## Big VooDoo Time Base Corrector

The Big VooDoo Time Base Corrector (BVTBC) is a broadcast quality full frame synchronizer and time base corrector. Inputs and outputs include composite in and out, Y/C in and out, and genlock input on professional BNC and 4-pin mini-DIN connectors. The unit features complete processor amplifier control, genlock, freeze (frame & fields), and operates in NTSC or PAL-B standards. Low cost and convenient quarter-rack size allows for easy and inexpensive multiple installations.
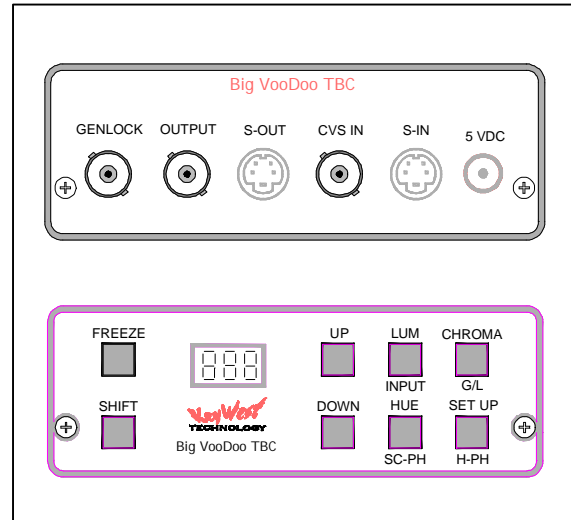
FEATURES

- Composite & Y/C input and output
- NTSC & PAL-B analog video input (output standard same as input)
- Adaptive 2-Line digital comb filter, with separate comb channels for luma & chroma
- Professional 75 ohm BNC and 4-pin mini-DIN input/output connectors
- 5.8 MHz typical NTSC luma bandwidth (to 3dB)
- 42dB typical SNR
- Freeze frame & field capability (with automatic freeze on loss of input sync)
- Genlock input via BNC connection
- Luma, Chroma, Saturation, and Hue proc amp controls
- Horizontal and Sub-Carrier Phase controls
- Auto-saves settings after time-out period
- Triple Eight-Segment LEDs indicate status
- RS-232 controllable (Windows™ compatible Graphical User Interface (GUI) included)
- Low-heat and low-power consumption while operating on 5VDC source (wall

ORDERING INFORMATION

Part #	Options
BVTBC	Rack Kit, Rack Kit Blanks, Universal PSU

APPLICATIONS

- Broadcast & Cable applications requiring stabilized video sources (such as from VTRs, older equipment)
- Post-Production for stabilized video
- Any application requiring color correction
- Any application requiring genlocked video sources
- As a genlock source
- "Tool-box" device for field testing and low-cost correction of video sync problems in the field
- Truck/Van installations
- Anywhere analog video is used

CAUTION

Use only 5VDC Regulated power input. Minimum current rating should be 1 Amp. Keywest Technology supplies a specified wall transformer with each unit. Use of non-specified power inputs will result in damage to the unit. Use of a Keywest Technology rack-mount multi-outlet 5VDC power supply is authorized.

