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# 5136-PFB-ISA
# Hardware Guide

**Version 2.07**



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# Contents

Introduction ..... 1

1

1.1 Purpose ..... 2
1.2 Conventions ..... 2
1.2.1 Style ..... 2
1.2.2 Special Notation ..... 2
1.3 Card Overview ..... 3
1.4 Reference Documents ..... 4
1.4.1 Related Products ..... 4
1.5 Warranty ..... 5
1.6 Technical Support ..... 6
1.6.1 Before you call for help... ..... 6
1.6.2 Getting Help ..... 6



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Installation ..... 7

2

2.1 Handling Precautions ..... 8
2.2 Preparing the Computer ..... 8
2.2.1 CMOS Setup ..... 8
2.2.2 Memory Management ..... 9
2.2.3 Windows system.ini ..... 9
2.2.4 Microsoft Windows 95/98 ..... 9
2.3 Hardware Installation ..... 14
2.4 Setting the Switches and Jumpers ..... 16
2.4.1 Port Address ..... 16
2.4.2 Transmit Enable Jumper ..... 19
2.4.3 Flash Write Enable Jumper ..... 19
2.4.4 Shared Interrupt Header ..... 19
2.4.5 Installing the Card ..... 20
2.5 Installing the Card Software ..... 21
2.5.1 5136-PFB-ISA Files ..... 21
2.5.2 COM PROFIBUS Files ..... 21
2.5.3 Set a Path (Optional) ..... 21
2.6 Loading Software Modules to the Card..... 22
2.6.1 PFBINST ..... 22
2.6.2 PFB1PGRM ..... 29
2.6.3 PFBRUN ..... 35
2.6.4 Return Values ..... 39
2.7 Connecting to a Network ..... 40
2.8 The Card LEDs ..... 42
2.9 Troubleshooting Installation ..... 43
2.10 Using Flash Memory ..... 45

Card Registers ..... 47

3

3.1 Card Registers ..... 48
3.1.1 Register Offsets ..... 48
3.1.2 The Board Control Register (BCR) ..... 48
3.1.3 The Memory Control Register (MCR) .50
3.1.4 The Memory Page Register (MPR)..... 50
3.1.5 The Interrupt Control Register (ICR) ....51

Technical Data ..... 53

A



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# 1

# *Introduction*

This chapter describes the following:

- the purpose of the manual
- the style conventions used in the manual
- an overview of the card
- reference material
- warranty and technical support information



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## 1.1 Purpose

This document is a hardware user's guide for the SST 5136-PFB-ISA interface card under DOS, Windows 3.1, Windows NT and for 16-bit applications under Windows 95/98. This card allows an application running on a host computer to communicate with ProfiBus networks, using ProfiBus DP, FDL and FMS.

## 1.2 Conventions

### 1.2.1 Style

The following conventions are used throughout the manual:

- Listed items, where order is of no significance, are preceded by bullets.
- Listed items, to be performed in the order in which they appear, are preceded by a number.
- References to commands, or dialog boxes are *italicized*.
- User entry text is in `Courier 9 pt` font
- Buttons that the user may press are in SMALL CAPS.

### 1.2.2 Special Notation

The following special notations are used throughout the manual:



Warning messages alert the reader to situations where personal injury may result. Warnings are accompanied by the symbol shown, and precede the topic to which they refer.



Caution messages alert the reader to situations where equipment damage may result. Cautions are accompanied by the symbol shown, and precede the topic to which they refer.



A note provides additional information, emphasizes a point, or gives a tip for easier operation. Notes are accompanied by the symbol shown, and follow the text to which they refer.



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## 1.3 Card Overview

The 5136-PFB-ISA card can:

- act as a DP slave
- act as a DP master
- send and receive FDL (layer 2) messages
- send and receive FMS messages

The card supports simultaneous operation in all these modes.

The card supports the standard ProfiBus baud rates of 9.6K, 19.2K, 93.75K, 187.5K, 500K, 750K, 1.5M, 3M, 6M and 12M baud.

The card has an onboard Intel i960 processor with 512 Kbytes of local RAM.

The card has an additional 256 Kbytes of RAM that is shared with the host in 16 Kbyte pages. The host determines which 16 Kbyte page of this shared RAM is mapped into the host memory by writing to a register on the card. This block of memory contains all the tables and buffers that are used to pass information between the interface card and the application software running in the host computer. This approach makes for a fast and simple connection between host application and card software. The host computer uses the loader program included on the distribution disk to load a software module into card memory.

In addition, the card has 512 Kbytes of sectored flash memory, for storage of programs and configuration data. The host computer uses the utility included on the distribution disk to store a software module into flash memory. ProfiBus configuration information may also be stored in flash.



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## 1.4 Reference Documents

For information on ProfiBus, refer to one of the following:

- ProfiBus standard DIN 19 245 parts 1, 2 and 3. Part 1 describes the low level protocol and electrical characteristics, part 2 describes FMS, part 3 describes DP
- European standard EN 50170
- ET 200 Distributed I/O System Manual, 6ES5 998-3ES22

### 1.4.1 Related Products

SST has the following related ProfiBus products:

- 5136-PFB-104, a 104 version of the 5136-PFB-ISA
- 5136-PFB-VME, a VME version of the 5136-PFB-ISA, which uses the same memory map
- 5136-PBMS, a Multi-slave ISA card, allowing 1 to 125 possible DP slave stations to be emulated or monitored on one physical Profibus connection
- 5136-PFB-PCI, a PCI version of the 5136-PFB104
- 5136-PFB-STD, a STD-32 version of the 5136-PFB-ISA



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## 1.5 Warranty

SST guarantees that all new products are free of defects in material and workmanship when applied in the manner for which they were intended and according to SST's published information on proper installation.

The Warranty period for the 5136-PFB-ISA is 10 years from the date of shipment.

SST will repair or replace, at our option, all products returned freight prepaid which prove, upon examination, to be within the Warranty definitions and time period.

The Warranty does not cover costs of installation, removal or damage to user's property or any contingent expenses or consequential damages. Maximum liability of SST is the cost of the product(s).

### Product Returns

If it should be necessary to return or exchange items, please contact SST for a Return Authorization number.

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## 1.6 Technical Support

### 1.6.1 Before you call for help...

Please ensure that you have the following information readily available before calling for technical support.

- Card type and serial number
- Computer make and model and hardware configuration (other cards installed)
- Operating system type and version
- Details of the problem; application module type and version, target network, circumstances that caused the problem

### 1.6.2 Getting Help

Technical support is available during regular business hours by telephone, fax or email from any SST office, or from the company Web site at www.mySST.com.

Documentation and software updates are available on our Web site.

#### North America

Telephone: 519-725-5136, Fax: 519-725-1515

Email: techsupport@mySST.com

#### Europe

Telephone: +49/(0)7252/9496-30, Fax: +49/(0)7252/9496-39

Email: sst@woodhead.de

#### Asia

Telephone: +81-4-5224-3560, Fax: +81-4-5224-3561

Email: techsupport@woodhead.co.jp



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# 2

# Installation

This chapter describes the following:

- preparing the computer for card installation
- setting the switches and jumpers on the card
- installing the card
- installing the card software
- connecting the card to a ProfiBus network
- downloading software modules to shared memory or flash memory on the card



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## 2.1 Handling Precautions



**Caution**

The 5136-PFB-ISA interface card contains components that are sensitive to electrostatic discharge.

Do not remove the card from its protective bag without following these precautions:

- Adequately ground yourself by touching a grounded object, such as the case of your computer, before handling the card.
- Never touch the backplane connectors or pins. Handle the card by the mounting bracket.
- Always store the card in the protective bag.

## 2.2 Preparing the Computer

The 5136-PFB-ISA requires resources in the host computer, including:

- 8 I/O port addresses
- 16 Kbytes of memory
- an interrupt, if applicable

Reserve resources in the computer and ensure that there are no conflicts with any other hardware in the computer.

