Manual P/N 854-10300

BVM Limited,
Hobb Lane,
Hedge End,
Southampton,
SO30 0GH, UK.
TEL: +44 (0)1489 780144
FAX: +44 (0)1489 783589
E-MAIL: sales@bvmltd.co.uk
WEB: http://www.bvmltd.co.uk

User's Manual

PMCSCU2

Ultra2 SCSI
PMC Module

Board Revision **A**
Manual Revision **A** 21 January 2000

This material contains information of proprietary interest to BVM Ltd. It has been supplied in confidence and the recipient, by accepting this material, agrees that the subject matter will not be copied or reproduced, in whole or in part, nor its contents revealed in any manner or to any person except to meet the purposes for which it was delivered.

DISCLAIMER

The information in this document has been checked and is believed to be entirely reliable, however no responsibility is assumed for inaccuracies. BVM Ltd. reserves the right to make changes and/or improvements in both the product and the product documentation without notice. BVM Ltd. does not assume any liability arising out of the application or use of any product described herein; neither does it convey any licence under its patent rights or the rights of others.

USE OF PRODUCT

This product has been designed to operate in a PMC compatible electrical environment. Insertion and removal of the module or cable(s) from the carrier board must not be done whilst in a powered condition.

Do not lever out any devices from the product, which uses surface-mounted devices extensively, as these can be fractured by excessive force.

This product uses devices sensitive to static electricity. Ensure adequate static electricity precautions are observed when handling the product and associated devices.

RF. INTERFERENCE

This product complies with European Council Directive 89/336/EEC (EMC directive), and conforms to EN55022 : 1994 Class B (Limits and methods of measurement of radio interference characteristics of information technology equipment) and EN50082-1 : 1997 (Electromagnetic compatibility - Generic immunity standard, Part 1: residential, commercial and light industry) when used in accordance with the BVM EMC Guidelines Manual part number 454-77000 (available on request from BVM Ltd.).

GENERAL NOTICES

UNPACKING AND INSPECTION

This product contains components which are susceptible to static discharge, and should be handled with appropriate caution.

Upon receipt of this product, visually inspect the board for missing, broken or damaged components and for physical damage to the printed circuit board or connectors. This product was shipped in perfect physical condition. Any physical damage to the product is the responsibility of the shipping carrier and should be reported to the carrier's agent immediately.

RETURN OF GOODS

Before returning a product for repair, verify as well as possible that the suspected unit is at fault. Then call BVM Ltd. for a Customer Return (CR) number. Carefully package the unit, in the original shipping carton if this is available, and ship prepaid and insured, preferably by courier, with the CR number written on the outside of the package.

Include a return address and the telephone number of a technical contact, and a detailed description of the observed fault. For out-of-warranty repairs, a purchase order for repair charges must accompany the return. BVM Ltd. will not be responsible for damage due to improper packaging of returned items. Out of warranty repairs can be arranged, and will be charged on a material and labour basis, subject to a minimum repair charge. Return transportation and insurance will be charged as part of the repair and is in addition to the minimum charge.

SOFTWARE LICENCE NOTICE

Any software that is provided as Copyright BVM Ltd. is proprietary and confidential property of BVM Ltd., and each single copy is given on the agreed understanding that it is licensed for use on product combinations supplied by BVM Ltd. or their appointed distributors only. The software product may not be copied (except for backup purposes), given away, rented, loaned, reproduced, distributed or transmitted in any way or form, in whole or in part, without written permission of BVM Ltd.

This applies to any merged, modified or derivative version of the software including, but not limited to, versions produced by customising, translating, reverse engineering, de-compiling or disassembly.

This licence may be automatically terminated without notice if any of its provisions are breached. Reasonable legal costs may be awarded to the prevailing party in connection with this licence agreement. Use of, or accepted delivery of these products shall constitute your acceptance of the provisions of this licence agreement.

WARRANTY

A) BVM Ltd. warrants that the articles furnished hereunder are free from defects in material and workmanship for one year after the date of shipment.

B) All warranties and conditions, express and implied, statutory and otherwise, as to the quality of the goods or their fitness for any purpose are hereby excluded and with the exception of liability for death or personal injury caused by negligence as defined in the Unfair Contract Terms Act 1977 the seller shall not be liable for any loss, injury or damage arising directly or indirectly from the use, application or storage of such goods.

C) Subclause (B) above shall not apply where the buyer deals as a consumer as this expression is defined in the Unfair Contract Terms Act 1977.

D) The liability of BVM Ltd. hereunder shall be limited to repair or replacement at the manufacturers discretion of any defective unit. Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorised repair or installation are not covered by this warranty. BVM Ltd. shall have the right of determination as to the existence and cause of any defect.

E) The warranty period of the replacement or a repaired product or part shall terminate with the termination of the warranty period with respect to the original product or part for all replacement parts supplied or repairs made during the warranty period.

