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TMS320C8x
Software Development Board

Installation
Guide

1997   **Digital Signal Processing Solutions**

TMS320C8x
Software Development Board
Installation Guide

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Read This First

About This Manual

This manual tells you how to install the TMS320C8x ('C8x) software development board (SDB). The SDB is a peripheral component interconnect (PCI) plug-in card that helps you evaluate characteristics of the 'C8x digital signal processor (DSP) to determine how it will meet the requirements of your given application.

The SDB offers you a simple application programming interface (API) to control data flow across the host bus. You can also use the SDB as a development tool to create software and applications for the 'C8x on a PC ™ . The board is designed for use on PCI PC-based computers with Windows NT ™ .

This manual assumes you are familiar with working in a Windows NT environment and understand general and technical PC and multimedia processes and terminology.

How to Use This Manual

Use this manual for instruction on installing and using the SDB. This book is divided into three distinct parts:

❑ **Introductory information**, consisting of Chapter 1, describes hardware and software requirements necessary to install and use the SDB and provides an overview of the 'C8x SDB and its components.

❑ **Instructive information**, consisting of Chapters 2, 3, and 4, describes procedures for installing the SDB, running the board diagnostics application, and troubleshooting problems with your SDB.

❑ **Reference material**, consisting of Appendixes A and B, provides supplementary SDB information and a glossary.

Notational Conventions

In this document, program listings, program examples, and interactive displays are shown in a `special typeface`. Examples use a **`bold version`** of the special typeface for emphasis; interactive displays use a **`bold version`** of the special typeface to distinguish commands that you enter from items that the system displays (such as prompts, command output, error messages, etc.).

Here is an example of a system prompt and a command that you might enter:

`d:\`**`setup.exe`**

Information About Cautions and Warnings

This book contains cautions and warnings.

This is an example of a caution statement.

A caution statement describes a situation that could potentially damage your software or equipment.

This is an example of a warning statement.

A warning statement describes a situation that could potentially cause harm to <u>you</u>.

The information in a caution or a warning is provided for your protection. Please read each caution and warning carefully.

Related Documentation From Texas Instruments

The following books describe the TMS320C8x software development board (SDB) and related support tools. To obtain a copy of any of these TI documents, call the Texas Instruments Literature Response Center at (800) 477–8924. When ordering, please identify the book by its title and literature number.

TMS320C80 Digital Signal Processor Data Sheet (literature number SPRS023) describes the features of the TMS320C80 and provides pinouts, electrical specifications, and timings for the device.

TMS320C80 (MVP) Code Generation Tools User's Guide (literature number SPRU108) provides information about the features and operation of the linker and the master processor (MP) and parallel processor (PP) C compilers and assemblers. It also includes a description of the common object file format (COFF) and shows you how to link MP and PP code.

TMS320C80 (MVP) C Source Debugger User's Guide (literature number SPRU107) describes the 'C8x master processor and parallel processor C source debuggers. This manual provides information about the features and operation of the debuggers and the parallel debug manager; it also includes basic information about C expressions and a description of progress and error messages.

TMS320C8x Emulator Installation Guide (literature number SPRU148) provides installation instructions for the 'C8x emulator card and the C source debugger software for PC systems running Windows NT, and describes release enhancements and miscellaneous changes for the current release.

TMS320C8x Master Processor User's Guide (literature number SPRU109) provides information about the master processor (MP) features, architecture, operation, and assembly language instruction set; it also includes sample applications that illustrate various MP operations.

TMS320C8x Multitasking Executive User's Guide (literature number SPRU112) provides information about the multitasking executive software features, operation, and interprocessor communications; it also includes a list of task error codes.

TMS320C8x Parallel Processor User's Guide (literature number SPRU110) provides information about the parallel processor (PP) features, architecture, operation, and assembly language instruction set; it also includes software applications and optimizations.

TMS320C8x Software Development Board Programmer's Guide (literature number SPRU178) provides descriptions of hardware functions, complete API references, theory of operation, and example code for the SDB.

TMS320C8x System-Level Synopsis (literature number SPRU113) describes the 'C8x features, development environment, architecture, memory organization, and communication network (the crossbar).

TMS320C80 Transfer Controller User's Guide (literature number SPRU105) provides information about the transfer controller (TC) features, functional blocks, and operation; it also includes examples of block write operations for big- and little-endian modes.

TMS320C80 Video Controller User's Guide (literature number SPRU111) provides information about the video controller (VC) features, architecture, and operation; it also includes procedures and examples for programming the serial register transfer (SRT) controller and the frame timer registers.

TVP3020 Video Interface Palette Data Manual (literature number SLAS080) provides information about the TVP3020 Video Interface Palette features, register set, operation, and characteristics.

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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MS, MS-DOS, Windows, and Windows NT are registered trademarks of Microsoft Corporation.

Pentium is a trademark of Intel Corporation.

Obtaining Technical Support

Before contacting Texas Instruments Technical Support, have the following information ready:

❏ Model number of your SDB

❏ Serial number located on the back side of your board

❏ Software version number located on the TMS320C8x SDB system software media

❏ Brand name, model number, and speed of the computer in which the board is installed

❏ Computer's PCI BIOS version

❏ Amount of memory in your computer system

❏ Version of the software and operating environment that you are using (such as Windows NT)

❏ Type of video or audio signal being captured or processed

❏ Cabling arrangement of input and output devices connected to the board

Once you have this information ready, contact Texas Instruments Technical Support as specified in the *If You Need Assistance* section that follows.

If You Need Assistance . . .

