Data General
Data General Corporation, Westboro, Massachusetts 01580

Customer Documentation

Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems

Printed in the United States of America
Rev. 01, September 1992
Ordering No. 014–002163

014–002163–01

Notice

Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems
014–002163–01

Revision History:

Original Release – August 1992
First Revision – September 1992

A vertical bar in the margin of a page indicates substantive technical change, addition, or deletion from the previous revision.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense. Testing was done with shielded cables. Therefore, in order to comply with the FCC regulations, you must use shielded cables with your installation.

WARNING

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus”, ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe (A) prescrites dans la norme sur le matériel brouilleur : “Appareils Numériques”, NMB-003 édictée par le ministre des Communications.

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）
で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制
協議会（ＶＣＣＩ）基準に適合しております。従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。取扱説明書に従って正しい取り扱いをして下さい。

About This Manual

This manual explains how to install and configure the Model 7430 VME SCSI-2 Adapter (VSA) in your AViiON® system. Use the information here in conjunction with the manual *Setting Up and Installing VMEbus Options in AViiON® Systems* and the installation manual for your AViiON computer.

Occasionally, you may need to refer to the configuration information for the VSA board. We suggest that you place this manual in the back of the binder that contains the manuals noted above.

Organization of This Manual

We have organized this manual into the following major sections:

The VME SCSI-2 Adapter (VSA) – Introduces the VSA board.

Overview of the Installation Procedure – Lists the steps required for configuring, installing, and cabling the VSA adapter, and lists the tools and other materials you will need to complete the installation.

Setting Jumpers – Explains how to set the board jumpers for addressing, bus request level, and interrupt level if you want values other than the defaults.

Selecting Single-Ended or Differential SCSI Bus Operation – Describes how to change the orientation of the VSA adapter's two daughter boards to select single-ended or differential operation.

Installing the VSA Board – Directs you to the appropriate manual for information on installing VMEbus option boards.

Connecting Devices to the VSA Board – Describes how to connect device cables to your VSA board and shows pin assignments.

Programming the VSA Board – Contains information you will need if you want to program the VSA board.

Related Manuals

Along with your computer system manual, you will also need the following manual:

Setting Up and Installing VMEbus Options in AViiON® Systems (014–001867)
For AViiON systems with no more than two VME option slots, this manual describes how to add and replace optional controllers and adapters that communicate with the AViiON system's CPU over a VMEbus.

You might also find the following manuals helpful:

NCR 53C710 SCSI I/O Processor Data Manual
Available from NCR, this manual describes the SCSI processor and its registers.

NCR 53C710 SCSI I/O Processor Programming Guide
Available from NCR, this manual describes how to program and use the SCSI SCRIPTS machine language to control SCSI and DMA sequences.

Contacting Data General

Data General wants to assist you in any way it can to help you use its products. Please feel free to contact the company as outlined below.

Manuals

If you require additional manuals, please use the enclosed TIPS order form (United States only) or contact your local Data General sales representative.

Telephone Assistance

If you are unable to solve a problem using any manual you received with your system, free telephone assistance is available with your hardware warranty and with most Data General software service options. If you are within the United States or Canada, contact the Data General Customer Support Center (CSC) by calling 1–800–DG–HELPS. Lines are open from 8:00 a.m. to 5:00 p.m., your time, Monday through Friday. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

For telephone assistance outside the United States or Canada, ask your Data General sales representative for the appropriate telephone number.

Joining Our Users Group

Please consider joining the largest independent organization of Data General users, the North American Data General Users Group (NADGUG). In addition to making valuable contacts, members receive *FOCUS* monthly magazine, a conference discount, access to the Software Library and Electronic Bulletin Board, an annual Member Directory, Regional and Special Interest Groups, and much more. For more information about membership in the North American Data General Users Group, call 1–800–253–3902 or 1–508–443–3330.

Contents

Tables

Table

Figures

Figure

The VME SCSI-2 Adapter (VSA)

The VME SCSI-2 adapter (VSA) is a dual-channel controller; it provides a VMEbus interface for two second-generation SCSI controllers. You can configure each SCSI port independently for single-ended or differential operation simply by changing the orientation of its small daughter board on the VSA board.

NOTE: Other documentation sometimes refers to the VSA and other SCSI host adapters as *host-bus adapters* (*HBAs*) or simply *host adapters*.

Figure 1 shows the VSA board.

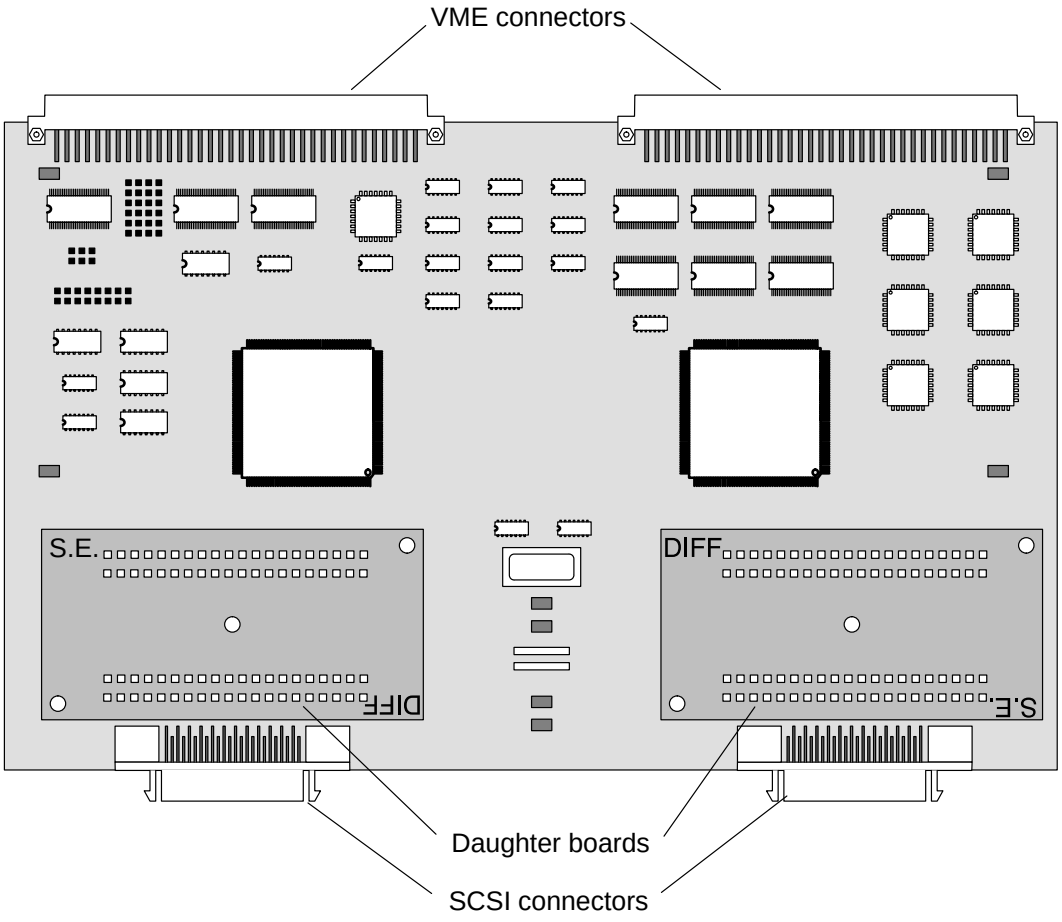

Figure 1 The VME SCSI-2 Adapter (VSA)

Overview of the Installation Procedure

Installing the VSA board consists of the following steps:

1. Unpack the VSA board.
2. Set up an ESD kit.
3. Set jumpers, if necessary.
4. Orient daughter boards for single-ended or differential operation.
5. Install the VSA board into your computer.
6. Connect cables from the VSA board to peripheral devices.

