



Where Automation Connects.



**inRAX<sup>®</sup>**  
**PC56-SLS**

**ControlLogix Platform**  
In-Rack Industrial PC

November 19, 2009

USER MANUAL

## PC56 Modules

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

Temp Code T5

II 3 G

Ex nA IIC T5 X

0° C <= Ta <= 60° C

II - Equipment intended for above ground use (not for use in mines).

3 - Category 3 equipment, investigated for normal operation only.

G - Equipment protected against explosive gasses.

## Warnings

### ATEX Warnings and Conditions of Safe Usage:

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction

- A** Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.
- B** Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- C** These products are intended to be mounted in an IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%. This device must be used only with ATEX certified backplanes.
- D** DO NOT OPEN WHEN ENERGIZED.

### Electrical Ratings

- Backplane Current Load on PC56: 1A @ 5 V DC
- Backplane Current Load on IDE: 1A @ 5 V DC
- Operating Temperature: 0 to 60°C (32 to 140°F)
- Storage Temperature: -40 to 85°C (-40 to 185°F)
- Shock: 30g Operational; 50g non-operational; Vibration: 5 g from 10 to 150 Hz
- Relative Humidity 5% to 95% (non-condensing)
- All phase conductor sizes must be at least 1.3 mm(squared) and all earth ground conductors must be at least 4mm(squared).

### Markings:

CSA/cUL	C22.2 No. 213-1987
CSA CB Certified	IEC61010
ATEX	EN60079-0 Category 3, Zone 2 EN60079-15



## **PC56™ Battery Warning**

PC56 CMOS BIOS settings are protected by a rechargeable battery during power-down situations. The battery must be fully charged before you change BIOS settings. You must keep the unit powered up for a full 20 hours in order to obtain full charge capacity. If the battery is not fully charged, changes to BIOS settings may be lost when the PC56 is removed from its power source. In this situation, the PC56 reverts to its default BIOS settings when power is re-applied.

If the battery is discharged, or the battery enable jumper is removed, the BAT LED will be illuminated red. A fully charged battery should maintain the BIOS settings for 15 days without power.

## **Your Feedback Please**

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about the product, documentation, or support, please write or call us.

### **ProSoft Technology**

5201 Truxtun Ave., 3rd Floor  
Bakersfield, CA 93309  
+1 (661) 716-5100  
+1 (661) 716-5101 (Fax)  
[www.prosoft-technology.com](http://www.prosoft-technology.com)  
[support@prosoft-technology.com](mailto:support@prosoft-technology.com)

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PC56-SLS User Manual  
November 19, 2009

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North America: +1.661.716.5100

Asia Pacific: +603.7724.2080

Europe, Middle East, Africa: +33 (0) 5.3436.87.20

Latin America: +1.281.298.9109



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# 1 Using This Manual

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## 1.1 Who Should Use This Manual

Use this manual if you are responsible for designing, installing, programming, or troubleshooting control systems that use the ProSoft Technology ControlLogix PC56-SLS module.

This manual is a guide for using the PC56-SLS. How you program PC56-SLS or how your application functions depends on the software applications you install on PC56-SLS.

Because of the variety of uses for the products, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in the product literature are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, ProSoft Technology does not assume responsibility or liability (to include intellectual property liability) for actual use.

### **1.1.1 Additional Documentation**

In addition to this manual there is a PC56 "Getting Started Guide". There are also API manuals for the various operating systems. The "Windows API Users Manual" comes on a CD packaged with each PC56-SLS.

Each PC56-SLS component ships with installation instructions. The user manuals and installation instructions are also available from the ProSoft Technology web site at [www.prosoft-technology.com](http://www.prosoft-technology.com).

## 1.2 Reference Material

<b>This Document</b>	<b>By:</b>	<b>Has this ISBN #</b>
PC Systems Architecture Series	MindShare, Inc.	ISBN: 0-201-40993-3
PCI Systems Architecture	Addison-Wesley Publishing Co.	
PC Systems Architecture Series	MindShare, Inc.	ISBN: 0-201-40996-8
ISA Systems Architecture	Addison-Wesley Publishing Co.	
PCI Hardware and Software Architecture and Design	Edward Solari and George Willse	ISBN: 0-929392-28-0



## 2 Product Specifications

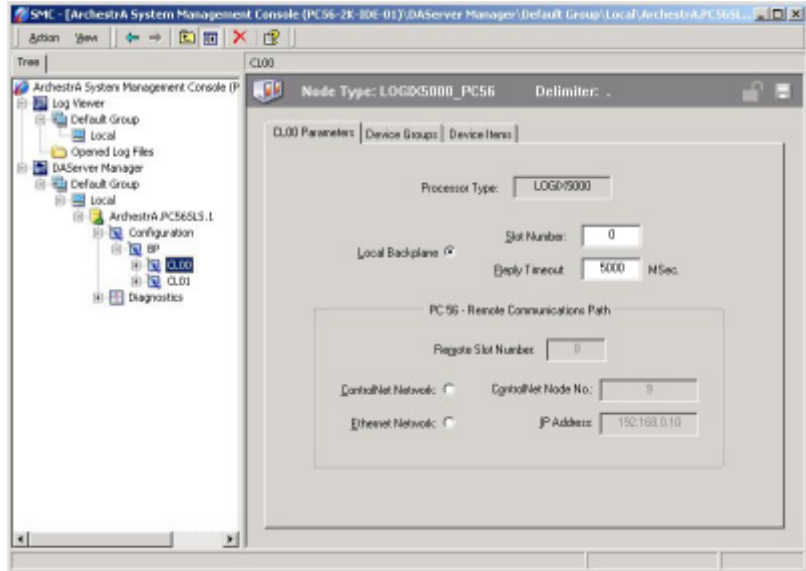
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The PC56 with SLS-DAServer (Data Access Server) allows you to access data from a ControlLogix processor directly across the backplane, and then communicate via SuiteLink, DDE, or FastDDE to local or remote Application Objects.

The PC56-SLS is an industrial PC for the ControlLogix platform that provides high speed communication with both local and remote ControlLogix processors. The PC56-SLS allows users to communicate with ControlLogix processors in an efficient, distributed, and cost-effective fashion. The PC56-SLS includes a graphical interface called Orchestra SMC (Management Console) for easy configuration and diagnostic support.