CONNECTIONS

RS-232 I/O

5VDC 1 Amp Input

Genlock Input

Composite Output   Y/C Output   Composite Input   Y/C Input

Figure 1

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

2

RS-232 Connection
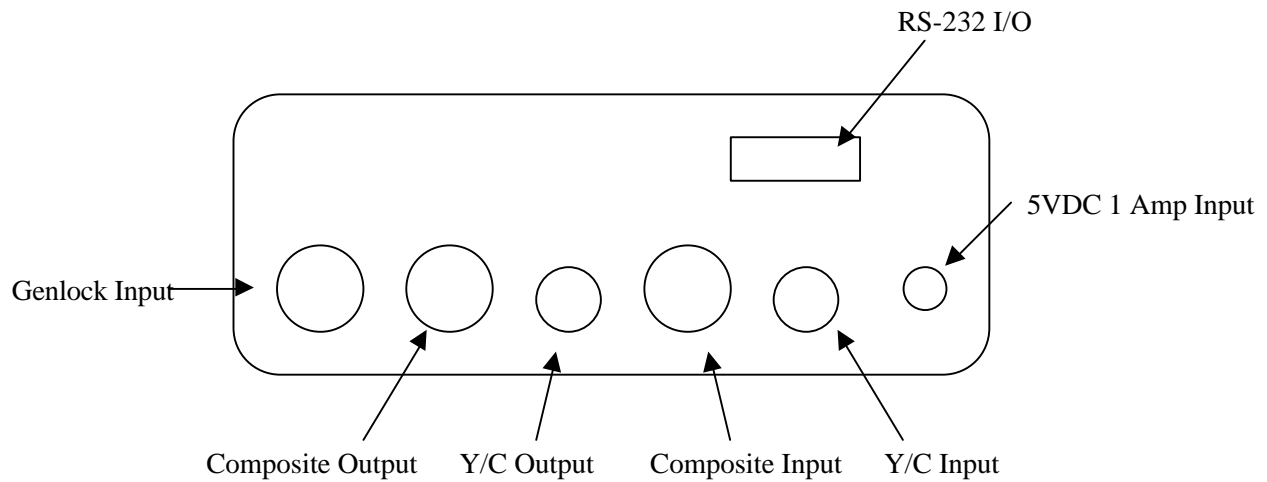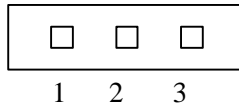

1   2   3

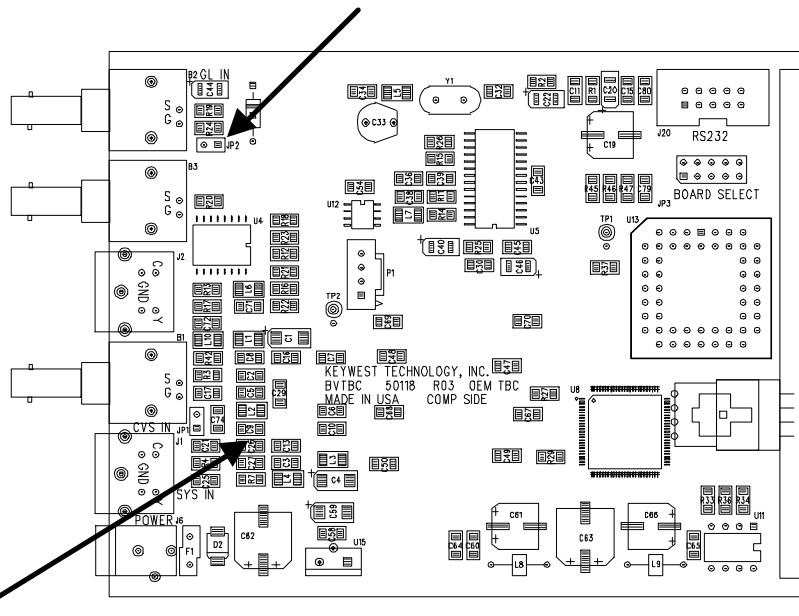## Viewing Rear Panel

Pin 1 – Ground
Pin 2 – Receive
Pin 3 – Transmit

Figure 2

Genlock Termination Jumper
JUMPER INSTALLED = 75 Ohm Termination

Composite Video Termination Jumper
JUMPER INSTALLED = 75 Ohm Termination

Figure 3

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

3

Quick Reference Guide

	First Function	Second Function	Third Function
Button 1	*Freeze*	*Standard*	*--*
Button 2	*Shift*	*Shift*	*Shift*
Button 3	*Increment*	*Increment*	*Increment*
Button 4	*Decrement*	*Decrement*	*Decrement*
Button 5	*Contrast*	*Source*	*Notch Filter*
Button 6	*Hue*	*Sub-Carrier Æ*	*--*
Button 7	*Color Saturation*	*Genlock Mode*	*Comb Filter*
Button 8	*Brightness*	*Horizontal Æ*	*--*

