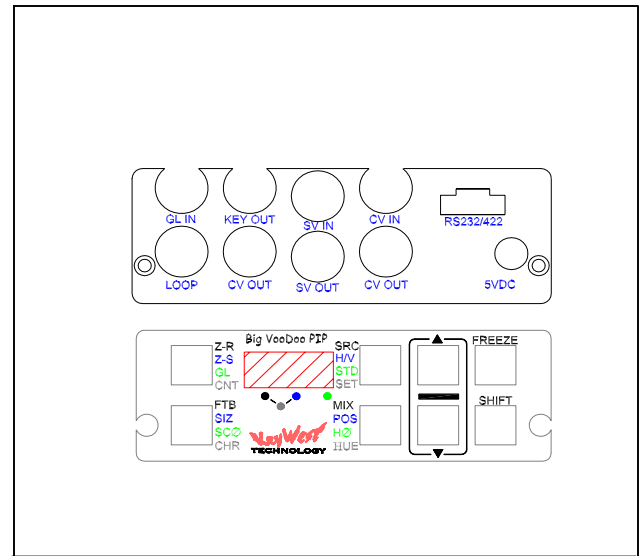


## Multi-Standard Composite and Y/C Picture-in-Picture Processor

The BVPiP accepts NTSC or PAL-B analog composite or Y/C video foreground and NTSC or PAL-B analog composite background video. The Picture-in-Picture (PiP) device resizes and positions input foreground video and can mix the processed and resized image over a broadcast quality background image. A full feature front panel gives the user control over zoom, aspect, position, processor amplifier settings, Vertical Blanking Interval data select, Horizontal Phase, Sub-Carrier Phase, and much more. In addition, the unit is capable of fade-to-black effects as well as dynamic mix effects.



## SPECIFICATIONS:

- Accepts analog composite and Y/C NTSC and PAL-B video (foreground and background--output standard same as input standard)
- Resized video output (composite and Y/C)
- Mixed composite video output
- Individual contrast, brightness, hue, chroma, sub-carrier, and horizontal phase control
- Professional 75 ohm BNC input and output connectors and 4-pin Y/C mini-DIN connectors
- Stand-alone, or rack mount four units across with Keywest 19" rack kit (kit not included)
- 5 VDC operation (wall transformer included)
- Foreground SNR 50dB weighted
- 5.8 MHz typical luma NTSC bandwidth (to 3dB at Full Screen Image—Unity Background)
- 16nS typical frame input to output delay
- Ambient operating temperature 0 to + 70 °C

## ORDERING INFORMATION

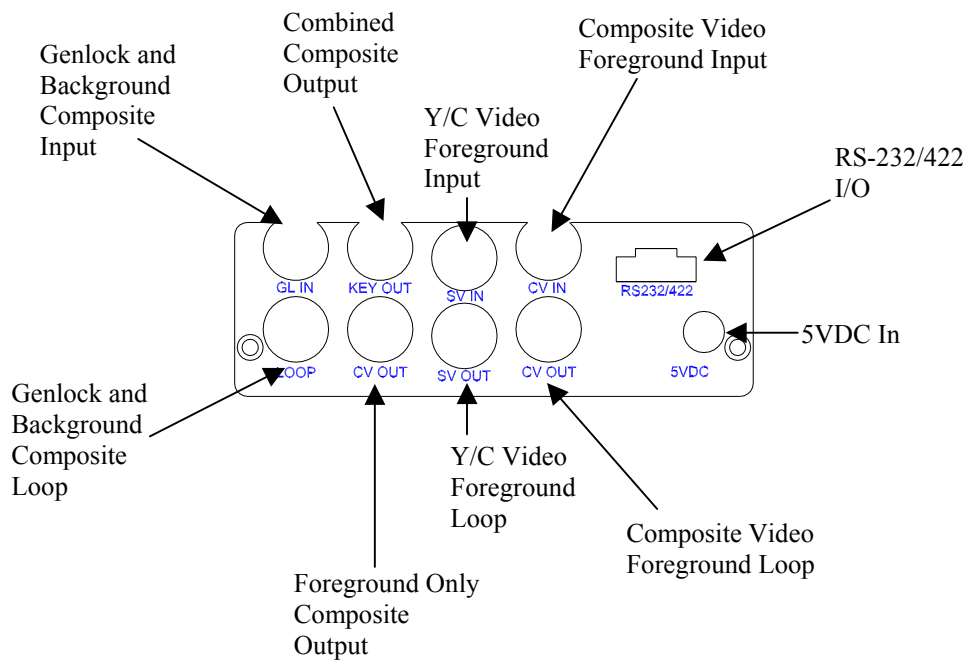
Part #	Options
BVPiP	Rack Kit, Rack Kit Blanks

## APPLICATIONS

- In-studio effects
- Over-the-shoulder PiP effects
- Shot Clock resizing and PiP effects
- Distance Learning
- Teleconferencing
- Broadcast PiP applications
- Any picture-in-picture application imaginable

OPERATING INSTRUCTIONS

CONNECTIONS



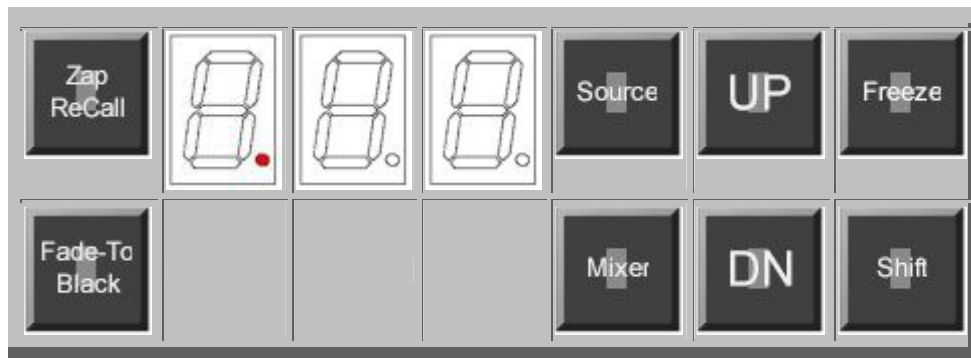
All video connections to be made with industry standard BNC connectors and 4-Pin Mini-DIN Y/C connectors

## BVPIP Menu Level 1

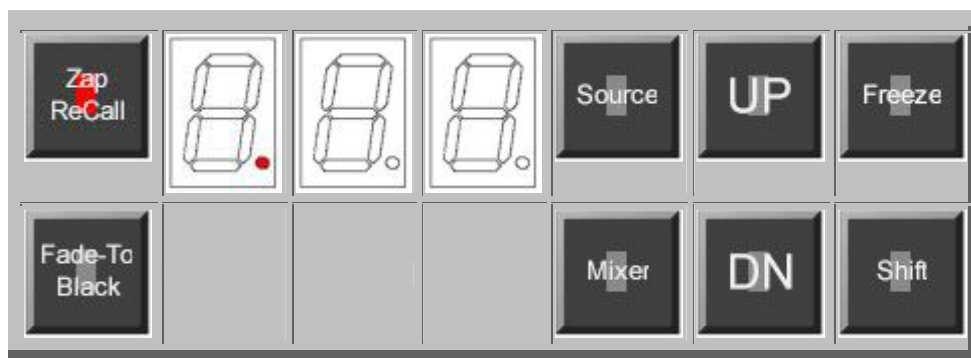
The BVPIP at turn-on looks like this... take note of the **•** decimal point inside the LED's. These little dots indicate the menu level you are on. Below, the **first** LED has the decimal point lit, indicating that we are at menu level ONE. There are a total of 5 menu levels, as shown below:



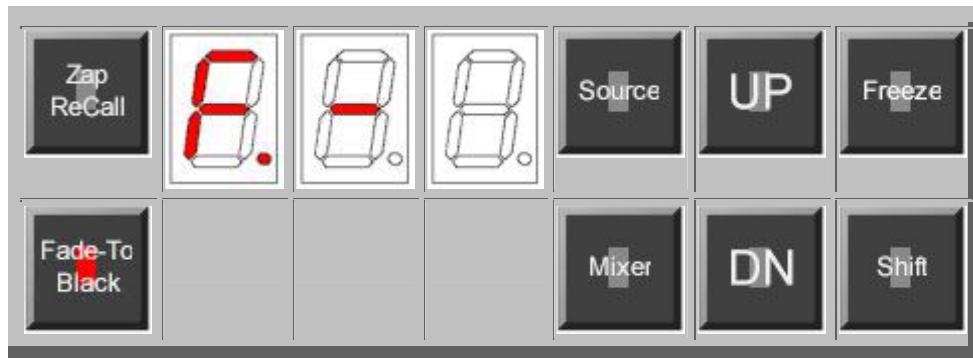
NOTE: The BVPIP *always* returns to this state, regardless of what menu level was last used, or when there is no user input for approximately 15 seconds.