❏ **World-Wide Web Sites**

TI Online	http://www.ti.com
Semiconductor Product Information Center (PIC)	http://www.ti.com/sc/docs/pic/home.htm
DSP Solutions	http://www.ti.com/dsps
320 Hotline On-line ™	http://www.ti.com/sc/docs/dsps/support.html

❏ **North America, South America, Central America**

Product Information Center (PIC)	(972) 644-5580		
TI Literature Response Center U.S.A.	(800) 477-8924		
Software Registration/Upgrades	(214) 638-0333	Fax: (214) 638-7742	
U.S.A. Factory Repair/Hardware Upgrades	(281) 274-2285		
U.S. Technical Training Organization	(972) 644-5580		
DSP Hotline	(281) 274-2320	Fax: (281) 274-2324	Email: dsph@ti.com
DSP Modem BBS	(281) 274-2323		
DSP Internet BBS via anonymous ftp to ftp://ftp.ti.com/mirrors/tms320bbs			

❏ **Europe, Middle East, Africa**

European Product Information Center (EPIC) Hotlines:

Multi-Language Support	+33 1 30 70 11 69	Fax: +33 1 30 70 10 32	Email: epic@ti.com
Deutsch	+49 8161 80 33 11 or +33 1 30 70 11 68		
English	+33 1 30 70 11 65		
Francais	+33 1 30 70 11 64		
Italiano	+33 1 30 70 11 67		
EPIC Modem BBS	+33 1 30 70 11 99		
European Factory Repair	+33 4 93 22 25 40		
Europe Customer Training Helpline		Fax: +49 81 61 80 40 10	

❏ **Asia-Pacific**

Literature Response Center	+852 2 956 7288	Fax: +852 2 956 2200
Hong Kong DSP Hotline	+852 2 956 7268	Fax: +852 2 956 1002
Korea DSP Hotline	+82 2 551 2804	Fax: +82 2 551 2828
Korea DSP Modem BBS	+82 2 551 2914	
Singapore DSP Hotline		Fax: +65 390 7179
Taiwan DSP Hotline	+886 2 377 1450	Fax: +886 2 377 2718
Taiwan DSP Modem BBS	+886 2 376 2592	
Taiwan DSP Internet BBS via anonymous ftp to ftp://dsp.ee.tit.edu.tw/pub/TI		

❏ **Japan**

Product Information Center	+0120-81-0026 (in Japan)	Fax: +0120-81-0036 (in Japan)
	+03-3457-0972 or (INTL) 813-3457-0972	Fax: +03-3457-1259 or (INTL) 813-3457-1259
DSP Hotline	+03-3769-8735 or (INTL) 813-3769-8735	Fax: +03-3457-7071 or (INTL) 813-3457-7071
DSP BBS via Nifty-Serve	Type "Go TIASP"	

❏ **Documentation**

When making suggestions or reporting errors in documentation, please include the following information that is on the title page: the full title of the book, the publication date, and the literature number.

Mail: Texas Instruments Incorporated	Email: comments@books.sc.ti.com
Technical Documentation Services, MS 702	
P.O. Box 1443	
Houston, Texas 77251-1443	

Note: When calling a Literature Response Center to order documentation, please specify the literature number of the book.

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SDB System Requirements and Components

This chapter explains the hardware and software requirements necessary to install and use the software development board (SDB), and it describes the items that are delivered as part of the TMS320C8x SDB kit.

1.1 System Requirements

To install and use the 'C8x SDB, you need the items in the following checklists, which include the hardware and software requirements plus the contents of the 'C8x SDB kit.

Hardware checklist

☐	**Host**	Pentium™ PC
☐	**Memory**	Minimum of 16M bytes of RAM plus at least 20M bytes of hard-disk space (32M bytes of RAM is recommended for optimum performance)
☐	**Monitor**	High-resolution multisync monitor
☐	**Slot**	One full-length peripheral component interconnect (PCI) slot
☐	**Peripheral cable**	Graphics output monitor cable (supplied by monitor manufacturer)
		For more information about the graphics output monitor cable, see Section 1.3, *Peripheral Cables.*
☐	**Required hardware**	CD-ROM drive
☐		Microsoft™ compatible mouse
☐	**Optional hardware**	An EGA- or VGA-compatible graphics display card and a large monitor (17-inch or 19-inch)
		The C source debugger has two options that allow you to change the overall size of the debugger display. For more information about debugger options, see the *TMS320C80 (MVP) C Source Debugger User's Guide*.

Software checklist

☐	**Operating system**	Windows NT (version 3.5 or later)
☐	**PC software tools**	The following tools are used with the SDB to write programs that use the 'C8x for image processing, graphics generation, audio processing, and standard digital signal processor (DSP) applications:
☐		Master processor (MP) optimizing C compiler
☐		Parallel processor (PP) optimizing C compiler
☐		MP reduced instruction set computer (RISC) assembler
☐		PP algebraic assembler
☐		Common object file format (COFF) linker for MP and PP code

☐ PP code compactor and register allocator

☐ Multitasking executive for host communications

'C8x SDB kit checklist

☐ **PCI plug-in card**   TMS320C8x SDB PCI plug-in card

For information about the PCI plug-in card, see Section 1.2, *TMS320C8x SDB PCI Plug-In Card*.

☐ **Peripheral cables**   S-VHS-to-RCA adapter cable

☐   VGA pass-through cable

☐   Audio breakout cable

For information about the cables that connect to optional peripherals, see Section 1.3, *Peripheral Cables.*

☐ **CD-ROMs**   **TMS320C8x SDB System Software**. This CD-ROM contains the following system software:

   ☐ **Device driver for Windows NT**. The kernel mode driver is responsible for all communications between the host and the SDB.

   ☐ **C source debuggers**. The debuggers allow real-time, in-circuit emulation of the 'C8x DSP. There are two types of debugger: one for the MP and one for the PPs. See the *TMS320C80 (MVP) C Source Debugger User's Guide* for more detailed information.

   ☐ **Board reset utility**. This command-line utility is executed on the host and resets the SDB hardware and the 'C8x DSP.

   ☐ **Board diagnostics utility**. This is a graphical user interface (GUI) program for Windows NT that tests the major hardware components of the SDB.

   ☐ **Peripheral library**. The library has a complete set of application programming interface (API) functions called by 'C8x programs to control the hardware peripherals. See the *TMS320C8x Software Development Board Programmer's Guide* for more detailed information.

Installing the SDB software sets up the debugger environment for using the SDB card.

☐ **TMS320C80 (MVP) Online Reference**. This CD-ROM provides easy access to paper-based reference documents that have been adapted for online viewing.