Modes	LED 1	LED 2	LED 3	Function
Freeze Modes				
	.		F	*Frame Selected*
	.		1	*Field One Selected*
	.	F	1	*Freeze Fld 1*
	.	F	F	*Freeze Frame*
Standards	6	0.		*NTSC*
	5	0.		*PAL-B*
Sources	C	.		*Composite*
	S	.		*Y/C*
Genlock Modes		L.		*Lock*
		A.		*Alone*
Filters	O	n	.	*Filter On*
	O	F	F.	*Filter Off*
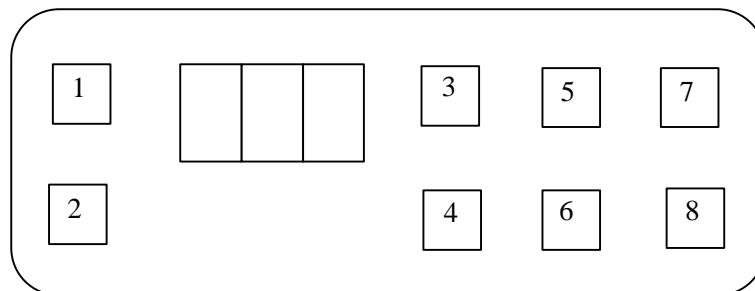
OPERATIONS

PROC AMP CONTROLS

Contrast Adjustment

Press CONT button, the LEDs indicate contrast value (0 – 255), adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Contrast is a reciprocal simultaneous adjustment of the maximum amplitude and the pedestal of a video signal—by increasing the contrast value, the maximum amplitude increases while the pedestal decreases in level, while decreasing the contrast value will decrease the maximum amplitude and increase the pedestal level. (Refer to figure 4)

Set-Up (Brightness) Adjustment

Press SET UP button, the LEDs indicate brightness value (0 – 255); adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Set-up (brightness) is an adjustment of active video that raises or lowers the signal in amplitude, with respect to blanking. Effectively it's an adjustment of the DC offset of the video signal, with the offset being referenced to blanking (0 IRE). An overly high brightness adjustment will make the video appear "washed-out", while on overly low brightness will make the video appear "dark". The BVTBC will clip any portion of the video signal above 108 IRE, and also will not allow any portion of the luminance signal below blanking (0 IRE). (Refer to figure 4)

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

5

Chroma (Saturation) Adjustment

Press CHROMA button, the LEDs indicate saturation value (0 – 255), adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Chroma (saturation) is the adjustment of the saturation of the color portions of the video signal.

Hue Adjustment

Press HUE button, the LEDs indicate hue value (0 – 255), adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Hue is the adjustment of chroma phase referenced to the burst frequency. It effectively changes the "tint" of the colors viewed on a monitor. This can be measured with a vector scope.

TIMING CONTROLS

Sub-Carrier Phase

Sub-Carrier phase adjustment is a second function button labeled SC. Press SHIFT and ensure the "dot" on the LED status indicator moves to the middle (second) position. Press SC button, the LEDs indicate sub-carrier phase value (0 – 255), adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Sub-Carrier adjustments are a color phase adjustment referenced to an input genlock signal (burst frequency). This adjustment is only effective if the unit is in genlock mode, and a genlock signal is input—the result will be hue-like adjustments of the genlocked image.

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

6

Horizontal Phase

Horizontal phase adjustment is a second function button labeled HORZ. Press SHIFT and ensure the "dot" on the LED status indicator moves to the middle (second) position. Press HORZ button, the LEDs indicate horizontal phase value (0 – 255), adjust value up or down using the up and down arrow buttons. Pressing and holding the up and down arrow buttons will continually adjust the value—the rate of adjustment will increase the longer the up or down arrow button is pressed and held. Press and hold the up and down arrows simultaneously to return to default setting of 128.