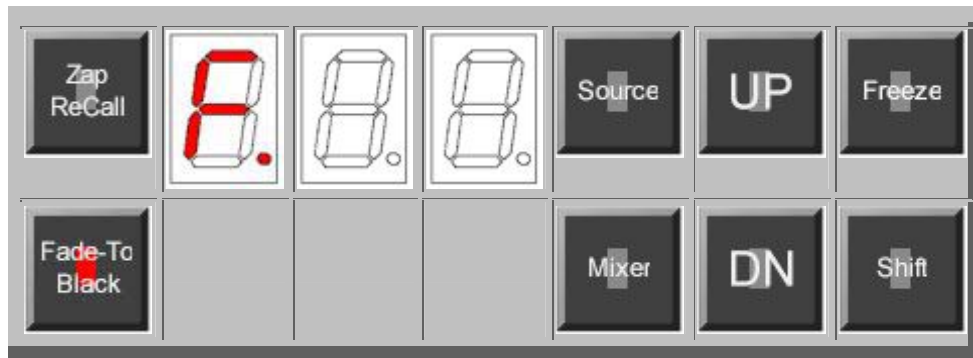
The First Button has the function of **Zap ReCall** - **Zap** is an acronym for **Z**oom, **A**spect, and **P**osition, which refers to the size, shape and position of the image. There are 11 Zap registers, of which, 0-9 are user defined. The eleventh register, 10, is factory default and produces a full screen display. Use the **UP** and **DN** buttons to select which register is to be recalled. Once you have selected the desired register - simply push the **Zap ReCall** again. The image size, shape and position stored in that register is selected. NOTE: Initially, there may be nothing stored, and the output will be random in size, shape, and position - or nothing at all.



The pushing the next button down will show the status of the **Fade-To-Black** function. The **F** in the first LED let's us know that we are in the **Fade-To-Black** mode, the **minus** sign in the second LED tells us that we are NOT in Fade-To-Black - Video is being output as normal. Remember, the Fade-To-Black function can only be used when the BVPiP is **Locked** to the **Background** video (see Genlock mode - [Menu Level 3](#)), and this requires a valid background video connected to the Genlock BNC at the rear of the BVPiP.

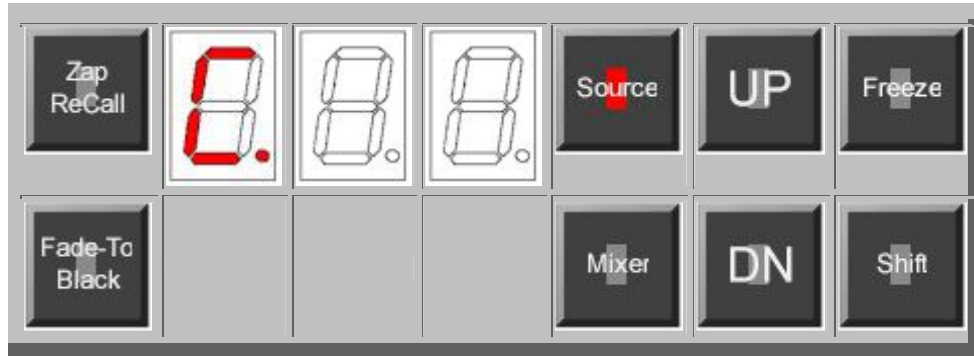


Pushing the **UP** button changes the display to...

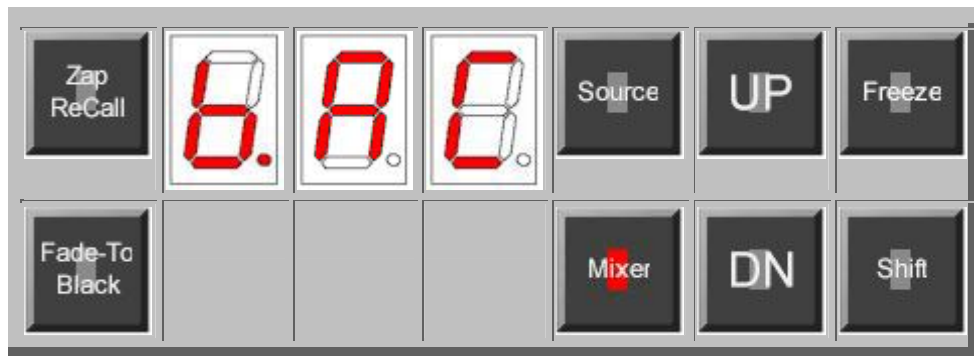
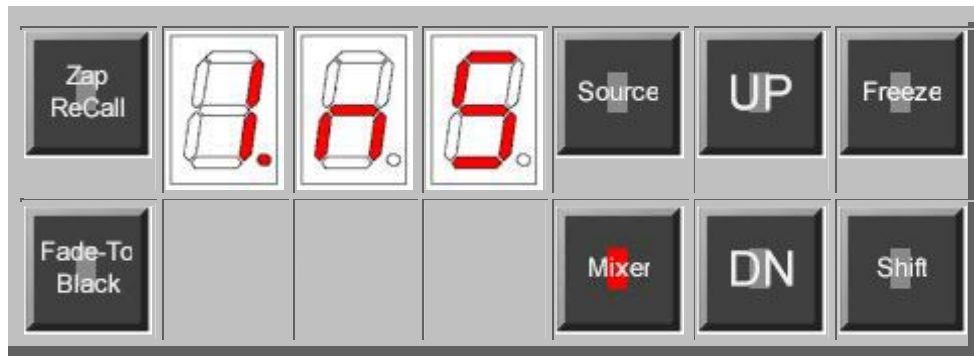


And the output video is faded to black. The speed of the transition to and from black is fixed in the hardware.

The **Source** button shows which of the two video inputs, available to the BVPiP, is selected. Using the **UP** button selects the Composite input, while the **DN** buttons select the S-Video source. When the **Source** button is pushed the display looks like this - when a Composite video has been selected.

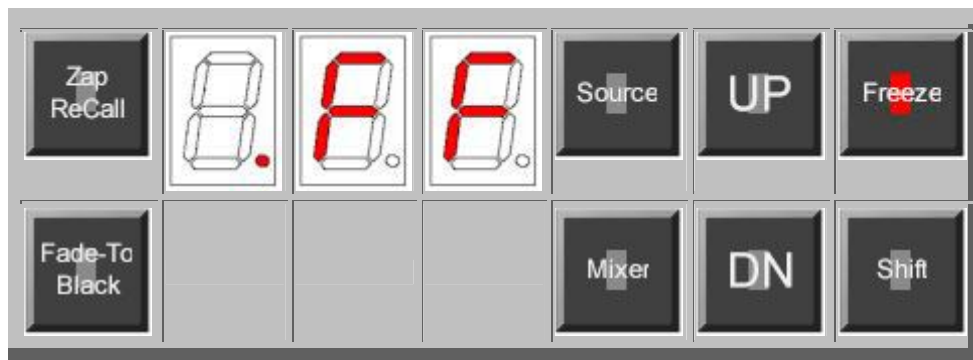


Pushing the **Mixer** button shows the status of the BVPIP video with respect to the Background input. If the LED's display **InSert**, then Effect video is Mixed (aka:inserted, or keyed) over the Background. If **InSert** is not displayed, then **bACKground** will be displayed - meaning that only the Background video is visible at the output of the BVPIP. **InSert** will be initiated by the pushing the **UP** button - mixing **IN** the Effect video. And, when the **DN** button is pushed, the display will change to show **bACKground**, and the Effect video is mixed **OUT** of the Background - leaving only the Background video.



The transition speed of the Mix in/out is also selectable. This selection is available on **Menu Level 5**. Remember, the **Mixer** function is only useable when the BVPiP is **Locked** to the **Background** video (see Genlock mode - **Menu Level 3**), and this requires a valid Background video to be connected to the Genlock BNC at the rear of the BVPiP.

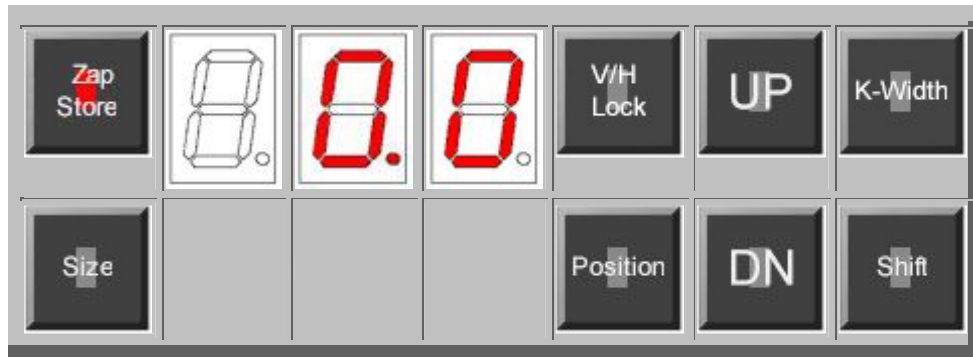
The last item available on Menu level 1 is the **Freeze** button. When **Freeze** is pushed the LED's show that the inserted video is **Field Frozen**, and this condition will remain until the **Freeze** button is pushed again. Thus the **Freeze** button toggles the **Freeze** function on/off.



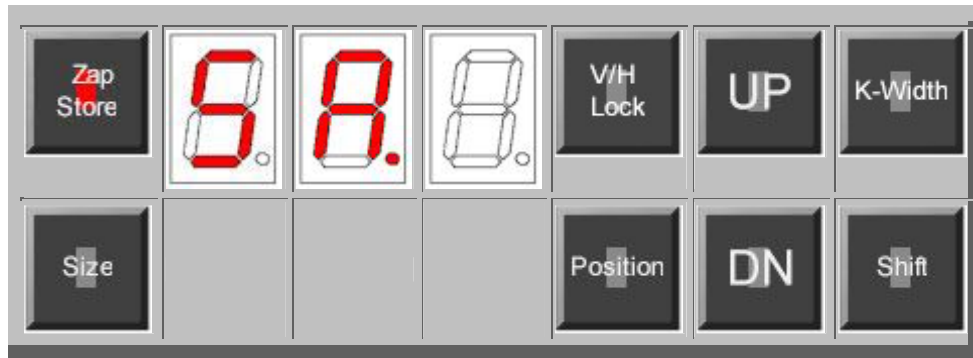
## BVPIP Menu Level 2

The functions for the BVPIP at Menu Level 2 are shown below.