- Improved reliability and performance: No middleware between client software and ControlLogix hardware
- Ability to run Application Objects: Application Objects can be run locally on the PC56-SLS providing highly reliable applications, because the application is right in the rack with the ControlLogix processor
- Easy Hardware Redundancy using two PC56-SLS modules, and then specifying two IP addresses for a very fast switching mechanism to support Redundancy
- Communicates with the ControlLogix processor directly through the ControlBus backplane, which simplifies installation and improves performance
- No modifications to the ControlLogix processor program are necessary
- Supports multiple ControlLogix processors
- Supports both local (same rack as PC56-SLS) and remote (via 1756-ENET or 1756-CNET modules) processors
- Includes configuration tools. Tag scan rates can be individually configured for optimal performance
- Communicates directly with the ControlLogix processor across the backplane for the most reliable data access.
- Provides data access via Wonderware client such as InTouch.
- Plug and Play. Can be added to new or existing ControlLogix PLCs without changing the control application
- Ability to read tags from networked processors
- No network connection required for local processors



## 2.1 Functional Specifications

The PC56 SLS consists of:

- PC56 Industrial PC for the ControlLogix platform
- SMC (Management Console) for easy configuration
- SuiteLink, DDE, and FastDDE
- Windows XP Professional
- 4 GB Compact Flash Drive

## 2.2 Hardware Specifications

Specification	Description
CPU Processor	Embedded 500 MHz Processor
Memory	512 MB SDRAM System Memory, upgradeable to 1 GB 512 KB SRAM (Battery Backed)
Compact Flash	Compact Flash Type I or II socket
Ethernet Port	10/100T IEEE 802.3 Ethernet 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in section 5.3.2 of IEC 60950: 1991 Ethernet Broadcast Storm Resiliency = less than or equal to 5000 [ARP] frames-per-second and less than or equal to 5 minutes duration
Serial Port	Isolated Serial RS-232 / RS-422 / RS-485
USB Port	Two USB 2.0 / 1.1 High Speed Host
Connectors	VGA, 2 Ethernet, 2 USB
Battery	Rechargeable Lithium Vanadium Pentoxide

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<b>Specification</b>	<b>Description</b>
Jumpers	COM 1 Mode Selection Battery Enable/Clear CMOS Boot to SAFE STATE (default settings) Hardware Debugger Support
Switches	Recessed Reset Switch
LED/Display	4-digit alphanumeric status display 3 Status LEDs 1 User LED Red, Green, Off
Real-Time Clock	Precision RTC accurate to +/- 4 minutes per year
Timers	82C54 Timer Clock 14 MHz - Interrupt Interval 1.67619 US
Video	VGA 1920 x 1440 1280 x 1024 256 1024 x 768 56K 800 x 600 16 M 43 Hz Interlaced 56 through 85 Hz Refresh Rates

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### 3 Introducing PC56

*In This Chapter*

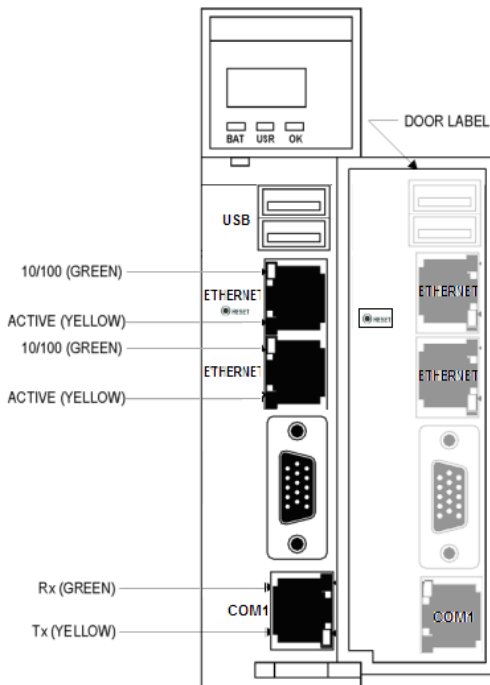
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#### 3.1 PC56 Overview

The PC56 enables you to easily integrate PLC (Programmable Logic Controller) and PC (Personal Computer) programs in a single platform. Think of PC56 as a PC or industrial computer that fits into the Rockwell Automation® 1756 ControlLogix® chassis.

The differences between PC56 and a normal PC are the added functions to better address the needs of the industrial controls user. One of these is the PC56's ability to directly communicate with the Rockwell Automation® 1756 ControlLogix® back plane.

Included with each PC56 are the APIs necessary to develop application code for a variety of Operating Systems. Currently supported Operating Systems include Windows CE and XP.



### 3.1.1 Features

Feature	Description								
CPU	266 MHz Pentium with MMX								
System Memory	128 MBytes SDRAM (standard)								
System Storage	<p>DOS, WinCE and WinNT</p> <p>The PC56 has an onboard Compact Flash™ socket that is used as the primary boot and storage device. There are currently three technologies which can use the onboard Compact Flash™ socket:</p> <p>WinNT - 1 Gb IBM Microdrive™</p> <p>DOS, WinCE - 32M Compact Flash™ . Go to the Sandisk WEB site <a href="http://www.sandisk.com">www.sandisk.com</a> for other sizes</p> <p>WinXP - 1 Gb IBM Microdrive™</p> <p>The Microdrive™, and Compact Flash™ appear as an IDE hard drive to the operating systems.</p> <p>Win2000, WinXP</p> <p>These operating systems are provided with a PC56-IDE25 module which houses a 10Gb hard drive. This module is connected to the PC56 over a high speed PCI bus. The capacity is required to adequately support the Operating Systems.</p> <p>Below are the typical published reliability figures for media used in the onboard CF socket.</p> <p>Compact Flash:</p> <p>Endurance: 300,000 erase/program cycles per logical sector guaranteed.</p> <p>Reliability: &lt; 1 non-recoverable error in 10 E14 bits transferred.</p> <p>Typical Data Transfer Rate: 1.5 Megabytes per second.</p> <p>IBM Microdrive:</p> <table border="1"> <tbody> <tr> <td>Reliability:</td> <td>MTBF 300,000 hours</td> </tr> <tr> <td>Error Rate:</td> <td>&lt; 1 per 10 E13 bits transferred</td> </tr> <tr> <td>Latency Avg.:</td> <td>7.1milliseconds</td> </tr> <tr> <td>Seek Time:</td> <td>12milliseconds</td> </tr> </tbody> </table> <p>Performance:</p> <p>The IBM Microdrive with a maximum data transfer rate exceeding 4 Megabytes per second provides a performance increase over Compact Flash memory.</p>	Reliability:	MTBF 300,000 hours	Error Rate:	< 1 per 10 E13 bits transferred	Latency Avg.:	7.1milliseconds	Seek Time:	12milliseconds
Reliability:	MTBF 300,000 hours								
Error Rate:	< 1 per 10 E13 bits transferred								
Latency Avg.:	7.1milliseconds								
Seek Time:	12milliseconds								
Communication Ports	<p>The PC56 has a wide variety of communications ports accessible from the front of the unit.</p> <p>One 10/100 Base-T Ethernet port</p> <p>Two isolated serial ports</p> <p>    COM1 (RS-232)</p> <p>    COM2 (RS-232, 422, 485)</p> <p>One enhanced parallel port</p> <p>One Universal Serial Bus (USB) port</p> <p>PS/2 style keyboard and mouse connectors</p> <p><b>Note:</b> Refer to the label on the front door of the module for connector location information.</p> <p>In addition you can add network specific modules to the PCI bus (See PC56 Peripheral section following for information)</p>								
BIOS	General Software Inc.								

