instrumentation technology systems

TECHNICAL DESCRIPTION

MODEL 6055B-6
SIX CHANNEL VIDEO INSERTER

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ITS MODEL 6055B-6
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1.0 GENERAL

The Model 6055B-6 Six Channel Video Inserter is a video insertion generator that inserts an IRIG Time message in up to six asynchronous video signals. Other functions include a full screen annotator, an IRIG synchronized Countdown Clock and an RS232C port. Display formatting and annotation is performed via an included detachable keyboard or via the RS232 port. Also included are individual alarm inputs for each channel. Countdown Clock enable (Start) and load (Preset) are controlled by TTL or Contact closure inputs. Features include:

1. *IRIG B Serial Time Signal demodulator/decoder.*
2. *RS232C port.*
3. *Countdown Clock Synchronized with the applied IRIG B Time signal.*
4. *Twelve discrete Alarm Messages (two for each video channel).*
5. *Detachable keyboard, provides means for the operator to locally annotate and format video display.*
6. *Two fonts, selectable by front panel switch, keyboard or via RS232 port.*
7. *Non-volatile memory, Setup configuration is not lost at power down.*
8. *Accepts RS170, NTSC or S-Video input.*
9. *Independent insertion of machine-readable digital information using left edge encoding method on each video channel*

The 6055B-6 is a microprocessor based unit. All message generation and positioning is controlled by the processor with the basic format established by system firmware and specific format by operator programming. Control of the 6055B-6 is via the keyboard, digital inputs, and front panel controls which establish the overlay intensity and modulation mode of the inserted video on each channel individually.

The unit is housed in a rack mountable aluminum enclosure, 19" wide x 3.5" high x 15" deep. It is powered by 100 to 240VAC, 50 to 400Hz.

2.0 CHARACTERISTICS

2.1 ALPHANUMERIC CHARACTERS

Two character fonts are provided, "constant contrast white" and "white with black border". The basic characters are generated on a 7x9 dot matrix. A "dot" or pixel is two scan lines high and an equivalent measure in width. The displayed height of the characters therefore is approximately 4.5% of the height of the total display. The distance between characters horizontally is the equivalent of 3 pixels. The distance between rows is 4 scan lines. When the black bordered font is selected an additional 2 pixels are added to the height and width of the characters making the size 9x11 pixels. The total number of characters that can be displayed over a full screen is 22 rows of 30 characters each or 660 characters.

The font may be selected by individual front panel switches, one for each channel. If the "Black Bordered" font is selected on the front panel, the second font may be selected on character by character basis via the keyboard or RS-232 port. The generated video is then mixed with the existing video dependent upon the font selected:

2.1.1 Constant Contrast (White)

This font 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 the original video and the "added" generated video is therefore constant. This helps prevent wash out at the high levels and assures a non-glaring display at the low levels. An additional feature of this mode is that the generated video does not obscure features on the existing video.

2.1.2 White with Black Border

In this method, a white character is displayed with a contiguous black border. The black portion of the font is fixed at the blanking level while the white portion is adjustable as in the constant contrast font. This font produces an easily read message that stands out from the existing video regardless of the background characteristics. The main drawback associated with this method is that it obscures the original video and therefore care must be taken when formatting the display.

2.2 IRIG CLOCK

The IRIG clock is controlled by the input of the serial IRIG B signal. Once the time is established a loss of the IRIG signal will cause the 6055B-6 to automatically switch to an internal real time clock which will increment the time display until the IRIG signal is re-acquired. If it is desired to run the internal clock without an IRIG B input, it may be set via the keyboard or RS232 port.

IRIG time display resolution is 0.01 sec. standard. An optional display resolution, Option H, of 0.0001 sec. is available at no additional charge.

2.3 LEFT-EDGE ENCODER

Each video channel has independent left-edge data insertion capability. When enabled, this data occupies the left 2 us of the video and contains the time (latched at vertical sync with a resolution of 0.1 ms) and twelve bytes of user-entered data. (See table 3)

2.4 PARALLEL PORT

The parallel inputs provide control to two functions:

Twelve discrete low true TTL (or contact closure) inputs, two for each channel, are used to enable Alarm messages.

Two inputs, RUN/HOLD and PRESET, are used to control the Countdown clock.

2.5 KEYBOARD

The detachable keyboard provides the means for the operator to annotate and format each video display (see Section 5). Key entries allow:

1. Positioning of the "Time" display.
2. Alpha/numeric annotation.
3. Setting the time in the absence of an IRIG input.
4. Setting the Start Time of the Countdown clock.
5. Positioning of the Countdown clock display.
6. Enable, disable, and append user data to the left-edge data encoders.

