

# Multi-user Solutions: ISA 8 and ISA 128 Multiport Adapters



By Eddie Ho, Derwin Gavin, Walter Lipp, and Dan Ayala

AIX is a multi-user system that allows many users to access the system resources. Users can be connected to the system either locally via a direct attachment ASCII device or through network access using a LAN device with TCP/IP protocol. In a host-centric environment in which many active users are draining CPU resources, the ISA 8- and ISA 128-port asynchronous adapters can off-load some character processing from the system.

The RISC System/6000 (RS/6000) has redefined the commercial data processing landscape with its many open system features, including portability, availability, scalability, and ease-of-use. The solution portfolio is mature and well-accepted in the market. This defines the conclusion of phase one of the RS/6000 technology.

Phase two generally includes vertical and horizontal system-level expansions, such as Symmetric Multiprocessing (SMP) and Massive Parallel Processing (MPP) technology, and adoption of industry-standard architecture, such as ISA and PCI. The ISA 8- and ISA 128-multiport adapters complement the industry-standard support. Both adapters are supported as part of the AIX Version 4 TTY subsystem infrastructure on systems that have an ISA bus.

The TTY subsystem has been redesigned to use the STREAMS layered architecture, which provides flexibility for future expansion and can react to more system-level modifications. (See "TTY Subsystem in SMP," *AIXpert*, February 1995.)

## ISA 8-Port Adapter

This multi-channel, intelligent serial communications adapter contains 128 Kbits of dual-ported high-speed RAM for program code and buffering. Each RS-232 port supports speeds of 115 Kbits per second.

The dual-ported RAM, accessible as Read/Write from both AIX and the adapter logic, facilitates high-speed data exchange between the TTY subsystem and the adapter. Figure 1 shows the adapter and the specification.

## Installation

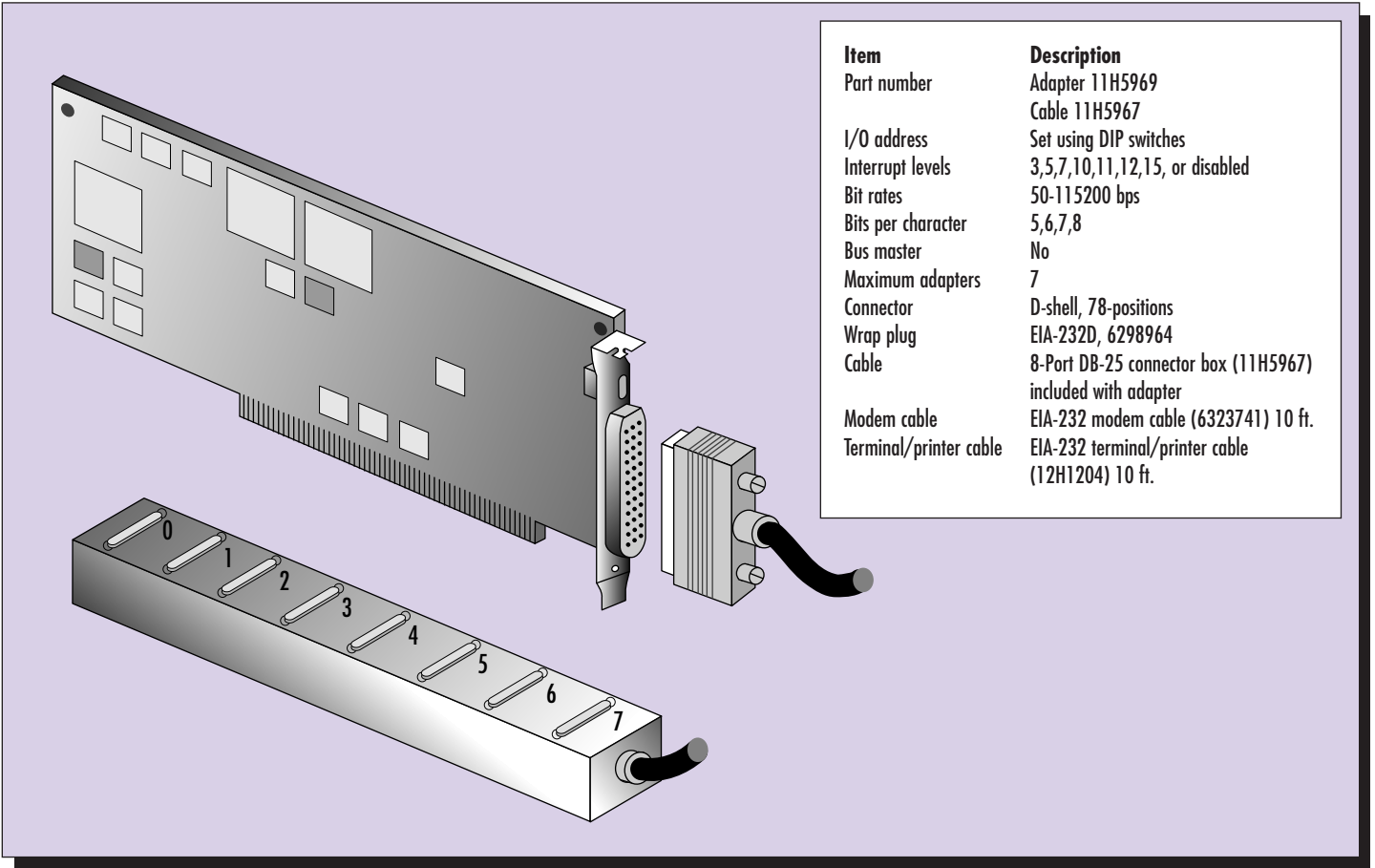
Bus I/O address assignment is a key part of ISA adapter installation. Each ISA adapter within a system must have a unique address assignment. Multiple 8-port adapters can be installed if the address assignments are unique and ISA slots are available.

