PEGASUS

Technical Manual

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If you intend to write your own low level software, you can start with the source code on the disk, which is supplied. This is example code only to illustrate use on Arcom's products. It has not been commercially tested. No warranty is made in respect of this code and Arcom shall incur no liability whatsoever or howsoever arising from any use made of the code.

Arcom Control Systems Ltd operate a company-wide quality management system which has been certified by the British Standards Institution (BSI) as compliant with ISO9001:1994

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Revision History

Manual	PCB	Comments
Issue A	V1I3	150502 First release of manual
Issue B	V1I3	130802 [ECO - 3079]

Disclaimer

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Arcom Control Systems reserves the right to make improvements to this document and/or product at any time and without notice.

Anti-Static Handling

This board contains CMOS devices that could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling the board. This includes storing the board in appropriate anti-static packaging and wearing a wrist strap when handling the board.

Battery

The board contains a Lithium non-rechargeable battery. Do not short-circuit the battery or place on a metal surface where the battery terminals could be shorted. During shipment the battery is isolated from the board's circuitry and should be connected before using the board. Please refer to the link section of this manual for details.

When disposing of the board or battery, take appropriate care. Do not incinerate, crush or otherwise damage the battery.

Electromagnetic Compatibility (EMC)

The PEGASUS is classified as a component with regard to the European Community EMC regulations and it is the users responsibility to ensure that systems using the board are compliant with the appropriate EMC standards.

The PEGASUS ICE Enclosure (See Appendix F) meets the following standards:

EN 50081-1 Generic emissions from residential commercial and light industrial environments
EN 50082-2 Generic Immunity from industrial environments

EN 55024 Class A immunity

EN 61000-4-3 Electromagnetic field immunity
EN 61000-4-2 Electrostatic discharge immunity
EN 61000-4-4 Fast Transients immunity

Packaging

Please ensure that should a board need to be returned to Arcom Control Systems, it is adequately packed, preferably in the original packing material.

Acknowledgements

Technical Support

Arcom Control Systems has a team of technical support engineers who will be able to provide assistance if you have any problems with this product. Please contact the Arcom support team at support@arcomcontrols.com for US customers or, support@arcom.co.uk for European customers.

Introduction

This manual describes the operation and use of Arcom Control Systems ' PEGASUS Single Board Computer. It has been designed as both a reference and a user manual and includes information on using all aspects of the board.

This board should have been supplied as part of an PEGASUS Development Kit and you should already have read the 'Quickstart' manual.

The PEGASUS is a PC/104 sized, PC/AT compatible processor board has been designed, to be embedded into OEM equipment. It contains all the standard features found in a PC/AT system with some embedded additions.

The board can be purchased in the following standard variants:-

PEGASUS-133-M32-F16	133MHz CPU, 32MB DRAM, 16MB Flash
PEGASUS-133-M16-F8	133MHz CPU, 16MB DRAM, 8MB Flash

Contact Arcom Control Systems sales for pricing and availability.

Features

CPU:
- AMD Elan SC520 133MHz processor (Am5x86 CPU)

Cache:
- 16-Kbyte unified cache

BIOS:
- General Software's Embedded BIOS 4.3 in Flash EPROM
- Onboard reprogramming

System Memory:
- Up to 64MB SDRAM

Silicon Disk:
- Up to 16MB Intel Strata Flash
- Datalight FlashFX Flash filling system

Ram Disk:
- 128KB SRAM Disk (battery backed)*

Integrated I/O:
- SMSC FDC37B727 with built in Real Time Clock and Keyboard controller

IDE Interface:
- Supports up to two IDE devices

Parallel Port:
- High speed parallel port, SPP/EPP/ECP modes
- BIOS Configurable

Serial Ports:

- Four 16C550 compatible high speed UART's
- 2 x RS232, 1 x RS422/485, 1 x TTL Interfaces

Network support:

- National MacPhyter DP83815 10/100-BaseT PCI Ethernet controller
- 32-bit PCI bus, Revision 2.2-compliant

Miscellaneous:

- 2 x User Links
- SSI Interface (Synchronous Serial Interface)
- Watchdog

***Not fitted as standard**

Getting started

The Development Kit contains a "Quickstart" manual that has been designed to enable users to set-up and start using the board as soon as possible. You should read this manual and follow the steps defining how to set-up the board. Once you have completed this task you will have a working PEGASUS system and can start adding other peripherals to enable you to start development.

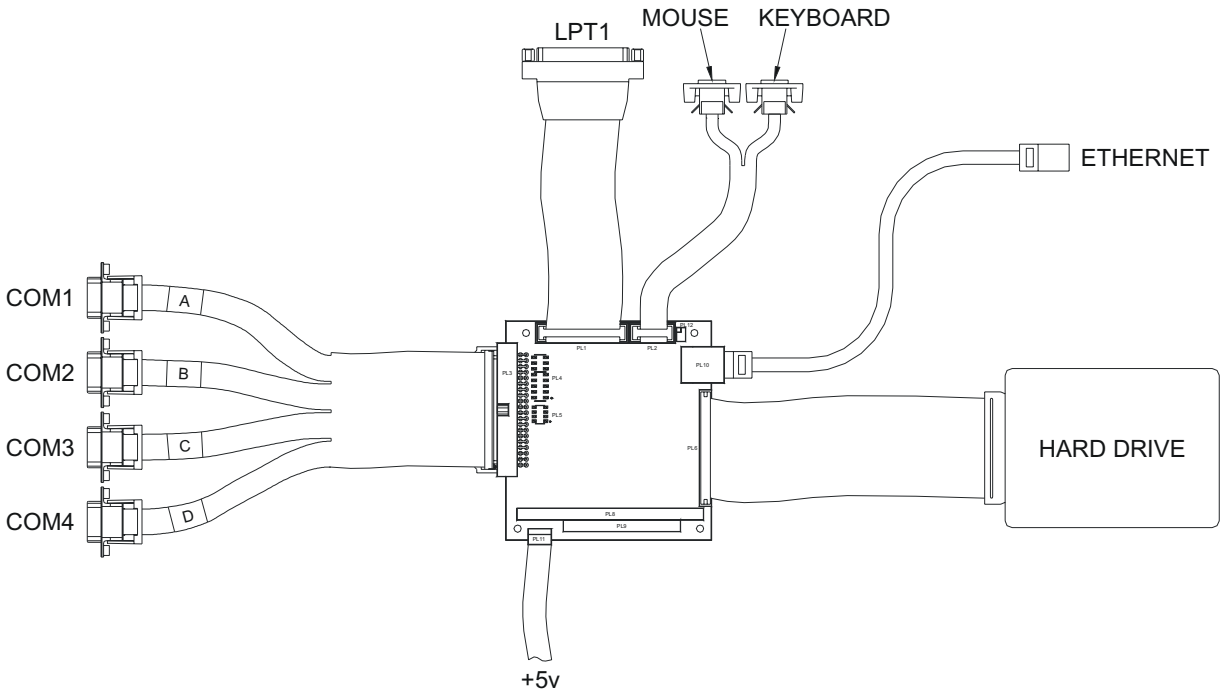
The section below has been designed to guide you through setting up and using some of the features of the PEGASUS. If you would like more detailed information on any aspect of the board refer to the "Detailed Hardware Description" section of this manual.

Using the PEGASUS

The PEGASUS uses a General Software's BIOS(Basic Input-Output System) to provide support for the board. The BIOS has a built-in set-up program that allows users to modify the basic system configuration. The set-up program can be invoked during the power on sequence by pressing any key when prompted during boot-up. The set-up parameters are stored in the CMOS RAM and will be retained when the power is switched off if the battery backup supply is connected (See link and connector section for details).

The BIOS defaults have been selected to enable the board to operate with a minimum of devices connected. If CMOS settings are lost the board will correctly power up and boot from the on-board flash disk, without any other peripherals connected.

Setup Diagram



Connecting a Host PC to the PEGASUS console (COM1)

As the PEGASUS does not have any video functionality on board, by default the console is directed to COM1, to view this you need a null modem cable (details of cable are below) and a computer with a suitable terminal emulator (e.g Windows and HyperTerminal). Connect one end of the null modem cable to the PEGASUS's COM1 and the other to your computer. Set the terminal emulator as follows:

Baud Rate: 115200
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None

Plug the power supply into the PEGASUS. You should now see this in you terminal emulator window:

```
General Software 80486 Embedded BIOS (tm) Version 4.3
00000640K Low Memory Passed
00031744K Ext Memory Passed
Press ^C for Setup


Bus Dev Func VendID DevID Class           Irq
 00  00   00   1022   3000  Host Bridge
 00  11   00   100B   0020  Ethernet        9









For more information: (800) 850-5755, sales@gensw.com, www.gensw.com.
-------------------------------------------------------------------------------------------------------
(C) 2000 General Software, Inc.
80486-4.3-6E65-4A0E
```

Required null modem cable pin out:

9 Way D-Type (Female)		9 Way D-Type (Female)
2	Ł	3
3	Ł	2
5	Ł	5

Using a VGA card

Alternatively to using the serial console functionality of the PEGASUS, it is possible to use a PC/104 video card. Although the PEGASUS was not designed for display-orientated systems, the BIOS will automatically detect the presence of a VGA adapter and direct the console though it. When the BIOS is in this mode, it will also configure the PS/2 Keyboard / Mouse interface (PL2).

Connecting a Hard disk drive

The PEGASUS can support up to two IDE hard disk drives. Both drives should be connected to PL6 via a 44-way cable. The primary drive should be set-up as a 'MASTER' and the secondary drive as a 'SLAVE'. The BIOS will automatically detect the hard disk drive during the POST (Power-on Self-Test) processes and configure the hardware correctly. The BIOS will attempt to load an operating system from the primary disk drive. If the operating system is DOS this drive will become DRIVE C: once the operating system has loaded. If the on board Flash memory is fitted and has been formatted as a silicon disk drive, then this will be allocated as the last drive in the system.

Connecting a CD-ROM (IDE Type)

If a CD-ROM drive is required in the system, it may be connected in place of the secondary drive detailed above. The CD-ROM should be configured as a 'SLAVE' device. Drivers will be required to support the drive under DOS.