F) Although BVM Ltd. offer a high level of technical support and advice, due to the complex nature and wide application of product configurations it is the responsibility of the purchaser to be satisfied at the time of purchase that the products are suitable for the final application.

G) The term 'Software' used herein is defined as 'any program data or code in source or binary format recorded in or on any readable device or media'.

H) BVM Ltd. will effect all reasonable effort to resolve accepted reproducible software errors reported within 12 months of purchase. Acceptance of an error shall solely be based on conformance to supporting specifications. Proper operation of earlier releases is not guaranteed.

NOTICES

Copyright ©2000 by BVM Ltd.

All trademarks are acknowledged to their respective owners.

Table Of Contents

Copyright © 2000 BVM Ltd.

List of Figures

Figure **Page**

1. Introduction

1.1 Scope

This manual provides:-

- A getting started guide.
- Configuration details.
- A user reference guide.
- Details of implementation specific considerations for major devices.
- General Hardware Description.

This user manual *does not* provide:-

- Detailed data on the operation of the SCSI controller device.
- Detailed data on the operation of the EEPROM.
- Detailed data on the operation of the FLASH EPROM.
- Details on the content of the PMC specification.
- Details on the content of the SCSI specification.

Information is provided to allow the module to be integrated into a system and configured by the system engineer. The User manual is intended for use by system integrators, service personnel, software engineers and end users.

Unless otherwise stated, address information is in hexadecimal notation.

1.2 PMCSCU2 Part Numbers

Part Number	Description
853-10310	Ultra2 SCSI PMC Module

A Windows® driver disc is available containing the Symbios™ SCSI Controller drivers, BVM installation files & diagnostic software.

Part Number	Description
850-10350	Windows® Driver Disc

Copyright © 2000 BVM Ltd.

