



**System Automation for OS/390 Processor  
Operations:  
Support for Attachmate IRMA 3270 PCI  
Adapter Cards and  
IBM 3270 Emulation PCI Adapters**





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## Chapter 1. SA OS/390 Processor Operations 3270 PCI Adapter Support

This service provides additional flexibility to SA OS/390 processor operations (ProcOps) customers in the hardware support for connecting operating system consoles to their processor operations PC.

Processor Operations has supported 3270 emulator cards for Micro Channel Architecture (MCA) bus PCs and IBM compatible ISA bus PCs. This service adds support for the Attachmate IRMA 3270 PCI Adapter and for the IBM 3270 Emulation PCI Adapter (IBM part number: 05J4401) as a connecting adapter between an operating system console and a PCI bus PC. Customers can now use a mixture of 3270 ISA bus cards and PCI bus cards to connect up to four consoles to their processor operations PC.





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## Chapter 2. Attachmate IRMA 3270 PCI Adapter Information

The Attachmate IRMA 3270 PCI Adapter is a PCI bus adapter designed to support 3270 terminal emulation in PCI V2.1 compatible PCs. It is designed as a 32-bit PCI V2.1 compliant target only device residing in a PCI (Peripheral Component Interface) bus expansion slot. The adapter is designed to be compatible with all PCs with PCI standard expansion slots. It conforms to PCI standard recommended dimensions for short cards.



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## Chapter 3. PCI Bus PC Configuration Information

Unlike ISA bus cards, PCI bus cards are plug-and-play devices: there are no switches on a PCI bus card for defining an I/O base address. Also, the processor operations PC distributed feature CUT mode emulator device driver does not need parameters to learn the address of the 3270 card's memory buffer.

However, the device driver still has to be informed (via parameters on the DEVICE statement in CONFIG.SYS) that it should use an installed 3270 PCI adapter card.

This configuration is accomplished by modifying the DEVICE statement for the CUT mode emulator device driver in the CONFIG.SYS file. This DEVICE statement is automatically added by the Distributed Feature download process, but will not contain the required parameters for the installed 3270 adapters. The syntax of the DEVICE statement for a PCI bus PC with 3270 adapters is as follows:

```
DEVICE=drive:\IBMING\ISQ\ISQXSCUT.SYS cardnum=cardparm ...
```

Here, **cardnum** is the emulator card number and **cardparm** is a parameter specifying the type of the emulator card. Up to 4 emulator cards may be specified with **cardnum** ranging from 1 to 4.

The **cardparm** parameter is either the letter **P** to indicate a supported PCI bus emulator card, or a valid 2-digit hex number to indicate an ISA bus emulator card. In the case of an ISA bus emulator card, the 2-digit hex number represents bits 12 through 19 of the physical address of the RAM buffer to be used by the emulator card. The valid choices for RAM buffer address parameters are (as in previous releases) **CA**, **CC**, **CE**, **D2**, **D4**, **D6**, **D8**, **DA**, **DC**, or **DE**.

The following are examples of how the DEVICE statement may be updated:

```
DEVICE=D:\IBMING\ISQ\ISQXSCUT.SYS 1=CA 2=P
```

In the above example, the Distributed Feature has been downloaded to the PC's D-drive and has two 3270 emulator adapters configured. Card number 1 is an ISA bus card configured to use the base memory buffer address 0CA000h. Card number 2 is a PCI bus card installed in a PCI slot. If more than one PCI bus card is physically installed in the PC, the device driver will use only the first such card in the enumeration order defined by the computer's PCI BIOS.

```
DEVICE=D:\IBMING\ISQ\ISQXSCUT.SYS 1=P 2=P 3=P 4=P
```

In this example, the maximum of four 3270 emulator adapters is configured. All four cards are expected in PCI slots by the device driver.

```
DEVICE=D:\IBMING\ISQ\ISQXSCUT.SYS 1=CA 2=P 3=CC 4=P
```

This is an extension of the first example: an additional ISA bus card (card number 3) is installed and configured to use the base memory buffer address 0CC000h. There is also another PCI bus card configured to be used as card number 4.