Check the following areas to make sure there are no conflicts:

### 2.2.1 CMOS Setup

Make sure that there is no shadow RAM at the same memory location as the card. Accomplishing this depends on the computer type, BIOS, etc. If the computer has a plug and play BIOS, this may be in the plug and play section. Beware of the wording; it may say "Disable shadow ram... disable" which means the disable of the shadow RAM is disabled.

If it is a plug and play computer, ensure that there is an ISA window where the card is located (this is what disables shadow memory.) This is often specified as an ISA shared memory size and an ISAshared memory base but there could be other variations. For the 5136-PFB-ISA, the ISA shared memory size should be set to 16K and the ISA shared memory base should be set to the memory address used for the card (default D000).



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### 2.2.2 Memory Management

A memory manager may try to use the address selected for the card. When the computer starts up, the memory on the card is disabled and the memory manager is unaware of it. When you enable the memory on the card by running the loader, a conflict between the card and the memory manager results and the computer may behave erratically or the loader may fail.

Look in the *config.sys* file for a line: "device=emm386.exe". This is the memory manager supplied with DOS. Tell the memory manager not to use the area occupied by the card.

For example, if the DOS memory manager is being used, and the card is to occupy the 16 Kbyte area from D000 to D3FF, add the option "x=D000-D3FF" to the line that starts the memory manager.

### 2.2.3 Windows system.ini

In the [386Enh] section of the *system.ini* file, there should be a line that reads:

```
EmmExclude=d000-d3ff
```

This line should be there whether you use Windows 95/98 or 3.1.

### 2.2.4 Microsoft Windows 95/98

Hardware may be accessed under Windows 95/98 using the same software as under Windows 3.1. Windows 95/98, however, provides a Control Panel interface to reserve hardware and make it available to software. To configure I/O addresses, memory addresses and interrupt channels, follow these steps.



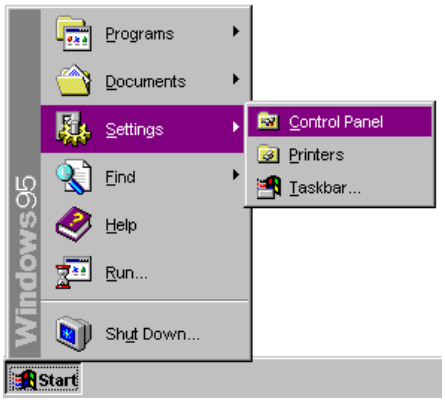
**Note**

If you installed Windows 95/98 over an existing version of Windows 3.1 then remove EMM386 from the *config.sys* file to reserve memory from the Control Panel.



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1. Start the Control Panel.



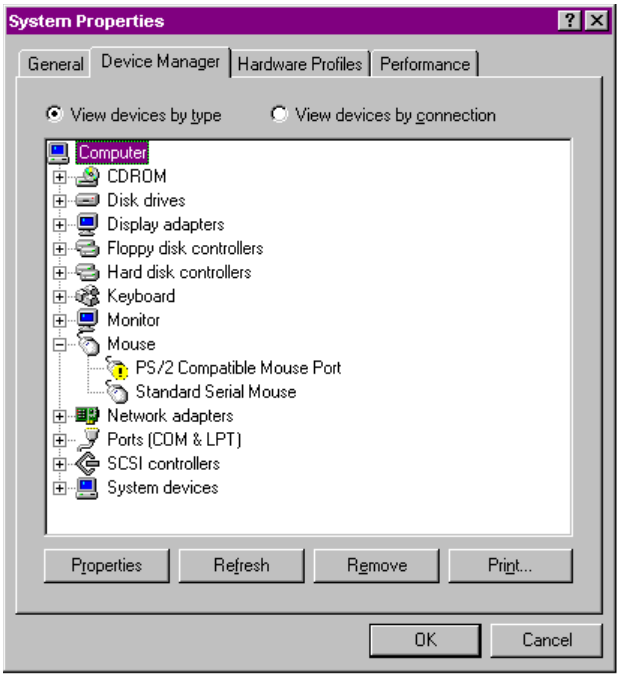

2. Select the *System* icon.






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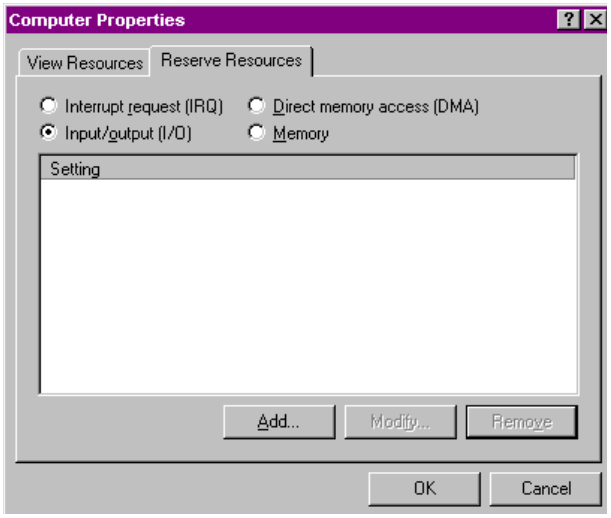
3. Double-click the *Computer* icon in the *Device Manager* property page.



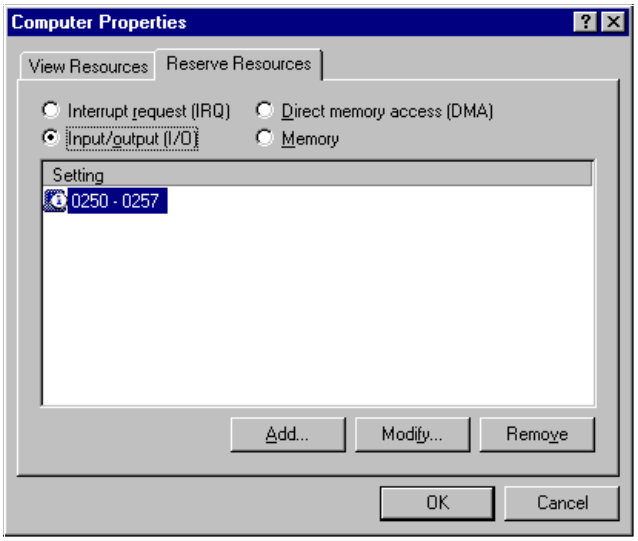



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4. To reserve I/O addresses, select the *Input/Output I/O* option, then click *Add*.



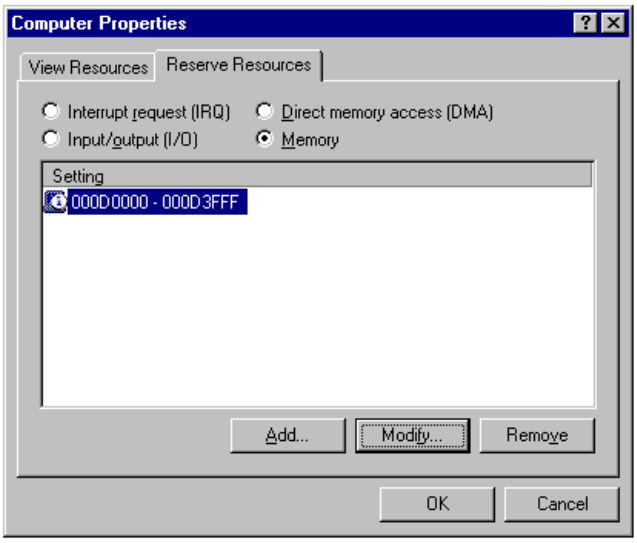

5. Enter the starting and ending I/O address range.






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6. To reserve Memory addresses and Interrupt requests, select the appropriate option, click *Add* and enter the appropriate values.




**Note**

The memory addresses have an extra digit; these are absolute addresses, not segment addresses. For example, D0000 is a absolute address.