Using the PC/104 Expansion Bus

PC/104 modules can be used with the PEGASUS to add extra functionality to the system. The PC/104 interface supports 8/16 bit ISA bus style interfaces.

Arcom Control Systems have a wide range of PC/104 modules that are compatible with the PEGASUS. These include modules for digital I/O, analog I/O, motion control, CAN bus, serial interfaces etc. Please contact Arcom sales if a particular interface you require does not seem to be available as these modules are continually being developed. Other manufacturers' boards can also be used with this interface if they conform to the PC/104 specification.

In order to use a PC/104 board with the PEGASUS it should be plugged into PL8 for 8-bit cards and PL8/PL9 for 16-bit cards. Before powering up the system ensure that you have checked that the link settings on the card for I/O address, IRQ and DMA settings do not conflict with any devices on the PEGASUS.

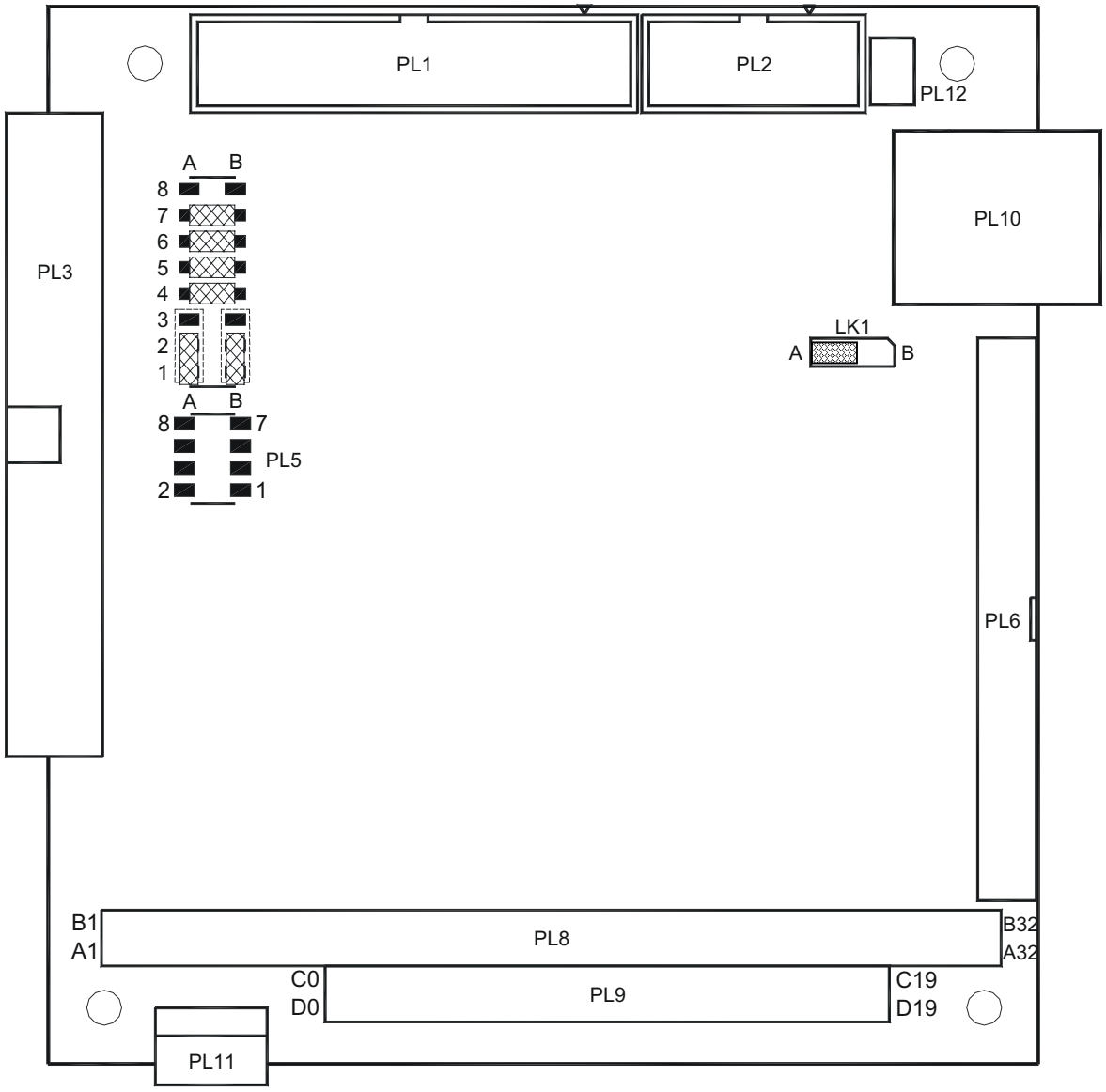
If you are using a PC/104 card that requires +5V, this will automatically be supplied via the PC/104 header. If you require +12V, this will only be available if the +12V pins on the 'POWER' connector PL11 have been connected to a supply. If you require -5V or –12v, these will need to be supplied directly to the PC/104 board.

Using the Ethernet Interface

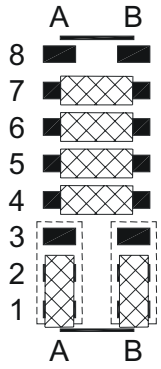
The National Semiconductor DP83815 Ethernet controller is used on the PEGASUS. Drivers for various operating systems are supplied on the support CD-ROM. The appropriate driver must be loaded before the Ethernet interface can be used.

Connection is made via the 8 way RJ45 connector PL10. A second connector PL10 provides outputs that can be used to drive LED's for TX / RX and LINK status.

Links



There are 8 user selectable links on the PEGASUS. The following section provides details on these links. The '+' sign indicates the default position for each link. The links are configured as follows. The diagram above shows the links in there default location.



LK2 - RESET
LK3 - USER LINK 1
LK4 - USER LINK 2
LK5 - RS 485/422 TERM
LK6 - RS 485/422 TERM
LK7/8 - RS 485/422

LK1 - Clear CMOS/ Battery disable
A battery link is fitted that is used to prevent drain on the battery during shipment. This link can also be used to clear the contents of the CMOS RAM.

LK1	Description
A +	Battery Backup Disabled (CMOS RAM cleared)
B	Battery Backup enabled

LK2 – Reset (A8-B8)
A momentary switch maybe connected to this, when the button is pressed it will put the board into a full hardware reset. Once the link is open circuit, the board will start executing from the top of memory. This is useful during development to restart the board after a software crash.

LK3 - User Link 1 (A7-B7)
This link is a user configuration link. It has no reserved function on the PEGASUS, but can be used by an application program to signify a configuration setting. The position of this link can be read via GP66 on the SuperIO.

LK3	Description
Fit+	GP66 is ‘Logic 0’
Omit	GP66 is ‘Logic 1’

LK4 - User Link 2 (A6-B6)
This link is a user configuration link. It has no reserved function on the PEGASUS, but can be used by an application program to signify a configuration setting. The position of this link can be read via the GP52 on the SuperIO.

LK4	Description
Fit+	GP52 is ‘Logic 0’
Omit	GP52 is ‘Logic 1’

LK5 (A5-B5), LK6(A4-B4), LK7(A1/2-A2/3) and LK8 (B1/2-B2/3) - RS422/485 Configuration
These links are used to configure the RS422/485 serial interface. They can be used to select either RS485 (half-duplex) or RS422 (full-duplex) connection and RS422/485 line termination. See the RS422/485 Interface section in the "Detailed Hardware Description" section of this manual for more details.

LK5	Description
Fit+	RS422 TX line termination resistor (120Ω) connected
Omit	RS422 TX line termination resistor (120Ω) disconnected

LK6	Description
Fit+	RS485 (RS422 RX line) termination resistor (120Ω) connected
Omit	RS485 (RS422 RX line) termination resistor (120Ω) disconnected

LK7 and LK8	Description
A+	RS485 half-duplex connection (A2-A3. B2-B3)
B	RS422 full-duplex connection (A1-A2. B1-B2)

Note: Both LK7 and LK8 must be set to the same position, i.e. both set to 'A' or both set to 'B'.

General Software's BIOS Set-up

During the POST (Power On Self Test) memory count up display, the user can press the <Del> key when the console is the PC Keyboard and video monitor, or the <^C> key when the console is a serial link. This causes the BIOS setup screen to load.

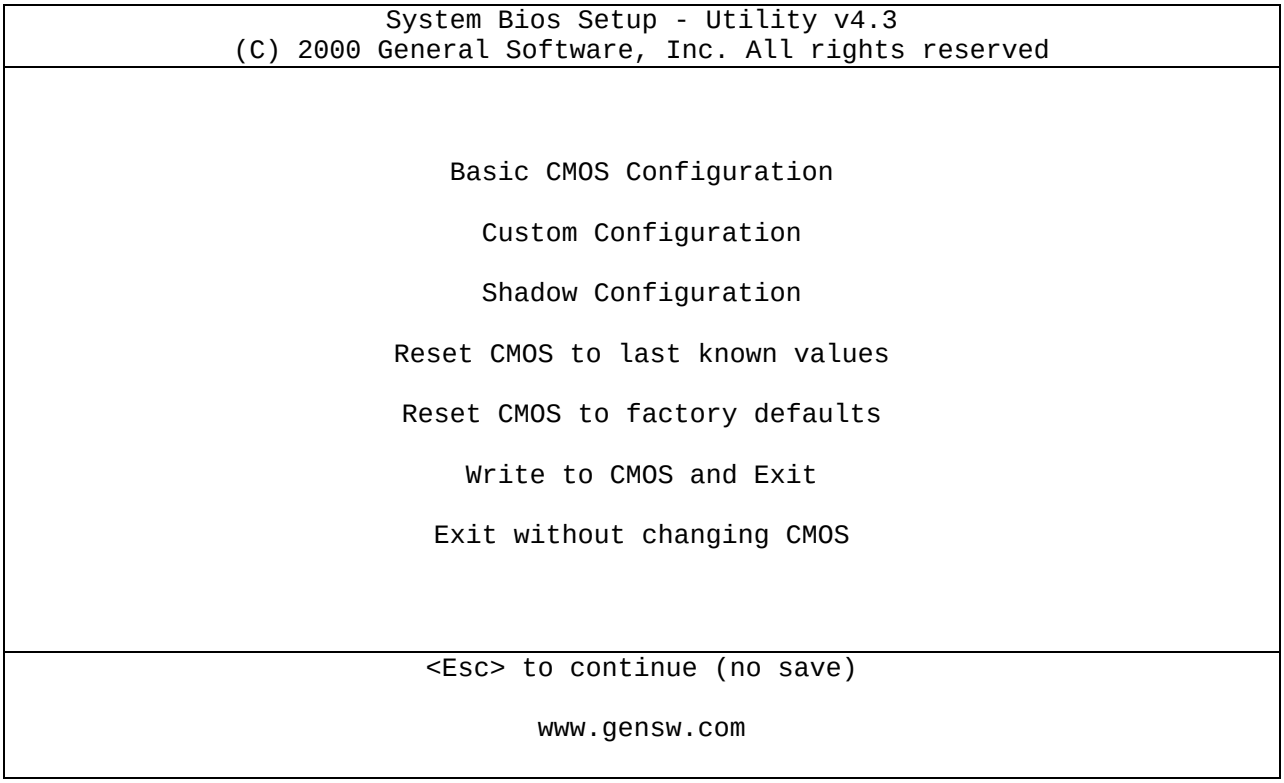
Control Keys (In serial Console Mode):