Horizontal phase adjustment is a horizontal timing adjustment referenced to an input genlock signal. This adjustment is only effective if the unit is in genlock mode, and a genlock signal is input—the result will be horizontal movement, to correct for any horizontal timing errors between the program video and the genlock signal.

SOURCE SELECTION

Source selection is a second function control. Press SHIFT button to enter second function mode indicated by the "dot" on the LED status indicator—the dot should be in the middle (second) position for second function operation. Press SRC button, the LEDs will read either "C" for composite input or "S" for Y/C input. Use the up and down arrow buttons to change the source.

The proc amp, genlock, and timing signals are stored and recalled separately for each input source. The BVTBC automatically recalls stored values when input sources are switched.

STANDARD SELECTION

Video standard (NTSC or PAL-B) selection is a second function control. Press SHIFT button to enter second function mode indicated by the "dot" on the LED status indicator—the dot should be in the middle (second) position for second function operation. Press STD button, the LEDs will read either "60" for NTSC (60Hz) input or "50" for PAL-B (50Hz) input. Use the up and down arrow buttons to change the standard.

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

7

GENLOCK MODE SELECTION

The BVTBC may be operated in genlocked or "alone" mode. Genlock mode requires an input genlock signal. Alone mode does not require an input genlock signal, and will ignore one if present. The BVTBC is a full frame synchronizer/TBC, and does not require a genlock input.

Genlock mode selection is a second function control. Press SHIFT button to enter second function mode indicated by the "dot" on the LED status indicator—the dot should be in the middle (second) position for second function operation. Press G/L button, the LEDs will read either "L" for genlocked mode or "A" for alone (not-genlocked) mode. Use the up and down arrow buttons to change the genlock mode.

FREEZE MODE SELECTION

The BVTBC is capable of freezing a full frame of video for special effects and applications. The unit is also capable of freezing individual frames (used more than frame freeze to eliminate jitter that can appear when freezing a full frame of video, particularly with VTR feeds).

Press FREEZE button twice to enter freeze mode. Use the up and down arrows to select between FRAME (indicated by "FF"), FIELD 1 (indicated by "F1"), and FIELD 2 (indicated by "F2"). To exit FREEZE mode, press the FREEZE button once.

FILTER MODE SELECTION

The BVTBC digital decoding circuitry contains NOTCH and COMB filters. These filters should only be adjusted if absolutely necessary and no other adjustments improve the video appearance. For this reason, they are not labeled on the front panel of the unit.

To access filter control, enter the third level control by pressing SHIFT until the "dot" on the LED is in the far right (third) position. Press CONT button to access the NOTCH filter—use the up and down arrow buttons to toggle the NOTCH filter ON and OFF (indicated by "on" and "off" on the LEDs). Press CHROMA button to access the COMB filter—use the up and down arrow buttons to toggle the COMB filter ON and OFF (indicated by "on" and "off" on the LEDs).