2. Overview

2.1 Board Layout

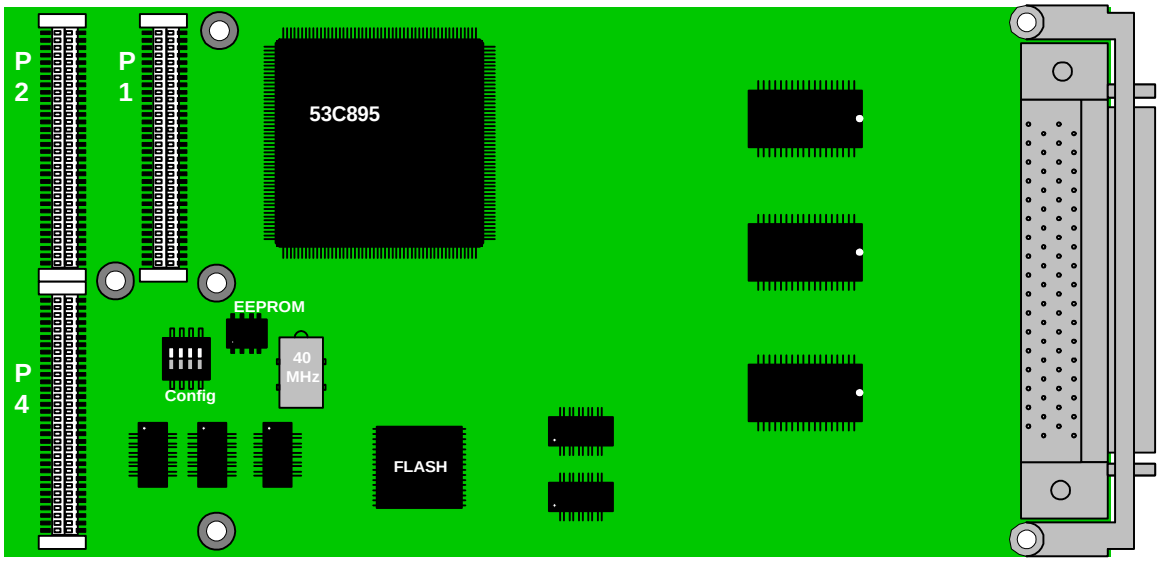

Figure 1 Board Layout Topside

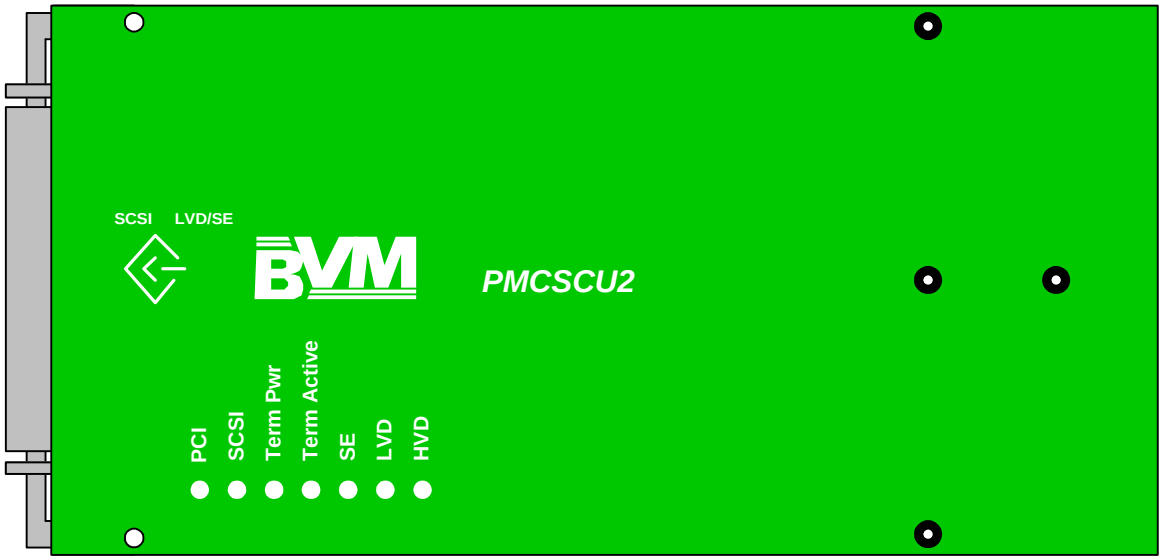

Figure 2 Board Layout Underside

Copyright © 2000 BVM Ltd.

2.2 Features

- Conformance to PMC standard IEEE P1386.1/Draft 2.0 4th April 1995.
- 32-bit PCI single chip Ultra 2 SCSI controller (SYM53C895).
- Auto-sensing of LVD (low voltage differential) or SE (single ended) SCSI connection.
- Accidental connection to HVD (high voltage differential) causes board shut-down.
- Supports up to 80Mbytes/sec transfer rate using Wide Ultra 2 SCSI (LVD mode) and 40Mbytes/sec in SE mode.
- Software control of SCSI terminators. Automatic selection LVD or SE termination.
- Support for up to 16 devices in LVD mode or 8 in SE mode (including PMCSCU2).
- Configuration EEPROM (16Kbits) for set-up parameters and other configuration information.
- On-board FLASH for BIOS & SDMS™ (SCSI Device Management System).
- SCSI signals accessible via 68-way SCSI-II front panel connector as well as rear I/O via PMC connector P4.

2.3 Applications

- High performance storage interface for industrial PC's or servers.
- Interface to high performance hard disc's
- Interface to CD-ROM drives.
- Interface to tape streamers.
- Interface to SCSI scanners.

Copyright © 2000 BVM Ltd.

3. Operation

3.1 Block Diagram

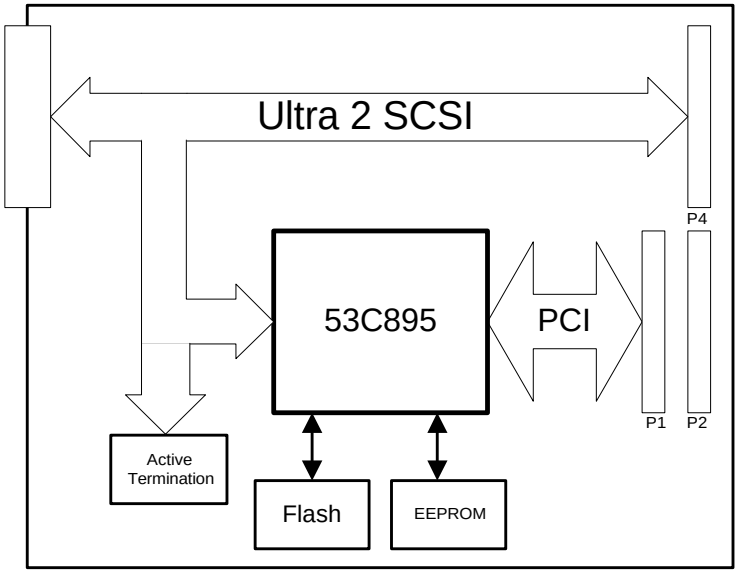

Figure 3 Block Diagram

3.2 SYM53C895 SCSI Controller

The PMCSCU2 uses a SYM53C895 PCI-to-Ultra2 SCSI I/O Processor, which incorporates Universal Low Voltage Differential (LVD) signalling for SCSI. The SYM53C895 uses LVDlink™ transceivers, which remove the distance and device constraints in SCSI single-ended designs and offer higher data transfer rates. As compared to Ultra SCSI designs, the SYM53C895 provides twice the performance and allows four times the cable length and number of connected devices.