2.6 RS232 PORT

The Serial RS232 port may be used to remotely control any function that is accessible via the keyboard and therefore provide an alternate means of user programming (see Section 5).

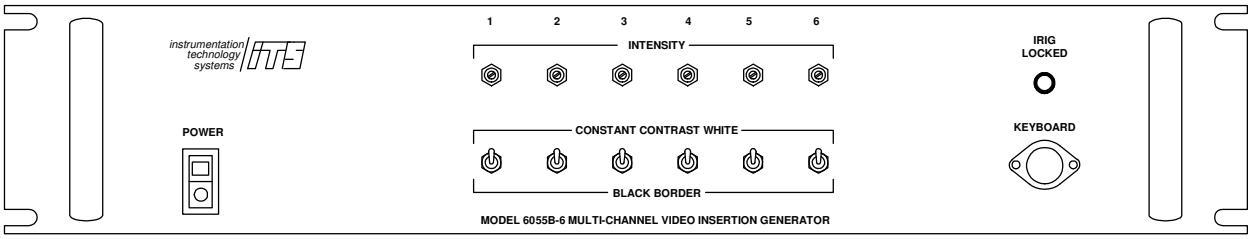
3.0 MECHANICAL CONFIGURATION (Fig 1)

The 6055B-6 is housed in a 3.5-inch high x 19-inch wide x 15-inch deep rack mountable aluminum enclosure. All circuitry is on four printed circuit assemblies. All connections are via mating connectors. No edge connectors are used.

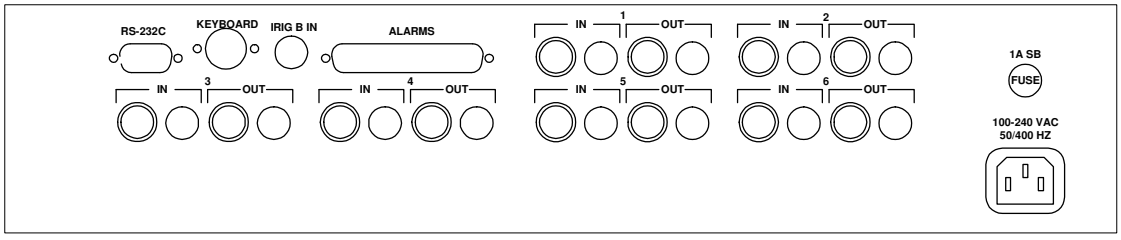
With the exception of the auxiliary keyboard connector, all connectors are mounted on the rear panel and all controls are on the front panel.

The keyboard has a front panel and a rear panel connector. Either may be used and are electrically identical.

FIGURE 1
MODEL 6055B-6 Mechanical Configuration



FRONT PANEL



REAR PANEL

4.0 CONTROLS, INDICATORS, AND CONNECTORS

4.1 Power ON/OFF

Rocker Switch -
Controls AC line power input. Illuminated when power is on.

4.2 Display Mode

Six, Two Position Toggle Switches -
Selects display modulation mode of white, (constant contrast) or white with black border for each channel.

4.3 Display Intensity

Six Rotary Potentiometers -
Controls intensity of generated display (in "white" display mode) for each channel.

4.4 IRIG Locked

Green LED Indicator -
Illuminated when IRIG signal is detected and the clock is synchronized.

4.5 Alarm Message Inputs

DD37S Connector -
Twelve discrete TTL inputs, low true (see table 1). Control display of fixed ALARM message on each of six video channels.

4.6 Countdown Control

DD37S Connector (Shared with 4.5) -
Two discrete TTL inputs, low true (see table 1). One signal initiates count and the second signal resets count to last preset start value. If both active, preset has priority.

4.7 RS232C

DE9PS Connector -
Standard RS232 port allows alternate for all keyboard functions. Also outputs time in ASCII string.

Pin	Signal	
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
7	RTS	Request To Send
8	CTS	Clear To Send

4.8 IRIG In

BNC Connector -
Receives serial IRIG B time signal.

