port on the PC using the "gender bender" provided

2. Connect the other end of the Dongle to the chassis I-BUS ports or D-BUS ports shown below:

PC	Dongle RS232
2 Received Data	**2**
3 Transmit Data	**3**
5 Signal Ground	**5**

*****
Use 110 ohm digital audio cable for I-BUS pins 2 and 7 (twisted pair)

Dongle I-BUS	Chassis '1' I-BUS	Chassis '2' I-BUS	Chassis 'n' I-BUS
1	**1** Ground 0V	**1** Ground 0V	**1** Ground 0V
***2**	**2** I-BUS-	**2** I-BUS-	**2** I-BUS-
4	**4** 7-12V Remote		
5	**5** Ground 0V	**5** Ground 0V	**5** Ground 0V
***7**	**7** I-BUS+	**7** I-BUS+	**7** I-BUS+
9	**9** 7-12V Remote		

Figure 3 DG-9 to I-BUS Cable Connections

PC	Dongle RS232
2 Received Data	**2**
3 Transmit Data	**3**
5 Signal Ground	**5**

*****
Use 110 ohm digital audio cable for D-BUS pins 2 and 7 (twisted pair)

Dongle D-BUS	Chassis '1' D-BUS
1	**1** Ground 0V
***2**	**2** I-BUS-
4	**4** 7-12V Remote
5	**5** Ground 0V
***7**	**7** I-BUS+
9	**9** 7-12V Remote

Figure 4 DG-9 to D-BUS Cable Connections

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3 Operation

Section 1 Resetting The DG-9

To Reset the DG-9 to the default set up (as detailed in Figure 1), disconnect the DG-9 from the PC COM port, short pins 7 and 8 on the RS232 side of the DG-9 and then connect the DG-9 to the I-BUS port on a chassis.

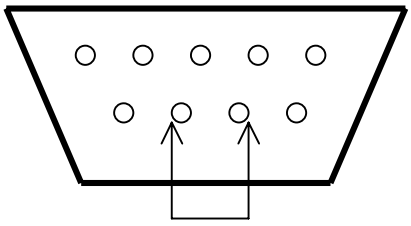

Figure 5 Resetting The DG-9

The LEDs on the DG-9 will flash and then both LEDs will remain red. Remove the short from pins 7 and 8 and then either:

1. **Reset the DG-9 to the default state as shown in 'Figure 1 Default State Of The DG-9'**, by disconnecting the short across pins 7 and 8 and then disconnecting the DG-9 from the I-BUS port on the chassis and then re-connecting the DG-9 to the I-BUS port on the chassis.

2. **Programme the DG-9 as described in the section 'Programming the DG-9',** by removing the short across pins 7 and 8 whilst keeping the DG-9 connected to the chassis I-BUS, and then connecting the DG-9 to the PC COM port and running the 'Dongle Setup' software. When the DG-9 has been programmed the LEDs will turn orange. Unplug the DG-9 from the I-BUS. When the LEDs have gone out, re-connect the DG-9 to the I-BUS. The LEDs should flash briefly then go out. If the LEDs remain on rest the DG-9 and try again. If the LEDs still remain on the DG-9 may be faulty.

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Section 2 Programming The DG-9

1. Follow the steps detailed in “Resetting The DG-9”.
2. Run the ‘Dongle Setup’ software.
3. Select “Port Setup” and select the COM port (“Port Number”) by pressing one of the “COM” buttons.
4. Select a Baud Rate by either pressing one of the pre-set buttons or by entering the required Baud Rate in the “Baud Rate” text box.
5. The “Send Timeout” and the “Receive Timeout” are pre-set to optimum values but new values can be typed directly into the text boxes.
6. When the desired values have been set, press the “OK” button. The values will be stored in the PC’s registry and will be automatically applied every time the “Dongle Setup” software is loaded.
7. Select “DongleSetup”.
8. If the DG-9 is correctly reset and connected, a screen similar to the one shown in Figure 5 The 'Dongle Setup’ Software, Set-up Screen, will appear.