Feature	Description
Battery	<p>The PC56 uses a rechargeable Lithium Vanadium Pentoxide battery to backup the 512K SRAM memory, real-time clock, and CMOS. The battery is user enabled by a jumper. The battery should last for the life of the module.</p> <p>The module must be powered for approximately twenty hours before it becomes fully charged. After it is fully charged, the battery provides backup power for the CMOS setup and configuration data, the real-time clock, and the 512K SRAM memory for approximately 21 days.</p> <p><b>Note:</b> The battery is not user replaceable.</p>
Three Position Switch	This is a user definable switch. Typically this switch used is by software applications to change operating modes of the application, example: Program, Run or Standby modes.
Reset Switch	Recessed, accessible from the front of the module. This switch will cause a reset to be issued to the module, causing a reboot.
Alphanumeric Display	There is a four character, program controlled, Alphanumeric LED display on the front panel.
LEDs	<p>There are three LEDs on the front of the PC56:</p> <p><b>BAT</b> - This LED is on when the battery charge is low or when the battery enable jumper is not installed.</p> <p><b>USR</b> - This RED and GREEN bicolor LED is under program control.</p> <p><b>OK</b> - This LED is GREEN under normal operation, and RED if there is a PC56 to ControlLogix® back plane communications failure. This LED can also be under program control via the API.</p>
Real Time Clock	The Real Time Clock is accurate to +/- 4 minutes/year over temperature range of 0 to 60 deg. C.
Battery Backed Static RAM	<p>The PC56 includes 512 KBytes of Battery Backed Static RAM. The following API functions are available for addressing SRAM:</p> <p>OCXcip_ReadSRAM</p> <p>OCXcip_WriteSRAM</p> <p>These commands can be used in conjunction with the Early Warning Power Fail Feature to backup critical application data values.</p>
Early Warning Power Failure	<p>As soon as a power failure is detected, the NMI (Non-Maskable Interrupt) is set, and the application will have 50ms until power is lost to perform logic-based tasks. To take advantage of this feature, code must be written to react to the NMI. For example, use the "OCXcip_WriteSRAM" API command to move critical data to battery-backed SRAM.</p> <p>Note that some operating systems are not able to take advantage of features at this level of functionality.</p>
Auxiliary Timer	<p>Win CE Only</p> <p>The PC56 uses an 8254 Timer Chip to implement an auxiliary timer. Using API calls, the timer can be controlled and monitored. The resolution on the timer is 1.67619 uS.</p>

### 3.1.2 PC56 Architecture

The continuing advances in processor technology have influenced the PC56 architecture. The speed at which new processors are introduced helped determine that a sub-module approach be used in the design of the PC56. The PC56 module consists of a two board stack, the ControlLogix® board and the CPU board.

The ControlLogix® board contains the components necessary to communicate with the 1756 backplane as well as all the physical interfaces on the front of the module. The PC56 interfaces with the ControlLogix® backplane through a shared memory window and uses a PCI interrupt. The memory window and interrupt are allocated by the system BIOS during the boot process.

The CPU board houses the processor, the PCI chipset and connector and the Ethernet chipset. These components are most likely to change with new advances in component technology.

### **3.1.3 Compatibility Issues**

PC56 is compatible with the Rockwell Automation 1756 ControlLogix chassis, the processors, ControlLogix software, power supplies, and all ControlLogix® I/O modules.

### **3.1.4 PC56 Software Tools**

In each PC56 package there is a CD with the Windows APIs and its manual. There is also example code included as well as source code for common tasks. Refer to the API manual for information.



## 4 Installing PC56

### *In This Chapter*

❖ Setting Jumpers .....	17
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Review the locations of the communications ports. Use the illustration on the front door of the module to locate the communication ports. Review the drawings included in this chapter to locate the jumpers that must be checked and, or changed as your application requires.

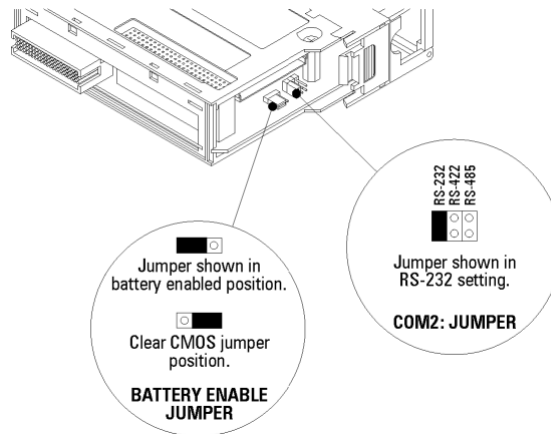
**Important:** Before you install PC56:

- Turn off power to the chassis
- Look at the three jumper settings:
  - COM1 port mode setting
  - Battery Enable/CMOS Clear
  - ControlLogix® Backplane shared memory allocation

### 4.1 Setting Jumpers

There are three jumpers to set, as your application requires.

#### 4.1.1 Battery Enable/ CMOS Clear



### Clearing CMOS Memory

Insert the jumper in the CMOS Clear position momentarily if you want to clear CMOS memory and restore the default BIOS settings.

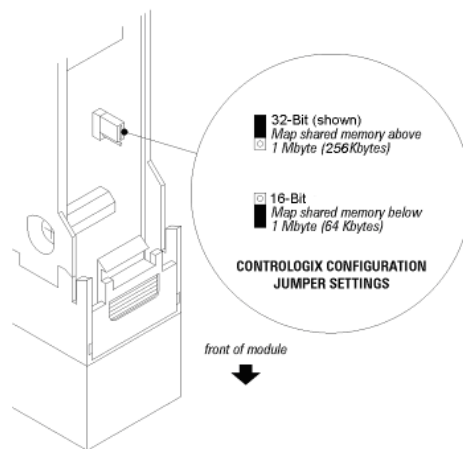
### 4.1.2 Battery Enable

Place the jumper in the Battery Enable position to enable battery back-up of the system Real Time Clock, CMOS Memory, and 512 KByte battery-backed SRAM. If the PC56 is not going to be powered up for a long period of time, then it is advisable to remove the Battery Enable jumper to prevent complete discharge of the rechargeable battery.

### 4.1.3 COM1 Mode Select

Used to set COM1 serial port to one of the three configurations listed.

## 4.2 Shared Memory Allocation Select



This jumper is used to map the ControlLogix® backplane shared memory window. This jumper determines whether there is a 256 KByte shared memory window mapped above 1 MByte, or a 64 KByte shared memory window mapped below 1 MByte.

### Windows CE, XP

The jumper should be set to the 32-Bit position for 32-Bit operating systems such as Microsoft Windows NT. This jumper position will map a 256 KByte shared memory window above 1 MByte.

## DOS

The jumper should be set to the 16-Bit position for 16-Bit operating systems such as MS-DOS. This jumper position will map a 64 KByte memory window below 1 MByte.

### 4.3 Inserting The Module

After you have checked the placement of the jumpers, insert PC56-SLS into the ControlLogix® chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogix® modules.

Align the module with the top and bottom guides and slide into the rack until the module is firmly against the back plane connector. With a firm but steady push snap the module into place. Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.

**Note:** Improper insertion of the module can cause unpredictable system behavior.

**Note:** *If you are installing PC56-SLS with other modules connected to the PCI bus. The peripheral modules will not have holding clips. Make sure all of the modules are aligned with their respective slots before you snap them into place.*

#### 4.3.1 Turn ON power

The PC56 will go through a POST routine that will check RAM and when complete will set the OK LED to GREEN. All other LEDs will be blank or OFF, unless your application sets them.