7. Click *OK* on the *Computer Properties* dialog box to close it.
8. Restart your system, if required.



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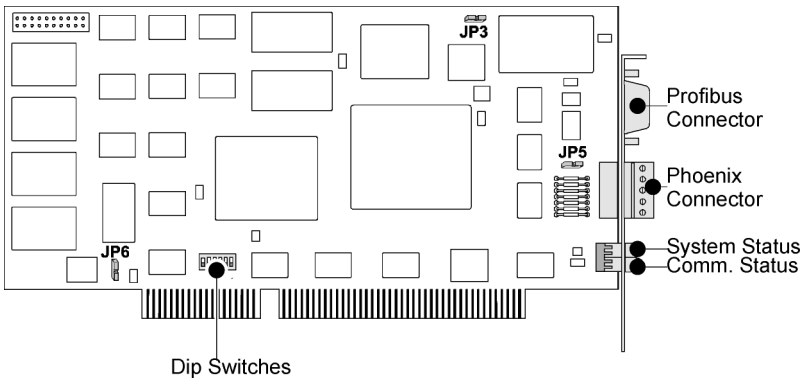
## 2.3 Hardware Installation

Before installing the 5136-PFB-ISA card, select an I/O port address for the card, using the DIP switches on the card.

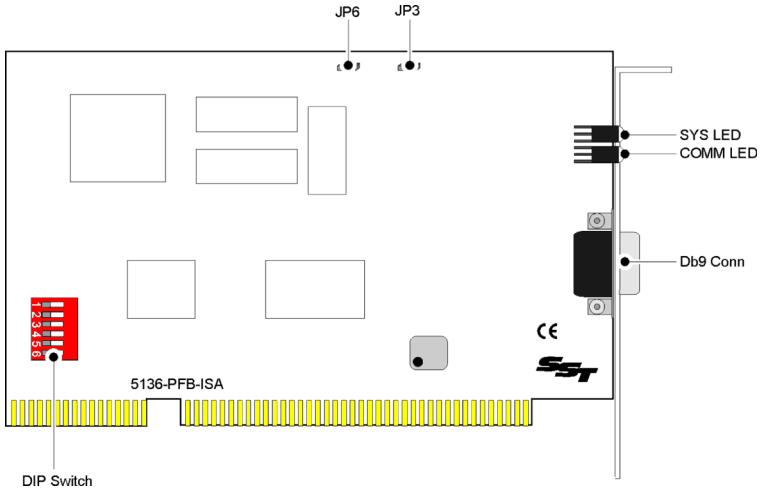
There are also several jumpers that must be set to appropriate locations.

Refer to section 2.1, *Handling Precautions* for information on how to handle the card

This drawing shows version 1.00




This drawing shows card version 3.1.






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**Note**

If your card does not have a Phoenix connector, refer to the note in section 2.7, *Connecting to a Network.*



**Caution**

This equipment is neither designed for, nor intended for operation in installations where it is subject to hazardous voltages and hazardous currents.



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# 2.4 Setting the Switches and Jumpers

## 2.4.1 Port Address

The 5136-PFB-ISA requires 8 I/O port addresses in the host computer. Set the base I/O address using the DIP switches on the card.

The default base port address is 250h. Unless there is a known conflict with some other hardware in the computer, do not change the port location from the default value.

The I/O space required is 8 bytes; therefore, a setting of 250h uses ports 250h-257h.

The following table shows the possible port addresses and the corresponding switch settings.

| Port Address(hex) | 1 | 2 | 3 | 4 | 5 | 6 | Remarks |
|---|---|---|---|---|---|---|---|
| 200 | ON | ON | ON | ON | ON | ON | game port |
| 208 | ON | ON | ON | ON | ON | OFF | |
| 210 | ON | ON | ON | ON | OFF | ON | |
| 218 | ON | ON | ON | ON | OFF | OFF | |
| 220 | ON | ON | ON | OFF | ON | ON | sound card |
| 228 | ON | ON | ON | OFF | ON | OFF | |
| 230 | ON | ON | ON | OFF | OFF | ON | |
| 238 | ON | ON | ON | OFF | OFF | OFF | |
| 240 | ON | ON | OFF | ON | ON | ON | |
| 248 | ON | ON | OFF | ON | ON | OFF | |
| 250 | ON | ON | OFF | ON | OFF | ON | Default |
| 258 | ON | ON | OFF | ON | OFF | OFF | |
| 260 | ON | ON | OFF | OFF | ON | ON | |
| 268 | ON | ON | OFF | OFF | ON | OFF | |
| 270 | ON | ON | OFF | OFF | OFF | ON | |
| 278 | ON | ON | OFF | OFF | OFF | OFF | LPT2 |
| 280 | ON | OFF | ON | ON | ON | ON | |
| 288 | ON | OFF | ON | ON | ON | OFF | |



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| Port Address(hex) | 1 | 2 | 3 | 4 | 5 | 6 | Remarks |
|---|---|---|---|---|---|---|---|
| 290 | ON | OFF | ON | ON | OFF | ON | |
| 298 | ON | OFF | ON | ON | OFF | OFF | |
| 2A0 | ON | OFF | ON | OFF | ON | ON | |
| 2A8 | ON | OFF | ON | OFF | ON | OFF | |
| 2B0 | ON | OFF | ON | OFF | OFF | ON | |
| 2B8 | ON | OFF | ON | OFF | OFF | OFF | |
| 2C0 | ON | OFF | OFF | ON | ON | ON | |
| 2C8 | ON | OFF | OFF | ON | ON | OFF | |
| 2D0 | ON | OFF | OFF | ON | OFF | ON | |
| 2D8 | ON | OFF | OFF | ON | OFF | OFF | |
| 2E0 | ON | OFF | OFF | OFF | ON | ON | |
| 2E8 | ON | OFF | OFF | OFF | ON | OFF | COM4 |
| 2F0 | ON | OFF | OFF | OFF | OFF | ON | |
| 2F8 | ON | OFF | OFF | OFF | OFF | OFF | COM2 |
| 600 | OFF | ON | ON | ON | ON | ON | Game port |
| 608 | OFF | ON | ON | ON | ON | OFF | |
| 610 | OFF | ON | ON | ON | OFF | ON | |
| 618 | OFF | ON | ON | ON | OFF | OFF | |
| 620 | OFF | ON | ON | OFF | ON | ON | |
| 628 | OFF | ON | ON | OFF | ON | OFF | |
| 630 | OFF | ON | ON | OFF | OFF | ON | |
| 638 | OFF | ON | ON | OFF | OFF | OFF | |
| 640 | OFF | ON | OFF | ON | ON | ON | |
| 648 | OFF | ON | OFF | ON | ON | OFF | |
| 650 | OFF | ON | OFF | ON | OFF | ON | |
| 658 | OFF | ON | OFF | ON | OFF | OFF | |
| 660 | OFF | ON | OFF | OFF | ON | ON | |
| 668 | OFF | ON | OFF | OFF | ON | OFF | |
| 670 | OFF | ON | OFF | OFF | OFF | ON | |
| 678 | OFF | ON | OFF | OFF | OFF | OFF | LPT2 |



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| Port Address(hex) | 1 | 2 | 3 | 4 | 5 | 6 | Remarks |
|---|---|---|---|---|---|---|---|
| 680 | OFF | OFF | ON | ON | ON | ON | |
| 688 | OFF | OFF | ON | ON | ON | OFF | |
| 690 | OFF | OFF | ON | ON | OFF | ON | |
| 698 | OFF | OFF | ON | ON | OFF | OFF | |
| 6A0 | OFF | OFF | ON | OFF | ON | ON | |
| 6A8 | OFF | OFF | ON | OFF | ON | OFF | |
| 6B0 | OFF | OFF | ON | OFF | OFF | ON | |
| 6B8 | OFF | OFF | ON | OFF | OFF | OFF | |
| 6C0 | OFF | OFF | OFF | ON | ON | ON | |
| 6C8 | OFF | OFF | OFF | ON | ON | OFF | |
| 6D0 | OFF | OFF | OFF | ON | OFF | ON | |
| 6D8 | OFF | OFF | OFF | ON | OFF | OFF | |
| 6E0 | OFF | OFF | OFF | OFF | ON | ON | |
| 6E8 | OFF | OFF | OFF | OFF | ON | OFF | COM4 |
| 6F0 | OFF | OFF | OFF | OFF | OFF | ON | |
| 6F8 | OFF | OFF | OFF | OFF | OFF | OFF | COM2 |

If you change the switch settings from the default, record the switch settings and the corresponding port address. This information is required in order to run the card loader.