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

8

100 IRE Recommended MAX
Amplitude (1.0 Vpp Terminated)

Pedestal 7.5 IRE For NTSC
Composite Video

0 IRE Blanking also Pedestal setting
for PAL-B Composite Video

- 40 IRE Sync Amplitude
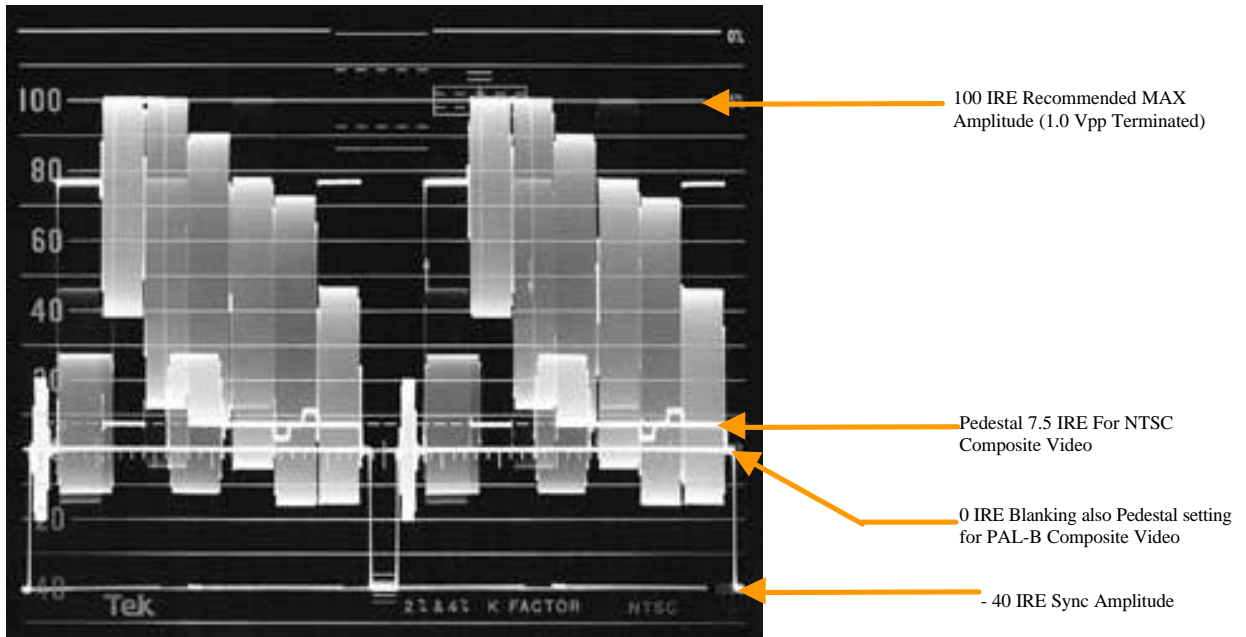
Sample NTSC Video Waveform   SMPTE Color Bars

Figure 4

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

9

MENU LEVEL 3 SPECIAL FUNCTIONS

NOTCH FILTER ON/OFF

The BVTBC Notch filters may be initiated on or off by the user. To access this function, press the SHIFT button to enter Menu Level 3 (indicated by the "dot" in the third LED status indicator). Once in Menu Level 3, press the CHROMA button—the LEDs will now indicate On or OFF for Notch Filter Status. Pressing the up an down arrows will change the Notch Filter status alternately.

COMB FILTER ON/OFF

The BVTBC Comb filters may be initiated on or off by the user. To access this function, press the SHIFT button to enter Menu Level 3 (indicated by the "dot" in the third LED status indicator). Once in Menu Level 3, press the CHROMA button—the LEDs will now indicate On or OFF for Notch Filter Status. Pressing the up an down arrows will change the Comb Filter status alternately.

TECHNICAL NOTE

Ensure that one or both filters are on during operation. Shutting off both Notch and Comb will adversely affect video, and will render proc amp controls useless.

TRACKING MODE SELECTION

The BVTBC sync tracking speed is user-adjustable. This mode, also known as "VCR MODE" allows the TBC to compensate for particularly unstable sync inputs (such as VHS and other TAPE inputs). To access this mode, press the SHIFT button to enter Menu Level 3, as described above. Once in Menu Level 3, press the FREEZE button—the LEDs will now give a display of two horizontal lines in LED #1 and a number from 0 to 3 in LED #3. Pressing the up and down arrows will change the number in LED #3 alternately. This changes the speed at which the TBC "tracks" sync error changes on the input signal.

As an example, many VHS tapes processed through the TBC will display "flagging" at the top of the image—this is due to mechanical head errors inducing sync duration and repetition errors. If

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

10

the BVTBC is set to it's fastest response mode, the flagging will be visible to the viewer. By selecting a slower tracking mode (3 being the slowest), the TBC will have more patience, and will maintain internal lock for a longer period—the result is the elimination of the "flagging".