4.0 CONTROLS, INDICATORS, AND CONNECTORS (continued)

4.9	Video In 1	Six BNC Connectors - Receives RS-170 or NTSC video.
4.10	Video In 2	Six 4 Pin Mini DIN Connector - Receives S-Video input.
4.11	Video Out 1	Six BNC Connectors - Outputs original (Y signal when S-Video applied) video with messages and symbol inserted.
4.12	Video Out 2	Six 4 Pin Mini DIN Connectors - Same as Video Out 1 except S-Video (Y and C) when S-Video applied to input.
4.13	Keyboard	5 Pin DIN Connector - Receives keyboard connector. There are (2) keyboard connectors, one on the front panel and one on the rear panel.
4.14	Power	3 Pin Male Connector - Receives Detachable Line Cord.
4.15	Baud Rate Select	Internal DIP Switch - Selects RS-232 serial data baud rate in accordance with the following settings. (S1 is located on P/N 1412258).

Baud	S1-3	S1-2	S1-1
300	on	on	on
600	on	on	off
1200	on	off	on
2400	on	off	off
4000	off	on	on
9600	off	on	off
19.2K	off	off	on
38.4K	off	off	off

TABLE 1

Alarm/Countdown Input Connector Pinout

Channel	Alarm 1	Alarm 2
1	35	36
2	30	31
3	23	24
4	16	17
5	27	28
6	20	21

Countdown run 4

Countdown reset 11

GND 1,8,15,26,33,34

5.0 USER PROGRAMMING

The Model 6055B-6 annotation entry and functional control is done via either the keyboard or the RS-232 port. Special control codes allow the user access to specific operational functions. There are two categories of control functions: global operators (Table 2) and channel specific operators (Table 3).

The convention for the following tables is:

⟨shift⟩"key_name"	Shift key is held down while designated key is pressed. ie, ⟨shift⟩F1 indicates that the SHIFT and F1 keys are pressed simultaneously.
⟨alt⟩"key_name"	Alt key is held down while designated key is pressed.
^"key_name"	CNTL key is held down while designated key is pressed
{UP}	Designates the "Up Arrow" key.
{DN}	Designates the "Down Arrow" key.
{RT}	Designates the "Right Arrow" key.
{LF}	Designates the "Left Arrow" or Backspace key.

The hex equivalent code is the hexadecimal equivalent value for the character and is the value applied via the RS-232 port when remote control is desired.

TABLE 2

GLOBAL OPERATORS

The following six functions operate for all channels whether they are currently selected or not.

KEY	HEX CODE	DESCRIPTION
^S	13H	Sends time to the RS-232 output port. The display is not affected when using this function.
^T	14H	Set time via either the keyboard or the RS-232 port. The time display prompt will be shown on all display channels. Time is entered from left to right, punctuation characters are jumped over, and error checking is done on a character by character basis. Invalid entries are not accepted. If there is an error in the entered value, press the ESC key and try again. When the complete time is entered correctly, press ENTER. The time will be set the moment that the ENTER key is pressed. TIME cannot be set manually if currently locked to an IRIG input signal.
^N	0EH	Set Countdown clock via the keyboard or the RS-232 port. The Clock time prompt is shown on all channels. Time is entered from left to right with the sign first, punctuation characters are jumped over, and error checking is done on a character by character basis. Invalid entries are not accepted. If there is an error in the entered value, press the ESC key and try again. When the complete time is entered correctly, press ENTER. The time will be set when the ENTER key is pressed.
^O	0FH	Globally saves all channel's annotation text to NVRAM.
^P	10H	Globally restores saved annotation text to all channels. This occurs automatically when the unit is turned on.
^⟨ALT⟩ DEL		Reset unit to factory default conditions. This command is active from the keyboard only.

TABLE 3

CHANNEL SPECIFIC OPERATORS

The following functions, except for the channel select and encode functions, are active on selected channels only.

KEY	HEX CODE	DESCRIPTION
⟨shift⟩ F1 to ⟨shift⟩ F6	81H to 86H	Selects channel 1 through 6 respectively, for annotation or formatting. Selecting a particular channel automatically deselects all other channels.
⟨alt⟩ F1 to ⟨alt⟩ F6	91H to 96H	Selects channel 1 through 6 respectively, for annotation or formatting as above, but does not deselect other channels. This function is used for simultaneous writing to multiple channels.
⟨shift⟩ F11	8BH	Selects "All Channels". Allows simultaneous programming of all six channels.
⟨shift⟩ F12	8CH	Deselects all channels.
^Q	11H	Toggles the cursor ON/OFF. This function is only active via the keyboard. Entries from the keyboard normally turn the cursor ON. The ^Q key is useful when the operator wishes to turn the cursor OFF after keyboard entry of data without deselecting the channel. The cursor will always be turned OFF on receipt of any data received from the RS-232 port.
^R	12H	Moves time message field to the location of the cursor. (See note 1)
^U	15H	Moves Countdown Clock message field to the location of the cursor. (See Notes 2 & 5)
^V n	16H	Set time font (See note 4)
^W n	17H	Set countdown clock font (See notes 4 & 5)
^A	01H	Set ALARM 1 message position to the location of cursor (See notes 2, 3 & 5)
^B	02H	Set ALARM 2 message position to the location of cursor (See notes 2, 3 & 5)