### 4.4 BOOT Screen On Power Up

```
General Software Pentium Embedded BIOS™ Version 4.3  
Copyright © 2000 General Software, Inc.  
Special Application Module
```

```
00000640K Low Memory Passed  
00013048K Ext Memory Passed (Maximum Ext Memory)  
Hit <Del> if you want to run SETUP.
```

```
© 2000 General Software, Inc.  
Pentium-4.3-6E69-4A4E
```



## 5 Installing Software

### *In This Chapter*

- ❖ Developing PC56 Compatible Software .....21
- ❖ Installing DOS Applications .....22
- ❖ Installing Windows CE Applications .....22

An IDE module or the on-board Compact Flash™ socket can be used as the PC56 primary boot and storage device. The on-board Compact Flash™ socket has a lower data transfer rate than the PC56-IDE25 Module. The system must be configured to meet the needs of your application.

PC56 modules are shipped the Operating System installed on media.

- WinCE: 64M Compact Flash
- All Others: 10G Hard Drive (PC56-IDE25)

Should expedited development assistance be of interest, ProSoft Technology has a Developers Support Kit designed to make the development, deployment, and maintenance of PC56 easy.

### 5.1 Developing PC56 Compatible Software

Developing applications for PC56 is similar to developing applications for a standard PC. An operating system specific Application Program Interface is provided to make a direct connection to the ControlLogix® Backplane. Refer to the appropriate API manual for information on making this connection with your application program.

#### DOS

The following compiler versions have been tested and are known to be compatible with the DOS API:

- Borland C++ V5.02
- Microsoft VC++ V1.52

Note: Microsoft Visual C++ versions above 1.52 no longer support 16-bit development. However, Visual C++ V1.52 is available from Microsoft for those who own later versions of Visual C++.

#### Windows

If you are developing 32-bit applications you will most likely want to use later compilers than those that are listed above for the DOS API. The Windows API has been tested with the above and later versions of the listed compilers.

## 5.2 Installing DOS Applications

After you have finished developing, compiling and testing your DOS application on a development PC, you must copy or install the compiled application onto media accessible to the PC56.

## 5.3 Installing Windows CE Applications

The CompactFlash is divided into two partitions. The first is a FAT16 partition containing the WinCE image (nk.bin). This partition must be FAT in order for the BIOS to boot WinCE. The second partition is formatted as TFAT, and contains the system registry. The first partition appears as \IDE Disk, and the second as \IDE Disk2. Users should use the TFAT partition (IDE Disk2) for program installation and all dynamic user data.

## 6 Troubleshooting

### *In This Chapter*

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If the system has been working properly, verify that the configuration has not been modified. This includes peripheral PCI module installation, jumper settings, BIOS settings, and cable connections. If needed, a module swap will verify a faulty module. Make sure that the system configuration is correct, and that the module you are replacing the suspect one with is a proven good one.

If the system has not been working properly, or you are installing the module for the first time, then review the jumper and BIOS settings.

### 6.1 FAQ

Question:

What do the LEDs mean?

Answer:

**BAT** - If this LED is ON if the battery is low, or if the Battery Enable jumper is not installed. As soon as power is applied to PC56, a low battery will begin to charge and the BAT LED will return to the OFF state within minutes. Twenty hours of continuous, powered-up operation will fully charge the battery.

**USR** - This LED is under program control and can be set to RED, GREEN, or OFF. Review the installed software program guide for information and state definitions.

**OK** - On power up, this LED is set to GREEN. During normal operation, if there is a problem communicating with the ControlLogix backplane it will be set to RED. This LED is under program and API control. It is sometimes referred to as the status LED. Refer to your application and the API manual for information.

Question:

How can I tell if a communications port is working properly?

Answer:

There are two LEDs associated with each communications port: the top one is green and the bottom one is yellow:

**GREEN:** Receive LED. This LED will momentarily turn ON when the serial port is receiving data from another device.

**YELLOW:** Transmit LED. This LED will momentarily turn ON when the serial port is transmitting data to another device.

Question:

Is PC56 slot dependent?

Answer:

No, but some consideration should be given to making room for any peripheral modules you are plugging onto the PCI bus.

Question:

Does the order I plug the PC56 peripherals on to the PCI bus matter?

Answer:

The PC56-IDE module, if used, should always be installed in the first slot to the left of the PC56 (Slot 0). Slot locations are numbered 0 through 2 starting at the first slot location to the left of the PC56. The PCI slot assignment jumper for each PCI peripheral module should be installed to match its corresponding physical slot location.

Question:

What is the maximum number of peripheral PCI modules I can plug onto PC56?

Answer:

Three unless otherwise specified.



## 7 Reference

### *In This Chapter*

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- ❖ Modifying BIOS Settings.....25
- ❖ Reset, Auxiliary Timers and PCI Information.....31

### 7.1 Memory Map

Address (hexadecimal)	Size (Kbytes)	Function
000000 to 09FFFF	640	System RAM
0A0000 to 0AFFFF	64	VGA Video Graphics RAM
0B0000 to 0BFFFF	32	VGA Enhanced Mode Graphics RAM
0B8000 to 0BFFFF	32	VGA Text RAM
0C0000 to 0CBFFF	48	VGA BIOS
0CC000 to CFFFFFF	16	Free Memory
0D0000 to 0DFFFF	64	Free Memory when ControlLogix® configuration jumper is set to 32 bit position. 64 Kbyte allocated by PCI BIOS for dual port memory when ControlLogix® configuration jumper is set to 16 bit position.
0E0000 to 0EFFFF	64	System BIOS
0F0000 to 0FFFFFF	64	System BIOS
0100000 to 07FFFFFFF	1 to 128 Mbyte	System Extended Memory
080000000 to 0C0000000	2 GByte to 3 GByte	Used to map memory windows requested by PCI peripherals

### 7.2 Modifying BIOS Settings

You should consider the needs of your application to determine the appropriate PC56 configuration for your application. Before you change any settings in CMOS make sure your PC56 is configured the way you are intending to use it in your application.

Make sure the Battery Enable/CMOS Clear jumper is installed in the Battery Enable position.

**Important:** Do not use the CMOS Clear jumper to clear memory unless you suspect CMOS memory to have corrupt data. It is recommended that you first examine CMOS memory to determine if the BIOS settings meet your requirements before you change any settings.

### 7.2.1 Changing BIOS Settings

Several PC56 configurations require BIOS changes in order to work properly. The system must be restarted to modify BIOS settings. During the power-on memory test, the following message is displayed:

Hit <Del> if you want to run SETUP

If the system is restarted with a warm boot, this message disappears quickly. Note also that this message display can be disabled by a BIOS setting. In either case, press the **[DEL]** key several times immediately after the system restarts in order to enter the System BIOS Setup Utility.

#### Navigating the Menu Screens

To:	Press this key:
Change the present item to the next/previous possible selection	Page Up] Page Down]
Select a sub-menu	Enter]
Move to another item	arrow keys
Return to the previous menu	Esc]

#### Basic CMOS Configuration

The following is the complete list of BIOS settings. Where appropriate, the default settings have been highlighted. The default settings support a Compact Flash™ disk as the boot media.

