

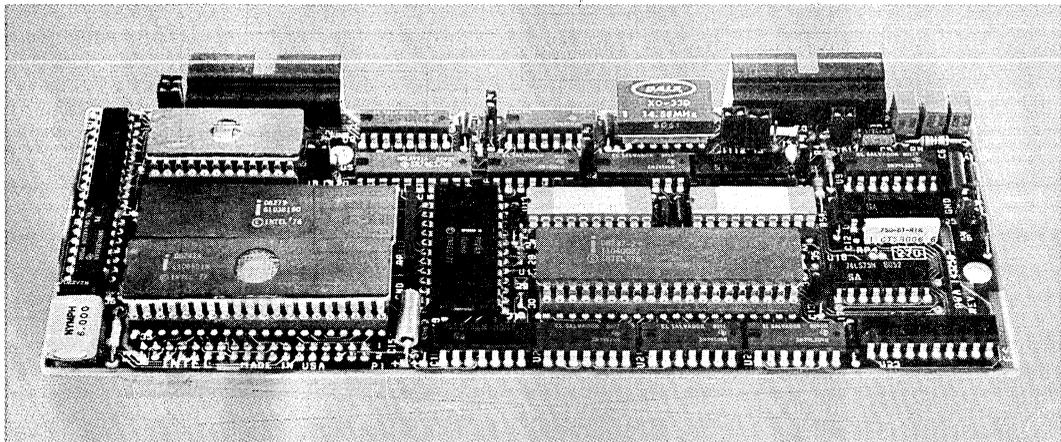


## iSBX™ 270 VIDEO DISPLAY CONTROLLER

- Complete video display controller on a double-wide iSBX™ MULTIMODULE™ board
- Interfaces to either black and white or color display monitors
- Displays 7 x 9, 5 x 7 or 6 x 8 character fonts
- High level software interface via a pre-programmed 8041A UPI
- Interchangeable character fonts available in EPROM
- Keyboard and light pen interface provided on-board
- 50 Hz or 60 Hz frame rate operation
- Provides cursor control, reverse video, blinking, underline, highlight and page or scroll mode
- Compatible with all 8/16 bit iSBC™ boards which support the Intel iSBX™ bus
- Graphics capability via pre-defined graphic character fonts

The iSBX 270 Video Display Controller (VDC) is a complete video controller on a standard double wide Intel iSBX MULTIMODULE board. Providing either black and white (B&W) or eight-color displays, the iSBX 270 VDC brings alphanumeric video control to the iSBX bus. Any computer board or system supporting the Intel iSBX MULTIMODULE bus is compatible with the iSBX 270 VDC, including most board and system products from Intel. Additionally, the iSBX 270 VDC supports keyboard and light pen I/O on-board; this simplifies the design of intelligent terminals.

The iSBX 270 module allows the user to add high level video display capability to his/her computer system with a minimal cost and effort. Typical applications for the iSBX 270 VDC include video displays for industrial operator stations, word processing systems, data base management products and many other uses.



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**FUNCTIONAL DESCRIPTION**

**iSBX™ Interface**

The iSBX 270 VDC interfaces to the Intel iSBX bus via the 8041A Universal Peripheral Interface (UPI) Microcomputer. The 8041A, under firmware control, provides communication between the base board and the iSBX 270 controller circuitry via the iSBX data and control lines. Data may be displayed immediately following power up, using default initialization provided by the 8041A UPI. In addition, eight high-level commands are provided by the iSBX 270 firmware; these eight commands are used to alter the default initialization of the controller and determine status. Following initialization, characters are displayed on the CRT by simply writing to the proper I/O port.

**CRT Interface**

The iSBX 270 VDC will interface to many B&W and RGB color display monitors. For B&W monitors, the iSBX 270 board provides TTL level signals for video, vertical sync and horizontal sync. Additionally, in B&W, two levels of intensity (normal and highlight) are supported under program control.

When operating in the color mode, the iSBX 270 module provides TTL level 75 ohm line drivers for Red, Green, and Blue Video and sync allowing 8 different colors to be displayed.