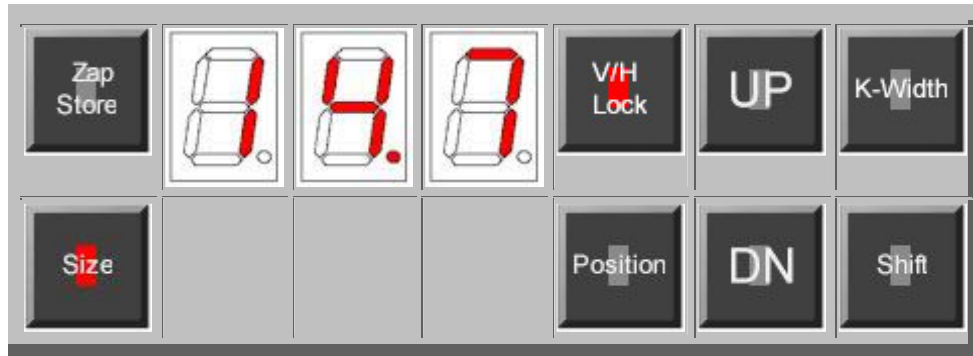
The picture below shows the effect of pushing the **Zap Store** button. When a particular size, shape and position of an effect has been produced, through the functions available on this menu level, these values can be stored and recalled at anytime in the future. Again, there are ten of these registers, 0-9, and using the **UP** and **DN** buttons you can select which register that to use to store a particular effect.



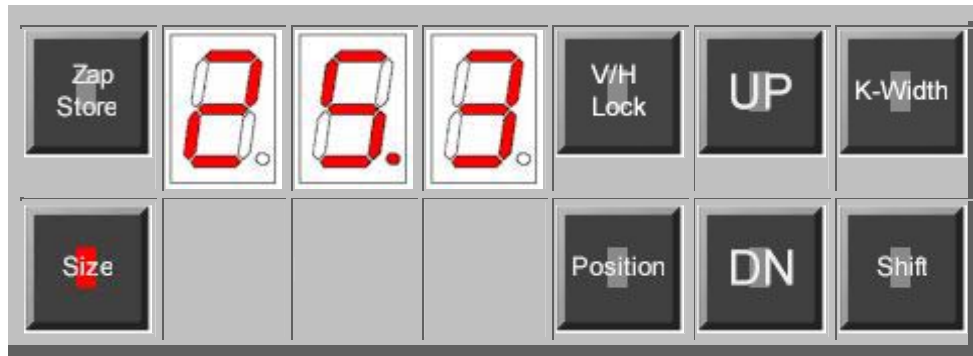
Once the register selection is made, pushing the **Zap Store** button again will initiate the Store, and the display will change to look like this... confirming the acceptance of the store request.



The next series of pushbutton selections will determine the *size and position* of the output video effect. Selecting the **Size** button, brings up a display similar to the one below. Notice that the **V/H Lock** button lights at the same time. When the **V/H Lock** button is lit the axis that we will be adjusting is **Vertical**. Conversely, when its dark the axis is **Horizontal** - **remember this** - it will save you a lot of time. The numbers in the LED displays indicate the vertical size of the picture, in this case 147 lines high. The range is 0-240 in NTSC. The **UP** and **DN** adjust the size.

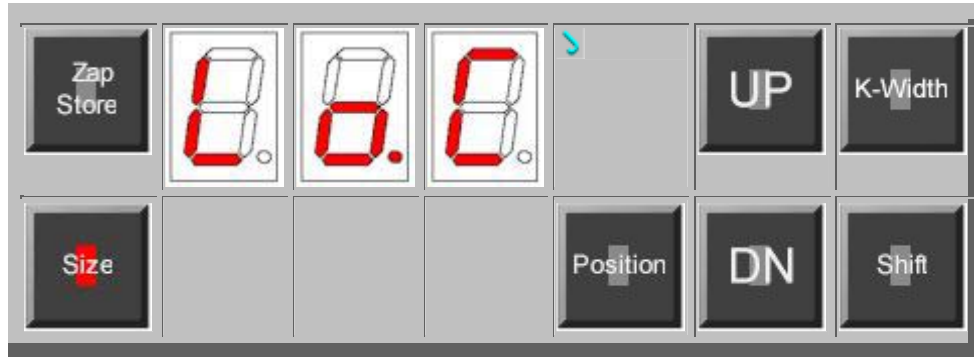


Pushing the **V/H Lock** button again, extinguishes the **V/H Lock** LED and the display changes to show the **Horizontal** size of the picture in pixels, in this case below we show that the Horizontal size is 253 pixels wide. The range is 0-704 in NTSC. Again, the **UP** and **DN** adjust the size.

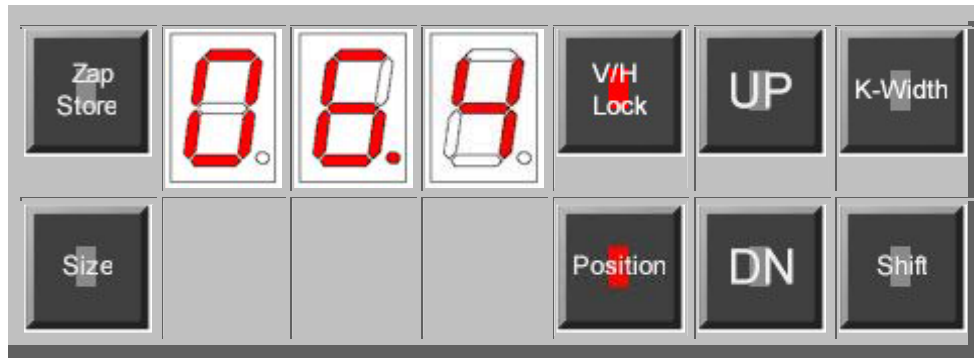




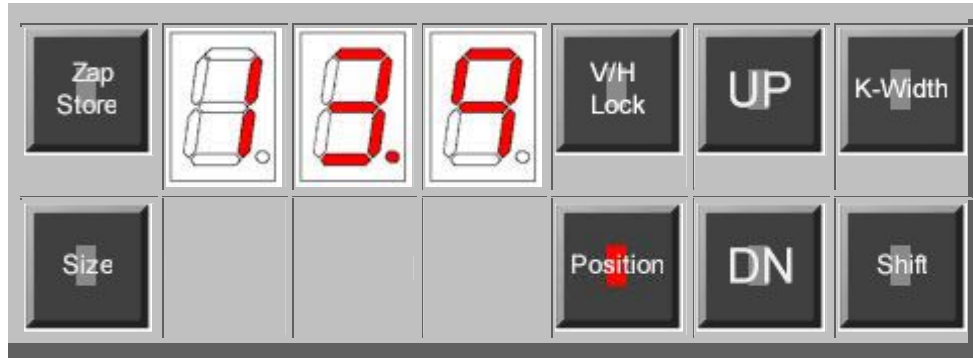
Pushing the **V/H Lock** for the third time will select the **LoCked** mode and the **V/H Lock** LED will begin to flash. In this mode, both H and V size change together and maintain the same aspect ratio that existed when the mode was initiated. Use the **UP** and **DN** buttons as usual to change the value. The **V/H Lock** is circular, it switches from V, to H, to Lock, to V, to H...



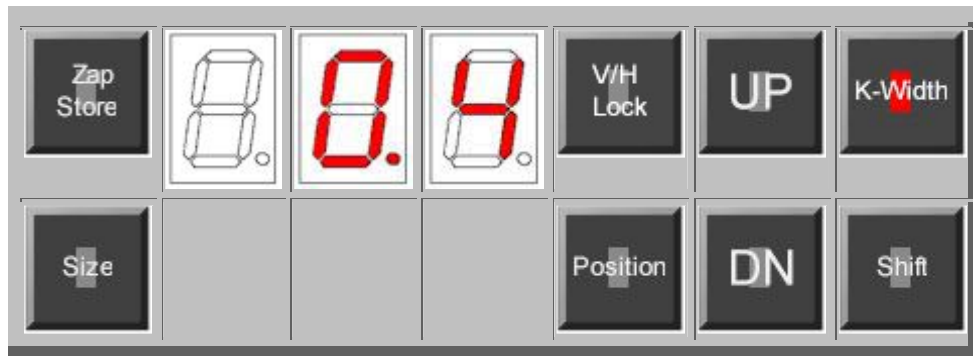
Pushing the **Position** button, lights the **V/H Lock** LED and changes the displays the **Vertical** position of the picture in lines from the top of the picture. In the display below, the number 064 means that the *top* of the resized picture will start at Horizontal line 64. The range is 0-240 in NTSC. Again, the **UP** and **DN** adjust the position for the start of the top of the picture.



Pushing the **V/H Lock** button again will extinguish its LED and the display will change to indicate the Horizontal position of the picture in pixels from the left side of the picture. In the display below, the number 139 means that the *left edge* of the resized picture will start at pixel number 139. The range is 0-706 in NTSC. The **UP** and **DN** adjust the position for the start left side of the picture. The upper left corner of the picture is 0,0. Once you have sized and positioned the effect you can decide if the resulting picture is one that should be saved for use again - if it is then the **Zap Store** procedure should now be followed...