Parameter	Value
Date:	Set this value to match the current date.
Time:	Set this value to match the current time.
NumLock: (Possible selections)	Determines the state of the NumLock Key after boot. Enabled Disabled (Default)
Typematic Delay: (Possible selections)	Sets the delay time before a held down key begins repeating. 250 ms (Default) 500 ms 750 ms 1000 ms Disabled
Typematic Rate: (Possible selections)	Sets the number of characters per/sec. displayed by a held down key. <b>30 cps</b> (Default) 24 cps 20 cps 15 cps 12 cps 10 cps 8 cps 6 cps

Parameter	Value
Show "Hit Del": (Possible selections)	Determines if the "Hit <Del> if you want to run SETUP" message is displayed during the system boot. Enabled (Default) Disabled
F1 Error Wait: (Possible selections)	Sets how the system responds to an error on boot up. When enabled, the "Hit F1 to continue" message is displayed and the system waits for a keyboard response if an error condition is detected at boot. Enabled (Default) Disabled
Test Above 1 MB (Possible selections)	Determines if the system memory above 1 MB is exhaustively tested during boot. Enabled (Default) Disabled
DRIVE ASSIGNMENTS: (Possible selections)	A: (None) Floppy (Parallel Port) Pri. Master (IDE CDROM) Pri. Slave (IDE CDROM) Sec. Master (IDE CDROM) Sec. Slave (IDE CDROM) C: Pri. Master (CF Socket) (None) Pri. Master (CF Socket) (Default) Pri. Master (IDE HDD) Pri. Slave (IDE HDD) Sec Master (IDE HDD) Sec. Slave (IDE HDD) Pri. Master (IDE CDROM) Pri Slave (IDE CDROM) Sec. Master (IDE CDROM) Sec. Slave (IDE CDROM) D: (None) (Possible selections same as C:) E: (None) (Possible selections same as C:) F: (None) (Possible selections same as C:)
Boot Method: (Possible selections)	Boot Sector Boot Sector WIN CE If WIN CE is selected, the BIOS will attempt to load the Windows CE binary (NK.BIN) from the root directory instead of the boot record that loads a traditional operating system such as DOS. If the Windows CE binary is not present on the disk then the boot record is loaded and executed. Boot Sector will simply load the boot record into memory and transfer control to it.

Parameter	Value
BOOT ORDER: (Possible selections)	Boot 1st: Drive C: Boot 2nd: None Drive A: Drive C: Drive D: None
IDE DRIVE GEOMETRY: (Possible selections)	Pri. Master: AUTOCONFIG, CHS Pri. Slave: Not Installed Sec. Master: Not Installed Sec. Slave: Not Installed Not Installed AUTOCONFIG, CHS AUTOCONFIG, LBA
Memory Base:	640KB Shows the amount of system base memory.
Ext:	127MB Shows the amount of system extended memory

**Default Peripheral Configuration**

The following table shows the default **Peripheral Configuration** settings. These settings should not ordinarily be changed unless required for your software or peripheral hardware configuration.

Parameter	Value
Parallel Port: (Possible selections)	Enabled Enabled Disabled
Parallel Port IRQ: (Possible selections)	7 5, 7
Parallel Port Address: (Possible selections)	378h 378h, 278h, 3BCh
Parallel Port Mode: (Possible selections)	Printer Printer (Standard IBM XT/AT compatible parallel port) SPP (PS/2 type bi-directional parallel port) ECP (Extended Capabilities Port)
UART 1: (Possible selections)	Enabled Enabled Disabled
UART 1 Address: (Possible selections)	3F8h 3F8h, 2F8h, 3E8h, 2E8h, 220h, 228h, 238h, 338h
UART 1 IRQ: (Possible selections)	4 3, 4, 5, 7
UART 2: (Possible selections)	Enabled Enabled Disabled

Parameter	Value
UART 2 Address:	2F8h
(Possible selections)	3F8h, 2F8h, 3E8h, 2E8h, 220h, 228h, 238h, 338h
UART 2 IRQ:	3
(Possible selections)	3, 4, 5, 7
IRQ Assignments:	The following Interrupt Requests can be assigned to PCI or ISA. The default settings are shown. An IRQ assigned to PCI will be made available for mapping to a PCI interrupt by BIOS during boot. An IRQ assigned to ISA will be reserved and will not get mapped to a PCI interrupt.
	IRQ3: ISA
	IRQ4: ISA
	IRQ5: PCI
	IRQ7: ISA
	IRQ9: PCI
	IRQ10: PCI
	IRQ11: PCI
	IRQ15: ISA
L2 Cache:	Enabled (Default)
(Possible selections)	Disabled

### Configuring BIOS Remotely

You can use a remote PC such as your Desk Top or Lap Top to change the BIOS settings in the CMOS memory of PC56. This method can be used if a monitor and keyboard are not connected to PC56.

#### **To Configure BIOS Remotely You Need:**

- A PC56
- A Desk Top or Lap Top PC
- A null-modem serial cable
- Emulation software capable of emulating a VT100, 102 or ANSI terminal. The "Hyper Terminal" program that comes with Microsoft Windows is the emulation program most often used in this situation.

#### **To remotely change BIOS settings:**

- 1 Connect the null-modem serial cable between COM2 of PC56 and the serial port of your Desk Top or Notebook computer.

**Important:** *The remote setup function only works on COM2 of PC56.*

- 2 Run the terminal emulation software on your PC.
- 3 Set the serial port parameters to:
  - 19200 bps
  - 8 data bits
  - 1 stop bit
  - No parity
  - Software flow control (XON/XOFF)

- 4 Activate the remote setup by holding down the space bar on the remote PC while turning on, or resetting PC56.
- 5 Release the space bar when the BIOS sign-on message appears on the remote PC.
- 6 When prompted during the memory test:
  - o Press **[CTRL-C]** on your PC. This will cause PC56 to enter the setup mode.

**Important:** *You are now in " BIOS Set Up Mode" any changes you make to the BIOS settings will be changes made in CMOS memory. These changes will only be permanent if you save these changes before exiting.*

After you enter the remote setup, the keys function differently than if you entered setup with a keyboard and display connected directly to PC56.

The following table describes the keys used to navigate the screen in Remote Setup:

Use This Key:	
<b>[TAB]</b>	move one field to the right
<b>N/A</b>	move one field to the left
<b>[CTRL-E]</b>	move one field up
<b>[CTRL-X]</b>	move one field down
<b>[Esc]</b>	return to previous menu
<b>+/-</b>	Toggle between options in a field

### Saving BIOS Settings

Select the **Write to CMOS and Exit** option from the main menu to save changes and exit BIOS setup. Selecting **[Esc]** or **Exit** without changing CMOS will exit CMOS Setup and Configuration without saving any changes.

## 8 Reset, Auxiliary Timers and PCI Information

### *In This Chapter*

- ❖ Overview ..... 31
- ❖ Using the Serial Port ..... 32
- ❖ Using the USB Ports ..... 38

### 8.1 Overview

In addition to the standard PC system hardware, PC56 contains the ControlLogix back plane interface circuitry with 512 MB SDRAM (upgradeable to 1 GB), an 82C54 timer, 512KBytes of battery-backed SRAM and a four character alpha-numeric display.