This effect, and others are most always associated with tape—but we don't rule out other unstable sync artifacts that can be corrected by this mode. Also, the selected mode varies with installation; in other words, setting 1 may work for some, and setting 3 might work for others. Experimenting with this mode will not adversely affect stable sync signal inputs.

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

11

Graphical User Interface—The Software

Keywest Technology developed a Windows™ compatible program. This graphical user interface (GUI) emulates complete front panel control of the BVTBC and may be installed and ran from any Windows™ based PC (Windows™ 95, 98, or NT).

The software package is available upon request on two floppy disks, or on one CD-ROM. If you receive the CD-ROM, install program "BVTBC". The GUI is also available for download at www.keywesttechnology.com

You will need one available serial port (usually addressed as COM 1, COM 2, COM 3, or COM 4).

Port Settings are 9600, N, 8, and 1

Insert Disk1 into your floppy drive (or insert the CD-ROM), locate the icon labeled SETUP, and click to install. Follow the on-screen instructions to complete installation of the GUI.

If you have any problems call us at 1-800-331-2019,
or email richl@keywesttechnology.com,
or reach us through our web site www.keywesttechnology.com

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

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

12

All serial commands must be proceeded by an 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

The following symbols are used:

    cr   single byte of hex 0D
    lf   single byte of hex 0A
    ack   single byte of hex 7D, ASCII '}'
    nak   single byte of hex 3F, ASCII '?'


```
*********************************************************
* Basic Functions
*********************************************************
;--------------------------------------------------------
; A Ask for settings            (5 bytes)
;   Asks for the board setting
;--------------------------------------------------------
```
Format:
    a A @ 0 cr   Ask for stored CV values
    a A @ 1 cr   Ask for stored SV values
    a A @ C cr   Ask for current values

Where:
    a   address byte, lower case ASCII 'A' to 'D'
    A   ASCII 'A' upper case A (hex 41)
    @   ASCII '@' at sign (hex 40)
    0   ASCII '0' zero (hex 30) for CV
    1   ASCII '1' one (hex 31) for SV
    C   ASCII 'C', upper case 'C' (hex 43)
        cr   carriage return, (0D hex)

Returns:
        For source request (0 and 1), (11 bytes)

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

        For current request ('C'), -- (13 bytes)

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

```
;---------------------------------------------------------
; C Choma (Color)                                          (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

Where:

a	address byte, lower case ASCII 'A' to 'D'
C	ASCII 'C' upper case C (hex 43)
1	ASCII '1' one (hex 31)
2	ASCII '2' two (hex 32)
+	ASCII '+' plus (hex 2B)
-	ASCII '-' minus (hex 2D)
@	ASCII '@' at sign (hex 40)
x	value to be set, single byte hex 00-FF
cr	carriage return, (hex 0D)

Returns:

    cr lf ack

```
;---------------------------------------------------------
; E Freeze                                                 (5 bytes)
;---------------------------------------------------------
```
Format:

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

Where:

a	address byte, lower case ASCII 'A' to 'D'
E	ASCII 'E' upper case E (hex 45)
@	ASCII '@' at sign (hex 40)
0	ASCII '0' zero (hex 30)
1	ASCII '1' one (hex 31)
2	ASCII '2' two (hex 32)
3	ASCII '3' three (hex 33)
+	ASCII '+' plus (hex 2B)
-	ASCII '-' minus (hex 2D)
cr	carriage return, (hex 0D)

Returns:

    cr lf ack

```
;-------------------------------------------------------
; H Hue (Tint)                                          (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

Where:

a	address byte, lower case ASCII 'A' to 'D'
H	ASCII 'H' upper case H (hex 48)
1	ASCII '1' one (hex 31)
2	ASCII '2' two (hex 32)
+	ASCII '+' plus (hex 2B)
-	ASCII '-' minus (hex 2D)
@	ASCII '@' at sign (hex 40)
x	value to be set, single byte hex 00-FF
cr	carriage return, (hex 0D)