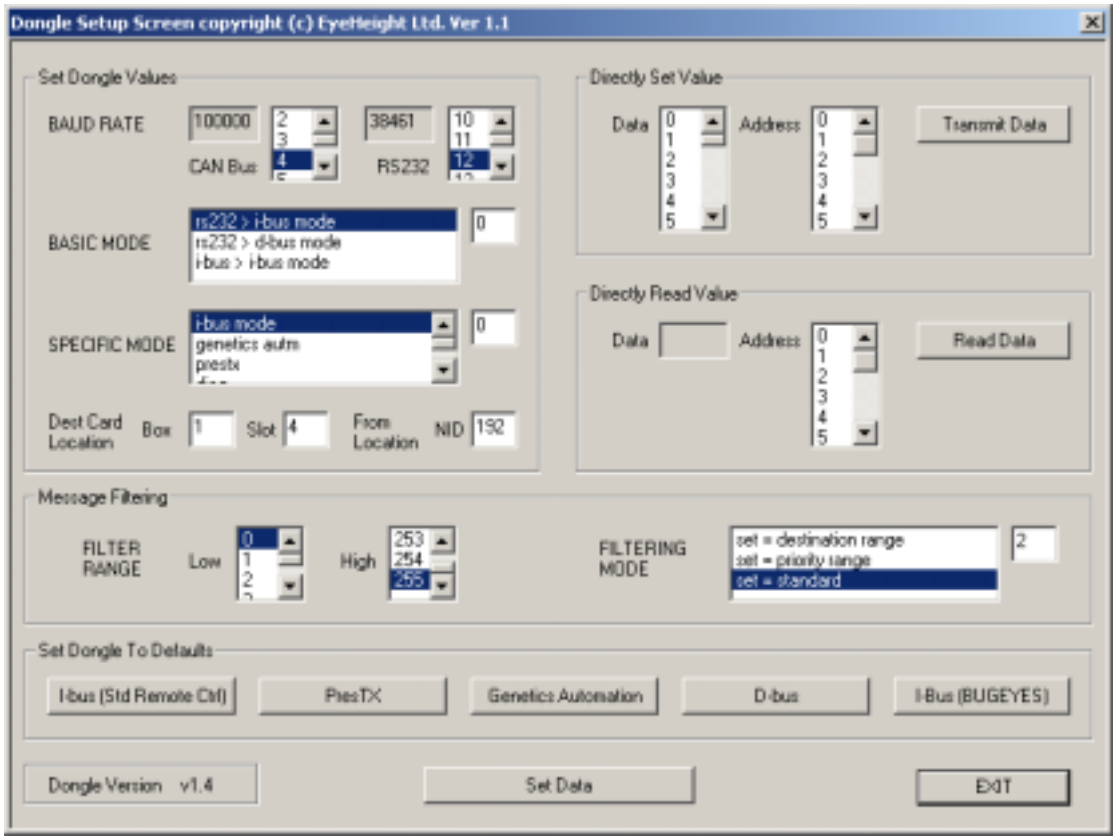

Figure 6 The 'Dongle Setup’ Software, Set-up Screen

9. The highlighted selections indicate the current DG-9 values.

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10. For example, the above screen is showing the default values as detailed in “Figure 1 The Default State of The DG-9”.
11. The 5 “Dongle Default” buttons allow the DG-9 to be quickly set up to the most commonly used values as follows:

- “I-Bus(Std Remote Ctrl)” is the normal I-Bus default setting for the DG-9, as described in “Figure 1 The default State of The DG-9” and is the mode that is used by all Eyeheight Software (with the exception of “BugEyes”, as described later) for communicating with the chassis (See Section 4 “I-Bus Protocol”).

- “PresTX” will set up the DG-9 as follows:

CAN Bus Baud Rate	100000
RS232 Baud Rate	19200
Format	RS232 to I-BUS
Mode	PresTX
Destination	Box 1 Card 4
From Location	Panel 1 (207 = 0xCF)
No Filtering	

Figure 7 PresTX DG-9 Set up

The DG-9 will verify and convert PresTX commands (see Section 4 “PresTX Protocol”) sent by the PC, to the I-BUS format (see Section 4 “I-Bus Protocol”).

- “Genetics Automation” will set up the DG-9 as follows:

CAN Bus Baud Rate	100000
RS232 Baud Rate	19200
Format	RS232 to I-BUS
Mode	Genetics Autm
Destination	Box 1 Card 4
From Location	Panel 1 (207 = 0xCF)
No Filtering	

Figure 8 Genetics Automation DG-9 Set up

The DG-9 will verify and convert Genetics Automation commands (see Section 4 “Genetics Automation Protocol”) sent by the PC, to the I-BUS format (see Section 4 “I-Bus Protocol”). The destination card’s location must be set in “Dest Card Location” and the “From Location” would normally be set to 207.

- “D-Bus” will set up the DG-9 as follows:

CAN Bus Baud Rate	500000

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RS232 Baud Rate	500000
Format	RS232 to D-BUS
Mode	Byte
Destination	Box 1 Card 4
From Location	Panel 1 (207 = 0xCF)
No Filtering	

Figure 9 D-BUS DG-9 Set up

This mode is used by the Eyeheight PC-9 for high speed data transfer, when running “BugEyes”.

- “I-Bus (BUGEYES)” ” will set up the DG-9 as follows:

CAN Bus Baud Rate	500000
RS232 Baud Rate	62500
Format	RS232 to I-BUS
Mode	I-BUS
Destination	Box 1 Card 4
From Location	Panel 1 (207 = 0xCF)
No Filtering	

Figure 10 I-BUS (BUGEYES) DG-9 Set up

This mode is used by the Eyeheight PC-9 when running the “BugEyes” software.

12. To set the Diagnostic mode select “diag” from the “SPECIFIC MODE” list box and click the “Set Data” button. In this mode the DG-9 will verify and convert the Diagnostic commands (see Section 4 “Diagnostic Protocol”) sent by the PC, to the I-BUS format (see Section 4 “I-Bus Protocol”).

13. To set the Byte mode select “byte” from the “SPECIFIC MODE” list box and click the “Set Data” button. In this mode the DG-9 will not be able to verify the commands but will convert ANY commands sent by the PC, to the I-BUS format (see Section 4 “I-Bus Protocol”).

14. Messages can be filtered by setting “FILTERING MODE” to “destination range” to only allow messages addressed to addresses (see Section 4 “Calculating A Network ID (NID)”) within the “Low” and “High” addresses set in “FILTER RANGE”, to be sent. If the “FILTERING MODE” is set to “priority range” then only messages addressed to addresses within the “Low” and “High” addresses set in “FILTER RANGE”, will be received.