☐ **Documentation**   Three books and the registration card

1.2   TMS320C8x SDB PCI Plug-In Card

The 'C8x PCI plug-in card is a printed-circuit assembly (PCA) that plugs into a PCI expansion slot on your computer's motherboard. The SDB card consists of the following components (see Figure 1–1):

❑ 40-MHz TMS320C80 DSP

❑ 8M bytes of DRAM

❑ 2M bytes of VRAM (for high-resolution display)

❑ Audio codec (for the capture and playback of audio signals at sample rates of up to 48 kHz in 16-bit stereo)

❑ Video capture, consisting of a complete video front end for capturing National Television Standards Committee (NTSC) or phase alternation line (PAL) video in a composite or S-VHS component format

❑ Video display, consisting of a video interface palette (VIP), which drives monitor resolutions up to 1600×1200 at 8 BPP (bits per pixel) with a 60-Hz refresh rate

❑ PCI interface

❑ Memory controller

Figure 1–1. TMS320C8x SDB Components
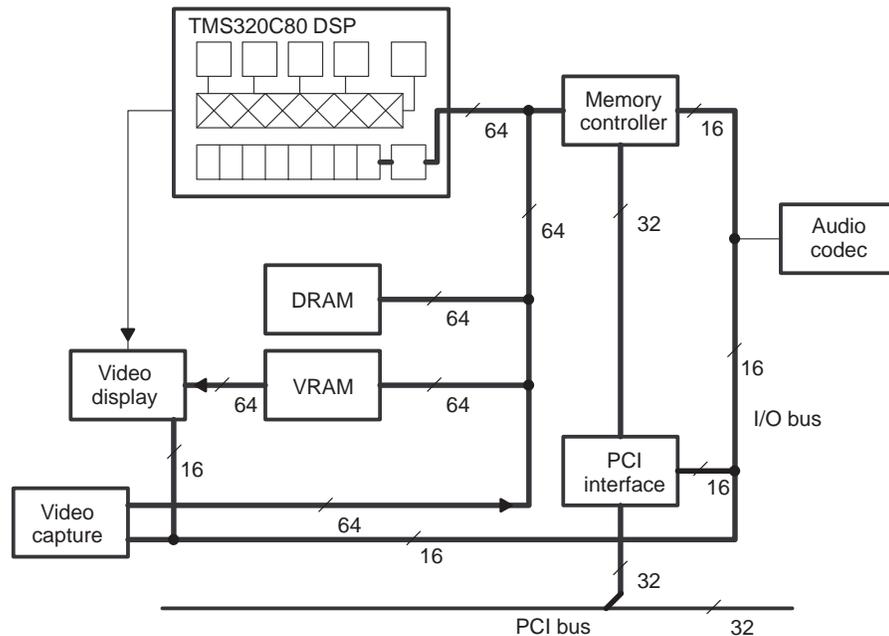
The SDB card also contains IEEE 1149.1 standard emulation support, and it has connectors for peripheral cables. Figure 1–2 illustrates the retaining bracket with the connectors provided for connecting optional peripherals to the SDB.

The relationship between the connectors, the cables, and the input/output (I/O) peripheral devices is described in Section 1.3, *Peripheral Cables*. The procedures for installing the hardware are given in Chapter 2, *Installing the TMS320C8x SDB*.

Figure 1–2. TMS320C8x SDB Connectors
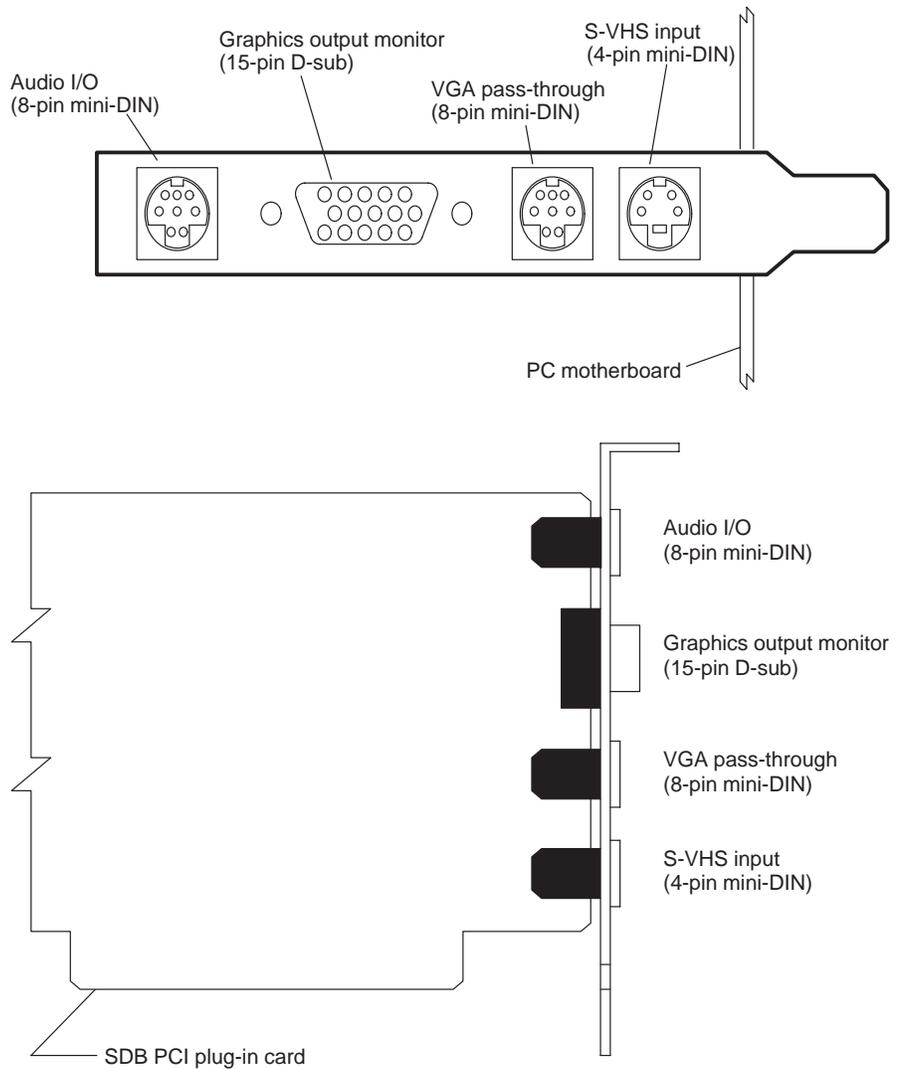
1.3 Peripheral Cables

The peripheral cables connect the SDB to external input or output sources. The cables you need depend on the external hardware (video camera, monitor, audio equipment, for example) you will be connecting to the SDB. The following table lists the peripheral cables and their corresponding connectors.