<^E>	UP
<^X>	Down
<Tab>	Next Cell
<+> / <->	Change Selection
<Esc>	Goto previous menu (or exit with out save)

Control Keys (In VGA Console Mode):

Up Arrow	UP
Down Arrow	Down
Left Arrow	Left
Right Arrow	Right
<Tab>	Next Cell
<+> / <->	Change Selection
<Esc>	Goto previous menu (or exit with out save)

The main menu of the BIOS setup looks like this:



From this menu you have several options:

Basic CMOS Configuration Screen:

The Basic CMOS Configuration screen looks like this:

<table>
<tr><td colspan="4">System Bios Setup - Basic CMOS Configuration

(C) 2000 General Software, Inc. All rights reserved</td></tr>
<tr><td>DRIVE ASSIGNMENT ORDER:
Drive A: (None)
Drive B: (None)
Drive C: (None)
Drive D: (None)
Drive E: (None)
Drive F: (None)
Drive G: (None)
Drive H: (None)
Drive I: (None)
Drive J: (None)
Drive K: (None)</td><td>Date:>Jan 01, 1980
Time: 00 : 23 : 45
NumLock: Disabled

BOOT ORDER:
Boot 1st: Drive C:
Boot 2nd: (None)
Boot 3rd: (None)
Boot 4th: (None)
Boot 5th: (None)
Boot 6th: (None)</td><td colspan="2">Typematic Delay : 250 ms
Typematic Rate : 30 cps
Seek at Boot : None
Show "Hit Del" : Enabled
Config Box : Enabled
Parity Checking : (Unused)
Memory Test Tick : (Unused)
Test Above 1 MB : Enabled
Debug Breakpoints: Disabled
Splash Screen : (Unused)</td></tr>
<tr><td>Boot Method: Boot Sector
FLOPPY DRIVE TYPES:
Floppy 0: Not installed
Floppy 1: Not installed</td><td colspan="2">IDE DRIVE GEOMETRY: Sect Hds Cyls
Ide 0: 3 = AUTOCONFIG, LBA
Ide 1: Not installed
Ide 2: Not installed
Ide 3: Not installed</td><td>Memory
Base:
640KB
Ext:
31MB</td></tr>
</table>

*default option

Configuring Drive Assignments and boot order:

There are three variables that are required to be set, to configure a drive.

1. Drive assignment Order
2. Boot Order
3. Drive type (IDE Drive Geometry)

Configuring Drive Assignments:

There is an extra field at the boot of the Drive Assignment Order column: Boot Method. For normal use of booting an OS from the boot sector of the selected drive select ‘Boot Sector’ If ‘Windows CE’ is selected the BIOS will attempt to load and execute a Windows CE Kernel file (NK.BIN), from the root directory of a selected drive.

Boot Order:

This category determines the order that the PEGASUS will attempt to boot from a drive.

Boot Method:

Set this to you required boot order, if a valid boot record is not found on the first drive, the BIOS will attempt to boot from the next drive.

Configuring IDE Drive Types:

If an IDE device is assigned a drive letter in the 'Drive Assignment Order' column, then the IDE drives must be configured in the 'IDE Drive Geometry' column.

IDE 0 - IDE Primary Master Device (On board IDE)
IDE 1 - IDE Primary Slave Device (On board IDE)
IDE 2 - IDE Secondary Master Device (Not Used)
IDE 3 - IDE Secondary Slave Device (Not Used)

To use the primary IDE drive on the PEGASUS, just configure IDE 0 in the IDE drive Geometry section, map IDE 0 to drive C: in the Drive Assignment Order section, and set the required boot order.

The IDE devices can be configured to be in five different modes: None, User, Physical, LBA or CHS.

The **User** type allows the user to manually select the number of cylinders, heads and sectors associated with the IDE device.

The **Physical** setting causes the BIOS to auto detect the drive geometry at POST, no translation is performed, so limits the size of the drive to a maximum 512MB.

The **LBA** setting causes the BIOS to auto detect the drive geometry at POST, but it translates the geometry using the standard LBA convention. This supports drives up to 16GB.

The **CHS** setting is the same as the LBA setting; apart from the translation is done using the Phoenix CHS convention.

Booting a CDROM:

Set the drive assignment 'A:' to "CD FL/Pri Master" or "CD FL/Pri Slave" depending on the configuration. Set the first boot order to 'Drive A:'. Make sure "Not installed" is selected under the drive geometry, for the CDROM device. The settings would like this:

<table>
<tr><td colspan="4">System Bios Setup - Basic CMOS Configuration

(C) 2000 General Software, Inc. All rights reserved</td></tr>
<tr><td rowspan="2">DRIVE ASSIGNMENT ORDER:
Drive A: CD Fl/Pri Slave
Drive B: (None)
Drive C: (None)
Drive D: (None)
Drive E: (None)
Drive F: (None)
Drive G: (None)
Drive H: (None)
Drive I: (None)
Drive J: (None)
Drive K: (None)</td><td>Date:>Jan 01, 1980
Time: 00 : 23 : 45
NumLock: Disabled

BOOT ORDER:
Boot 1st: Drive A:
Boot 2nd: (None)
Boot 3rd: (None)
Boot 4th: (None)
Boot 5th: (None)
Boot 6th: (None)</td><td colspan="2">Typematic Delay : 250 ms
Typematic Rate : 30 cps
Seek at Boot : None
Show "Hit Del" : Enabled
Config Box : Enabled
Parity Checking : (Unused)
Memory Test Tick : (Unused)
Test Above 1 MB : Enabled
Debug Breakpoints : Disabled
Splash Screen : (Unused)</td></tr>
<tr><td>Boot Method: Boot Sector

FLOPPY DRIVE TYPES:
Floppy 0: Not installed
Floppy 1: Not installed</td><td colspan="2">IDE DRIVE GEOMETRY: Sect Hds Cyls
Ide 0: Not installed
Ide 1: Not installed
Ide 2: Not installed
Ide 3: Not installed</td><td>Memory
Base:
640KB
Ext:
31MB</td></tr>
</table>

Typematic Delay:

Defines the time between the first and second character being displayed when holding down a key.

Disabled: Disables the typematic delay
250ms: Set the typematic delay to 250 milliseconds*
500ms: Set the typematic delay to 500 milliseconds
750ms: Set the typematic delay to 750 milliseconds
1000ms: Set the typematic delay to 1000 milliseconds

Typematic Rate:

This determines the number of characters per second displayed when holding down a key.

6 cps: Sets typematic Rate to 6 Characters Per Second
8 cps: Sets typematic Rate to 8 Characters Per Second
10 cps: Sets typematic Rate to 10 Characters Per Second
15 cps: Sets typematic Rate to 15 Characters Per Second
20 cps: Sets typematic Rate to 20 Characters Per Second
24 cps: Sets typematic Rate to 24 Characters Per Second
30 cps: Sets typematic Rate to 30 Characters Per Second*

Seek at Boot:

During POST the BIOS can access an IDE device. This can be used to force a Hard Drive or CDROM to "Spin up". Enable this option if you are having difficulty booting from a Hard Drive or CDROM.

Disabled: Disable the seek*
IDE: Seek the primary IDE device at Boot:
Floppy: Not Used.

Show “Hit Del”:

Enables or disables the prompt “Hit Del for setup” to enter the setup screen. This will speed up the boot process when disabled.

Disabled: Disable the message.
Enabled: Enable the message.*

Config Box:

Allows you to disable the configuration screen being displayed at the end of POST.

Disabled: Disable the configuration screen.
Enabled: Enable the configuration screen.*

Parity Checking:

Not Used.

Memory Test Tick:

Not Used

Test Above 1MB:

Enables or disables the memory test above 1MB, disabling this test will speed up the boot process.

Enabled: The BIOS will test all on board memory.*
Disabled: The BIOS will only test the first 1MB of memory.