The default address from the factory is 0x324. If other ISA adapters are already installed, the `lsresource` command (see section titled "AIX `lsresource` Command") can help you determine what address has been selected. The administrator should record this address for later use in software configuration.

Figure 2 shows the address and switch setting.

After the adapter has been properly installed, the next step is device driver installation, which is required for both new or existing systems. In AIX, the Base Operating System (BOS) level custom installation loads all the MCA adapters, but will not load any ISA adapters. The `devices.isa.cxia` driver supports this. Use the `AIX smit isa` command to install this fileset.

## ISA 8-Port Adapter

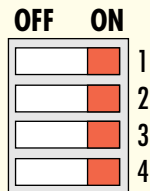


Item	Description
Part number	Adapter 11H5969 Cable 11H5967
I/O address	Set using DIP switches
Interrupt levels	3,5,7,10,11,12,15, or disabled
Bit rates	50-115200 bps
Bits per character	5,6,7,8
Bus master	No
Maximum adapters	7
Connector	D-shell, 78-positions
Wrap plug	EIA-232D, 6298964
Cable	8-Port DB-25 connector box (11H5967) included with adapter
Modem cable	EIA-232 modem cable (6323741) 10 ft.
Terminal/printer cable	EIA-232 terminal/printer cable (12H1204) 10 ft.

Figure 1. ISA 8-port adapter and DB-25 connector

## Address and Switch Settings

Bus I/O Address	Address Switch			
	1	2	3	4
0x104	OFF	OFF	ON	ON
0x114	OFF	ON	OFF	ON
0x124	OFF	ON	ON	ON
0x204	ON	OFF	OFF	ON
0x224	ON	OFF	ON	ON
0x304	ON	ON	OFF	ON
0x324	ON	ON	ON	ON



## Configuration

After the adapter has been installed, the adapter and the device type of each port must be configured to AIX. Follow these steps to configure the adapter.

1. Enter `smit isa` from the AIX prompt.
2. Select 'Add an ISA Adapter' from the panel. Figure 3 shows the list of ISA drivers that are installed.
3. Select 'pcxr' for bus architecture, as shown in Figure 4.
4. Select the appropriate bus and press Enter. Figure 5 shows the configuration parameters for the adapter.
5. Enter the recorded bus I/O address to the bus I/O address field.

Figure 2. Address and 8-port switch setting

Verify the installation using the `lsdev -Cs isa` command, which lists the configured ISA devices. The 8-port asynchronous ISA adapter should be listed and in the Available state.

The next step is defining each device type within the adapter. There are many parameters in a device definition, but they can generally be categorized as related to transparent printing, DB-25 signaling control, or data characteristics and speed.

This definition allows terminals, printers, plotters, modems, or other special devices to be attached. Refer to the *AIX Version 3.2 and Version 4.1 Asynchronous Communication Guide* (SC23-2488) for all session parameter descriptions. This is the first area for problem determination if the device is not working properly.

### ISA 128 Ports

The ISA 128-Port adapter subsystem can support up to 128 devices offering similar capabilities to the 8-port version. This adapter, also available in Micro Channel<sup>®</sup> format, is an intelligent adapter with the ability to off-load line protocol processing from AIX. The subsystem consists of an adapter card with up to eight Remote Asynchronous Node (RAN) units, each supporting 16 devices. The adapter is connected to the remote asynchronous node using either a direct connection or a synchronous modem to a remote location. The wiring system allows a remote workgroup in a host-centric application environment to be connected efficiently.