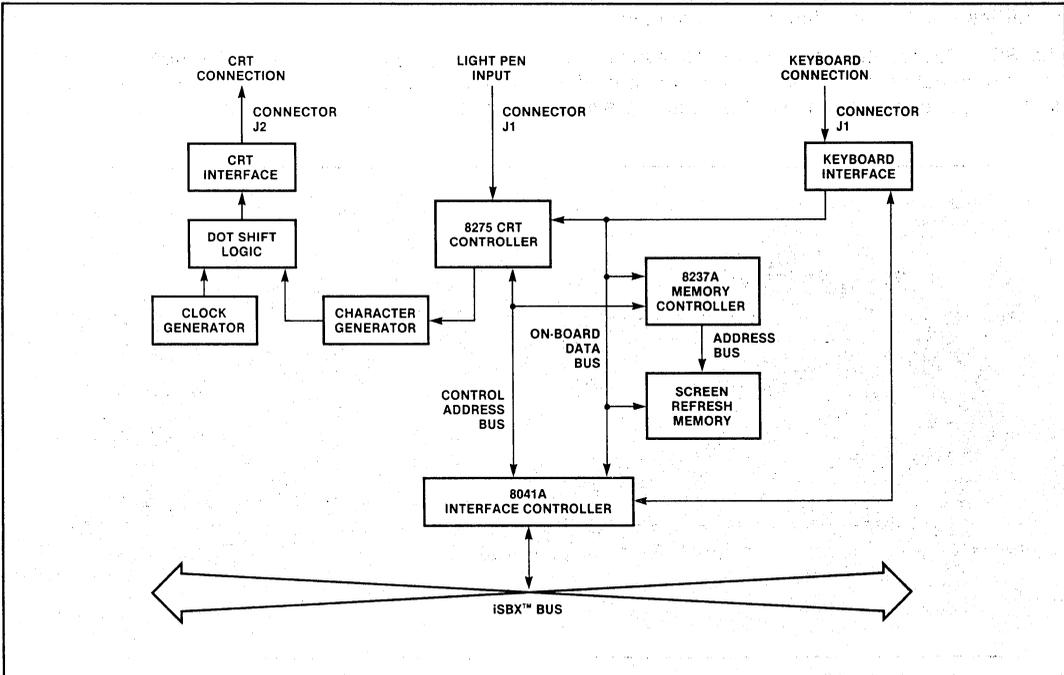
Composite video is not provided on the iSBX 270 MULTIMODULE board; however, with minimal external circuitry, composite video can be added (circuit design available; contact the local Intel Sales Office for details).

Table 1 lists several CRT vendors compatible with the iSBX 270 VDC.

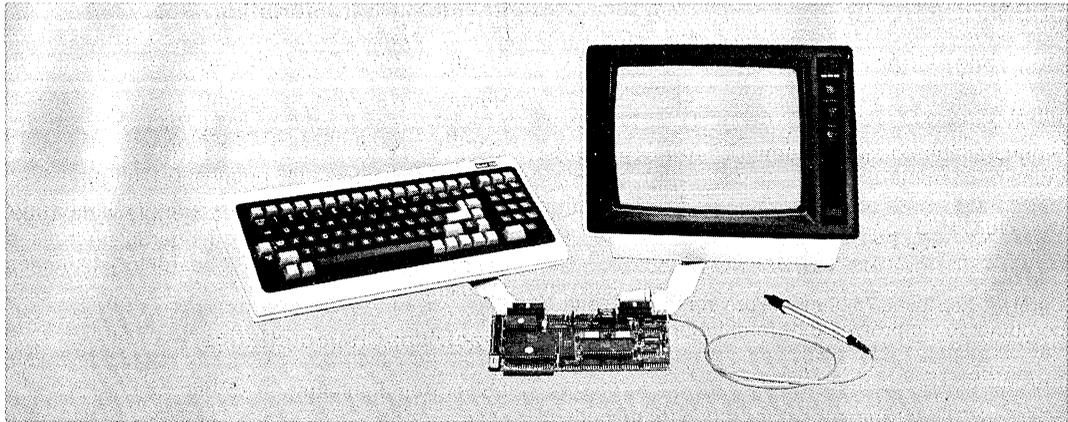
**Table 1. CRT's (B&W and Color)<sup>1</sup>**

TYPE	VENDOR	MODEL #
B&W	Ball Brothers	TTL 120, TV 120, TV 50
	Motorola	M3570
	TSD	MDC-15
Color	ELSTON	DM30-12B0-51-A04
	Ball Brothers	7-015-0131
	IDT	19AC
	CONRAC	5711C13
	NEC	1202DH
	MITSUBISHI	C-3419

<sup>1</sup>NOTE: This in no way constitutes an endorsement by Intel Corporation of these companies' products. The companies listed are known to provide products compatible with the iSBX 270 board.



**Figure 1. iSBX™ 270 VDC Block Diagram**



**Figure 2. The iSBX™ 270 VDC Interfaces to a User-Supplied Video CRT, Keyboard and Light Pen**

### CRT Controller

The CRT Controller performs all timing and data buffering functions for the CRT. The iSBX 270 VDC uses the Intel 8275 CRT Controller (for additional details refer to the 8275 data sheet available from Intel).

### Screen Refresh

The iSBX 270 VDC contains 4K bytes of high speed static RAM, as well as a high speed DMA controller (8237A). The 8237A, under the control of the 8041A UPI, takes care of both writing data to the screen and refreshing the screen.