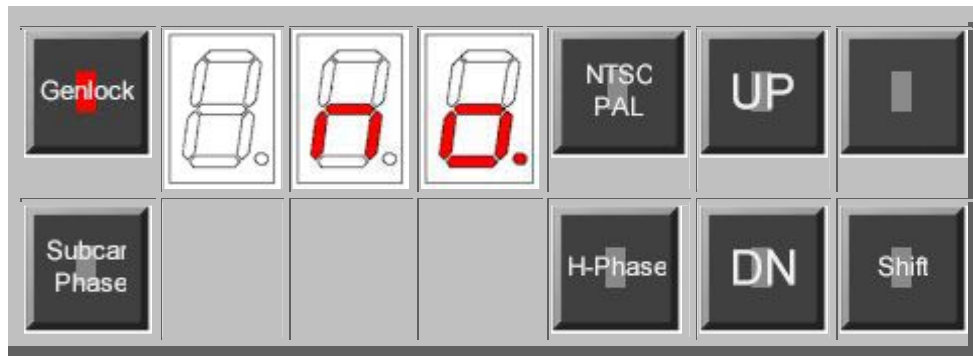
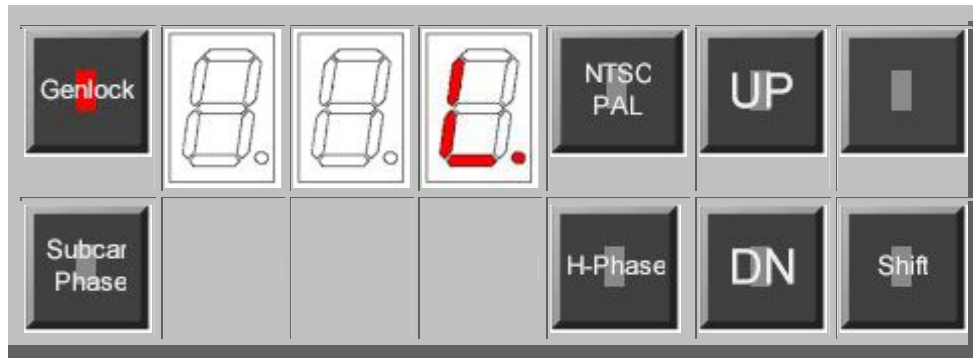
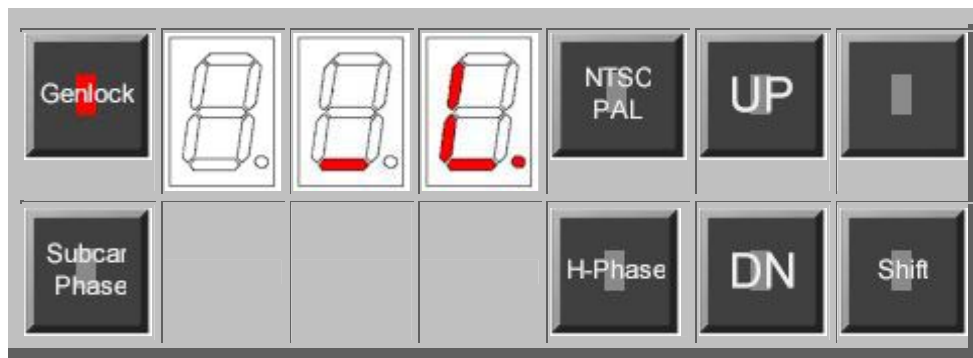
The last function on Level 2 is that of **Key-Width**. The **Key-Width** is used to crop the image that is displayed at the output of the combiner. Because of variations in the blanking width of video sources there may be undesirable black lines on either or both sides of the inserted video. The BVPiP allows the user to eliminate these lines by varying the **Key-Width**. There are 4 steps of adjustment, in pixels, 0, 4, 8 and 12. These values reflect the amount of cropping on each side of the pictures, for example, a value of 4 means that the left and right sides are 4 pixels narrower than normal. Normal being "0" for video that is correctly blanked. Pushing the **Key-Width** button switches the display to the stored value, and the **UP** and **DN** button change the value. When properly set there should not be any residual blanking on the sides of the inserted picture.



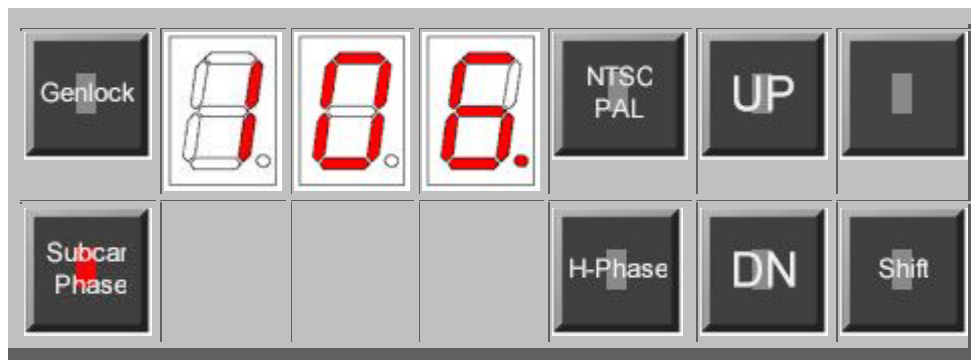
## BVPIP Menu Level 3

The functions for the BVPIP at Menu Level 3 are shown below.

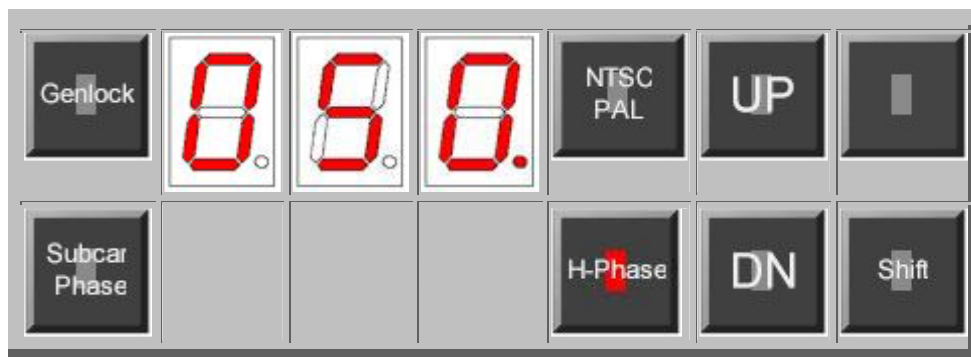
Pushing the **Genlock** button shows the Genlock status of the BVPIP, which in the picture below, is **\_L**, meaning NOT LOCKED. The second picture below shows Genlock status **Locked**, and finally the last picture shows what happens if you push Genlock without a Genlock input connected to the rear of the BVPIP, it just says **NO**. The **UP** button selects **Lock**, and the **DN** button selects **Unlock (\_L)**. Remember, if you want to genlock the output of the BVPIP - you must have a Composite video signal connected to Genlock input at the rear of the BVPIP.



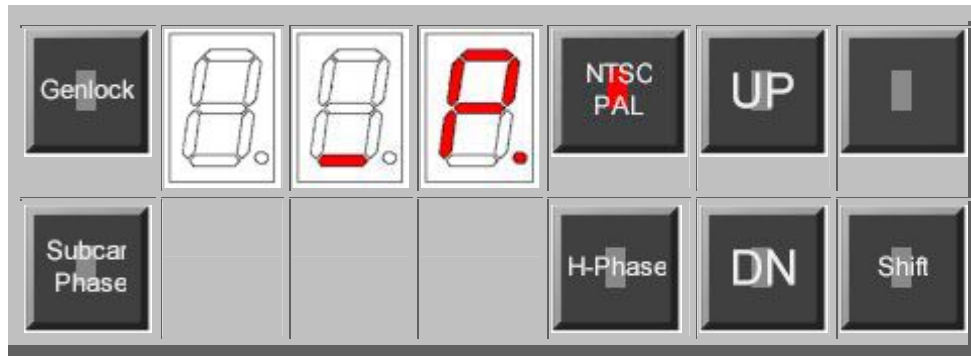
When the BVPIP is Genlocked - it is necessary to be able to adjust the phase of the output to match that of the Genlock video feed. This means adjustments for the **H-Phase** and **Subcarrier Phase**. The adjustment of **Subcarrier Phase** is best done with the use of a vectorscope to monitor the BVPIP output. When the **Subcarrier Phase** button is pushed, the stored relative phase is displayed. This number does NOT indicate any true phase difference, it is only a number relative to its range of 0-255. Each increment will change the output phase approximately  $1.4^\circ$  at 3.58MHz. Again, we use the **UP** and **DN** buttons to change the subcarrier phase. If you are using the **Mixed** output, make sure that the insert video subcarrier phase matches the color phase of the Background video. Don't confuse the **Subcarrier Phase** adjustment with the HUE adjustment - the HUE changes the chroma phase with respect to the burst - the **Subcarrier Phase** changes both burst and chroma phase together relative to the genlock input.



To adjust the **H-Phase** requires the use of a scope to monitor the BVPIP output. When the **H-Phase** button is selected - the stored relative phase is displayed. This number does NOT indicate any true phase reference, it is only a number relative to its range of 0-255. Each increment will change **H-Phase** approximately 78ns. The total range is from -5us to +15us relative to the Genlock input. Use the **UP** and **DN** buttons to change the Horizontal phase value. If you are using the **Mixed** output, make sure that the Effect video leading edge of sync matches that of the Background video leading edge of sync.