Debug Breakpoints:

Not Used

Splash Screen:

Not Used

Custom Configuration Screen:

System BIOS Setup - Custom Configuration (C) 2000 General Software, Inc. All rights reserved			
UART1 (COM1)	:>3F8h	UART2 (COM2)	: 2F8h
UART3 (COM3)	: 3E8h	UART4 (COM4)	: 2E8h
COM1 IRQ	: IRQ 4	COM2 IRQ	: IRQ 3
COM3 IRQ	: IRQ 10	COM4 IRQ	: IRQ 11
CPU speed	: 133 MHz	LPT1 IRQ	: Disabled
FlashFx	: Enabled	Serial Console port	: COM1
Serial Console Baud	: 115200	Dark Boot Mode	: Disabled
Hard Disk	: Enabled	PS/2 Mouse	: Enabled
^E/^X/<Tab> to select or +/- to modify <Esc> to return to main menu			

*default option

UART1 (COM1)
Enables or Disabled the COM1 port

3F8h: Sets COM1 to be at base address 3F8h*
Disabled: Disables COM1, address 3F8h is no longer decoded to UART1

UART2 (COM2)
Enables or Disabled the COM2 port

2F8h: Sets COM1 to be at base address 2F8h*
Disabled: Disables COM2, address 2F8h is no longer decoded to UART2

UART3 (COM3)
Enables or Disabled the COM3 port

3E8h: Sets COM1 to be at base address 3E8h*
Disabled: Disables COM3, address 3E8h is no longer decoded to UART3

UART4 (COM4)
Enables or Disabled the COM4 port

2E8h: Sets COM1 to be at base address 2E8h*
Disabled: Disables COM4, address 2E8h is no longer decoded to UART4

COM1 IRQ
Sets the COM1 IRQ

IRQ4: Sets COM1 IRQ to 4*
Disabled: Disables COM1 IRQ

COM2 IRQ
Sets the COM2 IRQ

IRQ3: Sets COM2 IRQ to 3*
Disabled: Disables COM2 IRQ

COM3 IRQ
Sets the COM3 IRQ

IRQ10: Sets COM3 IRQ to 10*
Disabled: Disables COM3 IRQ

COM4 IRQ
Sets the COM4 IRQ

IRQ4: Sets COM4 IRQ to 11*
Disabled: Disables COM4 IRQ

CPU SPEED
The SC520 processor can run at two different speeds 133Mhz and 100Mhz, this option allows you to changes this. This can save you power, and also enabled you to run at higher temperatures.

133Mhz: Run the processor at 133Mhz*
100Mhz: Run the processor at 100Mhz

LPT1 IRQ
Sets the LPT1 IRQ

IRQ7: Sets LPT1 IRQ to 7
Disabled: Disables LPT1 IRQ*

FLASHFX
Enables or disables the flash filing system

Enabled: Enabled FlashFX, the board will be able to boot to the on board flash*
Disabled: The board will no longer be able to boot the flash.

SERIAL CONSOLE PORT
Sets the current serial console port

COM1: Sets the current console port to COM1*
COM2: Sets the current console port to COM2
COM3: Sets the current console port to COM3
COM4: Sets the current console port to COM4

SERIAL CONSOLE BAUD
Sets the baud rate for the current serial console port

9600: Sets the current console baud rate to 9600
19200: Sets the current console baud rate to 19200
38400: Sets the current console baud rate to 38400
115200: Sets the current console baud rate to 115200*

DARK BOOT MODE
Enabling this option will disable all console activity to the serial console; you can turn the console on again by issuing a software interrupt:

INT15

Called with:

AH - A1h
BX – Specifies the console device, 0 indicates a vga console (VGA and keyboard), and nonzero values indicate the COM port number (starting with 1 for COM1)

Returns:

CY – Clear if successful
AH – Status error code
00h – no error
86h – not supported by BIOS configuration

Example code is supplied on the Development Kit CD see the software section.

Hard Disk
Enables or disables the IDE interface. When disabled IRQ14 is available on the PC104 interface.

Enabled: IDE interface enabled*
Disabled: IDE interface disabled.

PS/2 Mouse
Enables or disables the PS/2 mouse interface. When disabled IRQ12 is available on the PC104 interface.

Enabled: IDE interface enabled*
Disabled: IDE interface disabled

Shadow Configuration Setup Screen

The system Shadow Configuration Setup Screen allows the enabling and disabling of shadowing of areas of ISA ROM regions. Normally shadowing should be enabled at E000-F000 to maximize system ROM BIOS performance, and any other region that a ROM BIOS extension may be executed from.

Other Setup Options

The following options are also available:

- Reset CMOS to last known values

  This option causes the setup program to restore the CMOS values it had prior to any edits performed in the current session.

- Reset CMOS to factory defaults

  This option causes the setup program to restore the CMOS values to the hard coded factory settings. This is the same as removing the battery link.

- Write CMOS and Exit

  The option causes the setup program to save the current edits to the CMOS and reboots the board, causing the new values to load.

- Exit without changing CMOS

  The option causes the setup program to exit, without saving any changes made during the current session.

Detailed Hardware Description

The following section provides a detailed description of the functions provided by the PEGASUS. This information may be required during development once you have started adding extra peripherals or are starting to use some of the embedded features of the board.

Processor

The AMD Elan SC520 processor is an Am5x86 class processor with an integrated floating point unit (FPU)(compliant with ANSI/IEEE 754 standard). Integrated in to the device is a PCI host bridge, SDRAM controller and enhanced PC/AT-compatible peripherals. It has been designed to provide a low power, low cost fully integrated PC/AT compatible architecture. The SC520 is a 32-bit x86 compatible device and has 16K of unified cache integrated into the processor. A 133MHz part is used on the PEGASUS. The processor has a dual supply rail and is powered from +3.3V and 2.5V. These voltages are generated on the PEGASUS from the main +5V supply input.

Memory

SDRAM

There are two variants of the board. One is fitted with 16MB of SDRAM, the other 32MB of SDRAM. These are surface mount devices soldered to the board and cannot be upgraded. The BIOS automatically detects the amount of memory fitted to the board. The board can be fitted with 64Mbytes – Contact Arcom for further information.

BIOS EPROM

A 256Kbyte flash EPROM device is used to store the BIOS code. This device can be reprogrammed in situ using the UPDATE utility supplied on the support CD-ROM. (See the Software Support Section for details.) The system BIOS is copied into shadow RAM between 0E0000H and 0FFFFFH.

The flash device is a +5V only device and there is no link settings required to enable programming.

Flash Memory/Silicon Disk

The PEGASUS board supports up to 16MB flash memory, this memory is configured as a wear leveling read/write silicon disk drive. The Datalight FlashFX flash filing system will automatically be loaded to enable the flash drive to be accessed. The flash drive uses a 16KB memory window at 0D0000-0D3FFF to access the device and one 16bit I/O address (@ 200h) location is used to select the appropriate flash area.

200H 16-bit I/O Write

Bit No.	Page Address Register
0	Address Bit 14
1	Address Bit 15
2	Address Bit 16
3	Address Bit 17
4	Address Bit 18
5	Address Bit 19
6	Address Bit 20
7	Address Bit 21
8	Address Bit 22
9	Address Bit 23
10	Address Bit 24
11	Not Used
12	Not Used
13	Not Used
14	Not Used
15	Not Used

Battery Backed SRAM (Not fitted as standard)

The PEGASUS board can be fitted with 128KB SRAM device on board. This device can be used as a high-speed drive. The SRAM is backed up by the on-board battery, and uses a 16KB memory window at 0D4000-0D7FFF, the same 16-bit page register as the Flash is used, to select the appropriate area.

Memory Map

The following table shows the memory map for the PEGASUS.

Address	**Block Size**	**Description**
100000h –	63MB	(Upto)63MB SDRAM
0E0000h – 0FFFFFh	128K	PC BIOS
0DF000h - 0DFFFFh	4K	Elan SC520 configuration registers
0D8000h – 0DEFFFh	28K	Free
0D4000h – 0D7FFFh	16K	SRAM Window (to 128K SRAM) (If fitted)
0D0000h – 0D3FFFh	16K	Flash Window
0C0000h – 0CFFFFh	64K	Free
0B0000h – 0BFFFFh	64K	Free
0A0000h – 0AFFFFh	64K	Free
000000h – 009FFFh	640K	System DRAM

I/O Map

The PC/AT I/O address map is limited to 1K addresses. This is because only the lower ten address lines were originally used to decode I/O devices. The remaining lines were treated as undefined. Therefore the usable address range is 0-3FFH. Above this range, devices are mirrored throughout the entire 64K I/O address range of the processor.

The following table shows the I/O address mapping for the PEGASUS. If expansion boards are added via the PC/104 interface you should ensure that they are configured to be at a free address location. Otherwise they will not function correctly and may even cause the PEGASUS board to stop operating.

Device	**I/O Location (Hex)**
COM1	3F8-3FF
Reserved I/O space	3F0-3F7
COM3	3E8-3EF
Reserved I/O space	3E2-3E7
PC Card	3B0-3E1
Reserved I/O space	380-3AF
Parallel Port	378-37F
PC Card	300-377
COM2	2F8-2FF
Available for PC/104	2F0-2F7
COM4	2E8-2EF
PC Card	202-2E7
Flash Page	200-201
Available for PC/104	1F8-1FF
IDE controller	1F0-1F7
Alternate CPU Reset Control	0EF
Alternate A20 Gate Control	0EE
Master DMA (DMA0)	0C0-0DF
Interrupt Controller 2	0A0-0A1
System Control Port A	092
General Registers / DMA Page Registers	080-08F
Real Time Clock	070-071
Keyboard/Mouse	060-064
Programmable Interval Timer (PIT)	040-043
Master Interrupt Controller	020-021
Slave DMA (DMA1)	000-00F

Interrupts

Internal SC520 IRQ		Function	Source
Master ICU	IRQ0	Timer Tick	Elan SC520
	IRQ1	Keyboard	Super I/O
	IRQ2	Slave ICU	Elan SC520
	IRQ3	COM2	Elan SC520
	IRQ4	COM1	Elan SC520
	IRQ5	Reserved	-
	IRQ6	Free	PC/104
	IRQ7	Parallel Port	Super I/O
Slave ICU	IRQ8	Real Time Clock	Elan SC520
	IRQ9	Ethernet	DP83815
	IRQ10	COM4	Super I/O
	IRQ11	COM3	Super I/O
	IRQ12	PS/2 Mouse	Super I/O
	IRQ13	Co-processor	Elan SC520
	IRQ14	IDE Drive	-
	IRQ15	Free	PC/104

These IRQ's are only available to devices external to the Elan SC520 if they are configured to use one of the external programmable interrupt pins of the Elan SC520. Each of these pins is programmable to correspond to one of the Elan SC520 internal interrupts (IRQ1, IRQ3-IRQ15). For further information please refer to the AMD Elan SC520 Microcontroller User Manual. The Elan SC520 internal interrupts are configured to correspond to the interrupts available in the PC/AT system.