### Port Conflicts with Multiple 5136-PFB-ISA Cards

If port address 2xxh is unavailable, then so is port 6xxh. Similarly, if port 2xxh is free, then port 6xxh is free as well. For example, if the first card is installed at 250h, a second card can be installed at 650h. Similarly, if 2F8h is unavailable (conflict with COM2), then 6F8h is not available either.



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### 2.4.2 Transmit Enable Jumper

Jumper JP5 (TX ENA) controls transmission from the card. To enable transmission, put the jumper across the two pins. To disable transmission, remove the jumper from the card or put it on just one of the pins for storage. The default is transmission enabled. In card version 3.1 or higher, this jumper has been removed.



**Note**

If the card is used in passive monitoring applications such as capturing network messages, this feature (disable transmission) prevents the card from accidentally going active on the network.

### 2.4.3 Flash Write Enable Jumper

Jumper JP6 controls whether or not the host can write to flash memory. To enable writing to flash, put the jumper across the two pins. To disable writing to flash, remove the jumper from the card or put it on just one of the pins for storage. The default is to enable writing to flash memory.



**Note**

If a software module and configuration are in flash, this feature prevents accidentally overwriting the software module or configuration.

### 2.4.4 Shared Interrupt Header

Header JP3 (INT CHAIN) is used when multiple cards share the same interrupt. The header chains the cards together. Construct a cable that connects one of the header pins on one card to one of the header pins on the next card in the chain.

If you are using shared interrupts, contact SST for further information.



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### 2.4.5 Installing the Card

Once you set the switches and jumpers, install the card in the computer.

1. Ensure that the power is off, then open the computer case.
   The card can be installed in any standard 16-bit ISA slot.
2. Press the card firmly into the backplane connector.
3. Tighten the mounting bracket to the host chassis and secure it with a screw.
4. Replace the computer cover and start the computer.



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## 2.5 Installing the Card Software

### 2.5.1 5136-PFB-ISA Files

Run the batch file *install.bat* on the distribution disk to install all the software for the 5136-PFB-ISA. This batch file copies all the files on the distribution disk, including the SST config tools to directory \SSPFBDOS. Tell it the names of the source and destination drives. For example, type:

```
install A: C:
```

### 2.5.2 COM PROFIBUS Files

Run the batch file *\comet\updcomet* to copy the files for configuring the 5136-PFB-ISAwith COM PROFIBUS into appropriate directories. Tell it the name of the main directory containing the COM PROFIBUS files. For example, for version 3.0 of COM PROFIBUS, this directory is *\compb30*, so type:

```
A:\comet\updcomet c:\compb30
```

### 2.5.3 Set a Path (Optional)

To call the loader program from any directory on the hard disk, add the name of the card's software directory to the DOS path. This requires editing the file *autoexec.bat* that executes automatically when the computer boots. For example:

```
path c:\windows\command;c:\sspfbdos;...
```

Refer to your *DOS documentation* for more detailed information.



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## 2.6 Loading Software Modules to the Card

The host computer downloads the appropriate interface software to the card, making it possible to use the card for different applications by simply downloading a different module to the card.

Modules with extension .SS1 load into shared memory. Modules with extension .SSF load into flash memory.

The distribution disk contains two loader programs:

*pfbinst.exe* installs a software module (.SS1) into shared memory

*pfbprgm.exe* installs a software module (.SSF) into flash memory

The program *pfbrun.exe* runs a software module already stored in flash memory.

When running on a standard PCdo not bother with *pfbpgrm* or *pfbrun*. Usually *pfbinst* and *run* modules are run from RAM because it is easier to update the firmware by replacing the.SS1 file.

In embedded systems that do not have a file system, loading modules into flash is preferred. Put the card in a standard PC and use *pfppgrm* to update the module, then put the card back in the embedded environment, where the embedded program performs as a *pfbrun*.

### 2.6.1 PFBINST

This program reads the code for the software module (.SS1) from disk, loads it into the card, and then starts the processor on the card. The loader then waits for the card processor to complete its diagnostics and reports the status of the installation.

The loader is not a TSR (terminate and stay resident program). It simply downloads the program that the processor on the card runs. When it completes execution, it uses no system resources or memory from the host.

The syntax for the loader is:

```
PFBINST <filename> [port] [mem_seg] [irq] [options]
```

- < > indicates a required parameter
- [] indicates an optional parameter

To obtain the syntax for the loader, type `pfbinst` with no other parameters and press *Enter*.



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### Filename (Card Software Module)

Tell the loader which module to download to the card. The extension (*.ss1*) is assumed; do not include it as part of the filename.

The following modules for the 5136-PFB-ISA can be loaded into shared memory using *pfbinst.exe*.

| Module | Purpose |
|---|---|
| pfbprofi.ss1 | PROFIBUS DP/FMS module for shared memory |
| pfbcapt.ss1 | module for capturing network packets, for shared memory |
| pfbdp.ss1 | DP and FDL only module |

### Port

If you change the port address from its default value of 250h, include the port address on the loader command line. The value must match the switch settings on the card or the loader cannot install the software module on the card.

### Mem_seg (Card Memory Address)

The card occupies 16 Kbytes of host memory space. The base address is user selectable. The default segment address is D000. To set the memory address, pass it as a parameter to the loader (*pfbinst.exe*) which writes to a register on the card.

The following table lists the possible locations and describes other hardware that might be using the space. (The MCR bits are described in section 3.1.5, *The Interrupt Control Register (ICR)* ).

| Memory Address | Remarks | MCR Bits 6 5 4 3 2 |
|---|---|---|
| 8000 | Occupied by RAM in >512K systems | 0 0 0 0 0 |
| 8400 | Occupied by RAM in >512K systems | 0 0 0 0 1 |
| 8800 | Occupied by RAM in >512K systems | 0 0 0 1 0 |
| 8C00 | Occupied by RAM in >512K systems | 0 0 0 1 1 |
| 9000 | Occupied by RAM in >512K systems | 0 0 1 0 0 |
| 9400 | Occupied by RAM in >512K systems | 0 0 1 0 1 |
| 9800 | Occupied by RAM in >512K systems | 0 0 1 1 0 |



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| Memory Address | Remarks | MCR Bits 6 5 4 3 2 |
|---|---|---|
| 9C00 | Occupied by RAM in >512K systems | 0 0 1 1 1 |
| A000 | Used by VGA | 0 1 0 0 0 |
| A400 | Used by VGA | 0 1 0 0 1 |
| A800 | Used by VGA | 0 1 0 1 0 |
| AC00 | Used by VGA | 0 1 0 1 1 |
| B000 | Used by monochrome adapter | 0 1 1 0 0 |
| B400 | Used by monochrome adapter | 0 1 1 0 1 |
| B800 | Text area of screen | 0 1 1 1 0 |
| BC00 | Text area of screen | 0 1 1 1 1 |
| C000 | Video BIOS Extensions (VGA) | 1 0 0 0 0 |
| C400 | Video BIOS Extensions (VGA) | 1 0 0 0 1 |
| C800 | Usually free | 1 0 0 1 0 |
| CC00 | Usually free | 1 0 0 1 1 |
| D000 | Usually free | 1 0 1 0 0 |
| D400 | Usually free | 1 0 1 0 1 |
| D800 | Usually free | 1 0 1 1 0 |
| DC00 | Usually free | 1 0 1 1 1 |
| E000 | BIOS Extensions (or unused) | 1 1 0 0 0 |
| E400 | BIOS Extensions (or unused) | 1 1 0 0 1 |
| E800 | BIOS Extensions (or unused) | 1 1 0 1 0 |
| EC00 | BIOS Extensions (or unused) | 1 1 0 1 1 |
| F000 | System ROMs, BASIC | 1 1 1 0 0 |
| F400 | System ROMs, BASIC | 1 1 1 0 1 |
| F800 | PC BIOS | 1 1 1 1 0 |
| FC00 | PC BIOS | 1 1 1 1 1 |

The card address must be between 8000h and FC00h and must be a multiple of 400h. The starting segment addresses from C800 to DC00 are usually the best places to put the card.