Connector	Cable	Supplier
4-pin mini-DIN	S-VHS-to-RCA adapter cable	TMS320C8x SDB
8-pin mini-DIN	VGA pass-through cable	TMS320C8x SDB
15-pin D-sub	Graphics output monitor cable	Monitor manufacturer
8-pin mini-DIN	Audio breakout cable	TMS320C8x SDB

The purpose of this section is to familiarize you with the peripheral cables. See Section 2.3, *Connecting Peripheral Cables to the SDB,* for installation instructions.

S-VHS-to-RCA adapter cable

The S-VHS-to-RCA adapter cable (see Figure 1–3) consists of a 4-pin mini-DIN connector that connects the luminance and chrominance signals to RCA jacks for composite video sources. The adapter cable is compatible with most composite video cameras. When you are using a video source that requires a BNC connection, you can combine the adapter cable with a BNC-to-RCA adapter. The BNC-to-RCA adapter connector is not available through TI but can be purchased through a cable supplier.

Figure 1–3. S-VHS-to-RCA Adapter Cable

VGA pass-through cable

The VGA pass-through cable (see Figure 1–4) connects the 15-pin VGA output of the host display adapter to the 8-pin mini-DIN VGA pass-through connector of the board. When this cable is attached, settings in the display submap control whether the display output is taken from the SDB, from the host's display adapter, or from both.

Figure 1–4. VGA Pass-Through Cable


Graphics output monitor cable

The graphics output monitor cable is a 15-pin D-sub cable that connects the graphics output board connector to the monitor. This cable is necessary to display graphics output to a monitor and is supplied by the monitor manufacturer.

Audio breakout cable

The audio breakout cable (see Figure 1–5) separates audio connections by using an 8-pin mini-DIN connector to RCA plugs. The audio cable includes connections for stereo line-out, line-in, and auxiliary-in.

The cable is compatible with any audio equipment that connects to standard RCA jacks. The RCA plugs can be used with CJ11-to-dual-RCA connectors for audio components requiring phone plug connections. The CJ11-to-dual-RCA connectors cable is not available through TI but can be purchased through a cable supplier.

Figure 1–5. Audio Breakout Cable
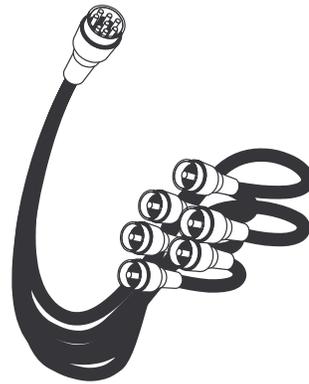
Installing the TMS320C8x SDB

This chapter contains step-by-step procedures for installing the TMS320C8x software development board (SDB). You begin by installing the board, connecting the peripherals (if applicable), and, finally, installing the software.

2.1 Before Starting the Installation Process

Before you begin installing the 'C8x SDB, do the following tasks:

❑ Verify that you received the items listed as part of the 'C8x SDB kit in Chapter 1.

❑ Make sure that the system in which you are installing the SDB meets the equipment and software requirements listed in Chapter 1.

❑ To help avoid equipment damage, read and follow the instructions in this section for controlling static electricity and avoiding obstructions that could prevent you from installing the SDB.

Note:

If you find any items missing or damaged, contact Texas Instruments immediately. See *If You Need Assistance* in the *Preface* for the appropriate phone numbers.

Controlling static electricity

Minimizing Static Shock

Special handling methods and materials should be used to prevent equipment damage. You should be familiar with identification and handling of ESD-sensitive devices before attempting to perform the procedures described in this manual.

To help avoid problems resulting from static electricity, follow these guidelines:

❑ Store the board in its antistatic bag until you are ready to use it.

❑ Keep the antistatic bag for storing or transferring the board between computers.

❑ Wear a properly connected ground strap at all times when handling the SDB.

Avoiding obstructions

Obstructions

To minimize the risk of damage to the SDB, avoid physical obstructions that prevent insertion of the board. You must install the SDB in a full-length PCI slot only.

Before installing the SDB, make sure your PC has a full-length PCI slot. Otherwise, obstructions could prevent you from fully inserting the SDB in the motherboard PCI-bus connector. For example, in some computer systems, the location or height of the central processing unit (CPU) or the location of the PCI-bus slot may prevent you from inserting the SDB. Failure to avoid obstructions when installing the SDB could permanently damage the card.

2.2   Step 1: Installing the SDB Card Into Your PC

Minimizing Personal Injury Risk

To minimize the risk of personal injury, *always* turn off the power to your PC and unplug the power cord before installing the SDB card.

To install the SDB card into your PC, follow these steps:

1)   Turn off your PC's power and unplug the power cord.

2)   Remove the cover of your PC.

3)   Remove the SDB from the antistatic bag.

4)   Insert the board in the full-length PCI local bus slot.

5)   Replace the PC cover.

Note:

Keep the antistatic bag for storing or transferring the board in the future.