Figure 6 shows a typical headquarters data center with a distributed regional center and a sister center with affinity to the regional center. The corporate headquarters usually consists of multiple applications or data sources on multiple platforms. The RS/6000 can be used as a regional gateway for applications and data access. The sister center is usually tied in for workgroup access due to geographic affinity.

### Adding an ISA Adapter

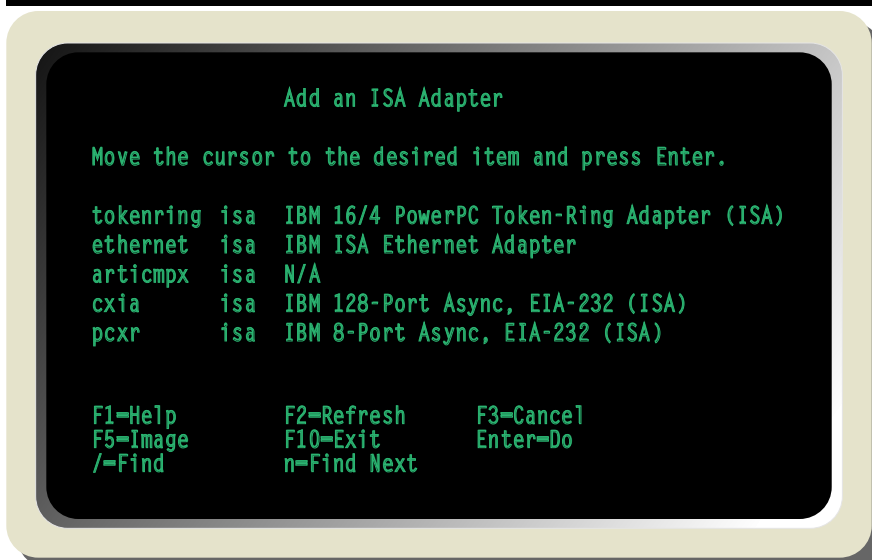


Figure 3. Adding an ISA adapter

### Parent Device



Figure 4. Selection for bus architecture

### Adding an 8-port Asynchronous Adapter



Figure 5. Adding an 8-port asynchronous adapter

### Installation and Configuration

The installation and configuration procedure is similar to the ISA 8-Port adapter except the following:

1. Bus I/O address (Figure 7 shows the switch diagram for the 128-port adapter.)
2. Software driver fileset is `devices.isa.cxia128`
3. Adapter name is `cxia#`

4. Different bus I/O address (default address is 0X328)

### AIX Isresource Command

The steps below can help determine what bus I/O address has been used by the existing adapter.