The external interrupt pins of the Elan SC520 are connected to the PC/104 interface and the SMSC FDC37C932 Super IO controller. The table below shows the connections and default programming for the interrupts.

Elan SC520 External Interrupt Pin	Elan SC520 Internal Interrupt	PC/104 Interface	SuperIO Interrupt Pin	Usage
PIRQ0	IRQ11	IRQ11	IRQ11	COM3
PIRQ1	IRQ1	-	IRQ1	Keyboard
PIRQ2	IRQ12	IRQ12	IRQ12	Mouse*
PIRQ3	IRQ3	IRQ3	IRQ3	COM2*
PIRQ4	IRQ10	IRQ4	IRQ4	COM4*
PIRQ5	-	-	-	Reserved
PIRQ6	IRQ6	IRQ6	IRQ6	PC104
PIRQ7	IRQ7	IRQ7	IRQ7	PC104 / Printer (LPT)*
PIRQ8	IRQ15	IRQ15	-	PC104
PIRQ9	IRQ9	IRQ9	-	Reserved
PIRQ10	IRQ14	-	IRQ10	IDE*

*These IRQs can be enabled for PC104, by disabling options in the BIOS. Refer the the BIOS setup section.

DMA Controller

There are two 8237A compatible DMA controllers internal to the Elan SC520. These controllers are cascaded in a standard PC/AT style and provide seven user DMA channels. There are four 8-bit channels and three 16-bit channels.

Any two of the seven channels can be mapped to the two external DMA request/acknowledge lines provided by the Elan SC520. The table below shows the default assignment for the DMA channels on the PEGASUS.

DMA	Usage	External Channel
0	Unassigned	PRDQ0 / PDACK0#
1	Unassigned	PRDQ1 / PDACK1#
2	Unassigned	PRDQ2 / PDACK2#
3	Parallel Port (ECP Mode)	PRDQ3 / PDACK3#
4	Unassigned	
5	Unassigned	
6	Unassigned	

The four external DMA channels of the Elan SC520 are connected to DMA channels 0 to 3. Channel 3 may only be used if the parallel port is disabled.

IDE Interface

The PEGASUS has a single Integrated Drive Electronics (IDE) controller that supports up to two hard disk drives. The disk drives are connected via a 1:1 44-way ribbon cable or 40 -> 44 way ribbon cable using PL6. One drive must be configured as a 'MASTER' and the other drive as a 'SLAVE'. An IDE compatible CD-ROM drive can also be used and should be configured as the 'SLAVE' device.

If a hard disk drive is attached to this interface the default configuration will cause the drive to be used as the standard boot device and the flash disk if present will become the next available drive.

Real Time Clock

The PEGASUS uses the Real Time Clock internal to the Élan SC520. It is fully compatible with the MC146818A standard clock device used in PC/AT systems. The date and time functions are stored in the real time clock when the main power is removed if the battery backup supply is enabled (See LK1 description). The Real Time Clock is decoded in I/O address space at 70-71H. The Real Time Clock registers are accessed via an indexed addressing mechanism. I/O location 70h is used to select the appropriate register and location 71H is used to access the data. See the Elan SC520 Microcontroller Register Set Reference Manual for further details.

The Real Time Clock and CMOS settings are maintained by the battery backup circuit when the main power input is disconnected. A lithium cell provides the battery backup supply and has a capacity of 170 mAH. This battery will provide sufficient support for at least 3 years continuous backup. The battery is disabled during shipment to prolong its useful life. If the board is going to be placed out of service for long periods of time then the battery should also be disabled. If the main supply is present on the board the battery is automatically disconnected from the Real Time Clock circuitry.

The accuracy of the Real Time Clock is based on the operation of the 32.768KHz watch crystal. This will provide an accuracy of +/- 1 minute per month if the board is in an ambient environment of +25°C. When the board is operated outside this temperature the accuracy may be degraded.

Keyboard/Mouse Controller

The SMSC FDC37B727 SuperIO controller provides support for a standard PC/AT keyboard and mouse. Both interfaces are present on PL2. The keyboard controller is decoded at I/O address location 60-64H and uses IRQ1 for keyboard and IRQ12 for mouse support. Power for the keyboard and mouse is sourced from the +5V supply.

NOTE: These interfaces are only initialized by the BIOS when there is a VGA board present. The IRQs are disabled when the interfaces are not in use.

Ethernet Controller

A National Semiconductor DP83815 Ethernet controller provides a 10/100-BASETX interface. This is a 32-bit PCI device that is configured by the BIOS during power ON. The device provides compliance with IEEE802.3u 100BASE-T specification and IEEE 802.3x Full Duplex Flow Control. A 93C46 EEPROM is used to store configuration data and ID information.

An 8-way RJ45 connector is used to provide signals (See Appendix A for pin assignment details).

A second connector PL11 also provides users with status signals that are designed to drive LED's. The status lines provide 10M, 100M and LINK status.

The support CD-ROM contains drivers for most operating systems and network software. These are stored in the ETHERNET directory.

User Link

LK2 and LK3 of the PEGASUS are user links. The status of this user link can be read via superIO I/O mapped registers. If the link is made then the bit will be read as logic '0' (see the link section for further details). This link does not have any defined function on the board and therefore can be used to select options in the application program. Refer to the Software Support section for details on example code.

PC/104 Interface

The PC/104 interface supports 8/16 bit ISA style PC/104 signals. Add-on boards can be used to enhance the functionality of the main board. A large number of companies have adopted the PC/104 standard and boards are available which support a wide range of interfaces. This bus can be used to add digital I/O, analogue I/O, serial ports, video capture devices, PC CARD interfaces, motion control devices etc.

Any board plugged into this interface will be accessed as if it were part of the main board. Therefore it may conflict with I/O and memory devices onboard - if it has not been correctly configured. Before using an expansion board you should check that it could be configured to work alongside the peripherals already incorporated onboard.

The PC/104 bus signals are fully compatible with the ISA bus electrical timing definitions. Some IRQ and DMA signal lines may be associated with onboard devices and are therefore are not free to be used by add-on boards.

Serial Ports

There are four high-speed 16550 serial UART's on the PEGASUS. Two RS282, one TTL and one RS422/485.

The Elan SC520 device supports COM1 (RS232) and COM2 (RS232). The SuperIO FDC37B727 device supports COM3 (TTL) and COM4 (RS422/485). The table below shows the configuration for each channel.

Port	I/O Address	Elan SC520 internal IRQ	
COM1	3F8-3FFH	IRQ4	RS232
COM2	2F8-2FFH	IRQ3	RS232
COM3	3E8-3EFH	IRQ11	TTL
COM4	2E8-2EFH	IRQ10	RS422 / 485

RS232 Interfaces

Both RS232 channels are fully software compatible with the 16550 and can be used as standard RS232 serial interfaces.

TTL Interface

The TTL Interface is a un-buffered serial port, offering full hardware handshaking. The UART is fully 16550 compatible.

RS422/485 Interfaces

The COM4 serial interface can be used to support RS422 or RS485 interfaces. The default link configuration has been selected to enable COM4 as RS422.

RS422

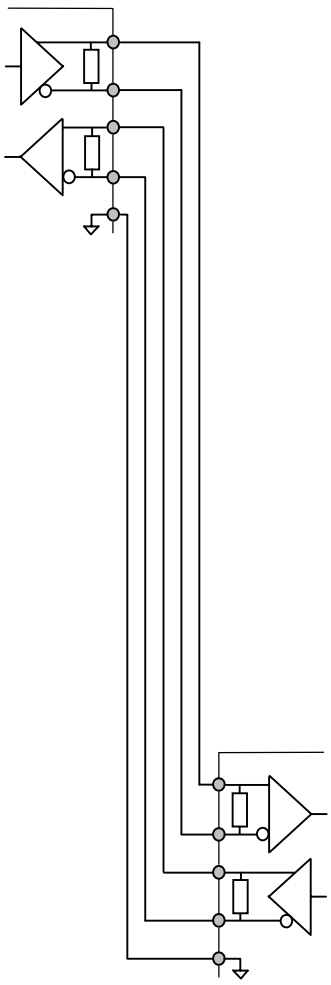
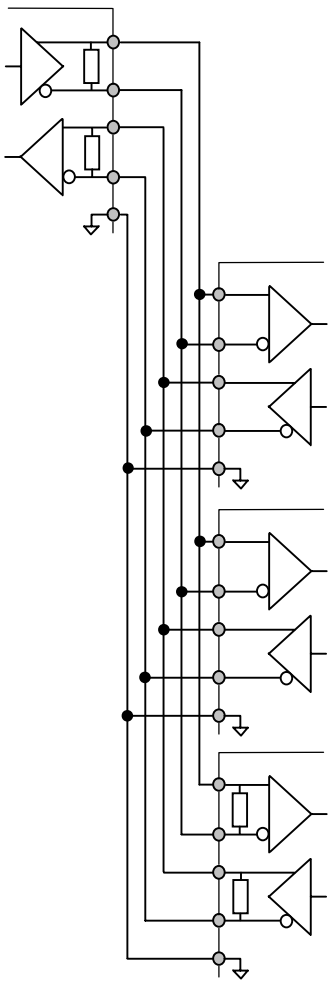
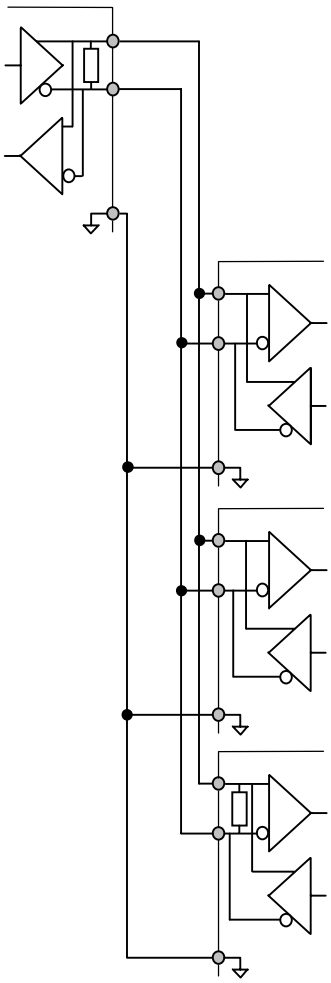
The RS422 interface provides full duplex communication. The signals available are TX+, TX-, RX+, RX- and Ground. The maximum cable length for an RS422 system is 1200m (4000ft) and

it supports 1 driver and up to 10 receivers. To enable RS422 operation links LK7 and LK8 should be in position B and the RTS line of COM3 should be at logic '0'. Links LK5 and LK6 should be made (to connect the 120Ω line termination resistors) if the board is at either end of the network.