The area from B000-B7FF is sometimes available since most computers do not have monochrome cards.



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Since the card memory is not enabled until the loader installs a module on it, memory management packages may try to use the same address as the card. This must be prevented since it blocks any access to the card's memory and renders the card inaccessible. Refer to the memory manager documentation to find out how to exclude memory areas.

Refer to section 2.2, *Preparing the Computer*, for more information.

### Irq (Host Interrupt)

If the application requires the use of host interrupts, tell the loader what hardware interrupt to use. The loader then writes to a register on the card (see section 3.1.5, *The Interrupt Control Register (ICR)*in the *Software User's Guide*) to select the interrupt. The table below lists supported interrupts:

| IRQ Number | Normal Use |
|---|---|
| 3 | COM2: |
| 5 | hard drive on XT, LPT2: |
| 7 | LPT1: |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 15 | |

If 0 (default) is passed to the loader as the IRQ level or an interrupt level is not specified, the loader disables interrupts.

More than one card can use the same interrupt but special precautions apply. Refer to section 2.4.4, *Shared Interrupt Header*, for information how cards must be physically connected to share interrupts and to the software user's guide for information on processing interrupts.

### Other PFBINST Options

The following options can be added to the command line.

| | |
|---|---|
| sil | Silent install. No messages are printed during loading. Use this option if you are calling the loader from within another program. The calling program must interpret exit codes to ensure that the loader ran without problems. See section 2.6.4 for exit values. |



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| | |
|---|---|
| dis | Disable card memory after installation. This allows multiple cards to be installed at the same memory address and then switched in as needed. Your application must enable the card memory to read or write to it. |

## Examples

### Example 1

To set the card memory address to C800, the port address to the default (250) and to install the PFBPROFI module:

```
PFBINST PFBPROFI C800
```

### Example 2

To set the card memory address to the default (D000), the port address to 280, to install the PFBPROFI module and to disable memory access after installation:

```
PFBINST PFBPROFI 280 dis
```

### Example 3

To set the card memory address to C800, the port address to 280, the interrupt to 5 and to install the PFBPROFI module:

```
PFBINST PFBPROFI C800 280 5
```

## PFBINST Messages

When running PFBINST, the monitor displays the version number, the name of the module (read from the module itself), and the module version number. For example:

```
5136-PFB-ISA104 *.SS1 Module Installer
Copyright (c) 1995 SST, a division of Woodhead Canada
Limited.
Version 1.00
;ProfiBus Module (DP, FDL)
;Copyright (c) 1995 SST, a division of Woodhead Canada
Limited.;For 5136-PFB-ISA104 Card;Version 1.01
Installation successful
Card occupies memory from d000 -> d3ff.
```

If calling for technical support, determine these version numbers before you call.



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PFBINST may display some of the following messages. If PFBINST encounters a problem, it may also display an explanation of possible causes of the problem.

**Module file_name not found**

Possible Causes of this error:

1. The *.SS1 module specified does not exist.

2. The *.SS1 module name specified is spelled incorrectly.

3. The '.SS1' extension was included with the module name on the command line. DO NOT include the extension; '.SS1 will be added automatically.

4. The path to the *.SS1 module was not correctly specified.

**ABORTING INSTALLATION!**

PFBINST could not locate the file to load.

**Invalid Port Address Specified xxx (200-2f8, 600-6f8 in steps of 8)**

**ABORTING INSTALLATION!**

The port address specified is not a legal value.

**Invalid Memory Address Specified 'xxxx' (8000-fc00 in steps of 400)**

**ABORTING INSTALLATION!**

The memory address specified is not a legal value.

**Invalid Interrupt Level Specified 'x' (0,3,5,7,9,10,11,12 or 15)**

**ABORTING INSTALLATION!**

The interrupt specified is not a legal value. It must be one of the values listed in the message.

**PFB Card Not Found at Port Address xxx**



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PFBINST tests access to various control bits on the card. If it cannot access them correctly, it aborts the installation and displays possible causes.

***** Non-FF values detected at xxxx**

PFBINST looks through the area where you have told it to locate the card in memory before it enables the card memory. If it finds values other than FF hex at address xxxx, it warns you that there may be RAM or ROM at this address and aborts the installation. Confirm that this area is free to be used by the card memory.

***** RAM detected at xxxx**

Before PFBINST enables card memory, it writes a value to the area where you told it to locate the card. If it reads back the same value at address xxxx, it assumes that there is RAM at that address and aborts the installation. Check shadow memory and memory management or try a different address.

`*** Unable to access card memory!`

PFBINST enables the card memory, then clears it to 0. It reads the first 16 bytes to confirm that they are zero. If they are not, it aborts the installation.

**Bad Port and/or Memory address**

This error occurs when PFBINST fails to verify a value it has written to memory. This may occur if the port address does not match the switch settings on the card, or the memory address supplied is causing a conflict with other memory in the computer.

**Card Memory Error at segment:offset!**

PFBINST reads back every byte it writes. If it reads an incorrect value, it aborts the installation.

**i960 Fail Asserted!**

The processor on the card did not start correctly.

**Downloaded Module Did Not Run!**



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The card software module did not start up correctly. PFBINST may print an error message that further describes the nature of the problem.

**`Installation Aborted by Ctrl-C`**

PFBINST displays this message if the program is interrupted while it is loading a module to the card.

**`Installation successful`**

PFBINST has successfully loaded the module on the card.

**`Card Memory Disabled.`**

This message appears after a successful load if the 'dis' option has been added to the PFBINST command line.

`Card occupies memory from nnnn -> nnnn`

PFBINST displays this message after a successful load to indicate where the card is located in host memory.

**`Card connected to Interrupt Level n`**

This message appears after a successful load if the 'irq' option has been added to the PFBINST command line.

## 2.6.2 PFB1PGRM

This program loads a software module (.ssf) into flash memory on the card.

PFBPGRM loads the.ssf module into shared memory on the card, along with a short program that does the actual writing to flash. This program then transfers the.ssf program into flash from shared memory.

PFBPGRM changes the contents of shared memory. If running PFBPGRM, use PFBRUN to run the module from flash (see section 2.6.3, *PFBRUN*) or use PFBINST to load a module into shared memory. One module can be stored in flash while running a different module in RAM.

To obtain the usage for the program, type `PFBPGRM` and press *Enter*. For example:

```
5136-PFB-ISA104 *.SSF Flash Programmer
```



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```
Copyright (c) SST, a division of Woodhead Canada Limited.
1995-1996

Version 0.06

Use: PFBPGRM <filename> [port] [mem_seg]

filename - *.SSF module to load into PFB flash (.SSF will
be added)

[] indicates optional parameter.

port: port address of 5136-PFB-ISA104 card. Must match DIP
switch setting

Value is in hex. Default port address is 250 hex.

mem_seg: memory segment address where the PFB card is to
reside.

Must be a free contiguous 16K block of memory from 8000
up.

Value is in hex. Default address is D000.