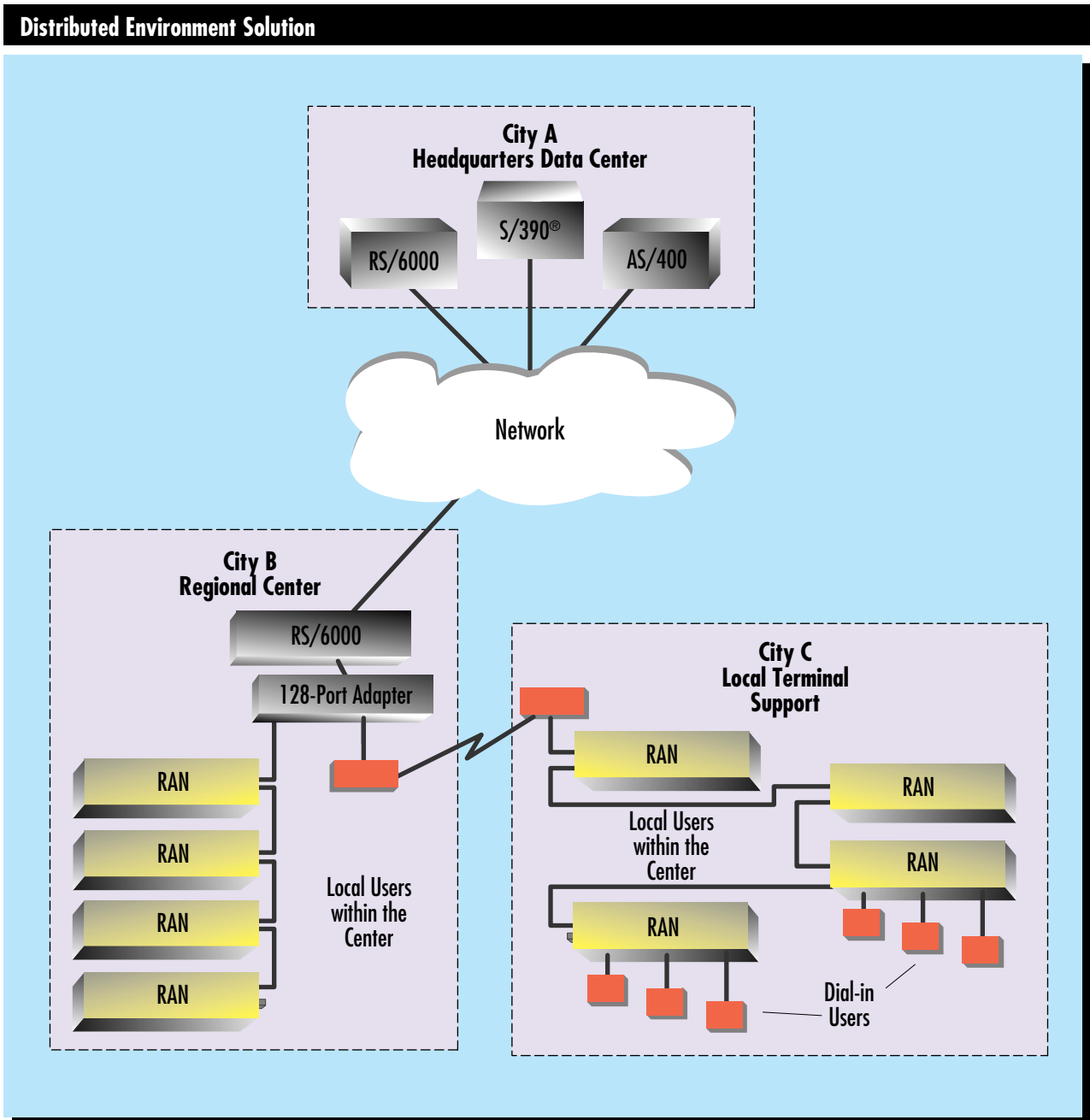


Figure 6. Distributed environment solution

1. Enter the following:

```
lresource -l bus0 -a ] grep bus_io.
```

This command generates a list of adapters using bus I/O that is similar to the chart in Figure 8.

The candidate bus I/O addresses for both ISA adapters are as follows:

- ◆ **8 Port:** 0x104, 0x114, 0x124, 0x204, 0x214, 0x304, 0x324
- ◆ **128 Port:** 0x108, 0x118, 0x128, 0x208, 0x218, 0x308, 0x328

The example shows that 0x2a0 is used by ampx0 and 0x6a0 by apm0; therefore, the selected address for 8 Port is 0x324 and 128 Port is 0x328.

2. Set the DIP switch accordingly.

### Conclusion

The ISA 8- and ISA 128-port adapters complete the multi-user solution in a small workgroup environment. As the workgroup increases in size and users demand better scalability, the future solution will be a new generation of multi-user adapters using higher bandwidth PCI bus architecture.



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### Switch Diagram for 128-Port Adapter

Bus I/O Address	Address Switch			
	1	2	3	4
0x108	OFF	OFF	ON	ON
0x118	OFF	ON	OFF	ON
0x128	OFF	ON	ON	ON
0x208	ON	OFF	OFF	ON
0x228	ON	OFF	ON	ON
0x308	ON	ON	OFF	ON
0x328	ON	ON	ON	ON

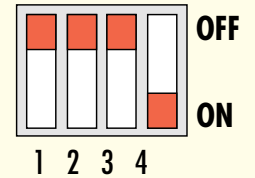


Figure 7. Switch diagram for 128-port adapter

Type	Adapter	Attribute	S G	Current Value
o	fda0	bus_io_addr		0x000003f0 - 0x000003f5
o	fda0	bus_io_addr2		0x000003f7
o	sa0	bus_io_addr		0x000003f8 - 0x000003ff
o	sa1	bus_io_addr		0x000002f8 - 0x000002ff
o	sioka0	bus_io_addr	1	0x00000060
o	sioma0	bus_io_addr	1	0x00000060
o	ppa0	bus_io_addr		0x000003bc - 0x000003be
o	ampx0	bus_io_addr		0x000002a0 - 0x000002a6
o	apm0	bus_io_addr		0x000006a0 - 0x000006a6
o	scsi0	bus_io_addr		0x0000f000 - 0x0000f0ff
o	scsi1	bus_io_addr		0x01000000 - 0x010000ff

Figure 8. List of sample adapters with their unique bus I/O addresses