RS485

RS485 is a half-duplex interface that provides combined TX and RX signals. PL3 pin 5 provides TX+/RX+ and pin 6 provides TX-/RX-. A ground connection (Pin 10) is also required for this interface. The maximum cable length for RS485 is the same as RS422 (4000ft), but RS485 supports up to 32 transmitters and receivers on a single network. Only one transmitter should be switched on at a time.

The PEGASUS uses the RTS signal to control transmission. When this signal is at logic '1', the driver is switched off and data can be received from other devices. When the RTS line is at logic '0', the driver is on. Any data that is transmitted from the PEGASUS will be automatically echoed back to the receiver. This enables the serial communications software to detect that all data has been sent and disable the driver when required. Links LK7 and LK8 should be in position A to the enable RS485 interface. Links LK5 and LK6 should be made (to connect the 120Ω line termination resistors) if the PEGASUS is at either end of the network. The differences between each of the configurations are illustrated below:

RS422 POINT-TO-POINT	RS422 MULTI-DROP	RS485 MULTI-DROP
		
Number of Wires 5 **Transmitters Enabled** always **Receivers Enabled** always **Duplex Mode** full **LK7** **B** **LK8** **B**	**Number of Wires** 5 **Transmitters Enabled** active RTS **Receivers Enabled** always **Duplex Mode** full **LK7** **B** **LK8** **B**	**Number of Wires** 3 **Transmitters Enabled** active RTS **Receivers Enabled** always **Duplex Mode** half **LK7** **A** **LK8** **A**

Parallel Port

The parallel port is fully IEEE1284 compatible and provides Standard Parallel Port (SPP), Enhanced Parallel Port (EPP) and Extended Capabilities (ECP) support. The parallel port is decoded at I/O address location 378-37FH (LTP1) and uses IRQ7. Note: The default BIOS set-up does not initialize IRQ7 for use by the parallel port. If the parallel port is to be used with interrupts, change the BIOS default settings. See the BIOS set-up section of this manual for more details.

The parallel port has built in protection circuitry to protect against powered devices being connected when the main supply is removed and damaging the device. Each data and control signal is designed to sink 24mA maximum, and source 12mA maximum.

The parallel port connector PL13 is a 26-way 0.1" boxed header. The pin assignment of this connector has been designed to provide 1:1 connection to an IDC 25-way D-Type socket (see Appendix A for details). This socket is compatible with a standard PC parallel port connector.
The parallel port can be used to connect an external printer, tape drive, disk drive, scanner etc.

Power Supply

The PEGASUS is designed to operate from a single +5V +/- 5% (4.75V to +5.25V) supply.

The 5V is monitored automatically onboard and if this supply falls below 4.63V the board will be placed in RESET. When the power supply rises above this threshold voltage the board will start to operate again. This power supply monitor ensures that the board does not hang if the supply voltage fails at any point.

An external battery connection +VBAT is also provided. An external battery can be fitted to provide the battery backup for the BIOS CMOS settings, the Real Time Clock and the SRAM disk drive. The external battery will supply power to the battery backup circuit when there is no +5V supply to the board AND the internal battery is disconnected or the internal battery has a lower voltage than the external battery. The battery needs to have a voltage of no less than 2.8V and no more than 3.3V

RESET Switch

A momentary switch may be connected on LK2. If the switch is pressed it will cause the board to be reset and the BIOS will start executing from the top of memory. This may be useful during development to restart the board if the software crashes.

Watchdog Timer

The PEGASUS contains a watchdog timer, which can be used to protect against application software conditions, which may cause the PEGASUS to 'hang'. The watchdog timer, once started, will trigger a CPU reset if it is not re-triggered within a set timeout period. The timeout period can be set to a value between 492μs and 32.31s. For information on programming the watchdog timer please see the supplied example code on the Development Kit CDROM.

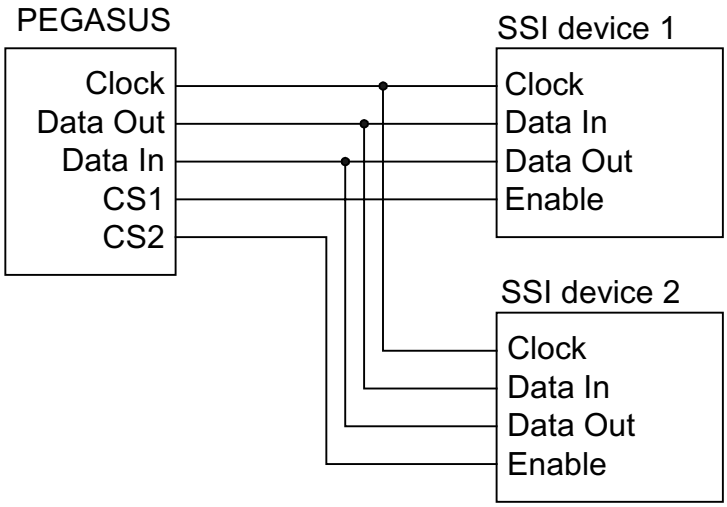
SSI (Synchronous Serial Interface)

The PEGASUS includes a synchronous serial interface (SSI). It can easily communicate with slave interfaces that are compatible to Motorola's Serial Peripheral Interface (SPI), Motorola's Serial Communication Port (SCP), National Semiconductor Corporation's Microwire, and other industry standards.

5 SSI signals are supplied:

1. Clock
2. Data In
3. Data Out
4. CS1
5. CS2

Wiring Example



Example software for the SSI port is supplied on the Development Kit support CD, this demonstrates how to communicate with a Dallas Semiconductor DS1306 device.

Software Support

The Development Kit contains a support CD-ROM that incorporates reference material and software utilities that can be used to support the PEGASUS. The following sections describe the software support and provide guidelines for using the drivers supplied on the CD.

Datalight ROM-DOS 6.22

If your PEGASUS board is fitted with flash memory it will be supplied with a license for Datalight's ROM-DOS 6.22 operating system. This operating system will be pre-installed on the flash drive.

ROM-DOS is a Microsoft MS-DOS compatible operating system, which has been specifically designed for embedded systems. The system and command files are physically much smaller, but still provide full compatibility to allow standard DOS applications to run without modification. ROM-DOS supports all the standard utility files like SYS, PRINT, MODE, FDISK, FORMAT etc. These files are supplied on the support CD-ROM and can be used as required.

A full user manual for ROM-DOS is also supplied on the CD that provides detailed information on the operating system and supported interrupts and features.

Datalight FlashFX Flash Filing System

The flash memory incorporated onto the PEGASUS is configured as a silicon read/write disk drive. This disk is supported using Datalight's FlashFX software. This software is designed to enable the disk to be accessed using standard DOS routines. The FlashFX software is installed during the POST process as a BIOS extension. This enables the flash disk to be used as a boot disk and this will be the default boot device if a hard disk drive is not present in the system. When shipped the flash memory will be formatted and configured as a ROM-DOS system disk.

The FlashFX software has been designed to incorporate wear leveling algorithms. The wear leveling ensures that the flash memory is used evenly and that no one sector is continually being written to. This enables the write performance of the flash device to be maximized.

The support CD contains utilities that can be used to ensure that the flash disk is configured correctly (See the README file in the FlashFX section of the support CD-ROM). If the flash disk gets corrupted for any reason these utilities can be used to reformat the flash. The CD can be used as a ‘Bootdisk’, this provides an automatic mechanism for reformatting the flash memory and copying the ROM-DOS operating system.

FUPDATE Utility

The FUPDATE utility provides users with the ability to update the BIOS used on the board. This may be required if you experience any incompatibilities with the BIOS and a later version is available. Please contact Arcom Control Systems if you need to have support, which is not in the standard BIOS. The FUPDATE utility can be invoked from the DOS command line and should be supplied with the BIOS image file name required i.e. FUPDATE BIOS.BIN. The program will automatically load the file and prompt you to confirm that you want to reprogram the BIOS ROM. Once the device has been reprogrammed you should reboot the system.

The FUPDATE utility can be found in the “\BIOS” directory on the ROMDOS Development Kit CDROM.

Note:- Make sure NO memory managers or TSR are running, as this will cause the update to fail. Also during this process it is important that you do not switch off the board as this may cause the BIOS ROM to be corrupted and this will stop the board from operating.

Bootdisk

The development CDROM is also a boot disk. A menu is provided once the board has started to boot to allow you to perform some pre-defined operations. These include reformatting the flash disk, copying the system files to the flash disk and re-installing the Development Kit flash image. Once the appropriate selection has been made the software will perform the operation automatically.

Example Code

The development CDROM contains example code for various PEGASUS board functions, these are:

- SSI Interface
- Watchdog
- Userlinks

These are found in the “\EXAMPLE” directory on the CDROM.