Returns:

cr lf ack

```
;-------------------------------------------------------
; I Comb Filter                                         (5 bytes)
;-------------------------------------------------------
```
Format:

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

Where:

a	address byte, lower case ASCII 'A' to 'D'
I	ASCII 'I' upper case I (hex 49)
@	ASCII '@' at sign (hex 40)
+	ASCII '+' plus (hex 2B)
-	ASCII '-' minus (hex 2D)
cr	carriage return, (hex 0D)

Returns:

cr lf ack

```
;-------------------------------------------------------
```

```
; J Notch Filter                                 (5 bytes)
;-------------------------------------------------------
Format:
        a J @ + cr          Notch On
        a J @ - cr          Notch Off

Where:
        a       address byte, lower case ASCII 'A' to 'D'
        E       ASCII 'J' upper case J (hex 4A)
        @       ASCII '@' at sign (hex 40)
        +       ASCII '+' plus (hex 2B)
        -       ASCII '-' minus (hex 2D)
        cr      carriage return, (hex 0D)

Returns:
        cr lf ack


;-------------------------------------------------------
; L     Luminance (Contrast)                      (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

Where:
        a       address byte, lower case ASCII 'A' to 'D'
        L       ASCII 'L' upper case L (hex 4C)
        1       ASCII '1' one (hex 31)
        2       ASCII '2' two (hex 32)
        +       ASCII '+' plus (hex 2B)
        -       ASCII '-' minus (hex 2D)
        @       ASCII '@' at sign (hex 40)
        x       value to be set, single byte hex 00-FF
        cr      carriage return, (hex 0D)

Returns:
        cr lf ack
```

;---

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest TECHNOLOGY

15 August 2001
Change 01

16

```
; N Standard                    (5 bytes)
;--------------------------------------------------------
Format:
        a N @ 0 cr          Set NTSC Standard
        a N @ 1 cr          Set PALB Standard

Where:
        a           address byte, lower case ASCII 'A' to 'D'
        N           ASCII 'N' upper case N (hex 4E)
        @           ASCII '@' at sign (hex 40)
        0           ASCII '0' zero (hex 30)
        1           ASCII '1' one (hex 31)
        cr          carriage return, (hex 0D)

Returns:
        cr lf ack


;--------------------------------------------------------
; R Recall Video             (5 bytes)
;--------------------------------------------------------
Format:
        a R @ 0 cr          Recall CV state
        a R @ 1 cr          Recall SV state
        a R @ P cr          Recall POR state
        a R @ S cr          Recall System Timing
        a R @ F cr          Recall Factory defaults

Where:
        a           address byte, lower case ASCII 'A' to 'D'
        R           ASCII 'R' upper case R (hex 52)
        @           ASCII '@' at sign (hex 40)
        0           ASCII '0' zero (hex 30) for CV
        1           ASCII '1' one (hex 31) for SV
        P           ASCII 'P' upper case P (hex 50) for Power-On-Reset values
        S           ASCII 'S' upper case S (hex 53) for System Timing values
        F           ASCII 'F' upper case F (hex 46) for Factory default values
        cr          carriage return, (hex 0D)

Returns:
        cr lf ack
```

```
;--------------------------------------------------------
```

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

17

; S Setup (Brightness)   (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

Where:

       a   address byte, lower case ASCII 'A' to 'D'
       S   ASCII 'S' upper case S (hex 53)
       1   ASCII '1' one (hex 31)
       2   ASCII '2' two (hex 32)
       +   ASCII '+' plus (hex 2B)
       -        ASCII '-' minus (hex 2D)
       @   ASCII '@' at sign (hex 40)
       x   value to be set, single byte hex 00-FF
       cr   carriage return, (hex 0D).