TABLE 3 (continued)

KEY	HEX CODE	DESCRIPTION
⟨Alt⟩ any printable key	A0H to FEH	Changes the annotation font of entered character. Active only when front panel font select switch is in "Black Bordered" position.
HOME	1EH	Moves the cursor position to the top left-most position in the annotation area.
^X	18H	Moves the cursor to the HOME position and clears the annotation display.
ENTER or ^M	0DH	Moves the cursor to the beginning of the next line or the beginning of the current line if on the last line.
{UP} or ^K	0BH	Moves the cursor UP one line until the top line is reached.
{DN} or ^J	0AH	Moves the cursor down 1 line until the last line is reached.
{LF} or ^H	08H	Moves the cursor back (left) one character. The cursor will wrap around from the beginning of one line to the end of the previous line until the HOME position is reached.
{RT} or ^L	0CH	Moves the cursor right one character and will wrap around from the end of the current line to the beginning of the next line.
DELETE	7FH	Deletes the last character entered and moves the cursor back to the deleted character location.
TAB OR ^I	09H	Deletes the next character and advances one character position until the end of the display is reached.
^D row_col	04H	Moves cursor to character position designated by "row" and "col" values. The control character is followed by a 4 digit number. The first 2 digits (01 to 22) designate the row. The second 2 digits (01 to 30) designate the column.

TABLE 3 (continued)

^E E *c*	05H	Enables the encoded data display on the selected channel *c* where *c* has the values of 1 through 6 for channels 1 through 6 respectively, or ? for all channels. This is a three byte command.
^E D *c*	05H	Disables the encoded data display from the selected channel *c* where *c* has the values of 1 through 6 for channels 1 through 6 respectively, or ? for all channels. This is a three byte command.
^E A *c x…x*	05H	Inserts the twelve byte data string *x…x* into the encoded data display after the time on the selected channel *c* where *c* has the values of 1 through 6 for channels 1 through 6 respectively, or ? for all channels. This is a fifteen byte command.

Note 1: The time message overlays but does not overwrite existing annotation. If the time is moved to a new location, the existing annotation in the old location will re-appear.

Note 2: The countdown clock and both alarm messages overwrite existing annotation. If moved to new locations, the old location will be left blank.

Note 3: The alarm messages display in both selected and deselected states. When selected the ALARM message is displayed. When deselected the message location is held blank.

Note 4: For both the time and countdown clock font selections, n = '0' selects the default font and n = '1' selects the ALT font.

Note 5: To remove positionable messages (Time, Countdown and Alarm) from display, set cursor to last character position in line and set message position to that location.

6.0 SPECIFICATIONS

6.1	Video In 1	Standard 525/60 composite video 2:1 interlace, black negative per EIA RS-170 or NTSC. 75-ohm input impedance.
6.2	Video In 2	Standard S-Video Y/C.
6.3	Video Out 1,2	Identical to video input except with message data added and DC restored, 75-ohm impedance (output as specified when terminated by 75-ohm load).
6.4	Encoded Data	Video left-edge encoding method. Format IAW RCC document 452-86 section 7.
6.5	Alarm Message Inputs	Twelve discrete lines, TTL logic levels (two for each channel), low true.
6.6	Countdown Control Input	Two discrete lines, TTL logic levels, low true
6.7	RS232C I/O	EIA RS232C, 8 bit, no parity, 1 stop bit. Baud rate selectable from 300 to 38400, default to 19200.
6.8	IRIG Input	IRIG B Standard Serial Time Code (IRIG Standard 200-98)
6.9	IRIG Display Resolution	Standard 0.01 Sec, Optional 0.0001 Sec.
6.10	Annotation Field	30 columns by 22 rows.
6.11	Keyboard	101 key, PC AT style. NOTE: Switch on keyboard must be set to PC mode.
6.12	Package and Environment	
	Size:	19-inch wide x 3.5-inch high x 15-inch deep, aluminum enclosure.
	Weight:	10 lbs., 12 ozs.
	Temperature:	0°C to 55°C ambient.
	Humidity:	85% non-condensing.
6.13	Power Input	100 to 240VAC, 50 to 400Hz, 30 watts