

**Model 6042(-2)
VIDEO DECODER/DIGITIZER**

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1.0 GENERAL

The ITS Model 6042 Video Decoder/Digitizer is a two function device. It is designed to read video data which has been encoded into the horizontal interval of an RS-170 or NTSC video signal in accordance with standard left edge format (OSG-452-86), and also quantize the relative position of points of interest within a viewed scene.

The 6042 decodes and unpacks the encoded data and generates an ASCII message which is output to an RS-232 port. A video insertion generator mixes a reticle into the video signal under operator control. The position of the reticle is controllable via the RS232 port. The reticle coordinates are therefore known by the host and are used to digitize the viewed location.

The 6042 is housed in a aluminum enclosure 2-1/2 inches high x 10 inches deep x 8-1/2 inches wide.

It is powered by 115VAC 50/60Hz.

1.1 DISPLAY

The inserted reticle may be mixed with the existing video either of two ways depending upon the position of a front panel toggle switch:

1.1.1 Relative White

This is the most commonly used method of adding the generated video. It provides a pleasing display over a wide range of original video light levels. A level set by an intensity control is added to the existing level of the original video. The contrast between

1.1.1 Relative White (continued)

the original video and the "added" generated video is therefore constant. This helps prevent wash out at the high light levels and assures a non-glaring display at the low levels. An additional feature of this method is that it doesn't obscure features in the original video. Elements as small as one pixel will show through an overlaying inserted character.

1.1.2 Black

The generated video is again overlaid on the existing video but, in this case, in the opposite polarity. The level is not adjustable as in the white but is set at the black or blanking level of the composite video signal. This method is effective when the original scene is uniformly bright or at a high level.

1.2 DATA DECODER

The 6042 decoder function is designed to operate reliably on encoded video received from low cost video recorders.

The unit decodes left edge encoded data which appears as a 2 μ s pulse starting 9.3 μ s after the falling edge of horizontal sync. A bit value of ONE is typically 0.65 volts above blanking while a value of ZERO is 0.00 volts. The 6042 can decode up to 252 bits (one bit per horizontal line) per field, starting at a point up to 12 lines before active video.

1.3 RETICLE GENERATOR

The 6042 provides for the insertion of a positionable reticle. The reticle may be positioned anywhere on the screen within one pixel by a host via the RS232 port. Additionally, two reticle formats are available which also are selectable via the RS232 port.

^R [12H] Enable the VERTICAL LINE marker and set it's horizontal position with the next 2 bytes of data from the RS-232 input. These data will be used as 16 bit 2's complement data sent MS byte first followed by LS byte and used as an offset from the horizontal center of the display. Negative values move the marker left and positive right.

^T [14H] Enable the CROSSHAIR marker and set it's position via the next 3 bytes of data from the RS-232 port. The first 2 bytes set the horizontal position (see above) and the next byte is used as a 2's complement 8 bit vertical offset from the center of the screen. Negative values move the marker down and left while positive moves it up and to the right.

The breadth of the line making up the reticle is one pixel. A pixel is one scan line high and an equivalent measure in width generating a matrix of 640 x 480. The 640 x 480 pixel matrix generates symmetrical pixels on a 4 x 3 aspect ratio display which simplifies normalization of digitization data.

1.4 RS232 PORT

The RS232C port is a standard asynchronous, serial, full duplex port with a selectable baud rate of 300 to 38.4k baud. Control of the reticle and acquisition of decoded data is accomplished via this port.

The port set-up is 8 data bits, 1 start bit, 1 stop bit, and no parity. RS-232 input and output are full duplex (input data NOT echoed to the output). No handshake is implemented or required.

2.0 DECODED DATA MESSAGE FORMAT

The 6042 generates an ASCII character string derived from the decoded data. The string is output via the RS-232 port either upon host request or automatically, dependent upon default switch settings (see 4.9). Host control of the data output is via the following control codes:

^Q [11H] Enable output of decoded data to the RS-232 port.

^S [13H] Disable RS-232 output of data.