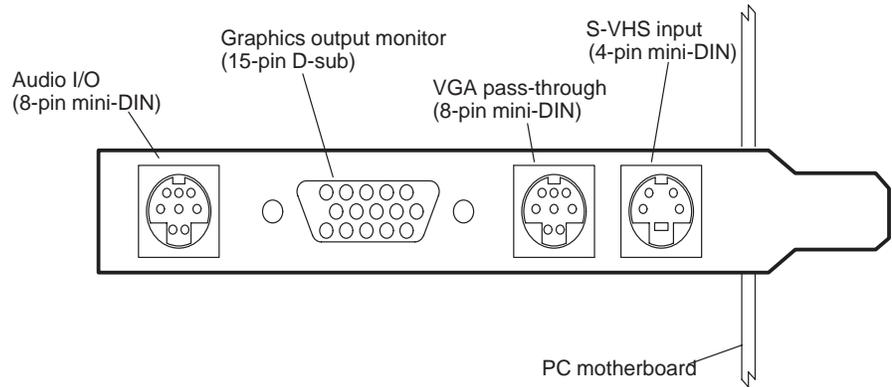*Figure 2–1. TMS320C8x SDB Installation*
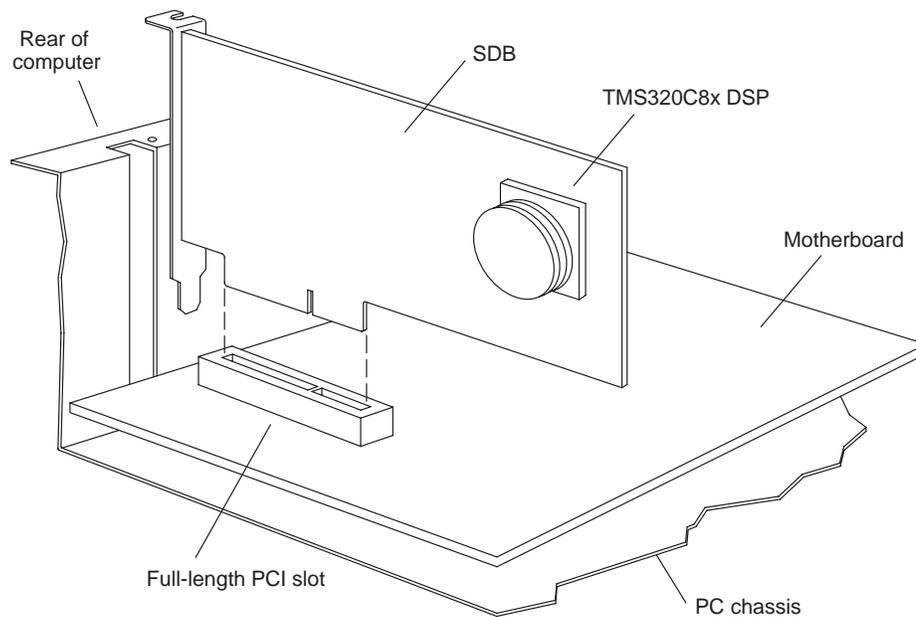
2.3 Step 2: Connecting Peripheral Cables to the SDB

Use the peripheral cables to connect the SDB to external input or output sources depending on how you will use your SDB. For example, you may want to connect video, graphics, and audio peripherals to your SDB.

To connect peripherals to the SDB, follow these steps:

1) Locate the peripheral connectors on the SDB retaining bracket.

Audio I/O
(8-pin mini-DIN)

Graphics output monitor
(15-pin D-sub)

VGA pass-through
(8-pin mini-DIN)

S-VHS input
(4-pin mini-DIN)

PC motherboard

Connecting the Wrong Connectors

The VGA pass-through and audio I/O connectors are not keyed, and both are 8-pin mini-DIN. Connecting an *audio peripheral* to the VGA pass-through connector or a *VGA peripheral* to the audio I/O connector by mistake can permanently damage the SDB and your equipment.

2) Locate the peripheral cables you need:

To connect the SDB to...	You need this cable:	See step:
Monitor for graphics output	Graphics output monitor cable (supplied by monitor manufacturer)	3
Video source	S-VHS-to-RCA adapter cable	4
Audio equipment	Audio breakout cable	5
External VGA-compatible adapter	VGA pass-through cable	6

3) Connect the graphics output monitor cable to the SDB's graphics output monitor 15-pin D-sub connector and to the monitor.

4) Connect the video source to the SDB's S-VHS input 4-pin mini-DIN connector. For composite video sources, use the S-VHS-to-RCA adapter cable that is provided.

Note:

The S-VHS-to-RCA adapter cable is compatible with most composite video cameras. When using a video source that requires a BNC connection, you can combine the adapter cable with a BNC-to-RCA adapter. The BNC-to-RCA adapter connector is not available through TI but can be purchased through a cable supplier.

5) Connect the audio breakout cable to the SDB's audio I/O 8-pin mini-DIN connector and to the audio equipment.
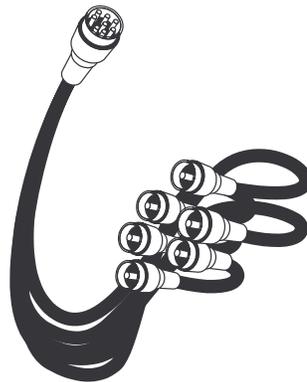
Note:

The cable is compatible with any audio equipment that connects to standard RCA jacks. The RCA plugs can be used with CJ11-to-dual-RCA connectors for audio components requiring phone plug connections. The CJ11-to-dual-RCA connectors cable is not available through TI but can be purchased through a cable supplier.

6) Use the VGA pass-through cable to connect the external VGA-compatible adapter to the SDB's VGA pass-through 8-pin mini-DIN.

2.4   Step 3: Installing the System Software

The system software tools package is shipped on CD-ROM. To install the tools on a PC running Windows NT, follow these steps:

1) Insert the CD-ROM into your CD-ROM drive.

2) Log onto Windows NT as a user with administrative privileges.

3) From the File menu, select Run.

4) In the dialog box, enter the following command (replace d with the name of your CD-ROM drive):

    ```
    d:\setup.exe
    ```

5) Click OK.

6) Follow the on-screen instructions.

2.5 Where to Go From Here

Your SDB card and system software are now installed. You should:

❑ Read Chapter 3, *Running the Board Diagnostics*, and follow the instructions. This chapter helps you verify the operation of the major components of the board, such as audio capture and playback, video display, video capture, and host communications.

❑ See Chapter 4, *Troubleshooting*, for help on correcting error conditions.

Running the Board Diagnostics

This chapter explains how to run the board diagnostics included with the software development board (SDB). You can run the diagnostics only after installing the SDB card and system software. See Chapter 2 for installation instructions.

Use the board diagnostics to verify the operation of the major components of the board, such as audio capture and playback, video display, video capture, and host communications. If any of the tests fail, see Chapter 4 for troubleshooting information.

To run the board diagnostics utility, follow these steps:

1) Execute the SDBRST.EXE program to reset the board.

2) Execute the SDBDIAG.EXE program to open the SDB Diagnostics dialog box, shown in Figure 3–1. If you run the diagnostics utility from a Windows NT DOS prompt, you must be in the C:\C8xSDB\BIN directory (or the directory in which you installed the software) to run the SDBDIAG.EXE program.

