

## Specifications

Analog Outputs	Analog composite, Y/C or component YPbPr (BetaCam™, MII™ & SMPTE/N10) or RGB
Analog Configuration	Four analog outputs User configurable as: all composite, dual composite & Y/C, composite with component or dual Y/C
Output Return Loss	> 35 dB at 5 MHz
Output D to A Quantization	10-bit
Sampling rate	4:2:2 up-sampled to 8:8:8 (2x) or 16:16:16 (4x)
Frequency Response	4x Y: 0-5.5 MHz +/- 0.15 dB 4x PbPr: 0-2.2 MHz +/-0.2 dB
K-Factor 2T	< 0.6 %
SCH Phase	< 0.8°
Differential Gain	< 0.5 %
Differential Phase	< 0.5°
S/N	> 75 dB
Chroma/Luma Delay	Composite < 2 ns; Y/C < 2 ns; YPbPr < 1 ns
Conversion Time	< 2 us
Jitter Filter LBW	2 Hz
Digital Input	270-Mbit SDI SMPTE259M-C / ITU-R.BT656
Digital Outputs	2 – Reclocked copies of input
Digital Output Return loss	>17 dB @ 270-Mbit
Operating Temp.	40-110° F (4-43° C) 40-122° F (4-50° C) With optional heat sink
Humidity	(non-condensing)
Power Input	5 VDC @ 0.6 A (0.9 A with CF option) Optional 7-30 VDC 4.5 W (6 W w/CF)
Size	BNC-BNC 6" x 3" x 1" (153 x 76 x 25mm)
Options	Reference color framing, 7-30 VDC power input

This product is not authorized for use in life support systems. Product liability limited only to the replacement of this unit. Cobalt Digital Inc. does not assume any liability for loss of use due to failure of this component.

*Specifications subject to change without notice.*

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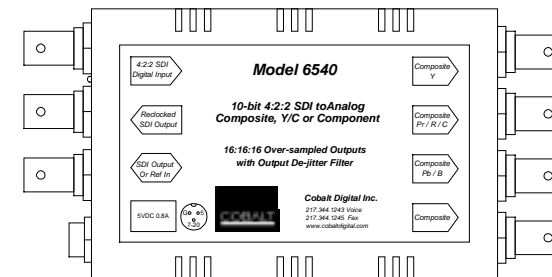
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## Model 6540

### SDI 4:2:2 10-bit to Analog Composite, Y/C or Component YPbPr & RGB Encoder



## Owner's Manual

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The COBALT 6540 is a high quality 10-bit digital to analog encoder for converting 525/625 4:2:2 SDI signals to analog composite, Y/C and component (YPbPr or RGB). The 6540 auto-detects the line-input standard and outputs the corresponding NTSC or PAL standard. The user can configure the default PAL outputs to be PAL-B/D/G/H/I, PAL N or PAL 60 and NSTC M or N. Pedestal selection can be enabled or disabled for NTSC operation.

The 6540 can be externally configured for three different analog output configurations: all composite, dual composite with Y/C, composite with component or dual Y/C. The 6540 supports four different component output modes: BetaCam™, MIIT™, SMPTE/N10 and RGB. The encoding process is 10-bit with sample conversion from 4:2:2 to 4:4:4, to 8:8:8 (2x-output mode) or 16:16:16 (4x output mode). Full user digital processing (proc.) controls are available to the end user for adjusting black level, Y gain, saturation and hue. Advanced controls include VBI blanking, line by line VBI pedestal control, extended filtering, DNR and Gamma configuration. All adjustments can be saved to non-volatile memory or factory defaults can be restored. A de-jitter VCXO is included to reduce input jitter from high frequencies down to 2Hz.

The 6540 includes two reclocked digital output copies or one when the optional color framing board is installed. One digital output BNC is re-purposed for black burst input. The user must adjust the SDI source's H-phase for position alignment. SCH phase is user adjustable on the 6540.