Note that it is **not** recommended to use PCI bus cards in applications other than processor operations while simultaneously using the same computer as a processor operations PC: the other application's device driver would very likely conflict with the processor operations PC CUT mode device driver. The processor operations PC CUT mode device driver will always access as many PCI bus cards as are

configured via the **cardnum=P** parameters in its DEVICE statement, and it will always access the *first* such cards as enumerated by the PCI BIOS. It will not, however, access PCI bus cards beyond the number specified in its DEVICE statement. Thus, another application using a PCI 3270 card can coexist with processor operations only if **its** device driver can be configured to use a specific card **not** used by the processor operations PC CUT mode device driver.

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## Chapter 4. BIOS Setup Considerations

The processor operations PC CUT mode device driver communicates with the 3270 emulator cards via interrupts. ISA bus 3270 cards always use interrupt request level (IRQ) 9, so IRQ 9 should not be available for PCI cards if ISA bus cards are being used.

PCI bus 3270 cards are more flexible: the computer's PCI BIOS chooses an IRQ to be used by the card and the device driver learns about the chosen IRQ during OS/2 boot time. However, the computer's BIOS does not always know about the IRQs used by other ISA bus cards installed in the system. E.g., an ISA bus Token Ring adapter may be using IRQ 11 (without being prepared to share the interrupt) and the PCI BIOS might erroneously assign IRQ 11 to a PCI bus 3270 card as well. This would result in an interrupt conflict causing the system to stop working properly. Such a conflict can be avoided by explicitly telling the computer's BIOS about IRQs occupied exclusively by ISA bus adapters and their device drivers.

The details of this configuration step vary among different computers. It is usually done within the computer's BIOS setup program under a submenu called PCI bus configuration or similar. The menu should provide options to assign chosen IRQs to ISA legacy adapters, thus marking them as not available for PCI adapters. Multiple PCI adapters can share a single IRQ line, but at least one IRQ must be marked as available in the computer's BIOS setup.



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## Chapter 5. Possible Conflicts with IBMINT13.I13

IBMINT13.I13 is an OS/2 device driver to access the computer's hard disks via BIOS software interrupt 13. It is a low performance driver meant only as temporary last resort to allow access to the hard disk until a more suitable device driver for the hard disk controller is installed.

The significance of IBMINT13.I13 with respect to ProcOps is that it uses an interrupt request level (IRQ) exclusively which may also be handed out by the computer's PCI BIOS. This can lead to a conflict if one of the installed PCI bus cards is assigned the IRQ which is exclusively used by IBMINT13.I13. This conflict will not show any symptoms during device driver loading, but it will prevent proper operation of the processor operations PC via PCI bus cards later on.

A computer used as a processor operations PC should not have IBMINT13.I13 installed in its CONFIG.SYS file. Instead, the proper device driver for the computer's hard disk controller should be installed to access hard disks (e.g., the correct Adaptec device driver if hard disks are attached to an Adaptec SCSI controller).





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## Chapter 6. New or Changed Device Driver Messages

When the processor operations PC CUT mode device driver is loaded the following new or changed messages may be shown during CONFIG.SYS processing:

Message : ISQP013I **CardName** card number **num**,  
I/O port=**I/O port base address**,RAM=**memory**  
**buffer address**.

Explanation: This is an informational message.  
The device driver detected an adapter with the specified **CardName**, using the **I/O port base address** and **memory buffer address** shown.  
The device name is **CUTnum**.  
This message is shown for ISA bus and PCI bus adapter cards only.  
Note that the **I/O port base address** will always be zero for Attachmate PCI bus cards.

System Action:  
None.

Operator Response:  
None.

System Programmer Response:  
None.

Message : ISQP030I Unable to open the OEMHLP\$ device, RC=**rc**

Explanation: This is an internal error.  
The device driver was not able to open the OEMHLP\$ device to query PCI BIOS.

System Action:  
The device driver is not installed.

Operator Response:  
Contact the system programmer.