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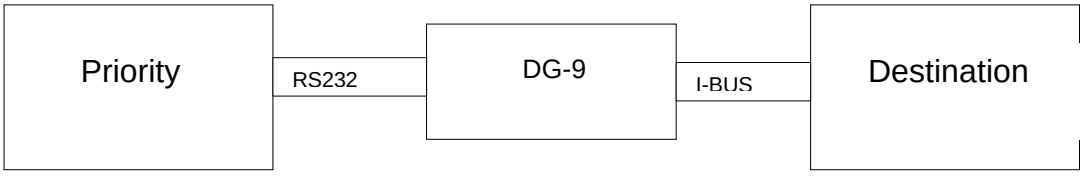

Figure 11 Priority and Destination, PC to Chassis

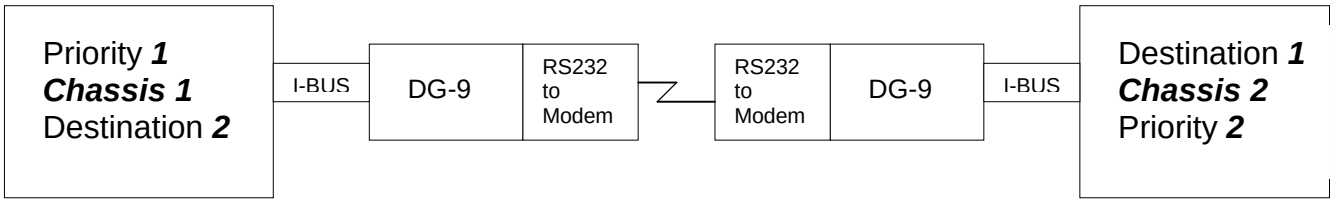

Figure 12 Priorities and Destinations, Chassis to Chassis

15. “Directly Set Value” and “Directly Read Value” are for factory use and allow direct access to the DG-9 internal memories.

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4 Technical Appendix

Section 1 Calculating A Network ID (NID)

Slot 1 NID = 0 (0x00)	Slot 3 NID = 4 (0x04)	Slot 5 NID = 8 (0x08)
Slot 2 NID = 2 (0x02)	Slot 4 NID = 6 (0x06)	Slot 6 NID = 10 (0x0A)

Figure 13 Box 1 Slots and NIDs

Slot 1 NID = 12 (0x0C)	Slot 3 NID = 16 (0x10)	Slot 5 NID = 20 (0x14)
Slot 2 NID = 14 (0x0E)	Slot 4 NID = 18 (0x12)	Slot 6 NID = 22 (0x16)

Figure 14 Box 2 Slots and NIDs

The box number is set by a dip switch within the chassis (see “The Genetics Products User Guide” for details) and as can be seen from the above two examples the NIDs can be calculated by using the equation:

(((Box Number – 1) x 12) + ((Slot Number – 1) x 2))

For example Slot 5 in Box 2 would be (((2 – 1) x 12) + ((5 – 1) x 2)) = 20.

Section 2 I-BUS Protocol

The message format for the I-BUS protocol is:

Priority Byte, Destination NID, Length of Command, Command, Check Sum.

The ***Priority Byte*** is normally set to 207 (0xCF),
The ***Destination NID*** is calculated as detailed in “Calculating A Network ID (NID)”,
The ***Length of the Command*** is the number of characters to be sent but NOT including the Priority Byte, the Destination NID, the Length of Command or the Check Sum,
The ***Command*** is selected from the following set of commands,

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The ***Check Sum*** is calculated by adding together the Priority Byte, the Destination NID, the Length of Command and the Command. The least significant hexadecimal byte of the result is used as the Check Sum.

For example, to send a query to the card in Box 2, Slot 5 to find out its Host Alias (Name) the following would be sent:

Priority Byte 207, Destination 20, Length 2, Command “HA”, Check Sum

Which would be sent as the hexadecimal string:

CF, 14, 02, 48, 41, 6E

The card would respond with:

Destination, Priority Byte, Length, “ha”, Name, Check Sum

Such as:

20, CF, 0E, 68, 61, 53, 2E, 41, 72, 65, 61, 20, 47, 65, 6E, 2E, 20, 48 =

Destination, Priority Byte, Length = 14 characters, ‘h’, ‘a’, “S.Area Gen. “, Check Sum = 0x548, so least significant hexadecimal byte = 48.

==========
Messages to the device switch leds
==========

D1	light up device switch led1
D2	light up device switch led2
D3	light up device switch led3
D4	light up device switch led4
D5	light up device switch led5
D6	light up device switch led6
D7	light up device switch led7
D8	light up device switch led8
D9	light up device switch led9

d1	turn off device switch led1
d2	turn off device switch led2
d3	turn off device switch led3
d4	turn off device switch led4
d5	turn off device switch led5
d6	turn off device switch led6
d7	turn off device switch led7
d8	turn off device switch led8
d9	turn off device switch led9

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f1 flash device switch led1
f2 flash device switch led2
f3 flash device switch led3
f4 flash device switch led4
f5 flash device switch led5
f6 flash device switch led6
f7 flash device switch led7
f8 flash device switch led8
f9 flash device switch led9

==========
Messages to the next/prev switch leds
==========

N0 light up next switch led
P0 light up prev switch led

n0 unlight next switch led
p0 unlight prev switch led

NF flash next switch led
PF flash prev switch led

==========
Messages to the digipot led
==========

P1 digipot led 1 lights
P2 digipot led 2 lights
P3 digipot led 3 lights
P4 digipot led 4 lights

p1 digipot led 1 turns off
p2 digipot led 2 turns off
p3 digipot led 3 turns off
p4 digipot led 4 turns off