3) In the SDB Diagnostics dialog box, click on any of the buttons in the Tests box to test a specific hardware function.

Click on this button:	To test this SDB hardware function:
Memory Test	VRAM and DRAM memory on board
Display Test	Video display
Video Test	Video capture
Audio Test	Audio capture and playback
All	All of the SDB hardware functions

Depending on the tests you run, the application may prompt you for feedback in the form of a Yes/No dialog box. For example, when you click on Display Test, the application asks you if the image has appeared on the monitor. As each test is completed, the status appears next to the corresponding button.

4) Click on OK to write the results of the test(s) to a file called results.txt. The results.txt file provides a log that specifies the memory configuration and the test status (Passed, Failed, or Not Tested).

For further information on any of the tests, click on the Help button to access the online documentation.

Figure 3–1. SDB Diagnostics Dialog Box
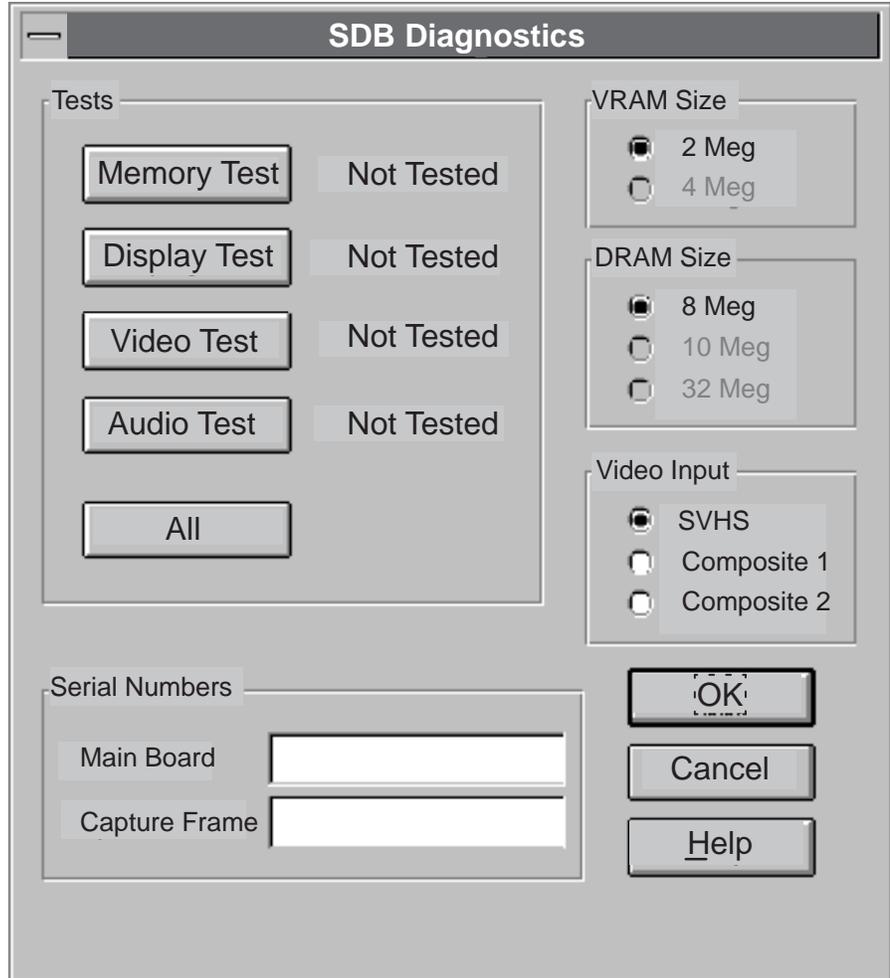
Troubleshooting

This chapter lists common error conditions and explains how to correct them.

If you experience difficulty when installing or using the TMS320C8x software development board (SDB), follow these guidelines before seeking technical support:

❑   Read the topic in this chapter that relates to the problem.

❑   Read the portion of this manual that discusses the procedures you followed or tasks you performed before the problem occurred.

The following error conditions (listed in alphabetical order) may occur during or after installing your SDB and its software. To correct the problem, take the action specified here for that message or condition. If the problem persists, seek technical support.

At least one service driver failed during system startup

Description   This message indicates one of the following problems:

❑   The drivers are installed incorrectly.

❑   The motherboard PCI configuration is incorrect.

Action   ❑   Make sure that the SDB is fully seated in the PCI connector. If the SDB is not fully seated, correct the problem and then rerun the setup.exe program to reinstall the SDB software.

❑   Make sure that the PCI BIOS autoconfiguration is enabled. (Ask your system administrator.) Enable the PCI BIOS autoconfiguration, if necessary, and then rerun the setup.exe program to reinstall the SDB software.

Driver not loaded

Description The most common reason the SDB device driver does not load once the drivers and software files are properly installed is that your PC has an improper motherboard BIOS configuration.

Action Ask your system administrator to verify the following items (if a correction is made, you will need to rerun the setup.exe program to reinstall the SDB software):

- ❑ PCI interrupts are enabled and passed through to the SDB.

- ❑ PCI autoconfiguration is enabled.

- ❑ The motherboard/chipset supports the PCI Local Bus Specification Revisions 2.0 and 2.1. Motherboards with chipsets supporting earlier revisions will not correctly configure the SDB and, therefore, the device driver will not load.

System hangs

Description This condition, in which your system locks up, occurs when the communication between the device driver for Windows NT and the kernel running on the 'C8x SDB is not synchronized.

Action Reboot your system.

You have insufficient privilege to add or remove a driver

Description If you did not log onto Windows NT as a user with administrative privileges, this message appears.

Action Log onto Windows NT as a user with administrative privileges and then rerun the setup.exe program to reinstall the SDB software.

SDB Connector Pinouts

This appendix contains the pinout for each peripheral cable connector for the software development board (SDB).

Topic   **Page**

A.1 S-VHS Input Pinout

The connection for the luminance (luma) and chrominance (chroma) signal for composite video sources is made through the S-VHS input connector. Figure A–1 shows the pinout for this 4-pin mini-DIN connector.