Before You Begin

Before beginning the installation, be sure to verify your planned configuration as described in *Setting Up and Installing VMEbus Options in AViiON® Systems* and the installation manual for your computer. When you calculate the amount of current drawn from your system power supply, use 5.0 amperes as the nominal value of +5 volts dc current required by the VSA. You do not need to consider any –5, +12, –12, or +9 V dc current.

You should carefully consider slot priority and the possible need to jumper backplane slots *before* you install a new VSA board. We recommend that you assign the VSA board the lowest available slot priority.

Also be sure to read the instructions for avoiding electrostatic discharge (ESD) damage in this section before installing the board.

Tools and Materials

You will need the following tools and materials to complete the installation of your VSA board:

- Electrostatic Discharge (ESD) kit
- Nonmagnetic needlenose pliers

Avoiding Electrostatic Discharge (ESD) Damage

The cover(s) and filler panel(s) installed on your equipment protect the electronic circuits inside the equipment from electrostatic discharge (ESD) damage. However, when you remove these covers and filler panels to replace or install subassemblies, you can inadvertently damage the sensitive electronic circuits in the equipment by simply touching them. Electrostatic charge that has accumulated on your body discharges through the circuits. If the air in the work area is very dry, running a humidifier in the work area will help decrease the risk of ESD damage. You must follow the procedures below to prevent damage to the equipment.

CAUTION: Read and understand the following instructions before you remove the cover(s) or panel(s) from the equipment.

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials or materials that naturally build up electrostatic charge, such as foam packaging, foam cups, cellophane wrappers, and similar materials.
- Do not remove replacement or upgrade subassemblies from their antistatic packaging until the exact moment that you are ready to install them.
- Gather the tools, manuals, an ESD kit, and all other materials you will need before you remove covers and panels from the equipment. Procedures for removing subassemblies usually list required materials at the beginning. After you remove a cover or panel, you should avoid moving away from the work site; otherwise, you may build up an electrostatic charge.
- Use an ESD kit when handling circuit boards or when touching the electronic circuits inside the equipment. If you don't have an ESD kit, you can order one from Data General. If an emergency arises and an ESD kit is not available, follow the procedures in the "Emergency Procedures (without an ESD kit)" section.
- Replace the cover(s) or panel(s) on the equipment as soon as possible so that the electronic circuits are protected.
- If the equipment has an opening for an optional device (such as a mass-storage drive), and the device is not installed, make sure a filler panel is installed in the opening before connecting the equipment to the ac power outlet.

Emergency Procedures (without an ESD kit)

In an *emergency* when an ESD kit is not available, use the following procedures to reduce the possibility of an electrostatic discharge by ensuring that your body and the subassembly are at the same electrostatic potential.

CAUTION: These procedures are not a substitute for the use of an ESD kit. Follow them only in the event of an emergency.

- Before touching any electronic circuits or boards inside the equipment, firmly touch a bare (unpainted) metal surface of the equipment.
- Before removing any replacement or upgrade subassembly from its antistatic bag, place one hand firmly on an unpainted metal surface of the chassis, and at the same time, pick up the replacement or upgrade subassembly while it is still sealed in the antistatic bag. Once you have done this, *do not* move around the room or contact other furnishings, personnel, or surfaces until you have installed and *secured* the subassembly in the equipment.
- Remove the subassembly from the antistatic bag, handling printed circuit boards by the edges. Avoid touching components and circuits on a printed circuit board.
- If you must move around the room or touch other surfaces before securing the subassembly in the equipment, first place the subassembly back in the antistatic bag. When you are ready again to install the subassembly repeat these procedures.
- Order an ESD kit from Data General for the next time you need to add or remove a cover or panel.

Setting Jumpers

This section explains how to set jumpers to select addressing, bus request level, and VMEbus interrupt level. You need to set these jumpers only if you want values other than the defaults.

Installing Jumpers

Jumpers, or jumper plugs, are small removable plastic posts that contain wire circuit connectors. *Jumper pins* are rows of small metal posts sticking out from the board surface. Figure 2 shows a row of jumper pins, some jumpered and some unjumpered.

CAUTION: You could ruin the entire board by bending or breaking these delicate pins; excercise extreme care when installing or removing jumper plugs.

To install or remove jumpers from a printed-circuit board, follow these steps *after* you set up an ESD kit:

1. Remove the device from its antistatic bag and place it, component side up, on a static-free surface. Do not touch the electronic components on the board; handle printed-circuit boards by the edges only.
2. Determine the location of the jumper(s) you need to change.
3. Use needlenose pliers to carefully pull the proper jumper(s) *straight up* and off the pin. Do not pull the plug from side to side, twist it, or otherwise risk bending or breaking the pins.

   Use needlenose pliers to carefully align and start pushing jumpers *straight* onto the proper pins; then push the jumper completely onto the pins with your finger, if necessary. You should not need to force a jumper onto the board if you install the proper jumper in the right location.

Figure 2 illustrates how to install and remove jumpers from a typical row of pins.

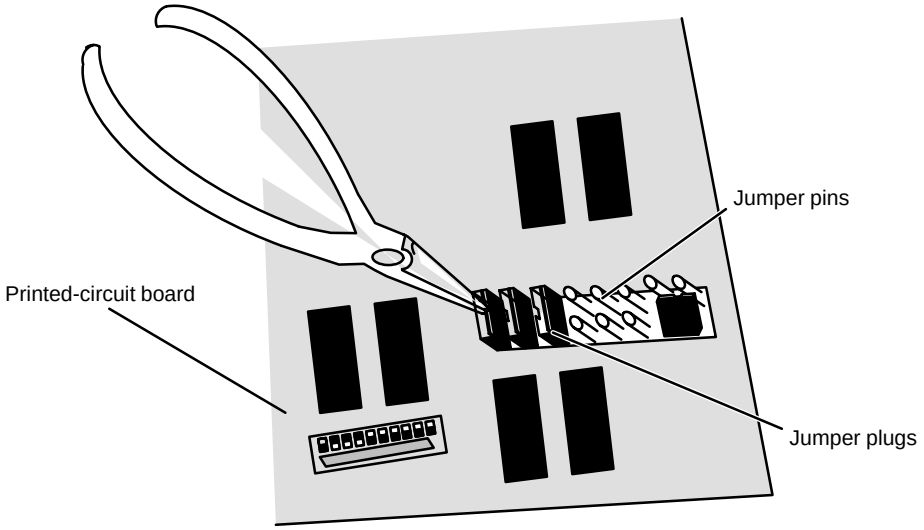

Figure 2 Removing or Installing Jumper Plugs

Board Addressing

You can jumper the VSA board to respond to any 256-byte address range in the VME A16 space. It contains two independent channels, each of which occupies 128 bytes of the selected range. Each channel is treated as a separate controller. Channels 0 and 1 are on the first board (Board 0), channels 2 and 3 on the second (Board 1), and so on. The default is Board 0 (channels 0 and 1).