F1 digipot led 1 flashes
F2 digipot led 2 flashes
F3 digipot led 3 flashes
F4 digipot led 4 flashes

==========
Messages to the Trend LCD Displays
==========

L1Nabcdefabcdefabcdef writes 18 chrs to the lcd display#1 height/width code N (top nibble =height, bottom nibble= width)

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L2Nabcdefabcdefabcdef writes 18 chrs to the lcd display#2 height/width code N (code 0x11 is [smallest] normal height and width)
L3Nabcdefabcdefabcdef writes 18 chrs to the lcd display#3 height/width code N (text written is abcdefabcdefabcdef)
L4Nabcdefabcdefabcdef writes 18 chrs to the lcd display#4 height/width code N (text written is abcdefabcdefabcdef)

"G1",01....47,48 Sends the first half of a graphic bitmap to display#1
"G2",01....47,48 Sends the second half of a graphic bitmap to display#1

.....etc,etc

"G6",01....47,48 Sends the first half of a graphic bitmap to display#4
"G7",01....47,48 Sends the second half of a graphic bitmap to display#4

(code 0x12 is normal height, double width)

B1n writes colour byte n to trend 1
B2n writes colour byte n to trend 2
B3n writes colour byte n to trend 3
B4n writes colour byte n to trend 4

==========
Miscellaneous messages
==========

SA Send Again. this asks the current host to update the panel status.
==========
HA Host Alias. This sends the user programmed name for the device reply is ha012345678901 where 012345678901 are the 12 chr ascii alias The host can also be a panel in this case (panel alias)
==========
SW SoftWare interrogation. this sends the current versions of software/firmware reply is sw012345678901234567 where 012345678901234567 is an 18 chr ascii software id
==========
OW Owner. This asks for the owner of the PCB interogated. This may actually be a panel or an automation system.
The response is ow<n>, where <n> is a single byte representing the can-bus ID of the owner of the PCB.
==========
AQ Aquire this device. If aquired the device will respond with aq If the device exists and is free.
==========
FA Force aquire this device. If aquired the device exists it responds with fa. This will aquire the device even if it is owned by another panel/aut system.
==========

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UA Un-Aquire the device if it exists and it is owned by this panel/aut system.

==========

FU Force the release of a device if it exists, even if it is owned by another panel/aut system.

==========

SM<n><This is the message> Send Message. Ascii text,n=number of text chrs in the message. Respose is "sm"
NOTE:(SM<n>u:abcd...) sends a new user name to a device. The name is abcd.... This is sent from the message panel menu.

==========

PO<1 or 2> <Ah,Al> <Dh,Dl> Sends (POKES) the byte <Dh,Dl> to address <Ah,Al> of xilinx 1 or 2. Response is "po"

==========

PE<1 or 2> <Ah,Al> Reads (PEEKS) the byte <Dh,Dl> to address <Ah,Al> of xilinx 1 or 2.Response is "po",<Dh,Dl>

==========

DIAG<"0"/"1"> DIAG0 will exit host diagnostic mode (Block interpreter+Special device drivers bypassed) DIAG1 will enter the above

==========

AA <menu#x> <DataH,DataL> Automation Adjustment of menu#x (1 byte) with data <DataH,DataL> (16 bit)

==========

K<ascii chr> A general keyboard chr has been sent - host dependent response. There is no reply for this message. It is generated in the MESSAGES include file.

==========

ma From Host to panel ONLY. This message informs the an automation system of the panel adjusting a parameter. "ma"<menu number><menu level><dataH><dataL>

==========

SD (Set Device button) From the host, used to assign a temporary duplex for this panel of a device.

==========

CD (Clear Device button) From the host, used to clear a device button if this has a button for a device for which this panel is NOT the owner or a duplex owner.

==========

HS<n> (Hardware Status) From the host. used to indicate status <n> usually an error.
n=1 psu1 fail, n=2 psu2 fail, n=3 psu1 come up, n=4 psu2 come up

==========

SM (Send Message) To a panel. Format "SM012345678901234567". This will Rudely display "012345678901234567" on the LCD of the panel. Unrecognised chrs will be displayed as "!"

==========

FPxx (Flexi-Panel) Format "FPxx" where "xx" are the software version. eg Vers2.1= "FP21"

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This is a Broadcast message sent after a flexipanel is powered up and is ready to receive messages "FP"

==========

"FD",<Nid>,<garbage> Find Device button with network ID <Nid> programmed into it, then select the button. Does not force host to refresh panel. Reply is "fd",<garbage,garbage> if successful, otherwise no reply.

==========

"FL",<n,garbage> Causes a panel "Flash", n times, total n*100mS,to draw attention to itself. LCD panels flash orange-OFF.

==========

"MU",<n,garbage> Causes a Host to Goto Menu number n, n=0,4,8... and then refresh its OWNER's display. Reply is "mu",<garb,garb>

==========

"MI",<n,i> Causes a Host to increment Menu number n, n=0,1,2.... to increase by i, i=8 bit 2's compliment. Reply is "mi",<garb,garb>

==========

==========

I-Bus commands for Structuring Generic 4RU AP/VP/SW Panels

==========

Switch Script Format:
<n0>,<nID0>,<cmd1>,<n1>,<nID1>,<cmd2>.... where nX is the number of chrs in eack cmdX to networkIDX. After each command the unit expects a reply before continuing. THERE ARE NO CHECKS ON THE REPLY IT SIMPLY SERVES AS A HANDSHAKE.