The BVPiP is designed to operate in both the PAL-B and NTSC standards. **NTSC/PAL** button selects which standard, and the display shows the default standard. Below the LED's shows **\_P**, which reads NOT PAL or simply NTSC. The **UP** button selects NTSC, the **DN** button selects PAL. The display just reads **P** when the PAL mode is selected. Cycle power one time after changing standards to ensure good chroma lock.

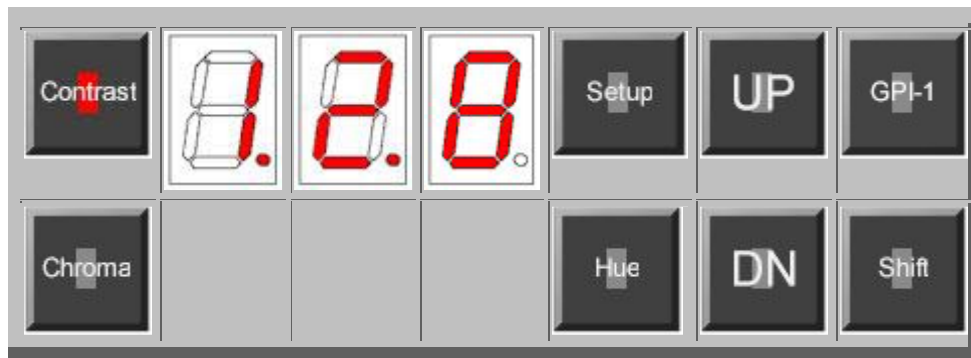


## BVPIP Menu Level 4

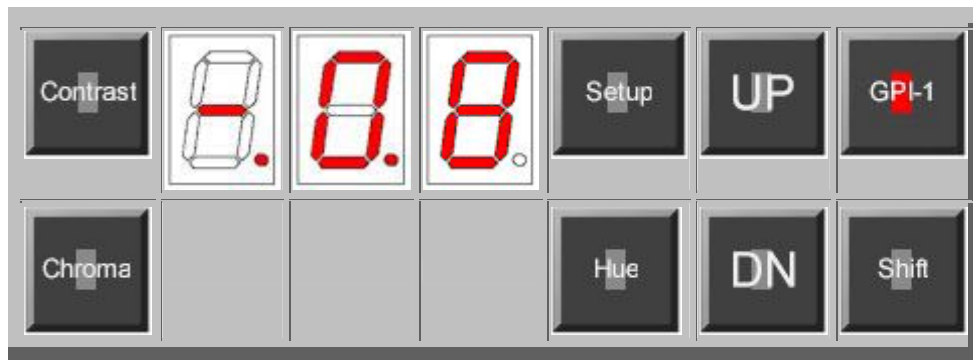
The functions for the BVPIP at Menu Level 4 are shown below.

Level 4 comprises the video processing amplifier controls of the BVPIP. Pushing the **Contrast** button - the LED's show a level of 128, which is the factory default settings for all the proc amp adjustments. The **UP** button increments the number and increases the gain of the selected function, while the **DN** button decrements, or reduces the gain. For example, in the case of **Setup**, the black level is made more positive with the **UP** button and less positive with the **DN** button.

Click on the proc amp adjustment desired and see an example of the change in the LED display. These are only examples of typical values. The actual values will be those the user has chosen for the material being processed. All adjustment are stored automatically 15 seconds after the last adjustment is performed.



The BVPiP offers only two GPI inputs, but the action performed by the GPI is user programmable from a list of 20 different functions. The front panel below shows that GPI-1 is programmed to control function #8 and the GPI is triggered by a low level on the GPI-1 input. Below the picture is a complete list of the GPI functions. As usual, pushing the GPI-1 button displays the save value, and this is changed with the **UP** and **DN** buttons. In addition to the list, the user can also program the polarity of the the GPI input. The GPI can be set to trigger on a low level (-\*\*) or high level (\*\*) using function 20. Function 20 is used for polarity change only - the absence of the "-" sign on the leading LED indicates that the GPI will be triggered by a high level, and this level change applies to all the functions available to GPI-1. The second GPI input, GPI-2, duplicates all these functions, and is available from [Menu Level 5](#).



The following GPI options are available by number:

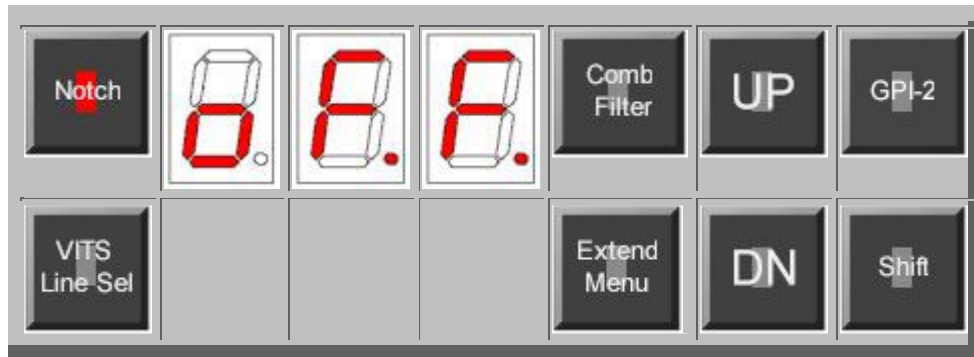
00	GPI off
01	Fade-to-Black OFF
02	Fade-to-Black ON
03	Fade-to-Black TOGGLE
04	Fade-to-Black FOLLOW - High (open) FTB "OFF", Low (closed) FTB "ON"
05	Mix Effect Video OFF
06	Mix Effect Video ON
07	Mix Effect Video TOGGLE
08	Mix Effect Video FOLLOW - High (open) Mix "ON", Low (closed) Mix "OFF"
09	Freeze OFF
10	Freeze ON
11	Freeze TOGGLE
12	Freeze FOLLOW - High (open) FRZ "OFF", Low (closed) FRZ "ON"
13	Key Frame from BEGINNING - Recalls ZAP register "0"
14	Key Frame DECREMENT - ZAPs go from 0,9,8,7...
15	Key Frame INCREMENT - ZAPs go from 0,1,2,3...
16	Key Frame END - Recalls ZAP register "9"
17	Key Frame FULL - Recalls ZAP register "10" (Full Screen)
18	Key Frame SET - Set current register as Start for subsequent Key Frames
19	Key Frame FOLLOW - High (open) goes to Reference, Low (closed) next
20	GPI Polarity - Use <b>UP</b> and <b>DN</b> buttons to change polarity



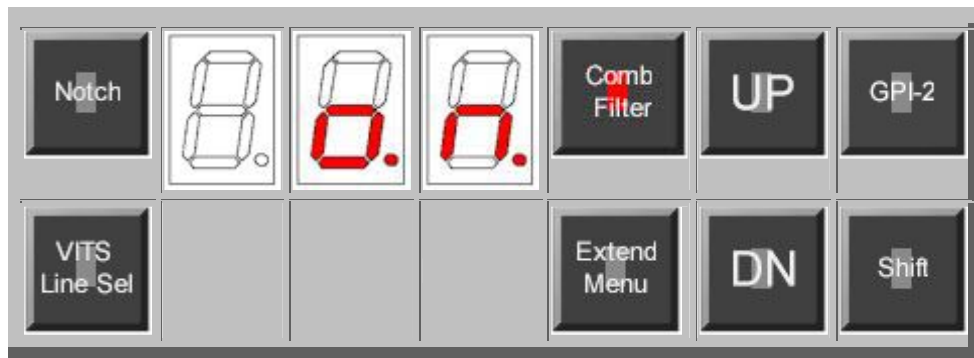
**BVPIp Menu Level 5**

The functions for the BVPIp at Menu Level 5 are shown below.

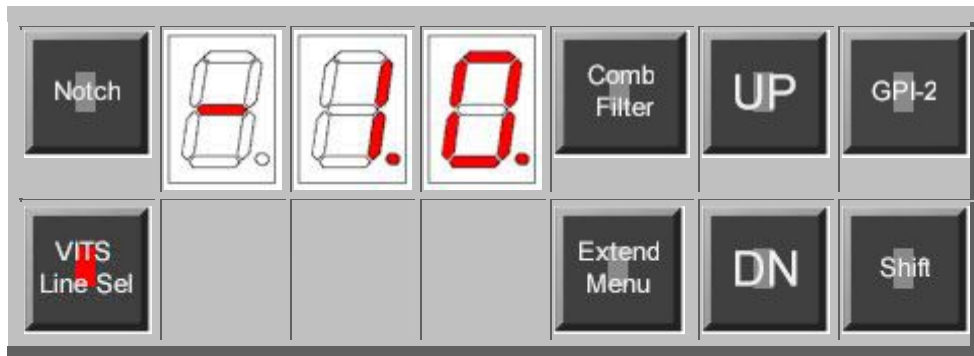
Level 5 comprises the extended functions. The display below shows the effect of pushing the **Notch** button. The LED's show normal setting of **oFF**, which is the factory default settings for the **Notch** Filter. The **Notch** Filter is used in PAL standards, and in NTSC in cases where the chroma in the video is incoherent. The **UP** button turns the filter ON, while the **DN** button turns it OFF.



This display shows the effect of pushing the **Comb Filter** button. The display shows the factory default for NTSC for the **Comb Filter** which is ON. The Comb Filter is to be turned OFF when the unit is operating in the PAL mode.