This chapter describes the functionality of the special hardware contained in the PC56 system.

#### **8.1.1 Auxiliary Timer (WinCE Only)**

The 82C54 timer shares a single PCI interrupt with the backplane support hardware, therefore your software must support sharing of this interrupt if you are going to use the timer in an application requiring the timer to initiate an interrupt. The 82C54 timer can also be configured to use the Non-Maskable Interrupt instead of a PCI interrupt. When the timer is configured to use NMI, then interrupt sharing between the timer and back plane hardware is not required..

#### **8.1.2 RESET: Functional Description**

A hardware reset occurs when the PC56 is powered up or when the reset switch is depressed. When a hardware reset occurs, the ControlLogix interface circuitry is reset, and its interrupt is disabled. The 82C54 timer interrupt is also disabled.

#### **8.1.3 PCI Configuration Base Addresses**

The PCI configuration space contains the addresses allocated to the shared RAM of the ControlLogix<sup>®</sup> interface circuitry and the SRAM as well as other PCI relevant addresses. The Vendor ID = 167Ch and Device ID = 0001h.

#### **8.1.4 Four Character Alpha-Numeric Display**

One of the unique features of PC56 is the front panel four character alphanumeric display. This display can scroll ASCII messages or display simple error codes. Refer to the API manual for information on how to write to this display.

## 8.2 Using the Serial Port

The PC56 module has one serial port that is electrically isolated from the backplane but shares a common isolated ground.

### 8.2.1 DOS Users

COM1 and COM2 are configurable through the DOS `mode` command (`mode comn b`) for 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 bit/sec. For example, at the DOS prompt, enter: `MODE COM2 48` to specify 4800 baud rate.

### 8.2.2 Connecting to the Serial Port

COM1 supports RS-232, RS-422, and RS-485. A jumper on the PC56 selects the COM1 mode.

In RS-422, the TXD lines are enabled when RTS is enabled. When RTS is disabled, the TXD lines go to tristate (offline).

In RS-485, the Transceiver is set to transmit when RTS is enabled, and receive when RTS is disabled.

Use the 9-pin, D-shell adapter cable to connect to the RJ45 connectors. See table for maximum cable lengths.

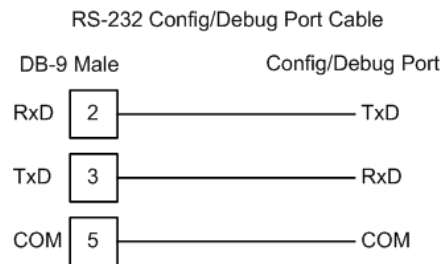
## 8.3 Cable Connections

The application ports on the PC56-SLS module support RS-232, RS-422, and RS-485 interfaces. Please inspect the module to ensure that the jumpers are set correctly to correspond with the type of interface you are using.

Note: When using RS-232 with radio modem applications, some radios or modems require hardware handshaking (control and monitoring of modem signal lines). Enable this in the configuration of the module by setting the UseCTS parameter to 1.

### 8.3.1 RS-232 Configuration/Debug Port

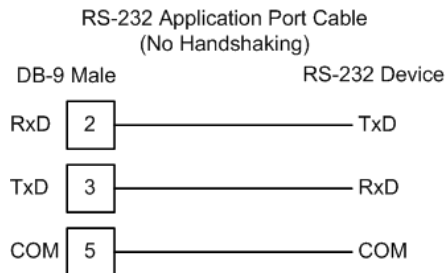
This port is physically an RJ45 connection. An RJ45 to DB-9 adapter cable is included with the module. This port permits a PC based terminal emulation program to view configuration and status data in the module and to control the module. The cable for communications on this port is shown in the following diagram:





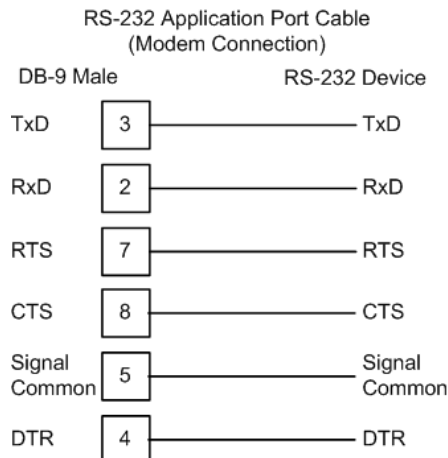
### 8.3.2 RS-232 Application Port(s)

When the RS-232 interface is selected, the use of hardware handshaking (control and monitoring of modem signal lines) is user definable. If no hardware handshaking will be used, the cable to connect to the port is as shown below:



#### RS-232: Modem Connection

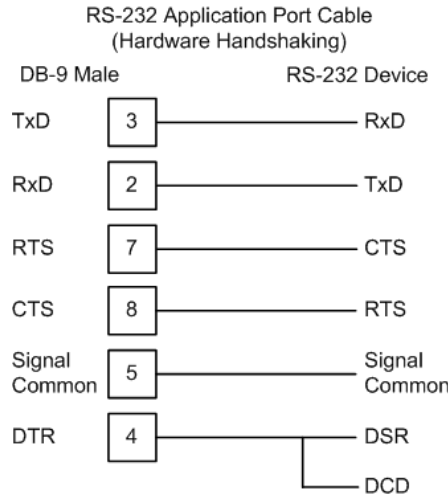
This type of connection is required between the module and a modem or other communication device.



The "Use CTS Line" parameter for the port configuration should be set to 'Y' for most modem applications.

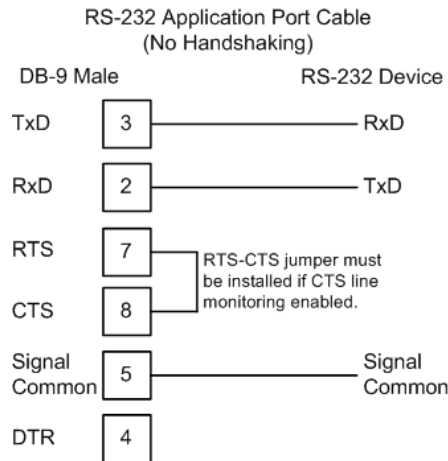
RS-232: Null Modem Connection (Hardware Handshaking)

This type of connection is used when the device connected to the module requires hardware handshaking (control and monitoring of modem signal lines).



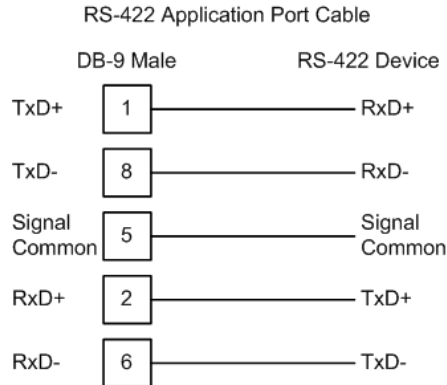
RS-232: Null Modem Connection (No Hardware Handshaking)

This type of connection can be used to connect the module to a computer or field device communication port.