Returns:

       cr lf ack

;--
; T   Store Video/Proc Register (5 bytes)
;--
Format:

       a T @ C cr   Store video/proc settings
       a T @ P cr   Store POR state
       a T @ S cr   Store System Timing

Where:

       a   address byte, lower case ASCII 'A' to 'D'
       T   ASCII 'T' upper case T (hex 54)
       @   ASCII '@' at sign (hex 40)
       C   ASCII 'C' upper case C (hex 43)
       P   ASCII 'P' upper case P (hex 50)
       S   ASCII 'S' upper case S (hex 53)
       cr   carriage return, (hex 0D)

Returns:

       cr lf ack

;--

; U Genlock   (5 bytes)
;---
Format:

        a U @ + cr   Genlock On
        a U @ - cr   Genlock Off (Alone)
        a U @ ? cr   Genlock Query

Where:

        a   address byte, lower case ASCII 'A' to 'D'
        U   ASCII 'U' upper case U (hex 55)
        @   ASCII '@' at sign (hex 40)
        +   ASCII '+' plus (hex 2B)
        -          ASCII '-' minus (hex 2D)
        ?   ASCII '?' question mark (hex 3F)
        cr   carriage return, (hex 0D)

Returns:

        U 0 cr lf ack   for stand-alone mode (non-genlock)
        U 1 cr lf ack   for gen-lock mode

;---
; V Video select   (5 bytes)
;---
Format:

        a V @ 0 cr   Recall CV video/proc settings
        a V @ 1 cr   Recall SV video/proc settings

Where:

        a   address byte, lower case ASCII 'A' to 'D'
        V   ASCII 'V' upper case V (hex 56)
        @   ASCII '@' at sign (hex 40)
        0   ASCII '0' zero (hex 30)
        1   ASCII '1' one (hex 31)
        cr   carriage return, (hex 0D)

Returns:

        cr lf ack

;---

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

19

; W Who are you ?   (5 bytes)
;---
Format:
        a W @ ? cr   Request board address

Where:
        a   address byte, lower case ASCII 'A' to 'D' (ignored in this case)
        W   ASCII 'W' upper case W (hex 57)
        @   ASCII '@' at sign (hex 40)
        ?   ASCII '?' question mark (hex 3F)
        cr   carriage return, (hex 0D)

Returns:
        n cr lf ack   where n is board address (ASCII 'a' thru 'd')

;---
; X   Request Boad Info   (5 bytes)
;---
Format:
        a X @ ? cr   Request board version

Where:
        a   address byte, lower case ASCII 'A' to 'D'
        X   ASCII 'X' upper case X (hex 58)
        @   ASCII '@' at sign (hex 40)
        ?   ASCII '?' question mark (hex 3F)
        cr   carriage return, (oD hex).

Returns:
        profuct version date cr lf ack

        i.e.   VdTbc V1.00 02/02/00 cr lf ack

;---

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

15 August 2001
Change 01

20

; Z System Timing   (6 bytes)
;--
Horizontal Phase:
Format:

a Z H 1 + cr	Increment hPha value
a Z H 1 - cr	Decrement hPha value
a Z H 1 @ cr	Normalize hPha value
a Z H 2 x cr	Set hPha value

Subcarrier Phase:
Format:

a Z S 1 + cr	Increment scPha value
a Z S 1 - cr	Decrement scPha value
a Z S 1 @ cr	Normalize scPha value
a Z S 2 x cr	Set scPha value

Where:

a	address byte, lower case ASCII 'A' to 'D'
Z	ACSII 'Z' upper case ASCII Z (hex 5A)
H	ACSII 'H' upper case ASCII H (hex 48)
S	ACSII 'S' upper case ASCII S (hex 53)
1	ASCII '1' one (hex 31)
2	ASCII '2' two (hex 32)
+	ASCII '+' plus (hex 2B)
-	ASCII '-' minus (hex 3D)
@	ASCII '@' at sign (hex 40)
x	single hex byte
cr	carriage return, (hex 0D)

Returns:
        cr lf ack

Keywest Technology
14563 W. 96th Terrace
Lenexa, Kansas 66215
800.331.2019
www.keywesttechnology.com

KeyWest
TECHNOLOGY

15 August 2001
Change 01

21