Figure 3 shows the location of the address jumpers on the VSA board and how to set them.

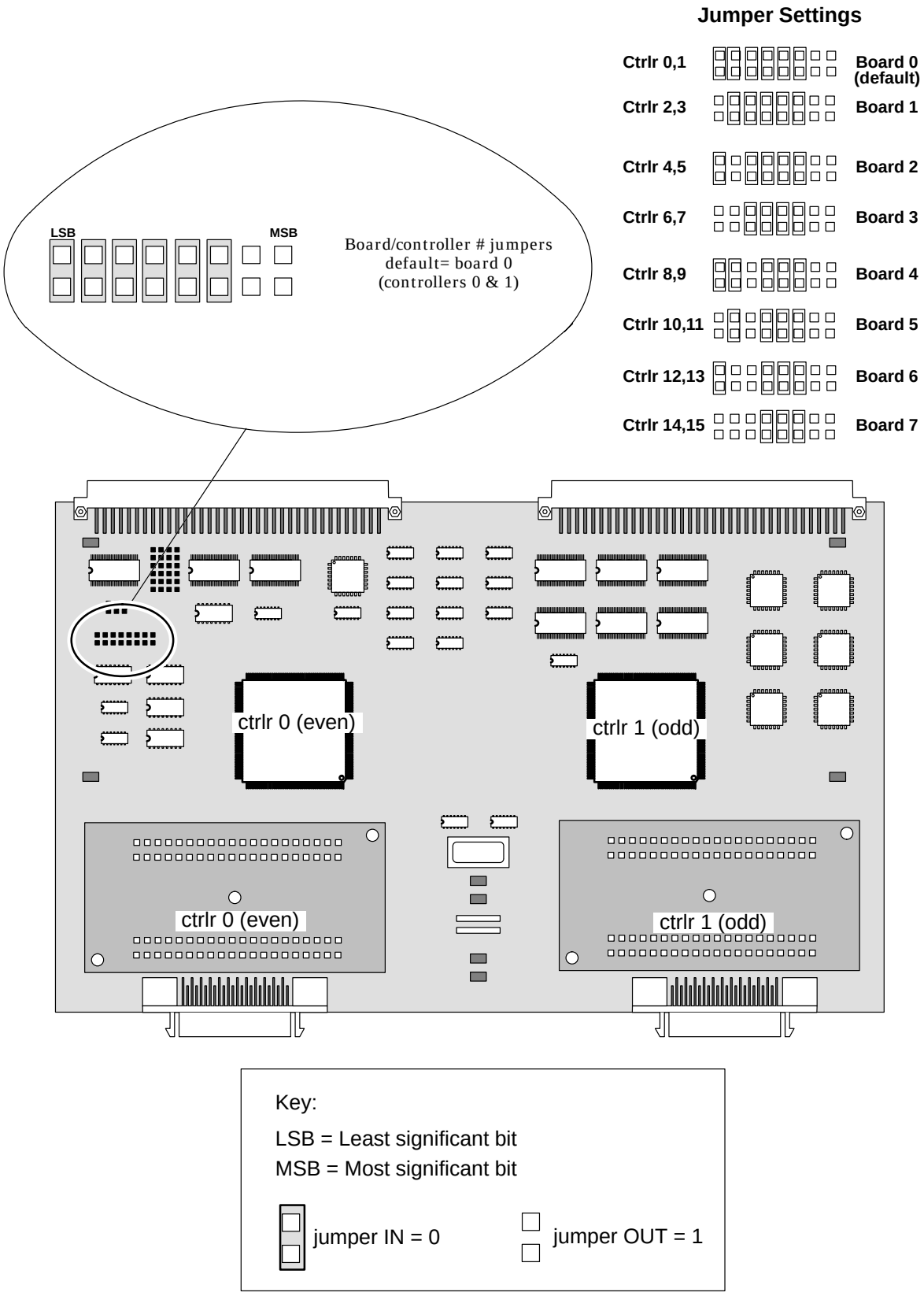

Figure 3 Setting Address Jumpers

Bus Request Level Jumpering

The bus request level is jumperable from 0 to 3, with 0 the default. The level you select must have its column of three jumpers IN. The other three columns must have the second and third pins in the column jumpered; this manages the bus grant and passes the signal through. Figure 4 shows the default jumper settings and how to set the jumpers for nondefault bus request levels.

VMEbus Interrupt Level Jumpering

The VMEbus interrupt level is jumperable from 1 to 7 (*not* 0), with the default of 2. Figure 4 shows the jumper settings for all seven interrupt levels.