Commands to the switch command buffer are:

==========

A button press is part of a cyclic sequence repeating <s> times. Each switch "State" or "Cycle" can send its own set of automation Commands programmed by "PR". Each "Cycle" can reflect an LED State using "LD". The number of States in the cycle is programmed
by the " command "CY"

Upon The First Power-up of a Generic 4RU AP/VP/SW Panel, the Network ID will be =first_birthday_priority_byte (equ d'250' at present)

==========

"CY",<s>,<n>. Means Cycle Switch number <s> buffer, <n> times, reply is “cy"

==========

"PR",<s>,<n>,..... Means Program Switch#s, cycle#n, With the remaining part of the message

==========

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"LD",<led_colour>,<s> LED in number<s> is <led_colour> for cycle 1
<led_colour=led state:0000=off,0001=grn,0010=red,0101=flash grn,
0110=flash red, 0011=flash red/grn
<s>=led no. (0-->7 for Switch LEDS,
8=start1 led, 9=end1 led, 10=start2 led, 11=end2 led)

==========

"PL",<s>,<n>,led_colour Program LED in switch <s> is <led_colour> for
cycle n

==========

"PF",<n>,<nID> Program PFL switches switch no.<n> to talk to network
ID <Nid>

==========

"FD",<n>,<nID> Program fader no.<n>= ASCII "1" or "2" to talk to network
ID <Nid>

==========

"F1" Ask For fader1 position, reply is "f1",<dataH>,<dataL>Data is 0-->1023
full range

==========

"F2" Ask For fader2 position, reply is "f2",<dataH>,<dataL>Data is 0-->1023
full range

==========

"SW" Ask for the Software version in this panel, reply is "swabcdefghijkl"
software Vers "abcdefghijkl"

==========

"ER",<addrH,addrL> Read EE-prom at address addrH,addrL, reply is
"er",<data>,<garbage> 8 bit data

==========

"EL",<addrH,addrL> Long Read of EE-PROM. Reads the next 16 bytes
of EE-PROM from the panel starting at Addr addrH,addrL
Reply is "el",<data0,data1....data15>

==========

"PB",<Nid>,<garbage> Change the Priority Byte (Network ID) of this unit
to Nid. This will be remembered for the next Power sequence. It will not
happen Immediately.

==========

"EW",<addrH,addrL>,<data> Write to the EE-PROM at address
<addrH,addrL> the data <data>.

==========

"SS",<s,n> Set Switch number <s> to cycle state <n>.

==========

"PS",<s,garbage> Push Switch number <s>. This does the same as the
user pushing the switch.

==========

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Section 3 Genetics Automation Protocol

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 simple RS232 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 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.

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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.

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Automation System Power-up Message

Upon power up of a Flexipanel the message "FP" will be transmitted 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

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Section 4 PresTX Protocol

Command Structure:

0x50, 0x58 ; Send ASCII “PX”
Command Number, 8bit ; 1 Byte, 256 Commands possible
Command data length, 8 bit <n> ; Total number of bytes in the command attributes
<n> attribute data…. ; <n bytes of attribute data>
checksum ;1 Byte. Sum of ALL data from 0x50 to the last attribute ;data

- Upon acceptance of a command the Eyeheight unit will respond with “OK”. Upon rejection of a command the Eyeheight unit will respond with 0x45, 0x52,<n> (“ER,<n>,<m>”) where <n> is a vector to which attribute is erroneous (n=0 points to the last attribute in the command, it then counts to the first) and <m> is a binary error number 0→255 to be defined indicating the type of error.

- The Eyeheight Unit can also respond with status information

Error List:

Error#1	-	“PX” not found
Error#2	-	Unknown command number
Error#3	-	Checksum Error
Error#4	-	Product does not exist in Automation Interface’s List of products. (eg specifying DSK#3 when there is no DSK#3 in this particular system)
Error#5	-	Product does exist but is not replying. (Product Missing or Hung)
Error#6	-	Product gave an unexpected response.
Error#7	-	The data written is not within the legitimate range for this parameter.
Error#8	-	The Menu does not exist for this product. (This may happen if the wrong card is in the wrong slot in the Chassis.
Error#9	-	Audio value could not be read for motorised fader positioning
Error#12	-	Run out of “TAKE” Stacks. (4 available)

- This automation protocol works upon a SETUP and then TAKE concept. The take can also be set to occur at a certain point on Timecode Frames and seconds leaving the automation system free of “exact point” command timing problems. The system will remember up to FOUR timecode events, such as DSK Mixer and Bug takes. It is recommended that if timecode is used the system is armed between 1 and 15 seconds before the event. A typical timelined event may be:

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Mixer Take
Logo Take
DSK1 Take
DSK2 Take.

After four such events are “armed” for a timecode timeline the user MUST wait for the event to occur before stacking more events.

Commands

Command : 0x00 (Select System)

Attribute Data: <System Number> System Number =0→15

This Defines the base Eyeheight PresTX System for which control is required

This enables multiple systems to be accessed using 1 RS232 port. (The systems MUST however be connected together using the I-BUS.)