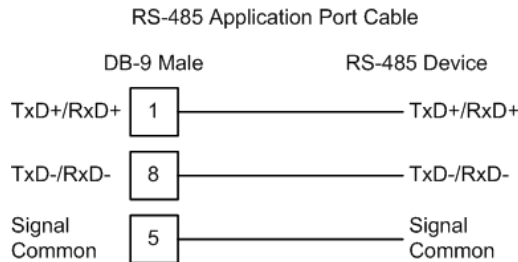
Note: If the port is configured with the "Use CTS Line" set to 'Y', then a jumper is required between the RTS and the CTS line on the module connection.

### 8.3.3 RS-422



### 8.3.4 RS-485 Application Port(s)

The RS-485 interface requires a single two or three wire cable. The Common connection is optional and dependent on the RS-485 network. The cable required for this interface is shown below:

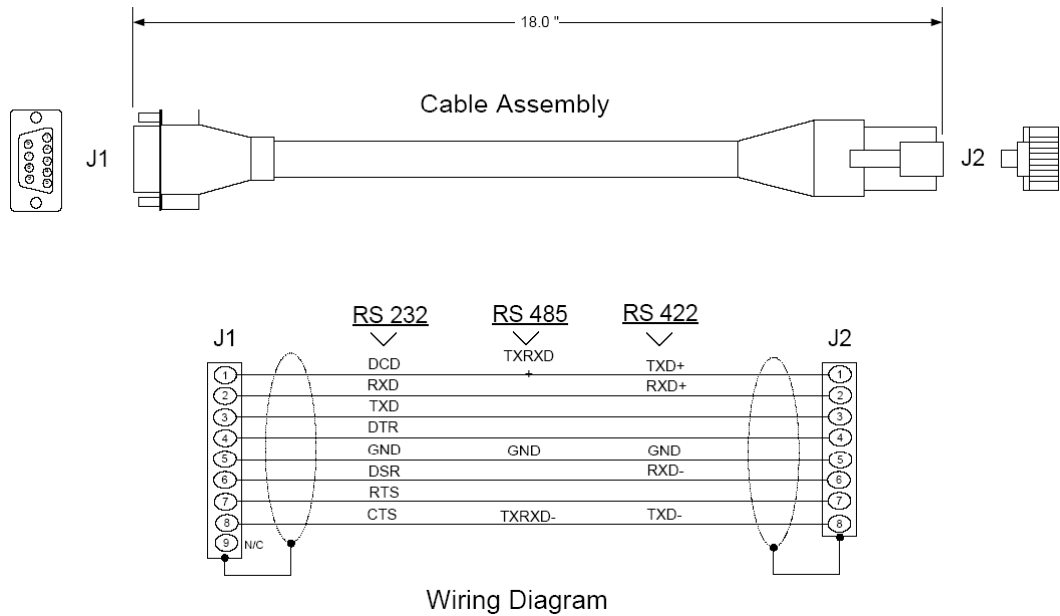


**Note:** Terminating resistors are generally not required on the RS-485 network, unless you are experiencing communication problems that can be attributed to signal echoes or reflections. In this case, install a 120-ohm terminating resistor on the RS-485 line.

#### RS-485 and RS-422 Tip

If communication in the RS-422/RS-485 mode does not work at first, despite all attempts, try switching termination polarities. Some manufacturers interpret +/- and A/B polarities differently.

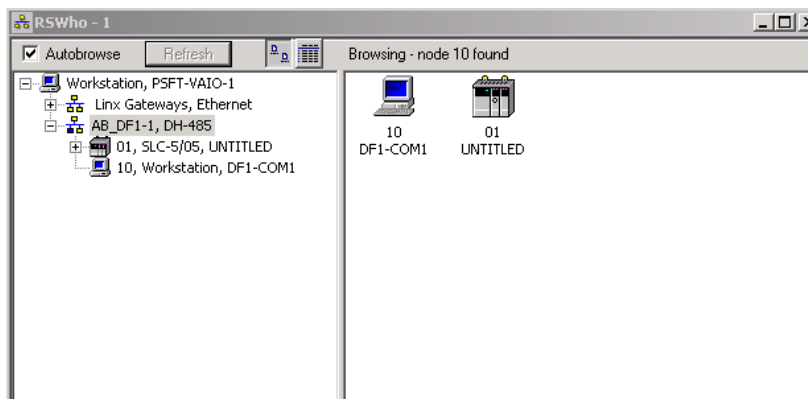
### 8.3.5 DB9 to RJ45 Adaptor (Cable 14)



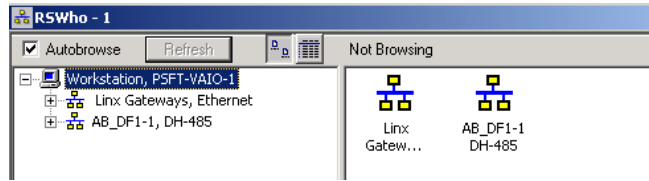
### 8.3.6 Disabling the RSLinx Driver for the Com Port on the PC



The communication port driver in RSLinx can occasionally prevent other applications from using the PC's COM port. If you are not able to connect to the module's configuration/debug port using ProSoft Configuration Builder (PCB), HyperTerminal or another terminal emulator, follow these steps to disable the RSLinx Driver.

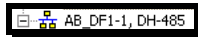
- 1 Open RSLinx and go to Communications>RSWho
- 2 Make sure that you are not actively browsing using the driver that you wish to stop. The following shows an actively browsed network:



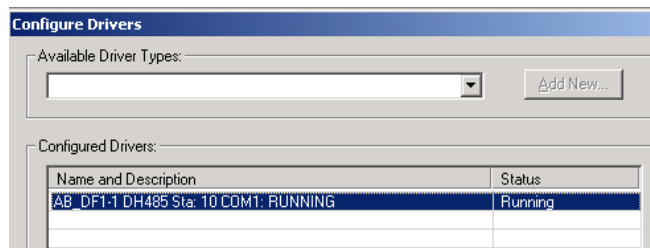
- 3 Notice how the DF1 driver is opened, and the driver is looking for a processor on node 1. If the network is being browsed, then you will not be able to stop this driver. To stop the driver your RSWho screen should look like this:



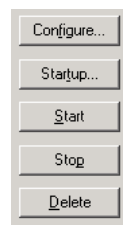
Branches are displayed or hidden by clicking on the  or the  icons.



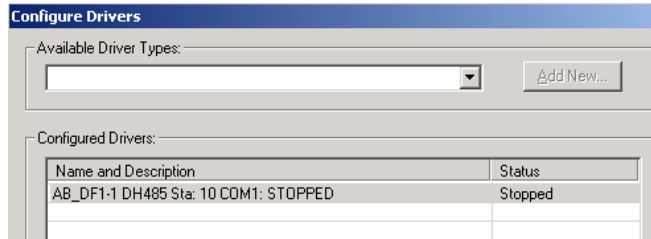
- 4 When you have verified that the driver is not being browsed, go to **Communications>Configure Drivers**  
You may see something like this:



If you see the status as running, you will not be able to use this com port for anything other than communication to the processor. To stop the driver press the "Stop" on the side of the window:



5 After you have stopped the driver you will see the following:



6 Upon seeing this, you may now use that com port to connect to the debug port of the module.

**Note:** You may need to shut down and restart your PC before it will allow you to stop the driver (usually only on Windows NT machines). If you have followed all of the above steps, and it will not stop the driver, then make sure you do not have RSLogix open. If RSLogix is not open, and you still cannot stop the driver, then reboot your PC.