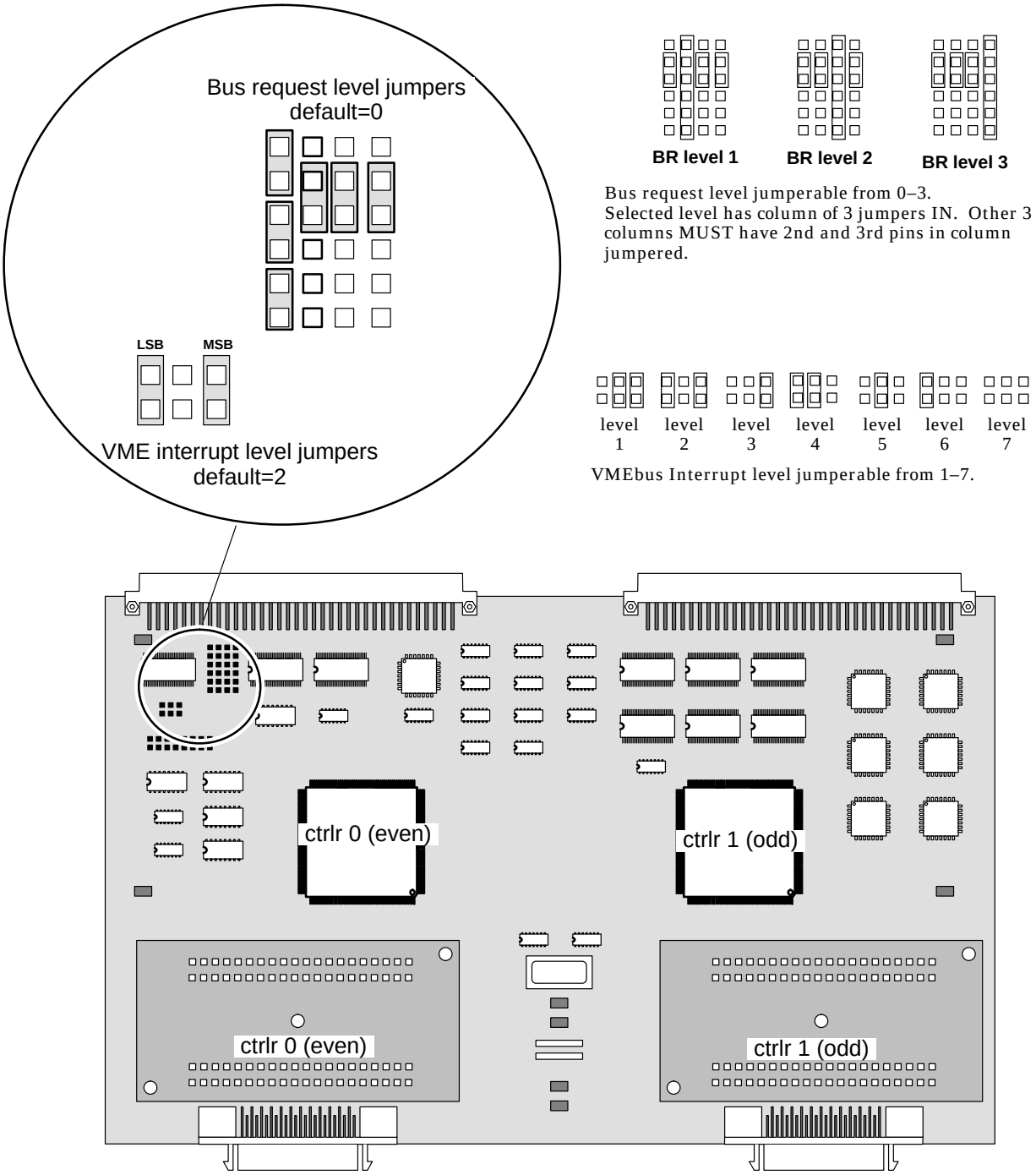

Figure 4 Setting Jumpers for Bus Request Level and VME Interrupt Level

Selecting Single-Ended or Differential SCSI Bus Operation

You can independently configure each SCSI port on your VSA board for either single-ended or differential operation by changing the orientation of a small daughter board. The default is single-ended; you will need differential only if you will use differential SCSI devices. Your SCSI ports might already be configured as you need them, but if you must change one or both, this section explains how.

Determining the Board's Current Orientation

If you received your VSA board factory-installed in your AViiON® computer, it should be configured as you need it. The board has a tag attached to one of its handles, on which the orientation of the ports is labeled at the factory (see Figure 5). Each SCSI port will be labeled S.E. (for single-ended) or DIFF (for differential), so you will not have to remove the VSA board to determine the orientation of the daughter boards.

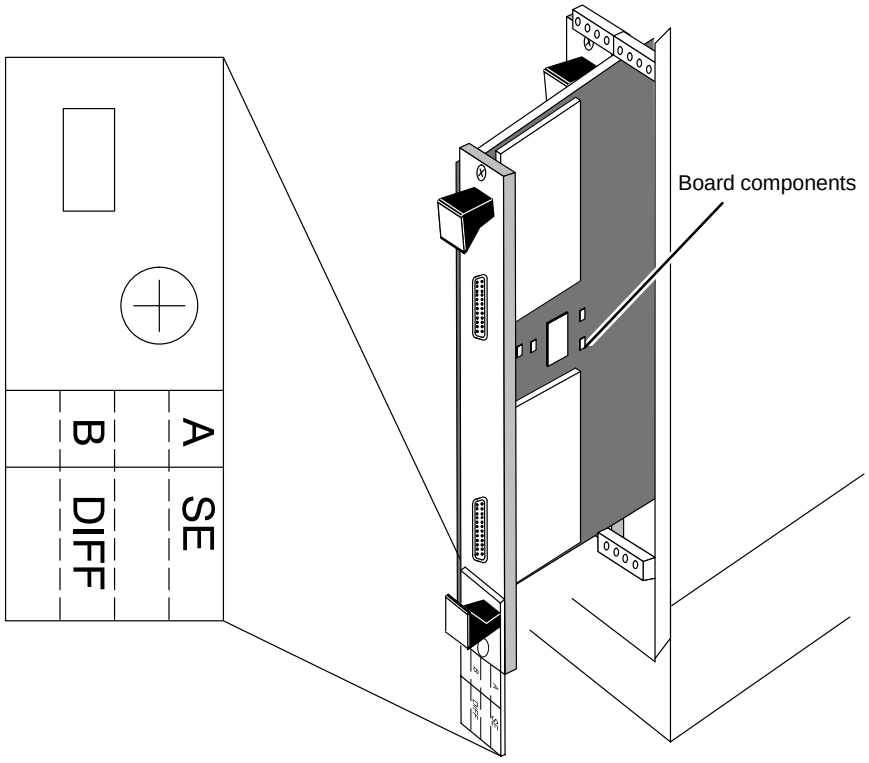

Figure 5 Labeled SCSI Ports

NOTE: Figure 5 is accurate only for customer-installable AViiON systems with no more than two 6U VME option slots. The instructions in this manual that deal with installing and/or removing the VSA board do not apply to systems in which the VSA board mounts in a 6U-to-9U adapter before installation.

If you must install the VSA board yourself, or if the daughter boards are not oriented the way you need them, you will have to position the daughter boards and fill in the label yourself. Each daughter board has the abbreviations S.E. and DIFF silk-screened onto opposite corners. The corner that is adjacent to the SCSI connector shows which way the board is oriented. For example, Figure 6 shows one daughter board positioned for single-ended operation and one positioned for differential.

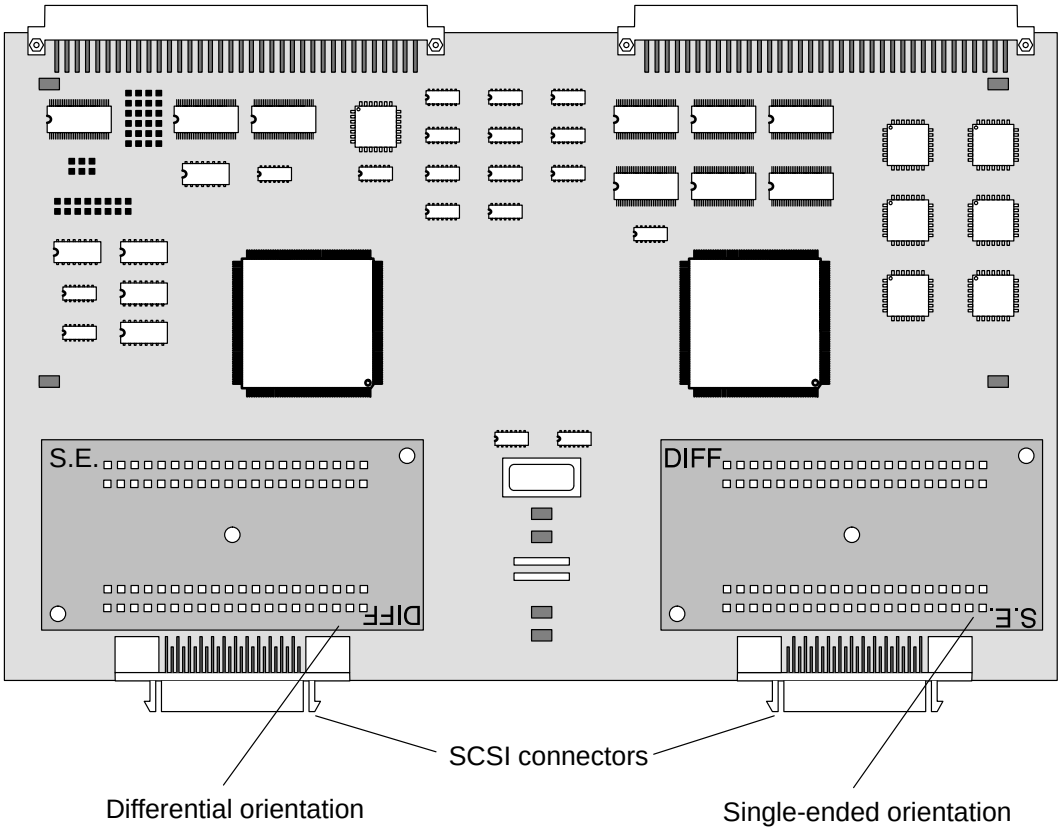

Figure 6 VSA Board with Daughter Boards Oriented for Differential and Single-Ended Operation

Changing the Orientation of a Daughter Board

To change the orientation of a daughter board from single-ended to differential or vice-versa, follow these steps:

1. Read the instructions on avoiding ESD damage, earlier in this document, and set up an ESD kit.
2. Using your fingers under the edges of the daughter board, and being careful not to bend the pins on the underside of the board, carefully pry up one side of the board just until it comes loose.
3. Again using your fingers, pry up the other side of the daughter board until it comes loose.
4. Lift the daughter board from the mother board and rotate it 180°, so that the corner reading S.E. or DIFF, whichever orientation you want, is closest to the SCSI connector.
5. Carefully align the pins on the daughter board with the connectors on the mother board, as shown in Figure 7.