Figure A–1. S-VHS Input Connector
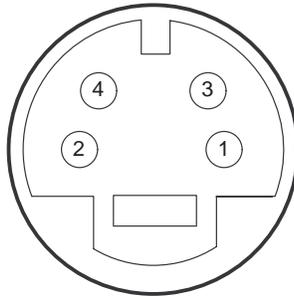
Legend: Pin 1 = Luma ground
Pin 2 = Chroma ground
Pin 3 = Luma input or NTSC/PAL input 1 (1 V peak-to-peak, negative sync, 75 Ω unbalanced)
Pin 4 = Chroma input (0.286 V peak-to-peak, Burst, 75 Ω unbalanced) or NTSC/PAL input 2 (1 V peak-to-peak, negative sync, 75 Ω unbalanced)

A.2 VGA Pass-Through Pinout

The connection for the output of a VGA graphics board, which allows only a single monitor, is made through the VGA pass-through connector. Figure A–2 shows the pinout for this 8-pin mini-DIN connector.

Figure A–2. VGA Pass-Through Connector
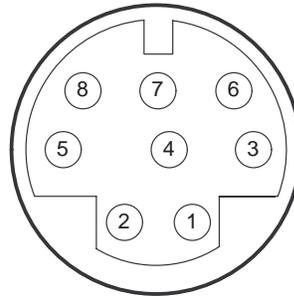
Legend: Pin 1 = AGND
Pin 2 = VGA in (red)
Pin 3 = VGA in (green)
Pin 4 = $\overline{\text{VGA}}$ in (blue)
Pin 5 = $\overline{\text{VGA}}$ in (horizontal sync)
Pin 6 = $\overline{\text{VGA}}$ in (vertical sync)
Pin 7 = AGND
Pin 8 = AGND

A.3 Graphics Output Monitor Pinout

The connection for the graphics output board to the monitor is made through the graphics output monitor connector. Figure A–3 shows the pinout for this 15-pin D-sub connector.

Figure A–3. Graphics Output Monitor Connector
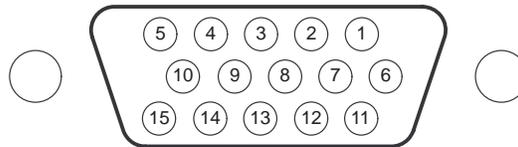
Legend: Pin 1 = Red
Pin 2 = Green
Pin 3 = Blue
Pin 4 = No connection
Pin 5 = No connection
Pin 6 = AGND
Pin 7 = AGND
Pin 8 = AGND
Pin 9 = No connection
Pin10 = AGND
Pin11 = No connection
Pin12 = No connection
Pin13 = $\overline{\text{HSYNC}}$
Pin14 = $\overline{\text{VSYNC}}$
Pin15 = No connection

A.4 Audio I/O Pinout

The connection for line-in, line-out, and auxiliary-in are made through the audio I/O connector. Figure A–4 shows the pinout for this 8-pin mini-DIN connector.

Figure A–4. Audio I/O Connector
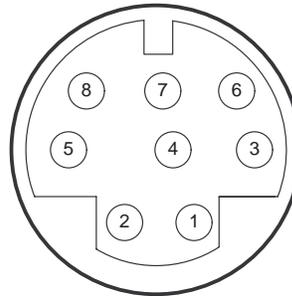
Legend: Pin 1 = Right out
Pin 2 = Left out
Pin 3 = Right AUX 1 in
Pin 4 = Left AUX 1 in
Pin 5 = AGND
Pin 6 = AGND
Pin 7 = Right line in
Pin 8 = Left line in

Glossary

A

administrative privileges: Authority to set software and hardware access. Includes access and privileges to install, manage, and maintain system and application software and directories on a network server or individual computer systems.

API: *Application programming interface.* Used for proprietary application programs to interact with communications software or to conform to protocols from another vendor's product.

architecture: The software or hardware structure of all or part of a computer system. Includes all the detailed components of the system.

audio breakout cable: A cable that connects the SDB to audio input and output peripherals. It contains standard RCA jacks for stereo line-out, line-in, and auxiliary-in.

B

BPP: *Bits per pixel.* The number of bits used to represent the color value of each pixel in a digitized image.

breakpoint: A user-selectable point in code that instructs the debugger to stop executing when that instruction is reached.

C

codec: *Coder-decoder*, or *compression/decompression*, typically of video or audio data.

chrominance: The NTSC or PAL video signal contains two pieces that make up what you see on the screen: the black and white part (luminance) and the color part. Chrominance is the color part and is also called chroma. See also *luminance*.

COFF: *Common object file format.* A file format used by the TMS320C8x for compiler and linker output files. A COFF file is organized into sections by the compiler.

command-line interface: A method of communicating with a computer's operating system in which you type commands from a defined set into a specific location on the monitor display. Command-based systems are usually programmable.

composite video display: A display that receives all encoded video information in one signal. This information can include color, horizontal synchronization, vertical synchronization, or other information normally required by the NTSC for televisions and video tape recorders. See also *NTSC*.

connector: A hardware coupler that joins or connects a cable to a peripheral device for electronic communication. The SDB has four connectors that connect cables from input/output peripherals to the board.

CPU: *Central processing unit.*

D

debugger: A window-oriented software interface that helps you to detect and fix errors in programs running on a 'C8x.

device driver: Software that enables computer hardware to communicate with a device. A device driver may also translate data and call other drivers to actually send data to a device. The SDB uses a device driver for Windows NT to ensure communication between the host and the SDB.

digital signal processor: See *DSP*.

DIN: *Deutsch Industrie Norm.* Germany's national standards organization that controls specifications for a system of plugs, cables, and sockets used for audio signaling equipment. See also *mini-DIN connector*.

DIN connector: A type of connector that is in accordance with the German national standard organization (Deutsch Industrie Norm - DIN) and is sometimes used in computer and audio connections. The most common is the PC keyboard connector.

DRAM: *Dynamic random access memory.* Memory typically used for external memory. A special memory circuit that is dynamic in nature; it requires each bit of information to be refreshed, or restored to its programmed state, on a periodic basis to maintain valid data.

driver: See *device driver*.

DSP: A processor used for high speed data manipulations of audio, video, graphical, or image information.

E

emulator: A debugging tool that is external to the target system and that provides direct control over the processor that is in the target system.

environment variable: A special system symbol that the debugger uses for finding directories or obtaining debugger options.