Hardware Support Information

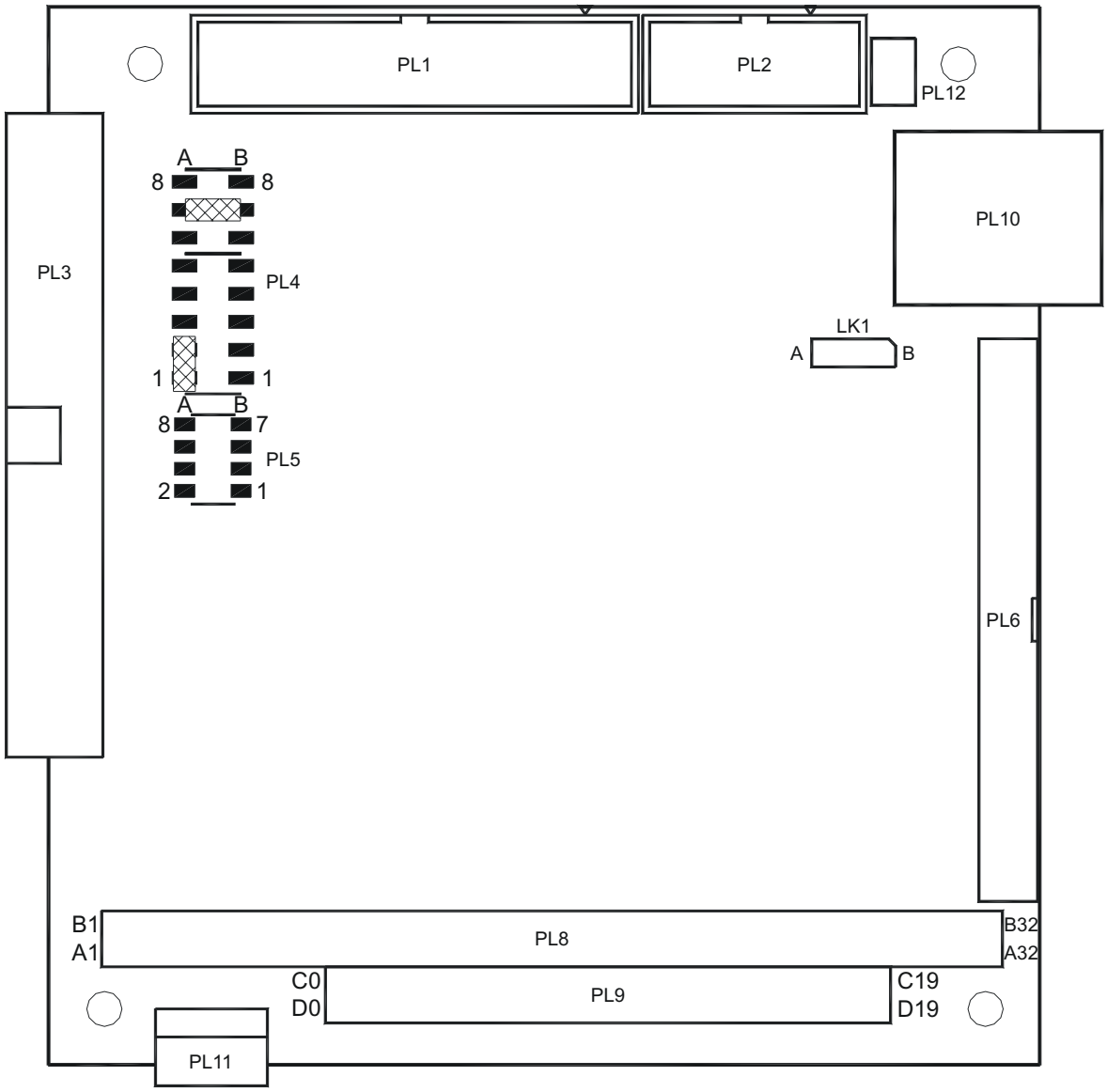
As the PEGASUS is a compatible PC/AT processor board any standard PC reference guide will provide information on hardware aspects of the board. The following material has been included on the support CD-ROM as it relates to specific features of the board, which may not be available from other sources. This information is stored in the REFERENCE directory:-

1. AMD SC520 data sheet.
2. National Semiconductors DP83815 Ethernet Controller data sheet.
3. SMSC 37B727 SuperIO Controller data sheet.
4. Intel Strata Flash Data Sheet.
5. PC/104 Specification.

If you are trying to locate information on a specific function, which is not included above, then refer to Appendix C, which contains references to some relevant Internet sites.

Please refer to the documentation on the CD-ROM for the latest information.

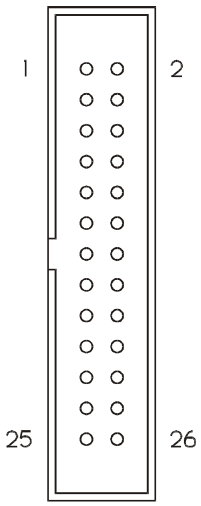
Appendix A – Connections



Connector	Description	Mating Connector Type (Part Number)
PL1	Parallel Port Interface	Standard 0.1” 26-way (2 row) IDC socket
PL2	PS/2 Keyboard / Mouse	Standard 0.1” 10-way (2 row) IDC socket
PL3	4 x Serial Ports	Standard 0.1” 40-way (2 row) IDC socket
PL4	Link Header – See Link section	
PL5	SSI Interface	
PL6	IDE Interface	Standard 2mm 44-way (2 row) IDC socket
PL7	Factory use only	
PL8	8 Bit PC/104 Expansion	
PL9	16 Bit PC/104 Expansion	
PL10	Ethernet	8-way RJ45 plug
PL11	Power Header	4-way molex floppy drive power type
PL12	Ethernet Status Header	Standard 2mm 6 way

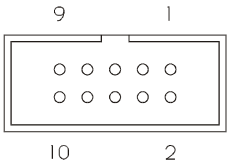
PL1 - LPT Parallel Port
26-way 0.1" IDC header

Pin	Signal Name	Pin	Signal Name
1	/STROBE	2	/AUTO
3	D0	4	/ERROR
5	D1	6	/INIT
7	D2	8	/SELECT
9	D3	10	Ground
11	D4	12	Ground
13	D5	14	Ground
15	D6	16	Ground
17	D7	18	Ground
19	/ACK	20	Ground
21	BUSY	22	Ground
23	PAPER END	24	Ground
25	Printer Selected	26	No Connect



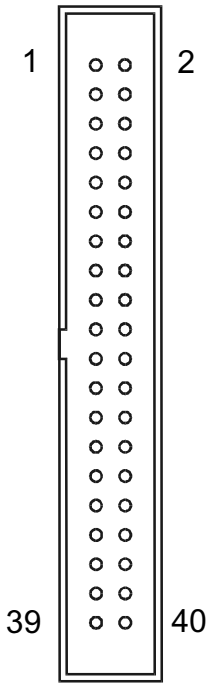
PL2 – PS2 Keyboard / Mouse
10-way 0.1" IDC header

Pin	Signal Name	Pin	Signal Name
1	+5V	2	Keyboard Data
3	Keyboard Clock	4	GND
5	+5V	6	+5V
7	Mouse Data	8	Mouse Clock
9	Ground	10	Ground



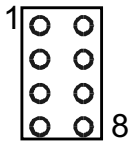
PL3 – 4 x COMS Ports
40-way 0.1" IDC header

Pin	Signal Name	Pin	Signal Name
1	N/C	2	N/C
3	N/C	4	N/C
5	RX/TX+	6	RX/TX-
7	RX+	8	RX-
9	N/C	10	GND
11	DSR3	12	GND
13	RX3	14	TX3
15	DTR3	16	DCD3
17	RTS3	18	CTS3
19	RI3	20	N/C
21	DCD2	22	DSR2
23	RX2	24	RTS2
25	TX2	26	CTS2
27	DTR2	28	RI2
29	GND	30	N/C
31	DCD1	32	DSR1
33	RX1	34	RTS1
35	TX1	36	CTS1
37	DTR1	38	RI1
39	GND	40	N/C



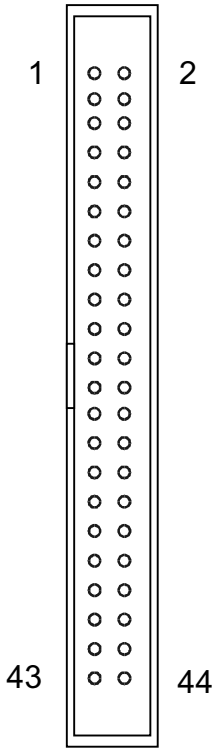
PL5 – SSI Interface
8-way 2mm header

Pin	Signal Name	Pin	Signal Name
1	+5V	2	Ground
3	+5V	4	Data In
5	Data Out	6	Clock
7	CS1	8	CS2



PL6 - IDE HDD Connector
44-way 2mm IDC header

Pin	Signal Name	Pin	Signal Name
1	/RESET	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	Ground	20	No Connect
21	DREQ	22	Ground
23	/IOW	24	Ground
25	/IOR	26	Ground
27	/IOCHRDY	28	Ground
29	DACK	30	Ground
31	INTR	32	/IOCS16
33	A1	34	No Connect
35	A0	36	A2
37	/CS0	38	/CS1
39	LED	40	Ground
41	VCC	42	VCC
43	GND	44	GND



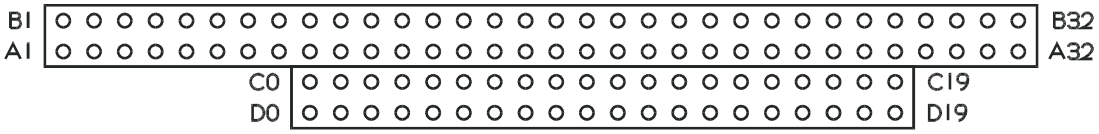
PL8 & PL9 - PC/104 Interface

Both 8-bit and 16-bit modules can be fitted to the PEGASUS. The board complies with the PC/104 specification with the exception that the /MASTER & REFRESH signal lines are not implemented on the 40-way connector. The PEGASUS is therefore the only master allowed in the system.

Care should be taken when installing modules, especially 16-bit types. Ensure that all the pins are correctly aligned with the sockets on the PEGASUS before pushing home. The module should then be secured with the fixing kit provided.