Example: PFBPGRM PFBPROFI 258

Error Codes:

0 - Installation Successful

1 - Invalid Parameter(s)

2 - Bad Port and/or Memory Address

3 - Card Memory Error

4 - Card Processor Failure

5 - Card Error

6 - Card Software Module not Found

7 - System Conflict
```

The memory and port addresses are described in *section 2.6.1, PFBINST*.



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### PFBPGRM Messages

PFBPGRM may display some of the following messages. If PFBPGRM encounters a problem, it displays an explanation of possible causes of the problem.

**Invalid Port Address Specified 'xxx' (200-2f8, 600-6f8 in steps of 8)**

**ABORTING INSTALLATION!**

The port address specified is not a legal value.

**Invalid Memory Address Specified 'xxxx' (8000-fc00 in steps of 400)**

**ABORTING INSTALLATION!**

The memory address specified is not a legal value.

**PFB Card Not Found at Port Address xxx**

PFBPGRM writes to the port address specified and tries to read back what it wrote. If what it reads is different from what it wrote, it aborts the installation.

***** Non-FF values detected at ssss:xxxx!**

PFBPGRM looks through the area where told to locate the card in memory before enabling the card memory. If it finds values other than FF hex at address ssss:xxxx, it warns that there may be RAM or ROM at this address and aborts the installation. Confirm that this area is free to be used by the card memory. Check shadow memory and memory management.

***** RAM detected at ssss:xxxx!**

PFBPGRM writes a value to the area where told it to locate the card in memory before it enables the card memory. If it reads back the same value that it wrote at address ssss:xxxx, it assumes that there is RAM at that address and aborts the installation. Check shadow memory and memory management or try a different address.



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***** Unable to access card memory at ssss:xxxx!**

PFBPGRM enables and clears the card memory, then reads back the first 16 bytes to confirm that they are zero. If it finds values other than 0, it aborts the installation.

***** Bad Port and/or Memory address**

This occurs when PFBPGRM fails to verify a value it has written to memory. This may occur if the port address does not match the switch settings on the card, or the memory address supplied is causing a conflict with other memory in the computer.

***** Card Memory Error!**

PFBPGRM loads a program for programming the flash and verifies that the program has been loaded correctly. If the verify fails, PFBPGRM aborts the installation.

***** i960 Fail Asserted!**

The processor on the card did not start correctly.

***** Downloaded Module Did Not Run!**

The flash programming module did not start up correctly. PFBPGRM may print an error string that further describes the nature of the problem.

**Ready PFB Flash Module Not Found at xxxx**

The flash programming module failed to indicate that it was ready to run.

***** Module 'filename' not found**

Possible Causes of this error:

1. The *.SSF module specified does not exist.

2. The *.SSF module name specified is spelled incorrectly.

3. The '.SSF' extension was included with the module name on the command line. DO NOT include the extension; '.SSF will be added automatically.

4. The path to the *.SSF module was not correctly specified.



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**ABORTING FLASH PROGRAMMING!**

PFBPGRM could not locate the.SSF file to load.

**Error in 'filename', Module Address xxxxxxxx out of range (0x40000000->0x40080000)**

The.SSF file is corrupt.

**Error in filename, Module Address xxxxxxxx Boundary Error (00000,20000,40000,60000)**

The.SSF module file is corrupt.

**Error in 'filename', Module Too Long xxxxxxxx (Segment Size=nnnnnnnn)**

The.SSF module file is corrupt.

**Erasing Flash Sector**

If PFBPGRM finds something already in flash, it erases it before programming the new module into flash and displays this message while erasing the flash.

**Error xx Executing PFB Flash Erase**

The card reported an error status of xx when it tried to execute the flash erase. Make sure the flash write enable jumper (JP6) is installed.

**Flash Sector Already Blank**

PFBPGRM displays this message if it finds the flash sector to be written to is already blank.

**Error xx Executing PFB Flash Blank Check**

PFBPGRM displays this message if the card returns an error status while checking if the sector to be written is blank.



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***** Card Memory Error at ssss:xxxx!**

PFBPGRM loads the *.SSF module into card memory in preparation for writing it into flash. If it fails to verify what it has written, it displays this message and aborts. Check the flash write enable jumper.

**Programming Flash...**

PFBPGRM displays this message as it programs the flash.

**Timeout Executing PFB Flash Program Command**

PFBPGRM displays this message if the card module that programs the flash does not respond within a timeout period.

**Error xx Executing PFB Flash Program**

PFBPGRM displays this message if the card module that programs the flash returns error status xx. PFBPGRM then aborts.

**Error xx Executing PFB Flash Verify @ xxxxxxxx**

PFBPGRM displays this message if the card module that programs the flash fails to verify what it has written and returns error status xx.

**Flash Programmed Successfully**

PFBPGRM displays this message to indicate that it has successfully written the program to flash and verified what it has written.



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### 2.6.3 PFBRUN

This program runs a program previously stored in flash memory. The output is as follows:

```
5136-PFB-ISA104 Flash Module Runner

Copyright (c) SST, a division of Woodhead Canada Limited. 1995-1996

Version 0.07

Use: PFBRUN [mem] [port] [Irq] [options]

[] indicates optional parameter.

port: port address of 5136-PFB-ISA104 card. Must match DIP switch setting

Value is in hex. Default port address is 250 hex.

mem_seg: memory segment address where the PFB card is to reside.

Must be a free contiguous 16K block of memory from 8000 up.

Value is in hex. Default address is D000.

Irq: Interrupt request level the card is to use.

0 will disable interrupts. A Value of 3,5,7,9,10,11,12 or 15 will enable the respective interrupt.

Value is in decimal. Default is 0, or disabled options: Possible options are as follows:

Sil -Silentinstall...callingprogrammustinterpret exit codes

dis -disable card memory after installation - allow multiple cards to be installed at the same memory address and then switched in as needed

Aux -run auxiliary program in flash (Not Used)

Example: PFBRUN 258 dc00 sil
```



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```
Error Codes:
0 - Installation Successful
1 - Invalid Parameter(s)
2 - Bad Port and/or Memory Address
3 - Card Memory Error
4 - Card Processor Failure
5 - Card Error
6 - Card Software Module not Found
7 - System Conflict
```

The memory and port addresses and the irq values are as described in section *section 2.6.1, PFBINST.*

### PFBRUN Messages

PFBRUN may display some of the following messages. If PFBRUN fails, it displays an explanation of possible causes of the problem.

**Invalid Port Address Specified 'xxx' (200-2f8, 600-6f8 in steps of 8)**

**ABORTING INSTALLATION!**

The port address specified is not a legal value.

**Invalid Memory Address Specified 'xxxx' (8000-fc00 in steps of 400)**

**ABORTING INSTALLATION!**

The memory address specified is not a legal value.

**Invalid Interrupt Level Specified 'x' (0,3,5,7,9,10,11,12 or 15)**

**ABORTING INSTALLATION!**

The interrupt specified is not a legal value. It must be one of the values listed in the message.



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**PFB Card Not Found at Port Address xxx**

PFBRUN writes to the port address specified and tries to read back what it wrote. If what it reads is different from what it wrote, the installation is aborted.

***** Non-FF values detected at ssss:xxxx!**

PFBRUN looks through the area where told to locate the card in memory before enabling the card memory. If it finds values other than FF hex at address xxxx, it warns that there may be RAM or ROM at this address and aborts the installation. Confirm that this area is free to be used by the card memory. Check shadow memory and memory management.

***** RAM detected at ssss:xxxx!**

PFBRUN writes a value to the area where told to locate the card in memory before enabling the card memory. If it reads back the same value that it wrote, at address xxxx, it assumes that there is RAM at that address and aborts the installation. Check shadow memory and memory management or try a different address.

***** Unable to access card memory at ssss:xxxx!**

PFBRUN enables then clears the card memory. It then reads the first 16 bytes to confirm that they are zero. If it reads incorrect values, it aborts the installation.

***** Bad Port and/or Memory address**

PFBRUN writes to the first byte of each page of card memory, then reads back the values to confirm that it can read them correctly. If the value is incorrect, it aborts the installation.

**i960 Fail Asserted!**

The processor on the card did not start correctly.



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***** Downloaded Module Did Not Run!**

The card software module did not start up correctly. PFBRUN may print an error string that further describes the nature of the problem.

**Installation successful**

PFBRUN has successfully loaded the module on the card.