   NOTE: Before proceeding to step 6, carefully inspect the boards from all sides to be sure that the pins are aligned correctly.

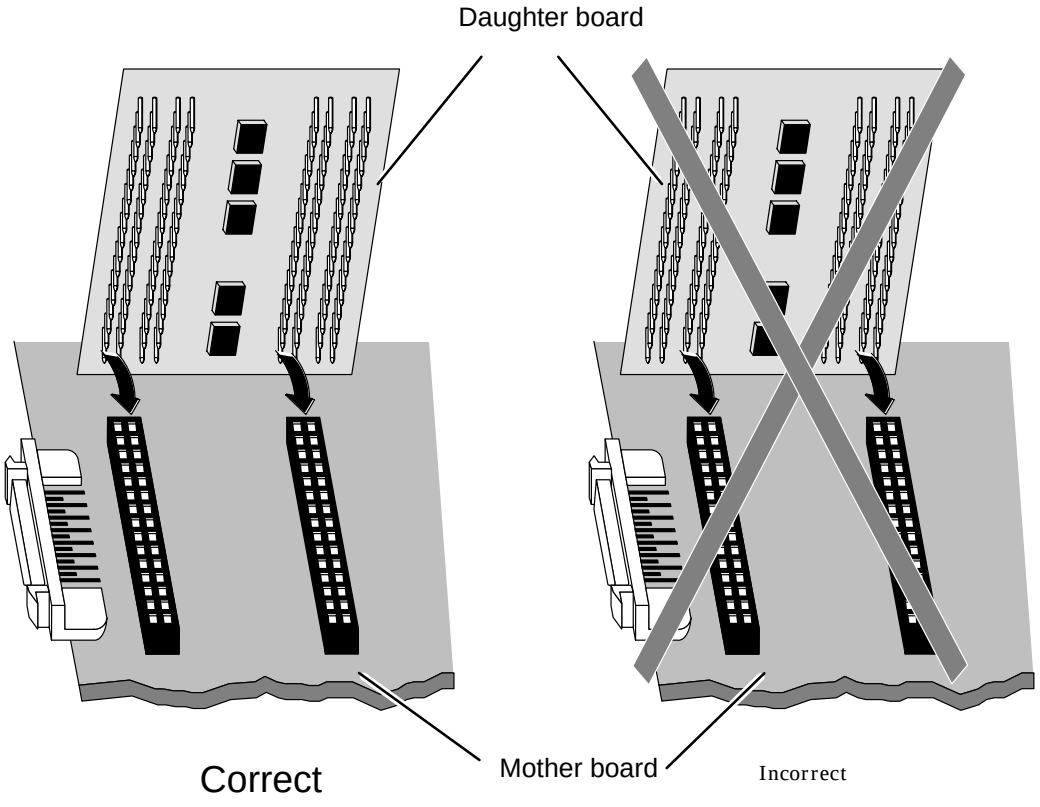

Figure 7 Positioning the Daughter Board for Reattachment

6. Press down both sides of the daughter board to connect the rows of pins on each side to the connectors on the mother board.

Installing the VSA Board

WARNING: Data General Corporation does not recommend or support customer installation or maintenance of some AViiON® systems. Refer to your Data General sales and field engineering contracts for information regarding Data General warranties before attempting to configure, install, or remove any system components.

Once you have planned your system configuration and configured your VSA board, you are ready to install it into your AViiON computer. The manual *Setting Up and Installing VMEbus Options in AViiON® Systems*, used in conjunction with your computer setup and installation manual, provides complete installation information for AViiON systems with no more than two 6U VME option slots.

Since the VSA three-board assembly is wider than most VMEbus option boards, take particular care when inserting the VSA into the VME card cage.

CAUTION: Be sure to read and follow the instructions in the section "Avoiding Electrostatic Discharge (ESD) Damage" near the beginning of this manual before starting the installation.

Connecting Devices to the VSA Board

Once you have installed the VSA board into your computer, you need to connect the cables to your SCSI peripherals. The SCSI cables you use are specific to the VSA board; they have a 50-pin high-density connector that plugs into a SCSI connector on the VSA board, and a 50-pin connector that connects to your peripheral device at the other end.

The SCSI cable is available in several lengths. Table 1 lists the cable model (ordering) numbers, part numbers, and lengths for use with AViiON systems that have no more than two 6U VME option slots. Check the 005 part number on the label of each of your cables to be sure you have the right cables.

NOTE: For single-ended operation, you must use a 5-ft or 10-ft cable. You can use any of the listed cables for differential operation.

Table 1 VSA Device Cables

Model No.	Part No.	Length (ft)
15396E005	005–039718	5
15396E010	005–039719	10
15396E020	005–039720	20
15396E040	005–039721	40

To attach the cable, press the 50-pin high-density connector end onto the appropriate SCSI connector on the VSA board (see Figure 8), and turn the thumbscrews clockwise to tighten.

CAUTION: Do not connect a differential device to a VSA daughter board oriented for single-ended operation, or vice-versa.

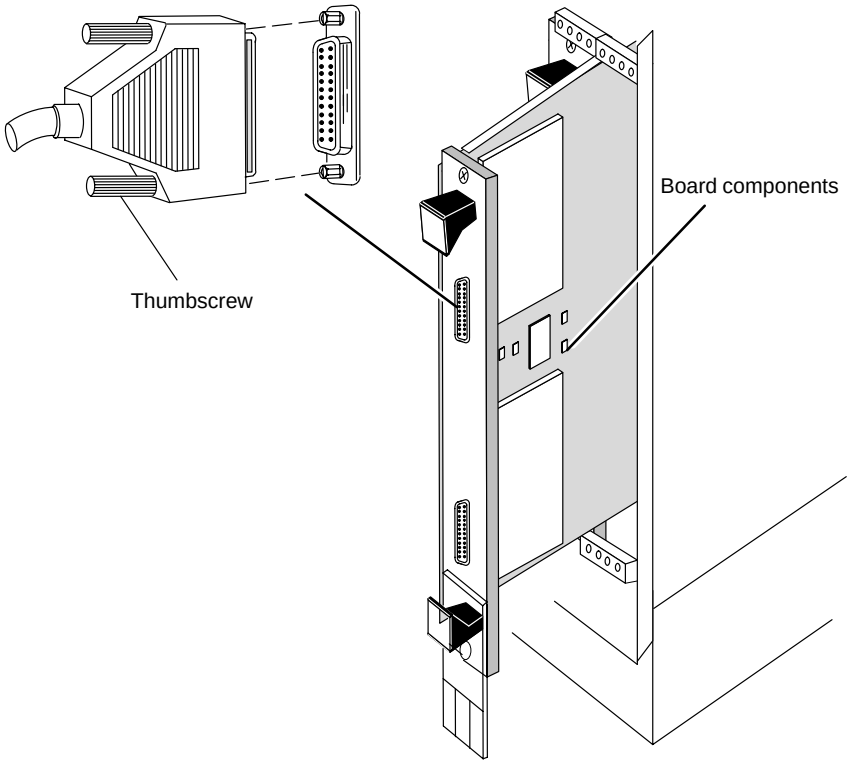

Figure 8 Cabling the VSA Board

Plug the other end of the cable into your peripheral device as described in the documentation you received with the device.