Command : 0x01 (Select Main AB Transition Type)

Attribute Data: <transition>,<transition attributes>

Transition = Type of transition as defined below

<0> CUT
<1> MIX
<2> CUT_HOLD_CUT
<3> CUT_HOLD_FADE
<4> FADE_HOLD_CUT
<5> FADE_HOLD_FADE
<6> SQEEZE BACK
<7> WIPE

<Transition attributes> are as defined below:

Transition=0

AttributeData=<TTo>

TTo=0 means Cut to A Input
TTo=1 means Cut to B Input
TTo=2 means Cut to Matte
TTo=3 means Cut to Black

Transition=1

AttributeData=<TTo>,<TTime>

TTime = Transition Time in Fields

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Transition=2

AttributeData=<TTo>,<HTo>,<HTime>

HTime = Hold Time in Fields

Hold time is defined as the time between the END of the first transition and the START of the second transition

HTo=0 is NOT a valid selection
HTo=1 is NOT a valid selection
HTo=2 means Hold input is Matte
HTo=3 means Hold input is Black

Transition=3

AttributeData=<TTo>,<TTime>, <HTo>,<HTime>

Transition=4

AttributeData=<TTo>,<TTime>,<HTo>,<HTime>

Transition=5

AttributeData=<TTo>,<TTime>,<HTo>,<HTime>

Transition=6

AttributeData==<TTo>,<TTime>,<PxH>,<PxL>,<PyH>,<PyL>,<PhH>,<PhL>, <PwH>,<PwL>

Where:
PxH = High Byte of Top Left position of squeezed frame Horizontal co-ordinate. 0=LHS, 719=RHS.
PxL = Low Byte of Top Left position of squeezed frame Horizontal co-ordinate. 0=LHS, 719=RHS.
PyH = High Byte of Top Left position of squeezed frame Vertical co-ordinate. 0=Top, 575=Bottom *
PyL = Low Byte of Top Left position of squeezed frame Vertical co-ordinate. 0=Top, 575=Bottom *
PhH = High Byte of Horizontal Width of the Squeezed Frame. Full Width=720
PhL = Low Byte of Horizontal Width of the Squeezed Frame. Full Width=720
PwH= High Byte of Vertical Height of the Squeezed Frame. Full Height=576 **
PwL= Low Byte of Vertical Height of the Squeezed Frame. Full Height =576 **
* =487 for 525 Systems
**=488 for 525 Systems

The picture will move from its last Position and size to its new position and size in Time TTime. The revealed background as the squeeze occurs will be TTo.

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Transition=7
AttributeData=<TTo>,<TTime>,<WipeNum>,<Wipe Border>,<Border Width>,<Border Colour Depth H>,<Border Colour Depth L>,<Border Luminance>,<Border Hue>,<Border Saturation>

WipeNum Eyeheight Wipe number:

0=Vertical Wipe
1=Horizontal Wipe
2=Vertical Curtains
3=Horizontal Curtains
4=Diagonal Wipe
5=Diamond Wipe
6=Horizontal Arrow
7=Vertical Arrow

Wipe Border =0, means Border OFF
=1, means Soft Border
=2, means Colour Border
=3, means Colour and Soft Border
Border Width =Variable from 1→50. 50 is a large border
Border Colour Depth H =High Byte of colour Depth (Colour Depth Varies from 0→511)
Border Colour Depth L =Low Byte of colour Depth
Border Luminance =0→255
Border Hue =0→255
Border Saturation =0→255

Command : 0x02 (TAKE Command)

Attribute Data: < Take flagsH >,< Take flagsL >,<F>,<S>

The TAKE 16 bit word as below. This will perform the actual “Take” Command on the PresTX system at a time when the Incoming Timecode Seconds and Frames equals <F> and <S>. This allows for the TAKE command to be issued up to 1 minute before the actual take is performed**. If <S>=255 then the take will happen immediately**. If a complex audio transition is set (CMD#7) an immediate take will reset the Complex Audio Transition Command. Command#7 can only be used with a specific timecode trigger because it uses a timecode timeline where the audio transition can occur before the video transition.

Take Flags:
flags = 0xFFFF Everything
1 VIDEO AB Transition (CMD#1)
2 AUDIO AB Transition (CMD#1-Audio will follow video)

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4	KEY0
8	KEY1
10	KEY2
20	KEY3
40	SQUEEZE BACK
80	LOGO 0
100	LOGO 1
200	LOGO 2
400	AUDIO 0 Separate (CMD#3), PGM A12
800	AUDIO 1 Separate (CMD#3), PGM B12
1000	AUDIO 2 Separate (CMD#3), VO1
2000	AUDIO 3 Separate (CMD#3), VO2
4000	AUDIO 4 Separate (CMD#3), PGM AB Output
8000	For Future use

Note: This command will give an "OK" or an error response for each IMPLIMENTED transition bit set. (Currently 40,4000 and 8000 are not implimented). The order of responses are from bits: 1,4,80,8,100,10,20,200,400,800,1000,2000. There is no response from '2'. This transition cannot occur without a video transition.