**Card Memory Disabled**

PFBRUN displays this message after a successful load if the 'dis' option has been added to the command line.

**Card occupies memory from xxxx -> XXXX**

PFBRUN displays this message after a successful load to indicate where the card is located in host memory.

**Card connected to Interrupt Level n**

This message appears after a successful load if the 'irq' option has been added to the command line.

**Installation Aborted by Ctrl-C**

PFBRUN displays this message if the program is interrupted while it is loading a module to the card.



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### 2.6.4 Return Values

PFBINST, PFBPGRM and PFBRUN all return the following values as exit status to DOS.

| Value | Meaning |
|---|---|
| 0 | Installation Successful |
| 1 | Invalid Parameter(s) |
| 2 | Bad Port and/or Memory Address |
| 3 | Card Memory Error |
| 4 | Card Processor Failure |
| 5 | Card Error |
| 6 | Card Software Module not Found |
| 7 | System Conflict. RAM or ROM conflict |



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## 2.7 Connecting to a Network

### Selecting the Proper Line Type

Use this table to determine which line type best suits your system requirements:

| Baud Rate (bits/s) | Line A Distance (Max) | Line B Distance (Max) | Total Capacitance of all Drop Cables |
|---|---|---|---|
| v19.2k | 1200 m** | 1200 m** | *15nF |
| 93.75k | 1200 m** | 1200 m** | *3nF |
| 187.5k | 1000 m** | 600 m** | *1nF |
| 500k | 400 m** | 200 m** | *0.6nF |
| 1.5M | 200 m** | NA | *0.2nF |
| 3, 6 and 12M | 100 m** | NA | *0.05nF |
| NA = Not Applicable<br>*If using a combination of both line types, divide the lengths shown by two.<br>**This is the sum of all bus segment and drop cable lengths. | | | |

This section contains information on how to connect the card to a ProfiBus communication network. The card contains a standard ProfiBus DB9 connector and a 5-pin Phoenix Combicon connector to allow a direct connection to a Profibus network.

| DB9 Pin Description | DB9 Pin # | DB9 Termination with 5136-PFB-ISA | Phoenix Connector | Phoenix Termination |
|---|---|---|---|---|
| chassis ground | 1 | | Earth ground | |
| reserved | 2 | | | |
| data + | 3 | connect this pin to pin 8 (data -) with 220 ohm resistor | B | jumper this pin to Termination B (see diagram in this section of the manual) |
| Tx enable | 4 | | | |
| isolated ground | 5 | connect this pin to pin 8 (data -) with 390 ohm resistor | | |
| voltage plus | 6 | connect this pin to pin 3 (data +) with 390 ohm resistor | | |



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| DB9 Pin Description | DB9 Pin # | DB9 Termination with 5136-PFB-ISA | Phoenix Connector | Phoenix Termination |
|---|---|---|---|---|
| reserved | 7 | | | |
| data - | 8 | | A | jumper this pin to Termination A (see diagram in this section of the manual) |
| reserved | 9 | | | |

Terminate the network at each physical end of the network, in two places.

The recommended cable is Beldon 3079A. Examples include:

Siemens 6XV1 830-0AH10 Two Core Shielded

Siemens 6XV1 830-0BH10 w/PE Sheath

Siemens 6XV1 830-3AH10 for underground burial

Siemens 6XV1 830-3BH10 trailing cable

Bosch Comnet DP #913 548 Flexible PROFIBUS Cable

Bosch Comnet DP #917 201 Trailing PROFIBUS Cable

Bosch Comnet DP #917 202 Massive PROFIBUS Cable

Allen-Bradley blue hose, which has an impedance of 78 ohms, is not recommended.



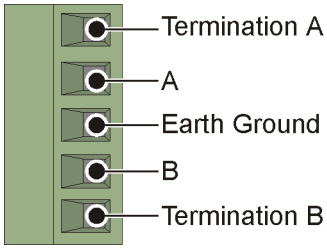
**Note**

If your card does not have a phoenix connector, connect as described in the above table with the DB9 termination. If your card has both types of connectors, terminate using the Phoenix connector, since they are internally connected.



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The Phoenix connector pins are:




## 2.8 The Card LEDs

There are two LEDs on the card. They are visible through the mounting bracket at the back of the card.

The upper LED (closer to the network connectors) is the system status LED. The lower LED is the communication status LED.

The state of the card LEDs depends on the software module loaded and is described in the software user's guide.

The card also uses the LEDs to signal internal errors. If an internal error occurs, the card flashes the system status LED once red, then flashes an 8-bit error code sequentially on the communication status LED, from low bit to high bit. Red indicates the bit is zero, green indicates the bit is 1. Then the cycle repeats. Record the sequence for technical support.



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## 2.9 Troubleshooting Installation

This section describes what to do if:

- the loader cannot download software to the card
- the card cannot communicate on a network

It also provides more detailed information on some common sources of problems.

### Card does not install correctly

If you cannot download software modules to the card:

- check that the chosen memory address is excluded from the DOS memory manager
- check that there is no shadow RAM in the area of memory occupied by the card

### Card loads correctly but does not go active on the network

- Check cabling for correct wiring to the card.
- Check for shorted wires, leads on terminating resistors shorted to cables, strands from the shield shorting to the other wires.
- Check baud rate.
- Check network termination. Only the two nodes at the physical ends of the network should have terminating resistors.

### Hardware Conflicts

If there appear to be hardware conflicts, remove any other cards in the computer and confirm that the software can be downloaded to the card in the simplest configuration. Now replace the other cards one by one until you isolate the cause of the conflict.

Refer to the documentation for any such cards in the system to see what memory and port addresses they use.



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### Memory Managers

If there is a memory conflict, check for a memory manager that is using the same memory location as the card.

Bypass the `autoexec.bat` and `config.sys` files by pressing *F5* when DOS prompts with *"Starting MS DOS"*.

In Windows 95/98, press *F8* then choose *"Safe mode command prompt only"*.

A memory manager may try to use the address selected for the card. The memory on the card is disabled when the computer starts up and so the memory manager is unaware of it. When the memory on the card is enabled by running the loader, a conflict between the card and the memory manager results and the computer may behave erratically.

There are too many memory managers available to discuss any particular one. Look in the `config.sys` file for things like "device=emm386.sys". If a line like that exists, use a text editor to comment the line out (insert REM at the beginning of the line), then reboot your computer. If the conflict disappears, read the documentation for your memory manager. There is usually a way to tell it not to use specific areas of memory. Tell the memory manager not to use the area to be occupied by the card. Refer to section 2.2, *Preparing the Computer*, for more information.

### Shadow RAM

Shadow RAM provides faster access to information stored in ROMs by transferring it to RAM memory. Do not shadow the area where the card is located in memory. If the area is shadowed, the card's RAM will not be accessible.

With some BIOSs, the wording for setting up shadow RAM is confusing. If it says that the default for 'Disable Shadow Memory size' is 'Disable', it in fact means that it is disabling the disable of shadow RAM! Instead change the setting to match the size of the card; for example 16K. Also set 'Disable Shadow Memory base' to match the start address of the card for example D000.



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### Plug and Play BIOS

In a computer with a Plug and Play BIOS, in the advanced section, set the ISA shared memory size to match the size of the area to be occupied by the card, for example 16K, and the ISA shared memory base address to match the memory address of the card, for example, D000.

If there are other cards in the computer that require shadow RAM to be disabled, the area specified must encompass these cards as well.

### Network Problems

If the card hardware is functioning correctly but you are unable to communicate on the network, check the cabling and termination. This is the usual source of network problems. Other common problems include:

- incorrect station number
- incorrect baud rate
- wires shorting together, especially the shield shorting to the other wires. Be very careful of the fine braid wire; it can be very hard to see and may be shorting to one of the signal wires.

## 2.10 Using Flash Memory

The 5136-PFB-ISA contains 512 Kbytes of sectored flash memory that is used to store a software module as well as DP master and DP slave configuration data and network parameters.To program a software module into flash, use the program PFBPGRM (see section *section 2.6.2, PFB1PGRM*). This program writes the program to the correct area in flash.