The SYM53C895 can support up to 12m cables and up to 15 peripheral LVD devices on a wide LVD SCSI bus, with the same cables and connectors defined in the SCSI-3 Parallel Interface ANSI standard. For backward compatibility to existing single-ended devices, the Universal I/O features of LVDlink™ transceivers allow the chip to switch between LVD and single-ended mode. In single-ended mode, the SYM53C895 performs synchronous data transfers up to Ultra SCSI rates, subject to Ultra SCSI distance and device constraints.

3.2.1 Ultra2 SCSI Support

The performance advantage of Ultra2 SCSI over Fast SCSI-2 and Ultra SCSI is most noticeable in applications that use large block size transfers such as video production and editing, or medical imaging, where large files must be stored or transported. The high SCSI bandwidth of Ultra2 SCSI, and the improvements in distance, connectivity, and reliability, make the SYM53C895 an ideal host connection to a RAID controller. Ultra2 SCSI performance along with the other features in the SYM53C895 make it ideal for these and other demanding applications in the high performance RAID subsystem, workstation, and server markets.

Copyright © 2000 BVM Ltd.

3.2.2 Major Features

- Ultra2 SCSI I/O Processor.
  - Performs SCSI data transfers up to 80Mbytes/sec, synchronous operation on a wide LVD SCSI bus.
  - Transfers SCSI data synchronously up to Ultra SCSI speeds in single-ended mode.
  - Allows total SCSI cable lengths up to 12m (longer cables may be possible in point-to-point solutions).
  - Allows up to 15 peripheral LVD SCSI devices on the wide bus.
- Extra large 816byte DMA FIFO for improved bus-to-bus speed matching.
  - Accommodates extra data while data bursting is occurring.
  - Provides better support for large block size transfers at Ultra2 SCSI speeds.
  - Allows the chip to handle a full disc sector.
  - Supports up to 512byte bursts across the PCI bus.
- 31 levels of SCSI Synchronous Offset.
  - Increases the pace of synchronous transfers to match Ultra2 SCSI transfer speed.
- On-chip LVDlink™ Universal Low Voltage Differential transceivers.
  - Do not require external precision regulators or resistors to operate.
  - Allows greater device connectivity and longer cable length.
  - Transceivers switch between single-ended and LVD to support backward compatibility.
  - Provides reliability and distance of differential.
  - SCSI without the cost of external differential transceivers.
  - LVDlink™ supports a long-term performance migration path to over 100 mega-transfers per second.
- On-chip clock quadrupler for achieving 160MHz internal SCSI clock while using an external 40MHz oscillator.

3.2.3 PCI Features

- Connects directly as one load to the PCI bus.
- 816byte DMA FIFO for improved speed matching.
- Functions as full 32-bit PCI DMA Bus Master.
- Complies with PCI 2.1 Specification.
- Supports 33MHz PCI Bus zero wait state operation.
- Supports maximum burst transfer rate of 132MBytes/sec.
- Supports PCI extended access cycles.

Copyright © 2000 BVM Ltd.

3.2.4 SCSI Features

- Includes 4Kbytes of internal RAM for SCSI SCRIPTS™ instruction storage, to reduce or eliminate instruction fetches over the PCI bus.
- Pre-fetches up to 8 dwords of SCSI SCRIPTS instructions, reducing PCI bus overhead.
- Expands arithmetic capabilities with enhanced Register Move instruction support.
- Supports SCSI SCRIPTS Load and Store instructions, for more efficient moving of data between memory and chip register space.
- Integrates local memory bus for BIOS storage in FLASH memory.
- LVDlink™ transceivers utilise LSI Logic TolerANT® active negation technology for improved single-ended SCSI signal integrity.

3.2.5 LVD Transceivers

The SYM53C895 has integrated Universal LVDlink™ transceivers, and uses the Differential Sense (DIFFSENS) signal to detect the bus cabling condition. The universal features of LVDlink™ transceiver's support single-ended (SE) or low-voltage-differential (LVD) SCSI modes, depending on the type of devices connected to the bus.

3.3 SCSI Termination

Active SCSI bus terminators are fitted on the PMCSCU2, which are able to terminate the SCSI bus in either low-voltage-differential (LVD) or single-ended (SE) mode depending on the mode detected.

Normally the terminators are controlled by software, but a switch allows permanent enabling or disabling of the terminators. A 1.5A (max) resettable fuse protects the external termination power line against external short circuits.

See the information referenced in "A.6 SCSI Terminators (page 16)" for further details.

3.4 FLASH Memory

The PMCSCU2 is fitted with 128Kbytes of FLASH memory using an Am29F010 (90ns) device, which can be programmed (and erased) on board via the SYM53C895 device. It is designed to contain boot code to allow operating system booting via the SCSI interface.