### 8.3.7 Maximum Lengths for Serial Cables

For:	Maximum cable length is:
RS-232	50 ft (15.24 m)
RS-422	4000 ft (1219.20 m)
RS-485	4000 ft (1219.20 m)

## 8.4 Using the USB Ports

PC56 has two high speed Universal Serial Bus 2.0 (USB) ports for connection to a variety of USB devices. USB device drivers are normally provided by the USB device manufacturer.

## 9 Support, Service & Warranty

### *In This Chapter*

- ❖ How to Contact Us: Technical Support..... 39
- ❖ Return Material Authorization (RMA) Policies and Conditions..... 40
- ❖ LIMITED WARRANTY..... 41

ProSoft Technology, Inc. (ProSoft) is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- 1 Product Version Number
- 2 System architecture
- 3 Network details

If the issue is hardware related, we will also need information regarding:

- 1 Module configuration and contents of file
  - Module Operation
  - Configuration/Debug status information
  - LED patterns
- 2 Information about the processor and user data files as viewed through and LED patterns on the processor.
- 3 Details about the serial devices interfaced, if any.

### 9.1 How to Contact Us: Technical Support

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<b>Internet</b>	Web Site: <a href="http://www.prosoft-technology.com/support">www.prosoft-technology.com/support</a> E-mail address: <a href="mailto:support@prosoft-technology.com">support@prosoft-technology.com</a>
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#### **Asia Pacific**

+603.7724.2080, [support.asia@prosoft-technology.com](mailto:support.asia@prosoft-technology.com)  
Languages spoken include: Chinese, English

#### **Europe (location in Toulouse, France)**

+33 (0) 5.34.36.87.20, [support.EMEA@prosoft-technology.com](mailto:support.EMEA@prosoft-technology.com)  
Languages spoken include: French, English

#### **North America/Latin America (excluding Brasil) (location in California)**

+1.661.716.5100, [support@prosoft-technology.com](mailto:support@prosoft-technology.com)  
Languages spoken include: English, Spanish

*For technical support calls within the United States, an after-hours answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.*

#### **Brasil (location in Sao Paulo)**

+55-11-5084-5178, [eduardo@prosoft-technology.com](mailto:eduardo@prosoft-technology.com)  
Languages spoken include: Portuguese, English

## 9.2 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions (collectively, "RMA Policies") apply to any returned Product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

### 9.2.1 All Product Returns:

- a) In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
- b) In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above (page 39). A Technical Support Engineer will request that you perform several tests in an attempt to isolate the problem. If after completing these tests, the Product is found to be the source of the problem, we will issue an RMA.
- c) All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase and receipt date. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft using a shipment method other than that specified by ProSoft or shipped without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
- d) A 10% restocking fee applies to all warranty credit returns whereby a Customer has an application change, ordered too many, does not need, and so on.

### 9.2.2 Procedures for Return of Units Under Warranty:

A Technical Support Engineer must approve the return of Product under ProSoft's Warranty:

- a) A replacement module will be shipped and invoiced. A purchase order will be required.
- b) Credit for a product under warranty will be issued upon receipt of authorized product by ProSoft at designated location referenced on the Return Material Authorization.

### 9.2.3 Procedures for Return of Units Out of Warranty:

- a) Customer sends unit in for evaluation
- b) If no defect is found, Customer will be charged the equivalent of \$100 USD, plus freight charges, duties and taxes as applicable. A new purchase order will be required.



- c) If unit is repaired, charge to Customer will be 30% of current list price (USD) plus freight charges, duties and taxes as applicable. A new purchase order will be required or authorization to use the purchase order submitted for evaluation fee.

The following is a list of non-repairable units:

- 3150 - All
- 3750
- 3600 - All
- 3700
- 3170 - All
- 3250
- 1560 - Can be repaired, only if defect is the power supply
- 1550 - Can be repaired, only if defect is the power supply
- 3350
- 3300
- 1500 - All

### **9.3 LIMITED WARRANTY**

This Limited Warranty ("Warranty") governs all sales of hardware, software and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft, and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

#### **9.3.1 What Is Covered By This Warranty**

- a) *Warranty On New Products:* ProSoft warrants, to the original purchaser, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires three years from the date of shipment (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 39 months. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or used replacement parts. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft.

- b) *Warranty On Services:* Materials and labor performed by ProSoft to repair a verified malfunction or defect are warranted in the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

### **9.3.2 What Is Not Covered By This Warranty**

- a) ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.
- b) This Warranty does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3, "C" or any variant of "C" programming languages) not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges; or (viii) disasters such as fire, flood, earthquake, wind and lightning.
- c) The information in this Agreement is subject to change without notice. ProSoft shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material. The user guide included with your original product purchase from ProSoft contains information protected by copyright. No part of the guide may be duplicated or reproduced in any form without prior written consent from ProSoft.

### **9.3.3 Disclaimer Regarding High Risk Activities**

Product manufactured or supplied by ProSoft is not fault tolerant and is not designed, manufactured or intended for use in hazardous environments requiring fail-safe performance including and without limitation: the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of the product could lead directly or indirectly to death, personal injury or severe physical or environmental damage (collectively, "high risk activities"). ProSoft specifically disclaims any express or implied warranty of fitness for high risk activities.

### **9.3.4 Intellectual Property Indemnity**

Buyer shall indemnify and hold harmless ProSoft and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not ProSoft is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless ProSoft and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party. ProSoft makes no warranty that the product is or will be delivered free of any person's claiming of patent, trademark, or similar infringement. The Buyer assumes all risks (including the risk of suit) that the product or any use of the product will infringe existing or subsequently issued patents, trademarks, or copyrights.

- a) Any documentation included with Product purchased from ProSoft is protected by copyright and may not be duplicated or reproduced in any form without prior written consent from ProSoft.
- b) ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.
- c) Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.
- d) Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.
- e) Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.
- f) **Additional Restrictions Relating To Software And Other Intellectual Property**

In addition to compliance with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

### **9.3.5 Disclaimer of all Other Warranties**

The Warranty set forth in What Is Covered By This Warranty (page 41) are in lieu of all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

### **9.3.6 Limitation of Remedies \*\***

In no event will ProSoft or its Dealer be liable for any special, incidental or consequential damages based on breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Damages that ProSoft or its Dealer will not be responsible for included, but are not limited to: Loss of profits; loss of savings or revenue; loss of use of the product or any associated equipment; loss of data; cost of capital; cost of any substitute equipment, facilities, or services; downtime; the claims of third parties including, customers of the Purchaser; and, injury to property.

\*\* Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas, the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

### **9.3.7 Time Limit for Bringing Suit**

Any action for breach of warranty must be commenced within 39 months following shipment of the Product.

### **9.3.8 No Other Warranties**

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

### **9.3.9 Allocation of Risks**

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

### **9.3.10 Controlling Law and Severability**

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

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