To run a program stored in flash memory, use the program PFBRUN (see section *section 2.6.3, PFBRUN*).

To load configurations etc. into flash, use the commands in the PFBPROFI module. Refer to the software manual for a summary of applicable commands.

It is up to you to remember what program is currently stored in flash memory. If you run PFBRUN, it reports which module is loaded in flash.

To look at what configuration data (DP master, DP slave, network parameters) is stored in flash, load the configuration into memory without going online and use one of the configuration dump programs supplied.



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If you are using the 5136-PFB-ISA in embedded applications, you can load everything you need into flash memory when the card is in a PC, then move the card to the destination embedded environment. If you need further information about loading programs into flash, contact SST.

Each time you store a configuration or load an SSF module to flash, it uses one cycle of flash storage. The estimated lifetime of the flash memory is 100000 cycles.

Refer to the *Software User's Guide* for information on using flash memory to store configurations.



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# 3

# *Card Registers*

This section describes the card registers, and is provided as a reference. The registers are as follows:

- register offsets
- the board control register (BCR)
- the memory control register (MCR)
- the memory page register (MPR)
- the interrupt control register (ICR)



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## 3.1 Card Registers

The information in the following sections is provided for reference and may be needed when writing applications for the card.

### 3.1.1 Register Offsets

Four read/write registers are used in the host I/O map. The base address for these registers is the port address described in section. The following table lists the registers.

| Register Offset | Register Name |
|---|---|
| 0 | Board Control Register (BCR) |
| 1 | Memory Control Register (MCR) |
| 2 | Memory Page Register (MPR) |
| 3 | Interrupt Control Register (ICR) |

For example, if the base port address set by the DIP switches is 250h, the BCR is at address 250, the MCR is at address 251, the MPR is at address 252 and the ICR is at address 253.

### 3.1.2 The Board Control Register (BCR)

The BCR contains bits that relate to the operation of the card hardware.

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| WD_BITE | I960_FAIL | 0 | 0 | 0 | 0 | I960_INT | I960_RESET |
| R | R | R | R | R | R | R/W | R/W |

The host sets bit 0, I960_RESET, to hold the i960 processor on the card in reset. The host clears this bit to let the processor run. The card defaults to bit 0 set and the processor is in reset.

The host sets bit 1, I960_INT, to assert an interrupt to the i960. Current software modules for the 5136-PFB-ISAdo not require any interrupts to the i960.



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The card sets bit 6, I960_FAIL, to indicate the current state of the i960 fail pin. Permissions are not set to write to this bit; regardless of what is written, it will always show the status. The loader or programmer monitors this bit on startup. This bit is set on startup until the i960 clears it after completing its internal diagnostics.

The processor on the card sets bit 7, WD_BITE, to indicate that the hardware watchdog has timed out. The i960 must periodically signal the hardware watchdog on the card to notify the hardware watchdog that the i960 is still operating. The only reasons for this bit to be set are catastrophic failure of the software module on the card or the operating voltage dropping below 4.7 volts. If the WD_BITE bit is set, the host must reload the card. Permissions are not set to write to this bit; regardless of what is written, it always shows the status.

Bits 2, 3, 4 and 5 are reserved and should always be set to 0.

Bits 0 and 1 read back whatever was written. Bits 6 and 7 reflect whatever status is set on the card (as long as the processor is running).

At powerup, the BCR contains 41h.



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### 3.1.3 The Memory Control Register (MCR)

The MCR determines where in host memory the shared memory on the card is mapped.

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| Mem Enable | A18 | A17 | A16 | A15 | A14 | 0 | 0 |
| R/W | R/W | R/W | R/W | R/W | R/W | R | R |

The card contains 256 Kbytes of shared memory. 16 Kbytes of this memory can be mapped into the host memory at one time. The host writes to the MCR to determine where in host memory this 16K appears.

Bit 7 is the memory enable bit. To enable access to shared memory from the host, set the bit to 1. To disable access to shared memory from the host, set the bit to 0.

Bits 6, 5, 4, 3, 2 define the board memory address, that is, the location in host memory where the card appears. The table in section , summarizes how to set these bits to select an address.

Bits 0 and 1 are reserved and should be set to 0. These bits always read as 0.

At powerup, the MCR contains 0.

### 3.1.4 The Memory Page Register (MPR)

The card contains 256 Kbytes of shared memory, mapped into the host memory in 16K pages. The host writes to the MPR to select which 16 Kbyte page of card shared memory maps into the host memory.

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Page_sel_3 | Page_sel_2 | Page_sel_1 | Page_sel_0 |
| R | R | R | R | R/W | R/W | R/W | R/W |

To select a particular page, write the page number to the MPR. Pages are numbered from 0 to 15.

Bits 4 to 7 are reserved and should be set to 0. (Bits 4 and 5 read back whatever is written but should always be set to 0.)

At powerup, the MPR contains 0.



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### 3.1.5 The Interrupt Control Register (ICR)

The ICR selects which host interrupt the 5136-PFB-ISA uses.

The ICR bits are defined as follows:

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| INT_PEND | INT_CHN _PEND | 0 | 0 | Int_sel_3 | Int_sel_2 | Int_sel_1 | Int_sel_0 |
| R | R | R | R | R/W | R/W | R/W | R/W |

Bits 0, 1, 2 and 3 set the host interrupt.

| Bit 3 | Bit 2 | Bit 1 | Bit 0 | Interrupt |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | disabled |
| 0 | 0 | 1 | 1 | 3 |
| 0 | 1 | 0 | 1 | 5 |
| 0 | 1 | 1 | 1 | 7 |
| 1 | 0 | 0 | 1 | 9 |
| 1 | 0 | 1 | 0 | 10 |
| 1 | 0 | 1 | 1 | 11 |
| 1 | 1 | 0 | 0 | 12 |
| 1 | 1 | 1 | 1 | 15 |

All values other than those shown in the table are invalid. An invalid setting disables interrupts.

Setting the interrupt to 0 disables host interrupts.

The card sets bit 7 when the card generates a host interrupt.

The card sets bit 6 when any card on the interrupt chain (including this card) sharing a common interrupt has generated an interrupt. Refer to section 2.4.4, Shared Interrupt Header, for instructions on setting up hardware to share interrupts.

Bits 4 and 5 should always be set to 0.

At powerup, the ICR contains 0.



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# A

# Technical Data

| | |
|---|---|
| **Part number** | 5136-PFB-ISA |
| **Function** | Interface card for ProfiBus DP, FMS and FDL (layer 2) networks |
| **Description** | single width, half length, surface mount card |
| | Intel i960 processor |
| | 512 Kbytes of local i960 RAM |
| | 256 Kbytes of onboard shared memory, accessible from the host computer in 16K pages |
| | 512 Kbytes of sectored flash memory, for storage of program and configuration data |
| | ASPC2 LAN controller |
| **Current Consumed** | maximum 750 mA at 5V. This 5V must be from a supply delivering Separated Extra Low Voltage (SELV). |
| **Environmental** | operating temperature 0-50 degrees Celsius |
| **Card connectors** | standard ProfiBus DB-9 connector |
| | Phoenix Combicon connector,<br>part number MSTB 2.5/5-ST-5.08 |



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# CISPR22 Compliance

This device meets or exceeds the requirements of the following standard:

- CISPR22:1997/EN 55022:1994 - “Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.”



**Caution**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Marking of this equipment with the symbol CE indicates compliance with European Council Directive 89/336/EEC - The EMC Directive. This equipment meets or exceeds the following technical standards:

CISPR22:1997/EN 55022:1994 - “Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.”

CISPR24:1997/EN 55024:1998 - “Information technology equipment – Immunity characteristics – Limits and methods of measurement.”



**Note**

To maintain compliance with the limits and requirements of the EMC Directive it is required to use quality interfacing cables and connectors when connecting to this device. Refer to the cable specifications in this manual for selection of cable types.



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