See section "7.2 BIOS FLASH EPROM (page 14)" and the information referenced in "A.1 SYM53C895 (page 16)" and "A.5 Am29F010 FLASH EPROM (page 16)" for further details.

3.5 EEPROM

The PMCSCU2 is fitted with 16Kbits of EEPROM using a 24C16 device, which is supplied pre-programmed by BVM.

The contents of the EEPROM are read by the SYM53C895 on coming out of reset and are used to set up the control registers after reset, allowing the following to be set:

- PCI interface configuration.
- PCI Subsystem and Subsystem Vendor ID.
- BIOS configuration parameters.

See section "7.3 Configuration EEPROM (page 14)" and the information referenced in "A.1 SYM53C895 (page 16)" and "A.4 NM24C16 EEPROM (page 16)" for further details.

Copyright © 2000 BVM Ltd.

4. Installation

1. PMC modules should only be installed when the host carrier board is in a powered-off condition to avoid damage to the PMC module and host carrier board. Normal ESD protection procedures should be followed to avoid damage to the board.
2. After removing any blanking panels on the host carrier front panel, the PMC module should be offered up to the host carrier site and the front panel carefully positioned through the host carrier front panel opening, taking care not to damage the EMC gasket on the PMC module front panel.
3. The PMC module should be fixed to the host carrier using four M2.5 x 6mm pan-head screws into the four fixing holes provided (two on the front panel and two on the spacers).
4. There is no voltage keying on the PMC100, it will work in both +3.3V and +5V host carriers.
5. The PMCSCU2 can be used with a standard 68-way SCSI cable which should be terminated with a suitable SCSI terminator - either single-ended (SE), low-voltage-differential (LVD) or automatic switching SE/LVD depending on the application - see section "6.1 Front Panel Connector (page 9)".
6. The PMCSCU2 switch must be set accordingly for SCSI termination on-board the PMCSCU2 -see section "5.2 Switch Settings (page 8)".
7. The installation can be tested with the Symbios™ SCSI BIOS Configuration Utility, which is entered from the SCSI BIOS - see section "7.2 BIOS FLASH EPROM (page 14)". The on-board LED's will assist this process - see section "5.1 LED Indicators (page 8)".

Copyright © 2000 BVM Ltd.

5. Configuration

5.1 LED Indicators

Seven LED indicators are fitted, viewable from the top of the board when it is fitted onto a host carrier. The functions are shown below in order (1st closest to the front-panel).

LED Function	Colour
53C895 is a PCI bus master if ON *	**AMBER**
53C895 is accessing the SCSI bus if ON	**RED**
SCSI Terminator Power ON or OFF	**GREEN**
SCSI Terminator Active if ON	**GREEN**
SCSI is SE if ON	**GREEN**
SCSI is LVD if ON	**GREEN**
SCSI is HVD if ON #	**GREEN**

Notes:

* The PCI bus master LED does not function on the current board - it is reserved for future use.

The PMCSCU2 does not support HVD mode - if this is indicated, the 53C895 will have shut down.

5.2 Switch Settings

SW1 poles 1 & 2 are used to select the SCSI termination mode as shown below. Switch poles 3 & 4 are unused.

Pole	ON	OFF
1	Enable software control of SCSI termination.	Disable software control of SCSI termination.
2	Enable SCSI termination. Software control must be disabled.	Disable SCSI termination or use auto if enabled.

Copyright © 2000 BVM Ltd.

6. Connections

6.1 Front Panel Connector

Figure 4 shows the front panel SCSI connector pin numbering.

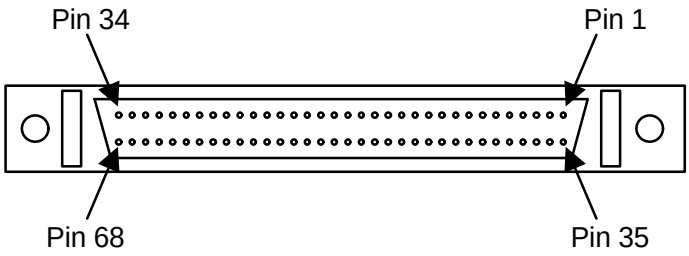

Figure 4 Front Panel SCSI Connection

The SCSI signal pin out is shown below:

Signal Name	Pin	Pin	Singal Name
+DB(12)	1	35	-DB(12)
+DB(13)	2	36	-DB(13)
+DB(14)	3	37	-DB(14)
+DB(15)	4	38	-DB(15)
+DB(P1)	5	39	-DB(P1)
+DB(0)	6	40	-DB(0)
+DB(1)	7	41	-DB(1)
+DB(2)	8	42	-DB(2)
+DB(3)	9	43	-DB(3)
+DB(4)	10	44	-DB(4)
+DB(5)	11	45	-DB(5)
+DB(6)	12	46	-DB(6)
+DB(7)	13	47	-DB(7)
+DB(P)	14	48	-DB(P)
GROUND	15	49	GROUND
DIFFSENS	16	50	GROUND
TERMPWR	17	51	TERMPWR
TERMPWR	18	52	TERMPWR
RESERVED	19	53	RESERVED
GROUND	20	54	GROUND
+ATN	21	55	-ATN
GROUND	22	56	GROUND
+BSY	23	57	-BSY
+ACK	24	58	-ACK
+RST	25	59	-RST
+MSG	26	60	-MSG
+SEL	27	61	-SEL
+C/D	28	62	-C/D
+REQ	29	63	-REQ
+I/O	30	64	-I/O
+DB(8)	31	65	-DB(8)
+DB(9)	32	66	-DB(9)
+DB(10)	33	67	-DB(10)
+DB(11)	34	68	-DB(11)

Copyright © 2000 BVM Ltd.

6.2 Rear I/O Connector

The SCSI signals are also connected to the P4 connector, the pin-out is shown below. Both the Front Panel and Rear I/O Connectors may be used simultaneously - ensure that SCSI termination is disabled in this instance (as the PMCSCU2 is no longer at the end of the SCSI cable) - see section "5.2 Switch Settings (page 8)".

P4 I/O			
Pin	Signal Name	Signal Name	Pin
1	+DB(12)	-DB(12)	2
3	+DB(13)	-DB(13)	4
5	+DB(14)	-DB(14)	6
7	+DB(15)	-DB(15)	8
9	+DB(P1)	-DB(P1)	10
11	+DB(0)	-DB(0)	12
13	+DB(1)	-DB(1)	14
15	+DB(2)	-DB(2)	16
17	+DB(3)	-DB(3)	18
19	+DB(4)	-DB(4)	20
21	+DB(5)	-DB(5)	22
23	+DB(6)	-DB(6)	24
25	+DB(7)	-DB(7)	26
27	+DB(P)	-DB(P)	28
29	GROUND	GROUND	30
31	DIFFSENS	GROUND	32
33	TERMPWR	TERMPWR	34
35	GROUND	GROUND	36
37	+ATN	-ATN	38
39	GROUND	GROUND	40
41	+BSY	-BSY	42
43	+ACK	-ACK	44
45	+RST	-RST	46
47	+MSG	-MSG	48
49	+SEL	-SEL	50
51	+C/D	-C/D	52
53	+REQ	-REQ	54
55	+I/O	-I/O	56
57	+DB(8)	-DB(8)	58
59	+DB(9)	-DB(9)	60
61	+DB(10)	-DB(10)	62
63	+DB(11)	-DB(11)	64

This pin out is compatible with the BVM cIO200 used with cPC200.

Copyright © 2000 BVM Ltd.

6.3 PCI Connections

P1 and P2 provide the standard PCI signals on the PMC module, as defined in the PMC specification and reproduced for reference purposes below.

P1 32 Bit PCI				P2 32 Bit PCI			
Pin	Signal Name	Signal Name	Pin	Pin	Signal Name	Signal Name	Pin
1	TCK	-12V	2	1	+12V	TRST#	2
3	Ground	INTA#	4	3	TMS	TDO	4
5	INTB#	INTC#	6	5	TDI	Ground	6
7	BUSMODE1#	+5V	8	7	Ground	PCI-RSVD*	8
9	INTD#	PCI-RSVD*	10	9	PCI-RSVD*	PCI-RSVD*	10
11	Ground	PCI-RSVD*	12	11	BUSMODE2#	+3.3V	12
13	CLK	Ground	14	13	RST#	BUSMODE3#	14
15	Ground	GNT#	16	15	3.3V	BUSMODE4#	16
17	REQ#	+5V	18	17	PME#	Ground	18
19	V (I/O)	AD[31]	20	19	AD[30]	AD[29]	20
21	AD[28]	AD[27]	22	21	Ground	AD[26]	22
23	AD[25]	Ground	24	23	AD[24]	+3.3V	24
25	Ground	C/BE[3]#	26	25	IDSEL	AD[23]	26
27	AD[22]	AD[21]	28	27	+3.3V	AD[20]	28
29	AD[19]	+5V	30	29	AD[18]	Ground	30
31	V (I/O)	AD[17]	32	31	AD[16]	C/BE[2]#	32
33	FRAME#	Ground	34	33	Ground	PMC-RSVD	34
35	Ground	IRDY#	36	35	TRDY#	+3.3V	36
37	DEVSEL#	+5V	38	37	Ground	STOP#	38
39	Ground	LOCK#	40	39	PERR#	Ground	40
41	SDONE#	SBO#	42	41	+3.3V	SERR#	42
43	PAR	Ground	44	43	C/BE[1]#	Ground	44
45	V (I/O)	AD[15]	46	45	AD[14]	AD[13]	46
47	AD[12]	AD[11]	48	47	Ground	AD[10]	48
49	AD[09]	+5V	50	49	AD[08]	+3.3V	50
51	Ground	C/BE[0]#	52	51	AD[07]	PMC-RSVD	52
53	AD[06]	AD[05]	54	53	+3.3V	PMC-RSVD	54
55	AD[04]	Ground	56	55	PMC-RSVD	Ground	56
57	V (I/O)	AD[03]	58	57	PMC-RSVD	PMC-RSVD	58
59	AD[02]	AD[01]	60	59	Ground	PMC-RSVD	60
61	AD[00]	+5V	62	61	ACK64#	+3.3V	62
63	Ground	REQ64#	64	63	Ground	PMC-RSVD	64