SCSI Bus Connector

Figure 9 pictures a SCSI bus 50-pin high-density connector of the type located on the VSA board. Tables 2 and 3 list the signals and pin numbers for these connectors for single-ended and differential operation, respectively.

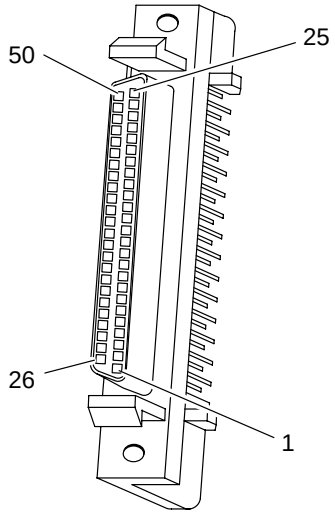

Figure 9 VSA SCSI Connector (Female)

Table 2 VSA SCSI Connector Signals – Single-Ended Interface

Pin	Signal
26	Data Bus 0 (DB0)
27	Data Bus 1
28	Data Bus 2
29	Data Bus 3
30	Data Bus 4
31	Data Bus 5
32	Data Bus 6
33	Data Bus 7
34	Data Bus P
35	Ground (GND)
36	Ground
37	Ground
38	Termination Power (TERMPWR)
39	Ground
40	Ground
41	Attention (ATN)
42	Ground
43	Busy (BSY)
44	Acknowledge (ACK)
45	Reset (RST)
46	Message (MSG)
47	Select (SEL)
48	Control/Data (C/D)
49	Request (REQ)
50	Input/Output (I/O)

NOTE: For single-ended SCSI connectors, pins 1 through 12 and 14 through 25 are connected to ground. Pin 13 is left open.

Table 3 VSA SCSI Connector Signals – Differential Interface

Pin	Signal	Pin	Signal
1	Shield	26	GND
2	DB0+	27	DB0–
3	DB1+	28	DB1–
4	DB2+	29	DB2–
5	DB3+	30	DB3–
6	DB4+	31	DB4–
7	DB5+	32	DB5–
8	DB6+	33	DB6–
9	DB7+	34	DB7–
10	DBP+	35	DBP–
11	DIFFSENS	36	GND
12	GND	37	GND
13	TERMPWR	38	TERMPWR
14	GND	39	GND
15	ATN+	40	ATN–
16	GND	41	GND
17	BSY+	42	BSY–
18	ACK+	43	ACK–
19	RST+	44	RST–
20	MSG+	45	MSG–
21	SEL+	46	SEL–
22	C/D+	47	C/D–
23	REQ+	48	REQ–
24	I/O+	49	I/O–
25	GND	50	GND

Programming the VSA Board

The SCSI interface, which communicates with mass-storage devices and other peripherals, has an NCR 53C710 SCSI I/O processor. To program your VSA board, use the information in this section along with the following manuals from NCR:

- *NCR 53C710 SCSI I/O Processor Data Manual*

  Describes the SCSI processor and its registers.

- *NCR 53C710 SCSI I/O Processor Programming Guide*

  Describes how to program and use the SCSI SCRIPTS machine language to control SCSI and DMA sequences.

Addressing

You can jumper the VSA board to respond to any 256-byte address range in the VME A16 space. It contains two independent channels, each of which occupies 128 bytes of the selected range. Each channel is treated as a separate controller.

Table 4 lists the VME controller addresses, interrupt level, and interrupt vectors for systems running the DG/UX™ system. Note that channels 0 and 1 are on the first board, 2 and 3 on the second, and so on.

Table 4 VME Controller Addresses, Interrupt Levels, and Interrupt Vectors

DG/UX Device Mnemonic	Base Address	Interrupt Level	Interrupt Vector
dgsc(0)	0xFFFFC000	2	0x30
dgsc(1)	0xFFFFC080	2	0x31
dgsc(2)	0xFFFFC100	2	0x32
dgsc(3)	0xFFFFC180	2	0x33
dgsc(4)	0xFFFFC200	2	0x34
dgsc(5)	0xFFFFC280	2	0x35
dgsc(6)	0xFFFFC300	2	0x36
dgsc(7)	0xFFFFC380	2	0x37
dgsc(8)	0xFFFFC400	2	0x38
dgsc(9)	0xFFFFC480	2	0x39
dgsc(A)	0xFFFFC500	2	0x3A
dgsc(B)	0xFFFFC580	2	0x3B
dgsc(C)	0xFFFFC600	2	0x3C
dgsc(D)	0xFFFFC680	2	0x3D
dgsc(E)	0xFFFFC700	2	0x3E
dgsc(F)	0xFFFFC780	2	0x3F

SCSI Byte Swapping

The 128-byte address space for each controller is divided into 64 bytes corresponding to the register space of the NCR 53C710, 4 bytes for vector initialization and status, and 60 reserved bytes. Table 5 shows the locations of the registers within the NCR 53C710 SCSI controller. Table 6 illustrates the correct way to access the 53C710 registers from your AViiON host. Note that to correctly access and interpret the 53C710 registers as 32-bit quantities, you must swap bytes. Refer to the NCR manuals listed earlier for descriptions of the registers.

Table 5 NCR 53C710 Address Map

Address Offset	VMED[31–24]	VMED[23–16]	VMED[15–8]	VMED[7–0]
00	SIEN	SDID	SCNTL1	SCNTL0
04	SOCL	SODL	SXFER	SCID
08	SBCL	SBDL	SIDL	SFBR
0C	SSTAT2	SSTAT1	SSTAT0	DSTAT
10	DSA HI	DSA MID–HI	DSA MID–LO	DSA LO
14	CTEST3	CTEST2	CTEST1	CTEST0
18	CTEST7	CTEST6	CTEST5	CTEST4
1C	TEMP HI	TEMP MID–HI	TEMP MID–LO	TEMP LO
20	LCRC	CTEST8	ISTAT	DFIFO
24	DCMD	DBC HI	DBC MID	DBC LO
28	DNAD HI	DNAD MID–HI	DNAD MID–LO	DNAD LO
2C	DSP HI	DSP MID–HI	DSP MID–LO	DSP LO
30	DSPS HI	DSPS MID–HI	DSPS MID–LO	DSPS LO
34	SCRATCH HI	SCRATCH MID–HI	SCRATCH MID–LO	SCRATCH LO
38	DCNTL	DWT	DIEN	DMODE
3C	ADDER HI	ADDER MID–HI	ADDER MID–LO	ADDER LO