### Character Generation

The character fonts (128 characters, including alphabetic, numeric, and special characters) that are displayed on the CRT are stored in EPROM. The need may arise to display different character fonts, i.e., those used in international systems or custom symbols which are application specific. With the iSBX 270 VDC the user may modify any or all of the character fonts by simply reprogramming the EPROM. In addition, the user may utilize a larger EPROM to obtain up to 256 characters.

### Keyboard Interface

The iSBX 270 VDC also interfaces to a keyboard I/O device via the J1 edge connector. The keyboard interface of the iSBX 270 VDC accepts up to eight TTL parallel data lines and one TTL strobe, either positive or negative. Keyboard input is indicated by a status bit in the 8041A and/or an interrupt. In addition, control lines are provided for visual and/or audible indicators.

Table 2 lists several keyboards that interface to the iSBX 270 VDC.

**Table 2. Keyboards<sup>1</sup>**

VENDOR	MODEL #
Advanced Input Devices	SK-067
Cherry	B70-05AB
Cherry	CB80-07AA
Chomerics	AN26109/AE26203
Cortron	35-500014
Keytronic	L1648
Keytronic	L1660
Keytronic	L1674-03
Keytronic	L1752
Microswitch	66SD6-7
Microswitch	87SD30-8

<sup>1</sup>NOTE: This in no way constitutes an endorsement by Intel Corporation of these companies' products. The companies listed are known to provide products compatible with the iSBX 270 board.

### Light Pen Interface

Light pen I/O devices may be directly interfaced to the iSBX 270 VDC. A light pen hit is triggered on the rising edge of the light pen signal and is indicated by a status bit in the UPI 8041A and/or an interrupt.

Table 3 lists a light pen vendor whose product interfaces to the iSBX 270 VDC.

**Table 3. Light Pens<sup>1</sup>**

VENDOR	MODEL #
Information Control Co.	LP-700

<sup>1</sup>NOTE: This in no way constitutes an endorsement by Intel Corporation of this company's products. The company listed is known to provide products compatible with the iSBX 270 board.

## SPECIFICATIONS

### Controller Characteristics

#### DISPLAY

Programmable to a maximum of 35 rows x 80 columns of characters.

#### CRT OUTPUTS

**B&W** — TTL level HSYNC, VSYNC, Video.

**Color** — TTL level, 75 ohm line drivers for RGB and combined sync provide 8 different display colors.

#### FRAME RATE

50 Hz or 60 Hz via jumper settings (non-interlaced).

#### CHARACTER FONTS

5 x 7, 7 x 9 or 6 x 8 jumperable with appropriate crystal. Character generator uses 2716 EPROM. Also compatible with 2732A EPROM's. For generation of special fonts, please refer to iSBX 270 VDC Hardware Reference Manual.

#### VIDEO CONTROL

Reverse video, blinking, underline, highlight, cursor control and page or scroll mode.

#### TV MONITOR

Most video display monitors with a 10 MHz bandwidth or better.

#### LIGHT PEN INPUT

TTL level pulse, maximum 50 ns rise time, minimum 100 ns hold time.

### Compatibility

#### CPU

Any iSBC single board computer or I/O board compatible with the MULTIBUS system bus and implementing the iSBX bus and connector.

### Physical Characteristics

**Width** — 3.08 inches (7.82 cm)

**Height** — 0.8 inches (2.05 cm)

**Length** — 7.5 inches (19.05 cm)

**Shipping Weight** — 0.5 pounds (0.175 Kg)

**Mounting** — Occupies one double-wide iSBX MULTIMODULE position on boards; increases board height (host plus iSBX board) to 1.14 inches (2.90 cm).

### Electrical Characteristics

**Power Requirements** +5 Vdc @ 1.3A.

### Environmental Characteristics

**Temperature** — 0°C to 55°C (operating); -55°C to +85°C (non-operating).

**Humidity** — Up to 90% relative humidity without condensation (operating); all conditions without condensation or frost (non-operating).

### Equipment Supplied

iSBX 270 VDC Controller  
Reference Schematic

Cabling and connectors from the VDC controller to the CRT, keyboard and light pen are not supplied with the controller. Cables can be fabricated with commercially available cable and connectors as described in the iSBX 270 Hardware Reference Manual.

### Reference Manual

**143444-001** — iSBX 270 Video Display Controller Hardware Reference Manual (NOT SUPPLIED).

Reference manuals may be ordered from any Intel sales representative, distributor office or from Intel Literature Department, 3065 Bowers Avenue, Santa Clara, CA 95051.

## ORDERING INFORMATION

Part Number	Description
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SBX 270	Video Display Controller MULTIMODULE Board
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