As there may be up to 19 bytes of decoded data per field and there are 60 fields per second, a data rate of not less than 19.2K baud is required to assure output of all decoded data. If a lower rate is selected, the system will transfer only what it can and throw out the extra fields of data. No field data will be broken, only used or discarded as blocks. The factory default setting is 9600 baud which outputs every other field of data (30 blocks/second).

The RS-232 output data format is as follows:

SYNC byte	1 byte = COH
Byte count in binary	1 byte = 0 - 13H
<u>Decoded data</u>	<u>19 bytes (padded with 0's)</u>
Total data/block	21 bytes

3.0 MECHANICAL CONFIGURATION

The 6042 is housed in a ruggedized 2.5 inch high by 10 inch deep by 8.5 inch wide sheet metal enclosure. All circuitry is on two printed circuit assemblies. Connections between PC assemblies are via mating connectors. No edge connectors are used.

All connectors and controls are on the front panel.

4.0 CONTROLS, INDICATORS, AND CONNECTORS

- 4.1 Power Two Position Toggle Switch - Turns power to unit ON and OFF. LED illuminated when power is on.
- 4.2 Insertion Level Controls the level, "brightness" of inserted graphics when in the white display mode.
- 4.3 Mode Select Two Position Toggle Switch - Selects video insertion mode of black or white.
- 4.4 RS232 PT02A12-10P Connector - Provides interface to RS232C port.
- 4.5 Video In BNC Connector - Receives RS170 or NTSC video.
- 4.6 Video Out 1 BNC Connector - Outputs original video with annotation, data and symbology added.
- 4.7 Video Out 2 BCD Connector - Same as Video Out 1.
- 4.8 Power 3 Pin Connector - Receives detachable line cord.

4.0 CONTROLS, INDICATORS, AND CONNECTORS (continued)

4.9 Internal Controls

DIP switch S1 on the processor board (1412190) is used to select the RS-232 baud rate and the default RS-232 output enable as follows:

Switch locations 1-3 select the baud rate:

<u>1</u>	<u>2</u>	<u>3</u>	<u>Baud Rate</u>
ON	ON	ON	300
OFF	ON	ON	600
ON	OFF	ON	1200
OFF	OFF	ON	2400
ON	ON	OFF	4800
OFF	ON	OFF	9600
ON	OFF	OFF	19200
OFF	OFF	OFF	38400

Switch position 4 selects the default RS-232 output mode. This is the default only, the mode may be enabled or disabled by command codes issued via the RS-232 port:

<u>4</u>	<u>Mode</u>
OFF	Decode data NOT sent out the RS-232 port
ON	Decode data sent out the RS-232 port

Switch locations 5 & 6 are not used.

5.0 SPECIFICATIONS

- 5.1 Video In Standard 525/60 composite video 2:1 interlace, black negative per EIA RS-170 or NTSC. 75-ohm impedance. 1 volt peak-to-peak.
- 5.2 Video Out RS-170 derived from video input with graphics added and DC restored, 75-ohm impedance (output as specified when terminated by 75-ohm load).
- 5.3 Video Amplifier
Bandwidth: $>20\text{MHz} \pm 1 \text{ db}$
Gain: Unity
- 5.4 Reticle/Coordinate Resolution Horizontal positional resolution 640 pixels.
- 5.5 Data Decoder Decodes left edge encoded data formatted IAW Optical Systems Group Document 452-86, Section 7. Compatible with ITS Model 6041 Video Data Encoder.
- 5.6 RS-232C Port EIA RS-232C serial asynchronous 300-38.4K baud, internally selectable, full duplex.
- 5.7 Package 8.5 inches wide, 2.5 inches high, 10 inches deep aluminum enclosure.
- 5.8 Construction and Workmanship Designed and manufactured in accordance with best commercial practice and MIL-I-54208.
- 5.9 Environment
Temperature 0 to $+50^{\circ}\text{C}$
Humidity 95% (non-condensing)
Storage Temperature -55 to $+80^{\circ}\text{C}$
- 5.10 Power 115VAC $\pm 10\%$, 50/60Hz, approximately 12W.