Table 6 VSA SCSI Address Map

Address Offset	VMED[31–24]	VMED[23–16]	VMED[15–8]	VMED[7–0]
00	SCNTL0	SCNTL1	SDID	SIEN
04	SCID	SXFER	SODL	SOCL
08	SFBR	SIDL	SBDL	SBCL
0C	DSTAT	SSTAT0	SSTAT1	SSTAT2
10	DSA LO	DSA MID–LO	DSA MID–HI	DSA HI
14	CTEST0	CTEST1	CTEST2	CTEST3
18	CTEST4	CTEST5	CTEST6	CTEST7
1C	TEMP LO	TEMP MID–LO	TEMP MID–HI	TEMP HI
20	DFIFO	ISTAT	CTEST8	LCRC
24	DBC LO	DBC MID	DBC HI	DCMD
28	DNAD LO	DNAD MID–LO	DNAD MID–HI	DNAD HI
2C	DSP LO	DSP MID–LO	DSP MID–HI	DSP HI
30	DSPS LO	DSPS MID–LO	DSPS MID–HI	DSPS HI
34	SCRATCH LO	SCRATCH MID–LO	SCRATCH MID–HI	SCRATCH HI
38	DMODE	DIEN	DWT	DCNTL
3C	ADDER LO	ADDER MID–LO	ADDER MID–HI	ADDER HI

Vector Initialization/Status Register

Offset x40 for each channel is the vector initialization/status register. Write operations to this address from the host place an 8-bit vector value into the vector register for the channel. The host should write the register as a full word, using the format shown in Figure 10.

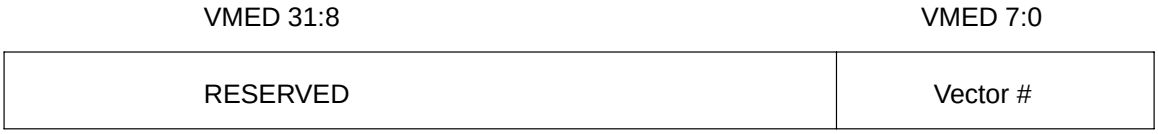

Figure 10 Vector Register

When the host reads from this register, the read operation accesses the channel's external status. The host should read this register as a full word even though only 4 bits are significant. Figure 11 shows the status it returns.

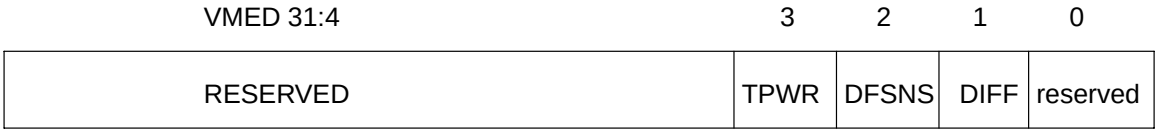

Figure 11 Status Returned on Reads to the Vector Register

The significant bits are as follows:

TPWR

1 = SCSI terminator power fuse is intact and power is available.

0 = SCSI terminator power fuse is blown.

DFSNS

1 = All devices on this SCSI bus are configured for differential operation.

0 = One or more devices are configured for single-ended operation and are colliding on a differential SCSI bus.

NOTE: The DFSNS bit is meaningless unless bit 1 (DIFF) is set to 1. If DFSNS is clear, then both 53C710 controllers on the board will be held in reset.

DIFF

1 = Channel's daughter board is configured for differential operation.

0 = Channel's daughter board is configured for single-ended operation.

Reserved

Bit 0 is reserved for future use.

Interrupt Operation

You can set jumpers to select the VME interrupt level for the VSA board. The default is level 2. There are two sources of interrupts on each board, hardware prioritized as follows:

53C710(0)	highest
53C710(1)	lowest

If one or both of these interrupts is pending when the host performs a VME IACK operation to the board's selected interrupt level, the vector that corresponds to the channel with the highest priority pending interrupt will be supplied.

Note that a VME IACK operation will not clear the interrupt. Refer to the *NCR 53C710 SCSI I/O Processor Data Manual* to determine how to clear the 53C710 hardware interrupt.

Parity Options

The VME bus does not provide data parity; you will have to program the controllers if you want to generate and check parity on SCSI data. To do so, program the following bits of the SCSI Control Registers as shown:

SCNTL0 EPC (bit 3) = 1	Enable parity checking
SCNTL0 EPG (bit 2) = 1	Enable parity generation
SCNTL1 AESP (bit 2) = 0	Assert odd SCSI parity

Differential vs. Single-Ended Operation

Before initializing the SCSI chip, you must determine whether the channel is operating in single-ended or differential mode. You can determine this by reading and interpreting the channel's status register. If the channel is configured for differential mode, you must set the "DIFF" bit in Chip Test Register 7 as follows:

CTEST7 DIFF (bit 0) = 1

Data Transfer Speed

If the channel will operate in single-ended mode, the negotiated speed of SCSI data transfer must be lower than for differential operation. When determining data transfer speed, keep in mind that the SCSI clock input for the 53C710 is 40MHz. Use this information when referring to the *NCR 53C710 SCSI I/O Processor Data Manual* to determine how to initialize the SXFER, DCNTL, and SBCL registers. We do not recommend running faster than 5 Mbyte/s on a single-ended SCSI bus; you can select speeds up to 10 Mbyte/s on a differential bus.

Burst Length

You must set the Burst Length bits in the DMA Mode Register (DMODE) to enable 4-word bursts on the VME bus, as follows:

DMODE BL1 (bit 7) = 1
DMODE BL0 (bit 6) = 0

In addition, to enable burst transfers to operate you must set the "CDIS" bit in Chip Test Register 7 as follows:

CTEST7 CDIS (bit 7) = 0

Script Cautions

Any accesses by SCSI scripts executing on a 53C710 to addresses in the range FFFFx400 through FFFFx7FF or FFFFxC00 through FFFFxFFF (where x is any value) may cause unpredictable results.

End of Document

Index

This index lists only the first page number for a reference, even if the text spans multiple pages.

TIPS ORDERING PROCEDURES

TO ORDER

1 An order can be placed with the TIPS group in two ways:

A MAIL ORDER – Use the order form on the opposite page and fill in all requested information. Be sure to include shipping charges and local sales tax. If applicable, write in your tax exempt number in the space provided on the order form.

B Send your order form with payment to:

Data General Corporation
ATTN: Educational Services/TIPS G155
4400 Computer Drive
Westboro, MA 01581–9973

C TELEPHONE – Call TIPS at (508) 870–1600 for all orders that will be charged by credit card or paid for by purchase orders over $50.00. Operators are available from 8:30 AM to 5:00 PM EST.

METHOD OF PAYMENT

2 As a customer, you have several payment options:

A Purchase Order – Minimum of $50. If ordering by mail, a hard copy of the purchase order must accompany order.

B Check or Money Order – Make payable to Data General Corporation. Credit Card – A minimum order of $20 is required for MasterCard or Visa orders.

SHIPPING

3 To determine the charge for UPS shipping and handling, check the total quantity of units in your order and refer to the following chart:

Total Quantity	Shipping & Handling Charge
1–4 Items	$5.00
5–10 Items	$8.00
11–40 Items	$10.00
41–200 Items	$30.00
Over 200 Items	$100.00

If overnight or second day shipment is desired, this information should be indicated on the order form. A separate charge will be determined at time of shipment and added to your bill.