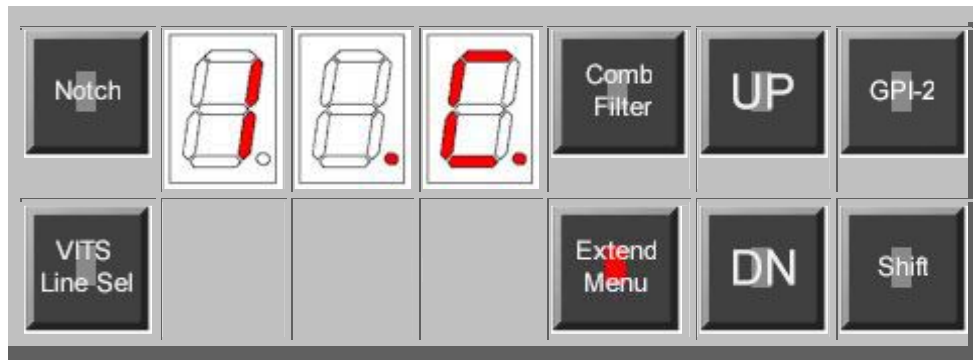


The BVPIp provides for the selection of which of the VITS signals present in the Background input are to pass through the system. Selecting the **VITS Line Select** button, brings up the display below. The minus (-) sign indicates that VITS on line 10 are blocked from the output of the BVPIp. Pressing the **VITS Line Select** advances the display by one from 10 to 21. The **UP** button adds the line to the output as indicated by the absence of the minus (-) sign before the number. The **DN** button deletes the line from the output and is indicated by the presence of the minus (-) sign.

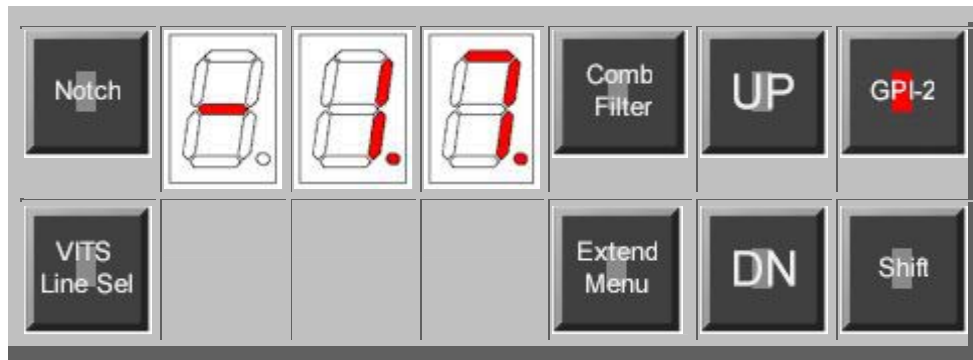


The **Extended Menu** button sets various system functions and presets. Below, the display shows a "1" in the first digit, indicating that we are in sub-menu 1. Each time the **Extended Menu** button is pressed this number increments up to and including the number 4. Here are the Functions of each push, starting with "1":

1. Mixer Dissolve Speed - the **UP** button increments from **C** for Cut (the fastest transition), **1** - Fast transition, **2** - medium transition, and **3** - slow transition. The **DN** button decrements the selection.
2. Alpha/Mix selection - The BVPIp can provide an Alpha Key signal out in place of the Mixer out. The display LED's show an "1" when in the Alpha mode and a "2" when in the Mixer mode. The **UP** selects Alpha, the **DN** selects Mixer.
3. Baud Rate - the communications speed is selectable, between 9600 baud and 19200. The display shows a "1" in the 19200 and a "2" in the 9600 mode. The **UP** selects 19200, the **DN** selects 9600.
4. Serial Port Protocol - this sets the communications standard for the serial port. The display shows a "1" for RS-422 and a "2" for RS-232. The **UP** selects RS-422, the **DN** selects RS-232.



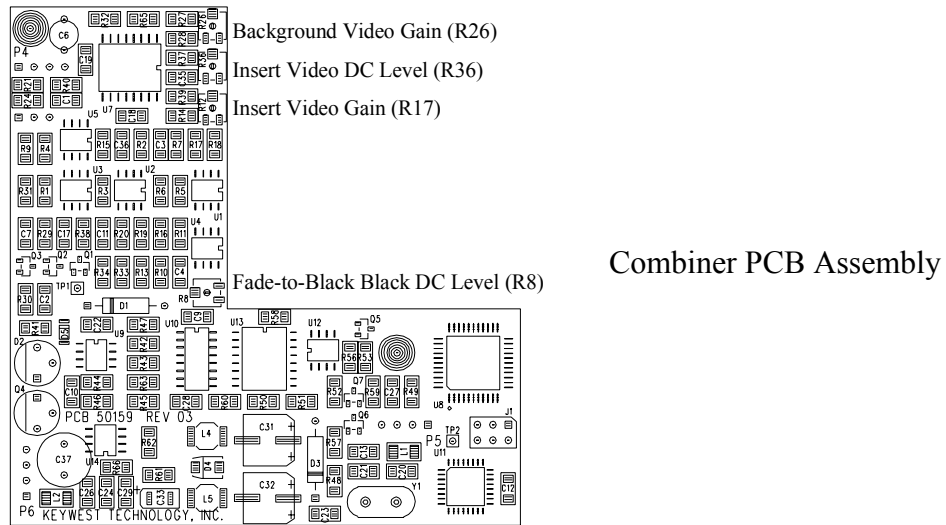
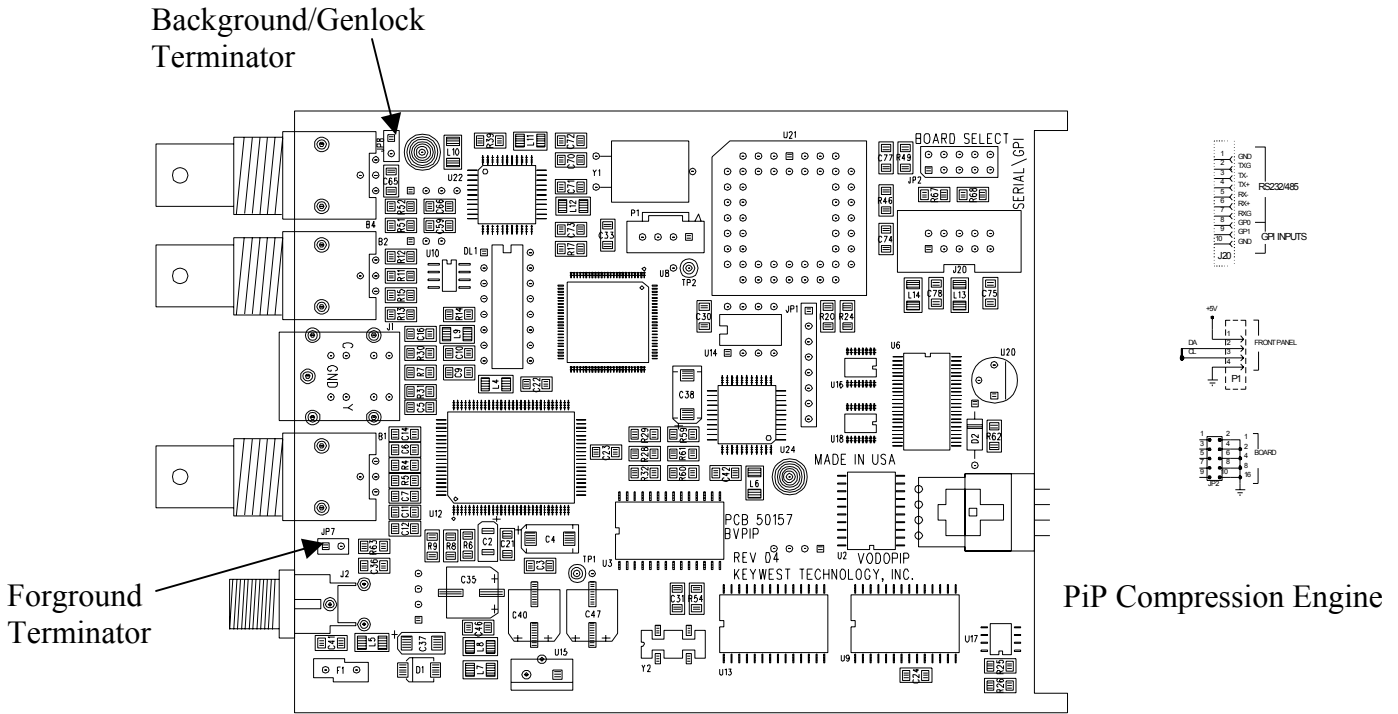
The BVPiP offers only two GPI inputs, but the action performed by the GPI is user programmable from a list of 20 different functions. The front panel below shows that GPI-2 is programmed to control function #17 and the GPI is triggered by a low level on the GPI-2 input. Below the picture is a complete list of the GPI functions. As usual, pushing the GPI-2 button displays the save value, and this is changed with the **UP** and **DN** buttons. In addition to the list, the user can also program the polarity of the the GPI input. The GPI can be set to trigger on a low level (-\*\*) or high level ( \*\*) using function 20. Function 20 is used for polarity change only - the absence of the "-" sign on the leading LED indicates that the GPI will be triggered by a high level, and this level change applies to all the functions available to GPI-2. The second GPI input, GPI-1, duplicates all these functions, and is available from [Menu Level 4](#).