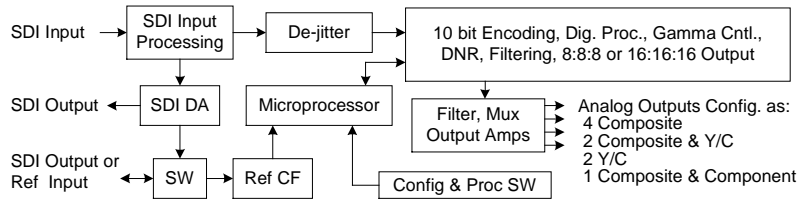


Figure 1 - 6540 Block Diagram

6540 User Configuration Settings								
1	2	3	4	5	6	7	8	Function
On	On	On						All Composite
On	Off	On						Y/C, Composite
Off	On	On						YPbPr BetaCam™, Composite
Off	On	Off						YPbPr MIIT™, Composite
Off	Off	On						YPbPr SMPTE, Composite
Off	Off	Off						RGB, Composite
SW4	Color							On = Color On Off = Color Off
SW5	Test Bars							On = Bars Output Off = Input Video Output
SW6	Pedestal							On = Add Ped Off = Bypass
SW7	Sample Mode							On = 4X Over-Sampled Off = 2X Over-Sampled
SW8	Clock Filter							On = Filtered Off = No-Filter
<b>Examples:</b>								
1	2	3	4	5	6	7	8	Function
On	On	On	On	Off	On	On	On	All Composite
Off	On	On	On	Off	On	On	On	Component BetaCam™
Off	Off	On	On	Off	Off	On	On	Component SMPTE
On	Off	On	On	Off	On	On	On	Y/C

Figure 2 - External Configuration Settings.

## SWITCH-1 SETTINGS

S 1-3 VIDEO INPUT AND COLOR ENCODING MODE (See figure 2.)

### S 4 COLOR

OFF - B&W output ON - Color enabled

### S 5 COLOR BARS ON/OFF

OFF - Display video ON - Display color bars

### S 6 SETUP (NTSC modes only – PAL pedestal is always off)

OFF - No pedestal ON - 7.5 IRE pedestal added

### S 7 OUTPUT SAMPLE MODE (interior switch)

OFF - 2x (8:8:8) ON - 4x (16:16:16)

### S 8 DE-JITTER FILTER (interior switch)

OFF - De-jitter filter off ON - De-jitter filter on

## DUAL Y/C MODE

Dual Y/C mode is an extended feature of the 6540. To enable, remove the top cover and set Jumper J21 to the two pins nearest J8 and set the external switches 1,2&3 to ON, OFF, OFF.

## REFERENCE CONFIGURATION AND TERMINATION (Color Framing Option)

Remove top cover and locate SW-1 (BNC function select) and SW-2 (Ref 75 termination). Set SW-1 away from the power-input connector to enable reference input or toward the power input connector to enable the second SDI output. Set SW-2 away from the reference input BNC for 75-ohm termination or toward the reference input BNC for no Reference termination.

## LED INDICATOR

The front panel LED indicates video lock when On and loss of video when blinking. A dark LED indicates loss of power. Internal switches S2&3 need to be set to 0-0 for normal LED operation.

## DIGITAL PROC. GAIN ADJUSTMENTS

Full control of Y-gain, Y-black level, color saturation and hue can be User controlled via S3, 2, 4 & 5. YPbPr and RGB have no hue control. To restore factory defaults, set S3,2 to 8-8 and press either S4 or S5. To set Proc. values configure S3,2 as shown below and press S4 & 5 to adjust levels. To save settings dial S3,2 to 9-9 and press either S4 or S5. To restore factory defaults dial S3,2 to 8-8 and press either S4 or S5.

Switch S3,S2 Functions (remove bottom cover)

- 1-1 Y-gain
  - 1-2 Y-black level
  - 1-3 Color saturation
  - 1-4 Hue +/-22.5° in 0.18° increments
  - 1-5 SCH phase
  - 1-6 1-6 Sharpness -4dB to +4dB in 12 steps
  - 2-7 VBI lines 10-20 encoded LED On = encoded, Off = VBI blanked
  - 5-0 VBI Pedestal odd lines 10-18 (NTSC only)
  - 5-1 VBI Pedestal odd lines 19-25
  - 5-2 VBI Pedestal even lines 10-18
  - 5-3 VBI Pedestal even lines 19-25
  - 5-4 Global VBI pedestal LED on = VBI Pedestal added Off = pedestal removed
- Note 5-4 over-writes settings of 5-0 through 5.3

## ANALOG OUTPUT CALIBRATION

Turn on bars and composite mode, restore Digital Proc. Factory Defaults S3,2 set to 8-8 and press up or down switch once. Connect output to calibrated waveform monitor. Place 6540 into all composite mode and adjust R144 for 100 IRE at J7, then adjust the three remaining pots R132 for J5, R153 for J3, R242 for J1 so that you have 100IRE of video at each output. Place 6540 into BetaCam mode and adjust R234 for 100 IRE at J1, adjust R142, R121 for 75% vectors on J3, J5.