VOLUME DISCOUNTS

4 The TIPS discount schedule is based upon the total value of the order.

Order Amount	Discount
$0–$149.99	0%
$150–$499.99	10%
Over $500	20%

TERMS AND CONDITIONS

5 Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

DELIVERY

6 Allow at least two weeks for delivery.

RETURNS

7 Items ordered through the TIPS catalog may not be returned for credit.

8 Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at (508) 870–1600 to notify the TIPS department of any problems.

INTERNATIONAL ORDERS

9 Customers outside of the United States must obtain documentation from their local Data General Subsidiary or Representative. Any TIPS orders received by Data General U.S. Headquarters will be forwarded to the appropriate DG Subsidiary or Representative for processing.

TIPS ORDER FORM

Mail To: Data General Corporation
Attn: Educational Services/TIPS G155
4400 Computer Drive
Westboro, MA 01581 - 9973

BILL TO:	**SHIP TO:** (No P.O. Boxes - Complete Only If Different Address)
COMPANY NAME_____	COMPANY NAME_____
ATTN:_____	ATTN:_____
ADDRESS_____	ADDRESS (NO PO BOXES)_____
CITY_____	CITY_____
STATE_____ ZIP_____	STATE_____ ZIP_____

Priority Code _____ (See label on back of catalog)

_____ _____ _____ _____ _____
Authorized Signature of Buyer (Agrees to terms & conditions on reverse side) | Title | Date | Phone (Area Code) | Ext.

ORDER #	QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE

A SHIPPING & HANDLING

	ADD
☐ UPS	
1–4 Items	$5.00
5–10 Items	$8.00
11–40 Items	$10.00
41–200 Items	$30.00
200+ Items	$100.00

Check for faster delivery

Additional charge to be determined at time of shipment and added to your bill.

☐ UPS Blue Label (2 day shipping)
☐ Red Label (overnight shipping)

B VOLUME DISCOUNTS

Order Amount	Save
$0–$149.99	0%
$150–$499.99	10%
Over $500.00	20%

Tax Exempt # or Sales Tax (if applicable) _____

ORDER TOTAL	
Less Discount See B	–
SUB TOTAL	
Your local* sales tax	+
Shipping and handling – See A	+
TOTAL – See C	

C PAYMENT METHOD

☐ Purchase Order Attached ($50 minimum)
P.O. number is_____. (Include hardcopy P.O.)
☐ Check or Money Order Enclosed
☐ Visa ☐ MasterCard ($20 minimum on credit cards)

Account Number | Expiration Date

_____
Authorized Signature
(Credit card orders without signature and expiration date cannot be processed.)

THANK YOU FOR YOUR ORDER

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
PLEASE ALLOW 2 WEEKS FOR DELIVERY.
NO REFUNDS NO RETURNS.

* Data General is required by law to collect applicable sales or use tax on all purchases shipped to states where DG maintains a place of business, which covers all 50 states. Please include your local taxes when determining the total value of your order. If you are uncertain about the correct tax amount, please call 508–870–1600.

Form 702
Rev. 8/87

DATA GENERAL CORPORATION
TECHNICAL INFORMATION AND PUBLICATIONS SERVICE

TERMS AND CONDITIONS

Data General Corporation (“DGC”) provides its Technical Information and Publications Service (TIPS) solely in accordance with the following terms and conditions and more specifically to the Customer signing the Educational Services TIPS Order Form. These terms and conditions apply to all orders, telephone, telex, or mail. By accepting these products the Customer accepts and agrees to be bound by these terms and conditions.

1. CUSTOMER CERTIFICATION
Customer hereby certifies that it is the owner or lessee of the DGC equipment and/or licensee/sub–licensee of the software which is the subject matter of the publication(s) ordered hereunder.

2. TAXES
Customer shall be responsible for all taxes, including taxes paid or payable by DGC for products or services supplied under this Agreement, exclusive of taxes based on DGC’s net income, unless Customer provides written proof of exemption.

3. DATA AND PROPRIETARY RIGHTS
Portions of the publications and materials supplied under this Agreement are proprietary and will be so marked. Customer shall abide by such markings. DGC retains for itself exclusively all proprietary rights (including manufacturing rights) in and to all designs, engineering details and other data pertaining to the products described in such publication. Licensed software materials are provided pursuant to the terms and conditions of the Program License Agreement (PLA) between the Customer and DGC and such PLA is made a part of and incorporated into this Agreement by reference. A copyright notice on any data by itself does not constitute or evidence a publication or public disclosure.

4. LIMITED MEDIA WARRANTY
DGC warrants the CLI Macros media, provided by DGC to the Customer under this Agreement, against physical defects for a period of ninety (90) days from the date of shipment by DGC. DGC will replace defective media at no charge to you, provided it is returned postage prepaid to DGC within the ninety (90) day warranty period. This shall be your exclusive remedy and DGC’s sole obligation and liability for defective media. This limited media warranty does not apply if the media has been damaged by accident, abuse or misuse.

5. DISCLAIMER OF WARRANTY
EXCEPT FOR THE LIMITED MEDIA WARRANTY NOTED ABOVE, DGC MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ON ANY OF THE PUBLICATIONS, CLI MACROS OR MATERIALS SUPPLIED HEREUNDER.

6. LIMITATION OF LIABILITY
A. CUSTOMER AGREES THAT DGC’S LIABILITY, IF ANY, FOR DAMAGES, INCLUDING BUT NOT LIMITED TO LIABILITY ARISING OUT OF CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR WARRANTY SHALL NOT EXCEED THE CHARGES PAID BY CUSTOMER FOR THE PARTICULAR PUBLICATION OR CLI MACRO INVOLVED. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO CLAIMS FOR PERSONAL INJURY CAUSED SOLELY BY DGC’S NEGLIGENCE. OTHER THAN THE CHARGES REFERENCED HEREIN, IN NO EVENT SHALL DGC BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS AND DAMAGES RESULTING FROM LOSS OF USE, OR LOST DATA, OR DELIVERY DELAYS, EVEN IF DGC HAS BEEN ADVISED, KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY THEREOF; OR FOR ANY CLAIM BY ANY THIRD PARTY.

B. ANY ACTION AGAINST DGC MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES.

7. GENERAL
A valid contract binding upon DGC will come into being only at the time of DGC’s acceptance of the referenced Educational Services Order Form. Such contract is governed by the laws of the Commonwealth of Massachusetts, excluding its conflict of law rules. Such contract is not assignable. These terms and conditions constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior oral or written communications, agreements and understandings. These terms and conditions shall prevail notwithstanding any different, conflicting or additional terms and conditions which may appear on any order submitted by Customer. DGC hereby rejects all such different, conflicting, or additional terms.

8. IMPORTANT NOTICE REGARDING AOS/VS INTERNALS SERIES (ORDER #1865 & #1875)
Customer understands that information and material presented in the AOS/VS Internals Series documents may be specific to a particular revision of the product. Consequently user programs or systems based on this information and material may be revision–locked and may not function properly with prior or future revisions of the product. Therefore, Data General makes no representations as to the utility of this information and material beyond the current revision level which is the subject of the manual. Any use thereof by you or your company is at your own risk. Data General disclaims any liability arising from any such use and I and my company (Customer) hold Data General completely harmless therefrom.