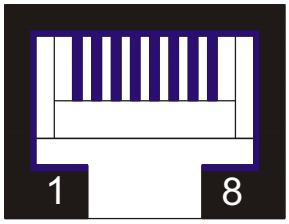
Row A & B - 64 way 0.1" Non-Stackthrough PC/104 compatible connector
Row C & D - 40 way 0.1" Non-Stackthrough PC/104 compatible connector

Pin	Row A	Row B	Row C	Row D
0	-	-	Ground	Ground
1	/IOCHCK	Ground	/SBHE	/MEMCS16
2	D7	RSTDRV	LA23	/IOCS16
3	D6	+5V	LA22	IRQ10
4	D5	IRQ9	LA21	IRQ11
5	D4	-5V	LA20	IRQ12
6	D3	DRQ2	LA19	IRQ15
7	D2	-12V	LA18	IRQ14
8	D1	/ENDXFR	LA17	/DACK0
9	D0	+12V	/MEMR	DRQ0
10	IOCHRDY	KEY	/MEMW	/DACK5
11	AEN	/SMEMW	D8	DRQ5
12	A19	/SMEMR	D9	/DACK6
13	A18	/IOW	D10	DRQ6
14	A17	/IOR	D11	/DACK7
15	A16	/DACK3	D12	DRQ7
16	A15	DRQ3	D13	+5V
17	A14	DACK1	D14	MASTER
18	A13	DRQ1	D15	Ground
19	A12	/REFRESH	KEY	Ground
20	A11	SYSCLK	-	-
21	A10	IRQ7	-	-
22	A9	IRQ6	-	-
23	A8	IRQ5	-	-
24	A7	IRQ4	-	-
25	A6	IRQ3	-	-
26	A5	/DACK2	-	-
27	A4	TC	-	-
28	A3	BALE	-	-
29	A2	+5V	-	-
30	A1	OSC	-	-
31	A0	Ground	-	-
32	Ground	Ground	-	-



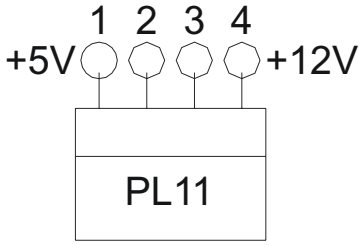
PL10 - Ethernet RJ45
8-way RJ45

Pin	Signal Name
1	TX+
2	TX-
3	RX+
4	No Connect
5	No Connect
6	RX-
7	No Connect
8	No Connect



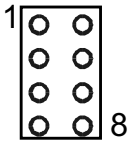
PL11 – Power
4-way Molex

Pin	Signal Name
1	+5V
2	GND
3	VBAT
4	+12V



PL12 - Ethernet Status LED's
6-way 2mm Pin header

Pin	Signal Name	Pin	Signal Name
1	RX/TX	2	GND
3	10-BaseT	4	GND
5	100-BaseT	6	GND



Appendix B – Specification

Temperature:

Operating –20ºC to 70ºC

Storage -20ºto +85ºC

Humidity:

10% to 90% RH (Non-condensing)

Real Time Clock Accuracy:

+/- 1min/month

Software:

Datalight ROM-DOS operating system.

Datalight FlashFX flash filing system

Power Requirements:

+5V +/- 5% 800mA (typical), 1.0A (max)

Battery:

3.0V Lithium 180mAH (CR2032 Coin Cell)

Maximum discharge current 2uA

Dimensions:

PC/104 Compatible Format

90.8mm x 90.4mm (3.575” x 3.550”)

Weight:

96 grams.

MTBF:

150,000 hours
Based on MIL-HDBK-217F using generic failure rates.

Appendix C - Reference Information

Product information, product notices, updated drivers and support material.
24hr-Online ordering System
www.arcomcontrols.com

PC/104 Consortium
PC/104 and PC/104-Plus Specifications. Vendor information and available add on products.
www.pc104.org

PCI Special Interest Group
PCI Bus specification and list of manufacturers.
www.pcisig.org

AMD
AMD Élan™ SC520 processor documentation
www.amd.com

SMSC
SMSC Super I/O documentation
www.smsc.com

Datalight Inc.
ROM-DOS and FlashFX information.
www.datalight.com

General Software
BIOS documentation and support material.
www.gensw.com

Appendix D – Troubleshooting

The PEGASUS board is delivered 'Ready to Run' and will automatically start running and load an operating system when power is applied. Either from the on board flash memory or mechanical disk drive. Once the board is running the information in this manual will provide you with guidelines and connection details for attaching peripherals and using the board.

If you are experiencing problems with a particular feature of the board, please refer to the relevant documentation to ensure that the board is configured correctly. If you are still unable to resolve the problem then contact Arcom Control Systems technical support team who will be able to offer advice and investigate the problem.

If the board does not start running when power is applied, and the display remains blank then there may be a problem with the system configuration. Follow the steps below to determine the cause of the problem:

1. Switch OFF the PEGASUS and disconnect from the power. Switch ON the power supply and measure the output voltage with digital voltmeter (DVM). This should be between +4.85V and +5.25V. If this is incorrect adjust and re-apply the power to the board. If the board does not work go to step 2.

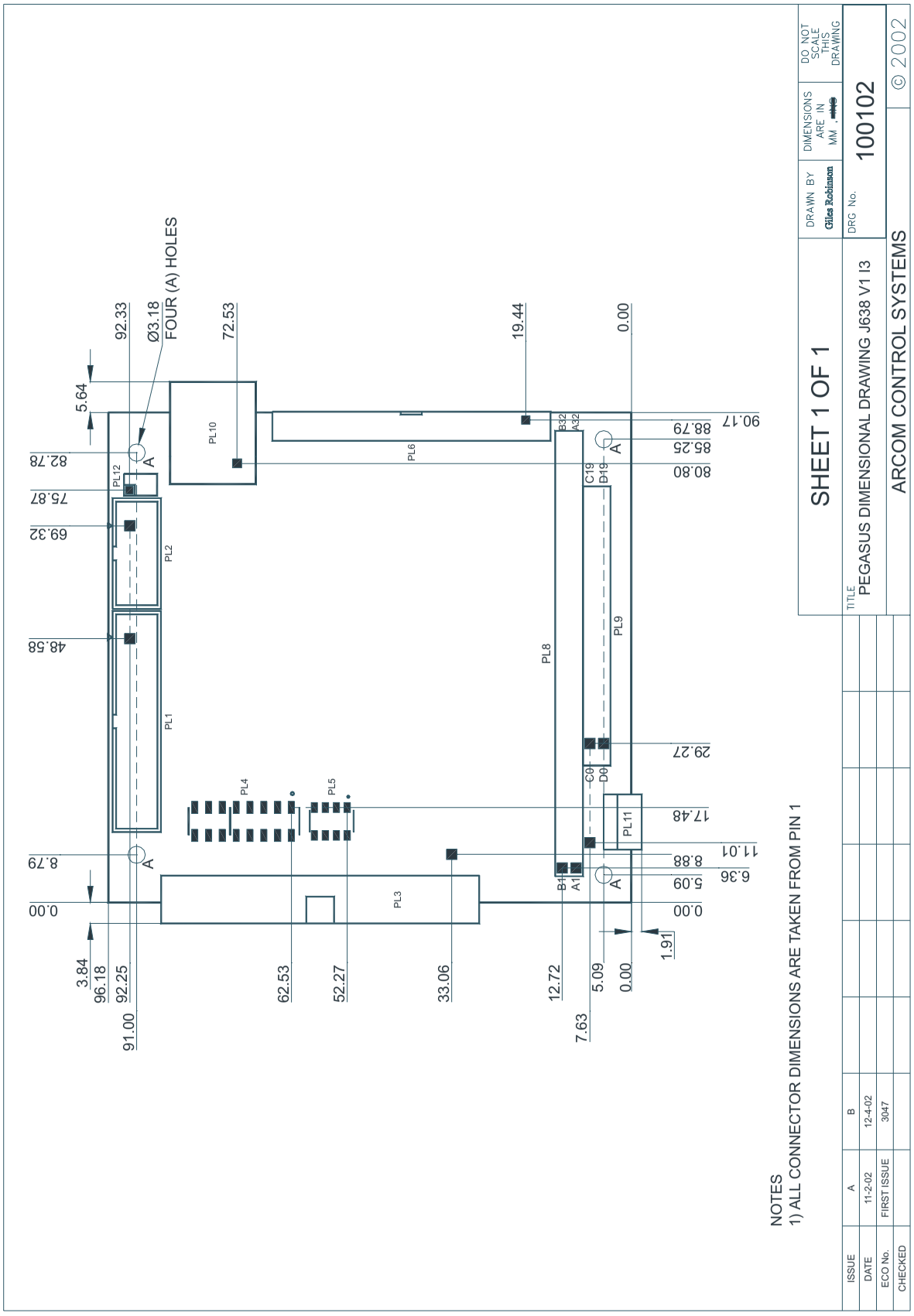
2. With the power supply connected and switched ON. Check the voltage at the power connector PL11 between pin 1 (+5V) and pin 2 (GND). If this voltage is outside the tolerance in step 1, adjust the supply until it meets the specification The board should automatically start running when the supply reaches the minimum voltage, but it is safest to switch OFF then ON again to make sure that the board starts correctly. If the board still does not work go to step 3.

3. Remove any PC/104 adapter boards plugged into the PEGASUS. Apply power to the board and see if it starts working. If the board starts to boot check the link settings on the PC/104 boards to ensure that they do not conflict with devices on the PEGASUS. Once the settings have been checked replace the PC/104 board and apply power. If the board did not start to work go to step 4.

4. Check all link settings are in the default location as listed in the 'Links' section of this manual and remove all cables except Coms and power supply cable. Apply power and check to see if the board starts correctly.

If you have completed all of the above steps and the board still fails to operate, then it will need to be returned to Arcom Control Systems for repair. Please contact the technical support department who will be able to give details of the returns procedure.

Appendix E – Mechanical Drawing



Appendix F – Enclosure

Details on the PEGASUS enclosure are available on the Arcom Control Systems website. At www.arcomcontrols.com/ manuals/Enclosures/PEGASUS_ICE_Enclosure.pdf