System Programmer Response:  
Contact an IBM support representative.

Message : ISQP031I No PCI BIOS was found, parameter **SlotNumber=P** is invalid.

Explanation: The **DEVICE=** statement of the CONFIG.SYS file specifies a PCI card for the **SlotNumber** shown, but no PCI BIOS was detected by the device driver.

System Action:  
The device driver is not installed.

Operator Response:  
Contact the system programmer.

System Programmer Response:  
Correct the error in the **DEVICE=** statement of the CONFIG.SYS file and re-boot the system.

Message : ISQP032I No PCI 3270 card was found for parameter **SlotNumber=P**.

Explanation: The **DEVICE=** statement of the CONFIG.SYS file specifies a PCI card for the **SlotNumber** shown, but no PCI 3270 card was detected by the device driver.

System Action:  
The device driver is not installed.

Operator Response:

Contact the system programmer.

System Programmer Response:  
Install a PCI 3270 card corresponding to the SlotNumber specified in the DEVICE= statement of the CONFIG.SYS file.

Message : ISQP033I Unable to read configuration space,  
RC=X'**rc**'.  
Cannot access card for parameter **SlotNumber**=P.

Explanation: The DEVICE= statement of the CONFIG.SYS file specifies a PCI card for the SlotNumber shown, but the device driver was unable to read the PCI configuration space of the card.

System Action:  
The device driver is not installed.

Operator Response:  
Contact the system programmer.

System Programmer Response:  
Contact an IBM support representative.

Message : ISQP034I Unable to access memory with physical address **physaddr** for parameter **SlotNumber**=P.

Explanation: The DEVICE= statement of the CONFIG.SYS file specifies a PCI card for the SlotNumber shown, but the device driver was unable to access the card memory at the physical address shown mapped by one of the Base Address Registers (BARs).

System Action:  
The device driver is not installed.

Operator Response:  
Contact the system programmer.

System Programmer Response:  
Contact an IBM support representative.

Message : ISQP035I Register **RegNo** = **RegVal**

Explanation: This is an informational message.  
The IBM register RegNo on the 3270 card has the value RegVal shown.

System Action:  
None.

Operator Response:  
None.

System Programmer Response:  
None.

Message : ISQP036I No PCI BIOS was found, RC=X'**rc**'.

Explanation: This is an informational message.  
The device driver could not detect a PCI BIOS, PCI\_GET\_BIOS\_INFO returned rc.

System Action:  
None.

Operator Response:  
None.

System Programmer Response:  
None.

Message : ISQP037I PCI BIOS **VMajor.Minor** found,  
LastBus=**lastbus**.

Explanation: This is an informational message.  
The device driver detected a PCI BIOS with the specified major and minor version number.

System Action:

None.  
Operator Response:  
None.  
System Programmer Response:  
None.

Message : ISQP038I PCI 3270 card was found for  
parameter **SlotNumber**=P.  
Explanation: This is an informational message.  
The DEVICE= statement of the CONFIG.SYS file specifies  
a PCI card for the SlotNumber shown, and a corresponding  
3270 card was successfully detected by the device driver.  
System Action:  
None.  
Operator Response:  
None.  
System Programmer Response:  
None.

Message : ISQP039I BAR**BARnum** = X'**address**'.  
Explanation: This is an informational message.  
The message shows the contents of the specified  
Base Address Register (BAR) in the configuration space of  
the 3270 PCI card recognized during device driver load.  
System Action:  
None.  
Operator Response:  
None.  
System Programmer Response:  
None.

Message : ISQP040I **name** = **value**.  
Explanation: This is an informational message.  
System Action:  
None.  
Operator Response:  
None.  
System Programmer Response:  
None.

Message : ISQP041I **name** = **value**.  
Explanation: This is an informational message.  
System Action:  
None.  
Operator Response:  
None.  
System Programmer Response:  
None.

Message : ISQP042I **text**  
Explanation: This is an informational message.  
System Action:  
None.  
Operator Response:  
None.  
System Programmer Response:  
None.







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