Command : 0x03 (Set Separate Audio Levels Command)

Attribute Data: < Audio Channel Number >,< Audio LevH >,
< Audio LevL>,<Transition Time>

Audio Channel Number =0→10 (Each a Stereo Pair, 0=PGM A12, 1=PGM B12, 2=VO1, 3=VO2, 4=PGM AB Output, Channel No 5→10 = VO3→VO8)
Audio LevH = Level at the end of the transition, High Byte. (0 – 1023 = 0db to –oo.)
Audio LevL = Level at the end of the transition, Low Byte.
Transition Time =how long (in Fields) to get to new level

Command : 0x04 (Set Keyer Attributes Command)

Attribute Data: <On/Off>,< Keyer Num >,<Transition Time>,
< Keyer Type >,<Keyer GainH>,<Keyer GainL>,
<Keyer LiftH>,<Keyer LiftL>

On/Off =0x01 for "KEY ON" and 0x00 for "KEY OFF"
Keyer Num = key number 0– 3
Transition Time = Time to make transition in Fields
Keyer Type 0=Normal
1=Additive Keying
Keyer GainH =Gain of Key Signal High Byte. (0→511)
Keyer GainL =Gain of Key Signal Low Byte.
Keyer LiftH =Lift on Key Signal High Byte. (-511→511 2's compliment)

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Keyer LiftL =Lift on Key Signal Low Byte.

Command : 0x05 (Set Logo Attributes Command)

Attribute Data: <On/Off>,< Logo Chan Num >,< Bug Play Num>, <Transition Time>

On/Off =0x01 for “LOGO ON” and 0x00 for “LOGO OFF”
Logo Chan Num = Logo channel number 0 to 255
Bug Play Num = The Number of the next bug Play sequence
Transition Time = Time to make transition in Fields

Command : 0x06 (Set Manual Interface Panel)

Attribute Data: <System Number>,< Panel Number >

System Number =<n> Where <n> is PresTX system number 0→15
Panel Number =<p> Where <p> is Manual Interface Panel Number 0→15

Command : 0x07 (Set Complex Audio AB Transition)

Attribute Data: <Tran Out OffsetH>,<Tran Out OffsetL>, < Tran Out TTime >,<Tran In OffsetH>, <Tran In OffsetL>,< Tran In TTime >, <Tran in A/B>

Tran Out OffsetH/L =+/- 2’s comp word. Start point of outgoing program audio relative to the video AB transition start point. Unit of time is video fields.
Tran Out Ttime Time taken for outgoing program audio to fade to silence in video fields.
Tran In OffsetH/L =+/- 2’s comp word. Start point of incoming program audio relative to the video transition AB start point. Unit of time is video fields.
Tran In Ttime Time taken for incoming program audio to fade from silence to full program audio in video fields.
Tran in A/B If the “In Transition” (Next Tran) is “A” then Tran in A/B=0x41, “A”.
If the “In Transition “(Next Tran) is “B” then Tran in A/B=0x42, “B”.

Once this command has been issued the next TAKE command (Cmd#2) will make this command take effect. This command can be cancelled by issuing Cmd#7 again (With any attributes). Issuing Audio separate commands

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(Cmd#3) with <Audio Channel Number>=0,1 is forbidden for obvious conflict of hardware reasons.
Please ensure when using this command that the specified TAKE timecode value (Cmd#2) is set correctly, bearing in mind that the audio transition offsets can cause the audio transition to start long before the video transition.

*(The timecode value in Cmd#2 is the timecode for the start of the **video AB Transition**)*
(This command will not work in Cmd#2 immediate mode. {where attribute <S>=FF})

Command : 0x0A (Set Eyeheight Pvw A,B,C,D X-Point on VX-8)

Attribute Data: < Bus >,< X point >,< V/A >

Bus:	Preview A	=0	Preview switcher A output
	Preview B	=1	Preview switcher B output
	Preview C	=2	Preview switcher C output
	Preview D	=3	Preview switcher D output

X point 0→11 Crosspoint number (set input)

V/A	Video only	=0
	Audio Only	=1
	Aud+Vid	=2

Currently V/A **MUST**=2 because 0 and 1 are not implemented.

This command will set up the crosspoints on the Eyeheight VX-8 Preview switch.

Command : 0x0B (Read Current On-Air status)

Attribute Data: <DUMMY DATA>

This command returns data on the current state of the Eyeheight PresTX System.
1 attribute is required which is unused. Suggest a zero value. This is for upward compatibility with PresTX FP-9 panel mode which will not accept commands with no attributes.

The return data format is:

<"O">,<"K">,< VO flags >,< Key Flags >,< Logo Flags >,
< Prog A/B >,< X point A >,< X point B>,<Aux1>,<Aux2>

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Each return data item is 1 byte. Bit 0 is the Least significant.

VO Flags: bits 0→7 return Voice over 0→7 on-air status. Bit is SET for On-Air.
Key Flags: bits 0→7 return Keyer 0→7 on-air status. Bit is SET for On-Air.
Logo Flags: bits 0→7 return Logo 0→7 on-air status. Bit is SET for On-Air.
Prog A/B =0 for "A" is on air. (On Programme bus)
=1 for "B"
=2 for Matte
=3 for Black
X point A This returns a number 0→11 which is the selected input on the router to the A bus.
X point B This returns a number 0→11 which is the selected input on the router to the B bus.
Aux1 This returns a number 0→11 which is the selected input on the router to Aux1.
Aux2 This returns a number 0→11 which is the selected input on the router to Aux2.

Command : 0x0C (Set Matte Generator)

Attribute Data: < Luminance >,< Hue >,< Saturation >

Each attribute is 1 byte:

This sets the colour of the MW-3 Matte generator.

Luminance =0→255, 16=Black, 235=White
Hue =0→255, 1 unit=360/256 of a degree
Saturation =0→255, 0=0%, 255=100% saturation.