Copyright © 2000 BVM Ltd.

6.4 SCSI Connection Details

SCSI bus connections to the PMCSCU2 can be made with an unshielded 68-conductor Ultra2 SCSI PVC ribbon cable. Standard PVC ribbon cable will not allow Ultra SCSI speeds without data errors. One side of this cable is marked with a coloured stripe to indicate pin 1.

All external SCSI bus connections to the PMCSCU2 should be made with high quality shielded 68 conductor cables.

6.4.1 SCSI Bus Widths and Speeds

Up to 8 SCSI, Fast SCSI and Ultra SCSI devices (including the PMCSCU2) can be connected on a single-ended Ultra SCSI bus only if they are evenly spaced on a 1.5m Ultra2 SCSI cable (0.19m between devices). Up to 4 devices can be connected if they are evenly spaced on a 3m Ultra SCSI cable (0.75m between devices). A single-ended SCSI bus should not exceed 3m (total internal and external cable lengths), even with fewer than four devices.

For LVD applications, up to 16 devices (including the PMCSCU2) can be connected if they are evenly spaced on a 12m Ultra SCSI cable (0.19m minimum between devices).

SCSI Mode *	SCSI Bus Width (bits)	Max. Data Rate (Mbytes/s)
SCSI-1	8	5
Fast SCSI	8	10
Fast Wide SCSI	16	20
Ultra SCSI	8	20
Wide Ultra SCSI	16	40
Ultra2 SCSI	8	40
Wide Ultra2 SCSI	16	80

Note:

* Absence of the word “Wide” means an 8-bit bus width. It is acceptable to use the word “Narrow” to avoid ambiguity.

6.4.2 SCSI Bus Lengths

SCSI Mode	Maximum Bus Length (m) *			Max. No. Devices +
	Single-ended	Differential	LVD	
SCSI-1	6	25	12.5	8
Fast SCSI	3	25	12.5	8
Fast Wide SCSI	3	25	12.5	16
Ultra SCSI	1.5	25	12.5	8
Ultra SCSI	3	-	-	4
Wide Ultra SCSI	-	25	12.5	16
Wide Ultra SCSI	1.5	-	-	8
Wide Ultra SCSI	3	-	-	4
Ultra2 SCSI	#	#	12.5	8
Wide Ultra2 SCSI	#	#	12.5	16

Notes:

* This parameter may be exceeded in point to point and specifically engineered applications.

Single-ended and high-power differential are not defined at Ultra2 speeds.

+ The Maximum Number of Devices includes the PMCSCU2 itself.

Copyright © 2000 BVM Ltd.

6.4.3 SCSI Bus Termination

The devices making up the SCSI bus are connected serially (chained together) with SCSI cables. The first and last physical SCSI devices connected on the ends of the SCSI bus must have their terminators active. All other SCSI devices on the bus must have their terminators removed or disabled. The PMCSCU2 is also on the SCSI bus, its termination is automatically enabled when it is connected to the end of the bus.

The peripheral device terminators are usually set with jumpers, resistor modules, a switch on the peripheral or a separate terminator module, refer to the peripheral manufacturer's on how to change it.

Caution: The auto-enable/disable sensing feature in the SYM53C895 may enable termination erroneously if it is directly cabled to another SCSI device or controller using the same sensing method. The SYM53C895 senses the presence of SCSI devices by detecting the ground signal on conductor 50 of the SCSI cable.

Any SCAM and SCSI devices connected to your SCSI bus will automatically set their own termination and identification codes.

6.4.4 Setting SCSI Bus ID's

Each SCSI device and the host adapter must be set to a separate SCSI ID 0 to 15. SCSI ID 7 is the pre-set SYM53C895 setting, giving it the highest priority on the SCSI bus. If you plan to boot your computer from a SCSI hard disc drive on the SCSI bus, that drive should have SCSI ID 0, or the lowest SCSI ID on the bus. For system performance optimisation this may be set to an ID other than ID 0. The SYM53C895 SCSI Bus ID may be set using the SCSI BIOS Configuration Utility.