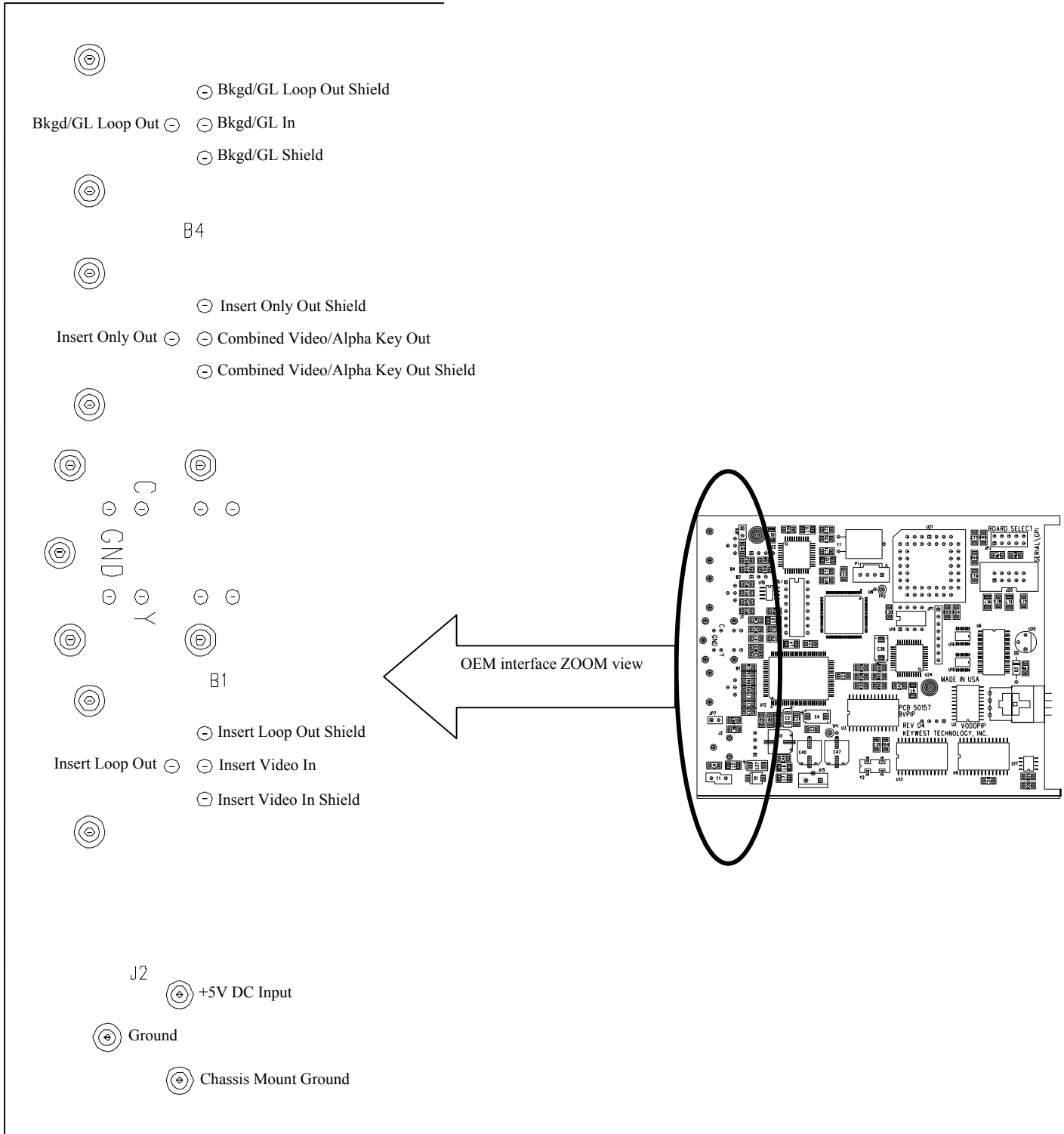
The following GPI options are available by number:

00	GPI off
01	Fade-to-Black OFF
02	Fade-to-Black ON
03	Fade-to-Black TOGGLE
04	Fade-to-Black FOLLOW - High (open) FTB "OFF", Low (closed) FTB "ON"
05	Mix Effect Video OFF
06	Mix Effect Video ON
07	Mix Effect Video TOGGLE
08	Mix Effect Video FOLLOW - High (open) Mix "ON", Low (closed) Mix "OFF"
09	Freeze OFF
10	Freeze ON
11	Freeze TOGGLE
12	Freeze FOLLOW - High (open) FRZ "OFF", Low (closed) FRZ "ON"
13	Key Frame from BEGINNING - Recalls ZAP register "0"
14	Key Frame DECREMENT - ZAPs go from 0,9,8,7...
15	Key Frame INCREMENT - ZAPs go from 0,1,2,3...
16	Key Frame END - Recalls ZAP register "9"
17	Key Frame FULL - Recalls ZAP register "10" (Full Screen)
18	Key Frame SET - Set current register as Start for subsequent Key Frames
19	Key Frame FOLLOW - High (open) goes to Reference, Low (closed) next
20	GPI Polarity - Use <b>UP</b> and <b>DN</b> buttons to change polarity

## BVPiP PCB Landmarks and Mechanical Adjustments



## OEM Interface Notes



## COMMAND SET

This is a listing of the RS232 Serial Commands for the Big Voodoo PIP Unit

**All serial commands must be preceded by an address byte. The W command will ignore the address byte.**

**Addresses are an ASCII character of 'a' thru 'd' (lower case letters).**

Commands not understood or wrong will elicit a NAK response as follows:

cr lf nak

Commands understood which don't return value(s) will elicit an ACK response as follows:

cr lf ack

### Command List -- BVPiP

A	Ask	a	
B	---	b	address
C	Color	c	
D	---	d	
E	Freeze	e	
F	FTB <Combiner>	f	
G	---	g	
H	Hue (Tint)	h	
I	Comb Filter	i	
J	Notch Filter	j	
K	---	k	
L	Luma (Contrast)	l	
M	MIX <Combiner>	m	Alpha/Mix <Combiner>
N	Standard	n	VITS Selection <Combiner>
O	---	o	
P	---	p	Position
Q	---	q	Size & Position
R	Recall	r	Recall Zap
S	Setup (Brightness)	s	Size
T	Store	t	Store ZAP
U	Genlock	u	
V	Video	v	
W	Who Are You ?	w	
X	Version ?	x	
Y		y	
Z	System Timing	z	

## ASK COMMANDS

### A Ask

Ask for the board settings (5 bytes)

Format:

a A @ n cr Ask for stored video/proc values  
a A @ C cr Ask for current video/proc values  
a A @ Z cr Ask for current ZAP values

Returns, for source request (0 thru 3), (11 bytes)

video,mode,cont,brit,color,tint,shar,filt,cr,lf,ack

Returns, for current request ('C'), -- (13 bytes)

video,mode,cont,brit color,color,tint,shar,filt,  
hPha,scPha,  
cr,lf,ack

Returns, for ZAP request ('Z'), -- (11 bytes)

hSize(2),vSize(2),hPos(2),vPos(2),  
cr,lf,ack

## PROC COMMANDS

### C Color

Adjust/Set Color Settings (5 bytes)

Format:

a C 1 + cr Increment Chroma value  
a C 1 - cr Decrement Chroma value  
a C 1 @ cr Normalize Chroma value  
a C 2 x cr Set Chroma value x= hex value to be set

Returns:

cr lf ack

### H Hue (Tint)

Adjust/Set Hue Settings (5 bytes)

Format:

a H 1 + cr Increment Hue value  
a H 1 - cr Decrement Hue value  
a H 1 @ cr Normalize Hue value  
a H 2 x cr Set Hue value x = hex value to be set

Returns:

cr lf ack



## L Luminance (Contrast)

Adjust/Set Luminance Settings (5 bytes)

Format:

a L 1 + cr	Increment Luma value	
a L 1 - cr	Decrement Luma value	
a L 1 @ cr	Normalize Luma value	
a L 2 x cr	Set Luma value	x = hex value to be set

Returns:

cr lf ack

## S Setup (Brightness)

Setup Adjust/Set (5 bytes)

Format:

a S 1 + cr	Increment Setup value	
a S 1 - cr	Decrement Setup value	
a S 1 @ cr	Normalize Setup value	
a S 2 x cr	Set Setup value	x = hex value to be set

Returns:

cr lf ack

## FREEZE COMMANDS

### E Freeze

Freeze Control (5 bytes)

Format:

a E @ + cr	Freeze On	
a E @ - cr	Freeze Off	
a E @ n cr	Select Field/Frame	n = 0,1,2,3
	0=Frame	2=Field 2
	1=Field 1	3=Frame

Returns:

cr lf ack

Freeze Query (5 bytes)

Format:

a E @ ? cr	Request Freeze Information
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Returns:

a E n cr lf ack    n = bit encoded byte value

## VIDEO STANDARD COMMANDS

### N Standard

Video Standard Control (5 bytes)

Format:

a N @ + cr	Set NTSC Standard
a N @ - cr	Set PALB Standard
a N @ N cr	Set NTSC Standard
a N @ P cr	Set PALB Standard

Returns:

cr lf ack

Video Standard Query (5 bytes)

Format:

a N @ ? cr	Request Standard Information
------------	------------------------------

Returns:

a N n cr lf ack	n = N, P
	N = NTSC
	P = PalB

## RECALL/STORE COMMANDS

R Recall Settings (5 bytes)

Format:

a R @ P cr	Recall POR Settings	
a R @ F cr	Recall Factory Settings	
a R @ S cr	Recall System Settings	
a R @ n cr	Recall Channel (Video/Proc) settings	N = 0, 1
	0 = CV	
	1 = SV	