Command : 0x0D (Extended TAKE Command)

Attribute Data: < Take flagsA >,< Take flagsB >,< Take flagsC >,< Take flagsD >,< Take flagsE >,< Take flagsF >,<F>,<S>

The Extended TAKE 48 bit word as below. This will perform the actual "Take" Command on the PresTX system at a time when the Incoming Timecode Seconds and Frames equals <F> and <S>. This allows for the TAKE command to be issued up to 1 minute before the actual take is performed**. If <S>=255 then the take will happen immediately**. If a complex audio transition is set (CMD#7) an immediate take will reset the Complex Audio Transition Command. Command#7 can only be used with a specific timecode trigger because it uses a timecode timeline where the audio transition can occur before the video transition.

TakeA Flags:

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	1	LOGO 1
	2	LOGO 2
	4	AUDIO 0 Separate (CMD#3), PGM A12
	8	AUDIO 1 Separate (CMD#3), PGM B12
	10	AUDIO 2 Separate (CMD#3), VO1
	20	AUDIO 3 Separate (CMD#3), VO2
	40	AUDIO 4 Separate (CMD#3), PGM AB Output
	80	For Future use
TakeB Flags:		
	1	VIDEO AB Transition (CMD#1)
	2	AUDIO AB Transition (CMD#1-Audio will follow video)
	4	KEY0
	8	KEY1
	10	KEY2
	20	KEY3
	40	SQUEEZE BACK
	80	LOGO 0
TakeC Flags:		
	1	AUDIO 5 Separate (CMD#3), VO3
	2	AUDIO 6 Separate (CMD#3), VO4
	4	AUDIO 7 Separate (CMD#3), VO5
	8	AUDIO 8 Separate (CMD#3), VO6
	10	AUDIO 9 Separate (CMD#3), VO7
	20	AUDIO 10 Separate (CMD#3), VO8
	40	Not Used
	80	Not Used

TakeD Flags: Not Yet Used

TakeE Flags: Not Yet Used(For Immediate use only, these events will not stack)

TakeF Flags: Not Yet Used(For Immediate use only, these events will not stack)

Command : 0x0E (Set Eyeheight A,B,Aux1, Aux2 X-Point on VX-8)

Attribute Data: < Bus >,< X point >,< V/A >

Bus:	A	=0	A input to the MW-3
	B	=1	B input to the MW-3
	Aux1	=2	Auxiliary (Spare) output
	Aux2	=3	Auxiliary (Spare) output

X point 0→11 Crosspoint number (set input)

V/A	Video only	=0
	Audio Only	=1
	Aud+Vid	=2

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Currently V/A **MUST**=2 because 0 and 1 are not implemented.

This command will set up the crosspoints on the Eyeheight VX-8 sub-router used to expand the A/B mixer into up to a 12 input mixer.

Command : 0x0F (Set Fade To Black [FTB] Time)

Attribute Data: < Time in Fields >

<Time in Fields> is the time to fade to black in video fields (1 field=1/50th sec 625,=1/60th sec 525)

This sets the fade to black time on the Bug Burner (LK-2, BA-2 or BA-2) in the system. This always uses Bug Burner#0. As a consequence of this, when multiple bug burners are used in a system, Bug Burner#0 MUST be the last processing unit in the PresTX chain.

Command : 0x10 (TAKE Fade to Black and Silence)

Attribute Data: < Take To >

< Take To > = 1 means fade TO Black+Silence
< Take To > = 2 means fade FROM Black+Silence

This sets the fade to black time on the Bug Burner (LK-2, BA-2 or BA-2) in the system. This always uses Bug Burner#0. As a consequence of this, when multiple bug burners are used in a system, Bug Burner#0 MUST be the last processing unit in the PresTX chain. The fade to silence uses Audio Mixer#0 (AM-2E) As a consequence of this, when multiple audio mixers are used in a system, Audio Mixer#0 MUST be the last processing unit in the PresTX chain.

Command : 0x11 (Set X-Points on Pesa Router)

Attribute Data: < Bus >,< X point >,< V/A >

Bus:	A	=0	A input to the MW-3
	B	=1	B input to the MW-3
	Aux1	=2	Auxiliary (Spare) output
	Aux2	=3	Auxiliary (Spare) output
	Aux3	=4	Auxiliary (Spare) output
	Aux4	=5	Auxiliary (Spare) output

Aux<n> =n-1 n'th Auxiliary (Spare) output

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X point 0→255 Crosspoint number (set input)

V/A	Video only	=0
	Audio Only	=1
	Aud+Vid	=2

This command will set up the crosspoints of a Pesa router used to expand the A/B mixer inputs.

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Section 5 Diagnostic Protocol

Sending "!DIAG!" puts the panel into Diagnostic mode. This suspends operation of the panel and enables interrogation of the I-Bus at I-Bus level.

Diagnostic mode has the following commands:

"E" Will exit Diagnostic mode and return to normal panel operation.

"D",<Network ID of i-bus dest.> Sets destination network ID. This is now the host being talked to.

"P",<Network ID of i-bus Priority> Sets this unit's Network ID. This unit can be any Nid for diagnostic purposes.

"!",<no. chrs in msg>,<...message body...> Sends a sequence to be translated to the i-bus. It will use the currently selected Destination ID (Set by "D" cmd) and will itself have the ID selected by the "P" command.

"?"<reply...> Starts a "wait for message for 100mS" from the i-bus. If there is a reply it will follow.

End Of Document

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