The peripheral device SCSI ID's are usually set with jumpers or with a switch on the peripheral. Refer to the peripheral manufacturer's instructions to determine the ID of each device and how to change it. You must have no duplication of SCSI ID's on a SCSI bus.

Copyright © 2000 BVM Ltd.

7. Programming

7.1 Windows® Driver Disc

BVM can supply a disc containing the SYM53C895 Symbios™ driver files for Windows® from LSI Logic, along with BVM installation files. The BVM installation files will ensure that the correct driver configuration is selected upon installation. Windows® 95, 98, NT4.0 and 2000 are currently supported.

7.2 BIOS FLASH EPROM

The FLASH memory is supplied pre-programmed with a BIOS from Symbios™ which supports controller configuration, device booting, device booting order and many other SCSI functions. The BIOS also contains the SDMS™ Configuration Utility which is entered by typing Ctrl<C> at the BIOS prompt during the bootstrap phase.

See the information referenced in "A.5 Am29F010 FLASH EPROM (page 16)" for further details.

7.3 Configuration EEPROM

The EEPROM is supplied pre-programmed by BVM, and contains the BVM PCI Subsystem Vendor ID, which is 15C0 (hexadecimal) and the PCI Subsystem ID, which is 0120 (hexadecimal). Use of these ID's in addition to the standard Symbios™ SCSI Controller ID allows selection of the Symbios™ driver via the BVM supplied installation files.

The EEPROM also contains other SYM53C895 configuration parameters. In particular it should be noted that SYM53C895 GPIO2 pin is configured to control the SCSI terminators (low for active).

See the information referenced in "A.4 NM24C16 EEPROM (page 16)" for further details.

Copyright © 2000 BVM Ltd.

8. Specification

8.1 On-Board Functions

8.1.1 SYM53C895 PCI SCSI Controller

Ultra2 SCSI I/O Processor, 80MB/s synchronous wide LVD, SE synchronous up to Ultra SCSI, up to 16 LVD SCSI devices, 816byte DMA FIFO, up to 512byte PCI bursts, 32-bit PCI DMA Bus Master, PCI 2.1 33MHz PCI zero wait state, maximum burst transfer 132Mb/s, 4Kb internal RAM for SCSI SCRIPTS™, LVDlink™ transceivers with LSI Logic TolerANT®.

8.2 Board Configuration

SWITCH:	SCSI Termination
EEPROM:	16Kbits - PCI Configuration
FLASH EPROM:	128Kbytes - BIOS
LED Indicators (7):	PCI, SCSI, TERMPWR, ACT/PSV, SE, LVD, HVD

8.3 PMC Interface

Bus Interface:	PCI 2.1 compliant
Bus Width:	32-bit
Data Transfer:	PCI 2.1 Bus Mastering
Interrupts:	PCI INT #A & INT #B
Memory Address:	BIOS assigned
PCI configuration:	DWORD, WORD & BYTE

8.4 SCSI Interface

Bus Interface:	synchronous or asynchronous
Bus Width:	8-bit or 16-bit
Arbitration:	8-bit or 16-bit
Signal Level:	single-ended or low-voltage-differential
Termination:	active single-ended or low-voltage-differential

8.5 Operating Environment

Dimensions:	74.0mm x 149.0mm (single PMC size)
Power:	+5v 230mA typical, +3.3v 140mA typical
Environmental:	0 to 70 °C, 95% humidity non-condensing (extended range to order)

Copyright © 2000 BVM Ltd.

Appendix A - Data Sheets & Manual References

A.1 SYM53C895 SCSI Controller

LSI Logic SYM53C895 PCI-Ultra2 SCSI I/O Processor with LVDlink™ Universal Transceivers Data Manual Version 3.0
(http://www.symbios.com)

A.2 SCSI Specification

ANSI - X3.131-1994 (SCSI-2)
(http://www.ansi.org)

A.3 PMC Specification

IEEE Draft Standard Physical and Environmental Layers for PCI Mezzanine Cards: PMC
P1386.1/Draft 2.0 April 4, 1995 DS5316
(http://www.ieee.org)

A.4 NM24C16 EEPROM

NM24C16/17 – 16K-Bit Standard 2-Wire Bus Interface Serial EEPROM
NM24C16/17 Rev. C.2, March 1999
(http://www.fairchildsemi.com)

A.5 Am29F010 FLASH EPROM

AMD Am29F010A 1 Megabit (128 K x 8-bit) CMOS 5.0 Volt-only, Uniform Sector Flash Memory
Publication #22181 Rev: B Amendment/+1 Issue Date: March 23, 1999
(http://www.amd.com)

A.6 SCSI Terminators

Dallas Semiconductors DS2118M Ultra2 LVD/SE SCSI Terminator
Date: 090199
(http://www.dalsemi.com)

Copyright © 2000 BVM Ltd.