Returns:

cr lf ack

T Store Settings (5 bytes)

Format:

a T @ P cr	Store POR Settings
a S @ S cr	Store System Settings
a T @ C cr	Store Channel (Video/Proc) Settings

Returns:

cr lf ack

## GENLOCK COMMANDS

### U Genlock

Genlock Control (5 bytes)

Format:

a U @ + cr            Genlock to Auto Mode  
a U @ - cr            Genlock to Stand-Alone Mode

Returns:

cr lf ack

Genlock Query (5 bytes)

Format:

a U @ ? cr            Genlock Request Information

Returns:

a U n cr lf ack    n = +, -  
                  + = Genlock mode  
                  - = Stand Alone mode

## MISC COMMANDS

### I Comb Filter Control (5 BYTES)

Format:

a I @ + cr            Comb Filter On  
a I @ - cr            Comb Filter Off

Returns:

cr lf ack

### J Notch Filter Control (5 bytes)

Format:

a J @ + cr            Notch Filter On  
a J @ - cr            Notch Filter Off

Returns:

cr lf ack

### V Video Source Select (5 bytes)

Format:

a V @ n cr            Switch video            n = 0, 1, C, S  
                  0 = CV        C = CV  
                  1 = SV        S = SV

Returns:

cr lf ack

note: changes video source without changing proc settings

## INFO COMMANDS

### W Who are you ? (4 bytes)

Format:

W @ ? cr                      Request board address

Returns:

W n cr lf ack              n = board address 'a,b,c, or d'

note: special command, does not require address byte

### X Request Board Info (5 bytes)

Format:

a X @ ? cr                      Request board version

Returns:

name    version date cr lf ack

i.e.    BVPiP V1.00 07/24/00 cr lf ack

## SYSTEM TIMING COMMANDS

### Z System Timing

#### Horizontal Phase Adjust (5 bytes)

Format:

a Z 1 + cr                      Increment hPha value

a Z 1 - cr                      Decrement hPha value

a Z 1 @ cr                      Normalize hPha value

a Z 2 x cr                      Set hPha value                      x = hex value to be set

Returns:

cr lf ack

#### Sub-carrier Phase Adjust (5 bytes)

Format:

a Z 3 + cr                      Increment scPha value

a Z 3 - cr                      Decrement scPha value

a Z 3 @ cr                      Normalize scPha value

a Z 4 x cr                      Set scPha value                      x = hex value to be set

Returns:

cr lf ack

#### Timing Query (5 bytes)

Format:

a Z @ ? cr                      Request Timing Information

Returns:

a Z x y cr lf ack              x = hex Hphase value, y = hex SCPhase value

## POSITION AND SIZE COMMANDS

### p Set Position (lower case p) (7 bytes)

Format:

a p xx yy cr

xx horz pos, two hex bytes 0000 to 02C4 hex (0 to 708 dec)

yy vert pos, two hex bytes 0000 to 00F2 hex (0 to 242 dec)

Returns:

cr lf ack

### q Position and Size (lower case q) (eleven bytes)

Format:

a q xx yy ww hh cr

xx horz pos, two hex bytes 0001 to 02C4 hex (1 to 708 dec)

yy vert pos, two hex bytes 0001 to 00F2 hex (1 to 242 dec)

ww pixel width, two hex bytes 0000 to 02C4 hex (0 to 708 dec)

hh line height, two hex bytes 0000 to 00F2 hex (0 to 242 dec)

Returns:

cr lf ack

### s Set Size (lower case s) (seven bytes)

Format:

a s ww hh cr

ww pixel width, two hex bytes 0000 to 02C4 hex (0 to 708 dec)

hh line height, two hex bytes 0000 to 00F2 hex (0 to 242 dec)

Returns:

cr lf ack

**ZAP REGISTER COMMANDS****r Recall Zap register (lower case r)** (five bytes)

Format:

a r @ n cr            n = 0 - 9, A

Returns:

cr lf ack

**t Store Zap register** (five bytes)

Format:

a t @ n cr            n = 0 - 9

Returns:

cr lf ack

**COMBINER BOARD COMMANDS****F Fade To Black (FTB)****Fade To Black Control** (5 bytes)

Format:

a F @ + cr            FTB On  
a F @ - cr            FTB Off

Returns:

cr lf ack

**Fade To Black Query** (5 bytes)

Format:

a F @ ? cr            Request FTB Information

Returns:

a F n cr lf ack    n = +, -  
+ = FTB On  
- = FTB Off**M Mixer****Mixer Control/Adjust** (5 bytes)

Format:

a M @ + cr            Mix On (A goes to B)  
a M @ - cr            Mix Off (B goes to B)  
a M @ n cr            Set Mixer Speed            n = 1 to 3  
                          0 = Slow      2 = Fast  
                          1 = Medium    3 = Cut

Returns:

cr lf ack

Mixer Query (5 bytes)

Format:

a M @ ? cr            Request Mixer Information

Returns:

a M n cr lf ack    n = bit encoded byte value  
 7 --  
 6 --  
 5 --  
 4 --  
 3 --  
 2 0=Mix On, 1=Mix Off  
 1    00=Slow    10=Fast  
 0    01=Med    11=Cut

**m Alpha/Key Output Select**

Alpha/Key Control (5 bytes)

Format:

a m @ M cr            MIX Output  
 a m @ A cr            Alpha Key Output    Returns:

Returns:

cr lf ack

Alpha/Key Query (5 bytes)

Format:

a m @ ? cr            Request Alpha/Key Information

Returns:

a m n cr lf ack    n= M,A  
 M = Mix Output  
 A = Alpha/Key

**n VITS Line Insertion Control**

VITS Control (6 bytes)

Format:

a n @ x y cr            VITS Line Selection  
                           x , y            two hex bytes, bit encoded for active lines  
                                                      1=line on, 0=line off

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	bit
	10	11	12	13	14	15	16	17	18	19	20	21	--	--	--	--	line
ie.	0	0	0	0	0	0	1	1	1	1	1	1	x	x	x	x	
	lines 16, 17, 18, 19, 20, 21 enabled																

Returns:

cr lf ack

VITS Query (4 bytes)

Format:

a n ? cr Request VITS Information

Returns:

a n x y cr lf ack  
x, y Two hex bytes defined as above

**G GPI Functions** (upper case G) (5 bytes)

Format:

a G x y cr

Where:

a address byte, lower case ASCII 'A' to 'D'  
G an ASCII 'G' (uppercase G)  
x an ASCII '1' or '2' (GPI1 or GPI2)  
y a hex byte \$00 to \$16, \$20, or \$21 for GPI functions \*\*\*\*\*  
cr carriage return, (0D hex).

Returns:

cr lf ack

GPI function

00hex thru 16hex selects a GPI function (same as LCD Menu)  
20hex initiates a GPI function  
21hex stores the GPI function (for POR recall)

- 00 GPI Off
- 01 FTB Off
- 02 FTB On
- 03 FTB Toggle
- 04 FTB Follow
- 05 MIX Off
- 06 MIX On
- 07 MIX Toggle
- 08 MIX Follow
- 09 FRZ Off
- 0A FRZ On
- 0B FRZ Toggle
- 0C FRZ Follow



0D KFRM BEG	Go to ZAP resister 0
0E KFRM REV	Go to previous ZAP register (loop from 0 to 9)
0F KFRM FWD	Go to next ZAP register (loop from 9 to 0 if needed)
10 KFRM END	Go to ZAP register 9
11 KFRM NRM	Go to ZAP register 10 (full size)
12 KFRM SET	Set current KeyFrame for KFRM Follow to use as reference
13 KFRM Follow	High (open) go to reference, Low (closed) go to Next
14 KEY Off	
15 KEY Insert	
16 KEY Follow	

**Symbols used in this document:**

a	address byte, ASCII lower case 'a,b,c, or d'
+	ASCII '+' plus sign (hex 2B)
-	ASCII '-' minus sign(hex 2D)
@	ASCII '@' (at sign) (hex 40)
cr	ASCII carriage return, (0D hex)
lf	ASCII line feed, (0A hex)
ack	ASCII `}' close brace (hex 7D)
nak	ASCII `?' question mark (hex 3F)

**KEYWEST TECHNOLOGY  
LIMITED WARRANTY**

KEYWEST TECHNOLOGY does hereby declare that the said product be covered under limited warranty for defective materials and workmanship. This warranty is extended to the original purchaser only, for the amount of time indicated below, effective from the original purchase date and subject to the following:

**\*\*\*\*THIS WARRANTY DOES NOT COVER\*\*\*\***

- A. Products that have been subjected to abuse, accident, alteration, modification, tampering, negligence, misuse, or if repaired or attempted repair performed by anyone other than a service facility authorized to render such service, or if the model or serial number has been altered, tampered with, defaced, or removed
  
- B. Operational adjustments covered in this manual

WARRANTY PERIOD: 2 Years Parts & Labor

Cut and return the following page to register your product.

**PRODUCT WARRANTY REGISTRATION**

Complete and mail within 10 days of purchase

Purchaser's Name \_\_\_\_\_  
Title: \_\_\_\_\_ Phone: \_\_\_\_\_  
Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Purchased From: \_\_\_\_\_  
Comments: \_\_\_\_\_

**PURCHASE DATE:**                      **MO.**                      **YR.**

<b>MODEL #</b>	<b>SERIAL #</b>	<b>PARTS</b>	<b>LABOR</b>
		<b>2 YRS.</b>	<b>2 YRS.</b>