G

graphics output monitor cable: The cable provided by a monitor manufacturer that connects a VGA source to the monitor.

ground strap: A strip of conductive material attached at one end to earth ground and at the other to a person or an object so that static electricity can dissipate to ground and bypass electronic circuitry. Typically used by people when they are handling discrete electronic components or assemblies that are sensitive to static electricity.

GUI: *Graphical user interface.* A screen format that provides windows, menus, dialog boxes, icons, lists, and options that allow you to start a program or perform a task by pointing to a pictorial representation, selecting an item using a mouse, or using a keyboard.

H

horizontal sync: The portion of the composite video signal that tells the receiver where to place the image in the left-to-right dimension. The horizontal sync pulse tells the receiving system where the beginning of the new scan line is. See also *vertical sync*.

I

IEEE 1149.1 standard: "IEEE Standard Test Access Port and Boundary-Scan Architecture", first released in 1990. See also *JTAG*.

interrupt: A signal sent by hardware or software to a processor requesting attention. An interrupt tells the processor to suspend its current operation, save the current task status, and perform a particular set of instructions. Interrupts communicate with the operating system and prioritize tasks to be performed.

J

JTAG: *Joint Test Action Group.* The Joint Test Action Group was formed in 1985 to develop economical test methodologies for systems designed around complex integrated circuits and assembled with surface-mount technologies. The group drafted a standard that was subsequently adopted by IEEE as IEEE Standard 1149.1-1990, "IEEE Standard Test Access Port and Boundary-Scan Architecture".

K

kernel: The core portion of the operating system that manages memory, files, and peripheral devices. It also starts applications, allocates resources, and maintains time and date.

kHz: *Kilohertz.*

L

luminance: The NTSC or PAL video signal contains two pieces that make up what you see on the screen: the black and white part and the color part (chrominance). The black and white part is called the luminance and is also called luma. See also *chrominance*.

M

memory map: A graphical representation of a computer system's memory, showing the locations of program space, data space, reserved space, and other memory-resident elements.

MHz: *Megahertz.*

mini-DIN connector: A connector that is similar to a DIN connector (only much smaller) using multiple pins in accordance with the German national standard organization (Deutsch Industrie Norm - DIN). Two 8-pin mini-DIN connectors are used on the SDB to connect input/output peripherals.

motherboard: The main circuit board that contains the processor, main memory, circuitry, bus controller, connectors, and primary components of the computer. The TMS320C8x SDB is connected to the motherboard via the PCI local bus. Depending upon the computer system design, daughter boards, expansion boards, input/output boards, other boards, or additional memory may also be connected to the motherboard using the bus controller.

multisync monitor: A monitor that adjusts itself to the horizontal and vertical synchronization rate of the video signal. A multisync monitor can be used with a variety of video adapters.

N

NTSC: *National Television Standards Committee.* A color television broadcast standard wherein the image consists of a format that has 525 scan lines; a field frequency of 60 Hz; a broadcast bandwidth of 4 MHz; a line frequency of 15.75 kHz; a frame frequency of one-thirtieth of a second; and a color subcarrier frequency of 3.58 MHz. See also *PAL*.

P

PAL: *Phase alternation line.* A European deviation of the standard U.S. television NTSC signal.

PC: *Personal computer.*

PCA: *Printed-circuit assembly.* A printed-circuit board on which separately manufactured component parts have been installed in an electrical circuit that performs a defined function.

PCI: *Peripheral component interconnect.* High-speed local bus that supports data-transfer speeds of up to 132M bytes per second at 33 MHz.

peripheral cable: A cable that is used to connect a peripheral to the SDB. Peripheral cables for the SDB include the VGA pass-through cable, graphics output monitor cable, S-VHS-to-RCA adapter cable, and audio breakout cable.

parallel processor: See *PP*.

PP: *Parallel processor.* The 'C8x's advanced digital signal processor that is used for video compression/decompression (P×64 or MPEG), still-image compression/decompression (JPEG), 2-D and 3-D graphic functions such as line draw, trapezoid fill, antialiasing, and a variety of high-speed integer operation on image data. A 'C8x single-chip multiprocessor device may contain from one to eight PPs, depending on the device version.

processor: The central processing unit or microprocessor of the computer. In most instances, it refers to one or more chips that form the core brain of the computer.

R

RCA connector: A connector used for attaching audio and video devices such as stereo equipment or a composite video monitor to a computer's video adapter.

RCA jack: The female portion of an RCA connector usually located on audio or video equipment.

real-time processing: The mechanisms required for ensuring that operations on a computer system are completed within strict time intervals.

register: A small area of high speed memory, located within a processor or electronic device, that is used for temporarily storing data or instructions. Each register is given a name, contains a few bytes of information, and is referenced by programs.

refresh rate: The speed with which a video source redisplays the screen.

S

S-VHS: *Super VHS (vertical helical scan).* Similar to the VHS video recording standard, except that the chrominance and luminance data are treated as components that provide higher quality video.

S-VHS-to-RCA adapter cable: A cable provided by TI that connects a video source to the SDB.

script: A file that contains a set of shell commands.

SDB: *TMS320C8x software development board*.

sync: A synchronization signal that tells the display where to put the picture. See also *horizontal sync* and *vertical sync*.

T

TMS320C8x: The digital signal processor (DSP) created by Texas Instruments and used as the primary component (processor chip) of the TMS320C8x development board.

V

vertical sync: A bidirectional vertical timing signal occurring once per frame with a pulse duration defined as an integral number of lines (halflines for interlaced mode). The portion of the composite video signal that tells the receiver where the top of the picture is. See also *horizontal sync*.

VGA: *Video graphics array.*

VGA pass-through cable: A cable provided by TI as part of the TMS320C8x SDB kit or package. The cable connects the output of a standard VGA graphics board to the VGA pass-through connector of the SDB.

video digitizer: A device that converts an analog video signal to a digital representation.

VIP: *Video interface palette.* Used to convert digital RGB (red-green-blue) information to analog signals that drive a display.

VRAM: *Video random access memory.* A portion of the microprocessor's memory address space reserved for the temporary storage of video data before it is sent to the display monitor. A type of dynamic read access memory that lets the video circuitry serially access the memory bit by bit. VRAM has separate pins for the processor and video circuitry and is used in high-speed video applications.

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