



## **SmartPort Plus**<sup>™</sup>

INTELLIGENT SERIAL PORT BOARD  
USER'S MANUAL

MAN-0177-010

Rev. 2.0

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## A Note Concerning TV and Radio Interference

### **FCC Information**

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communications.

It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference - in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

**SHIELDED CABLE MUST BE USED TO REMAIN IN COMPLIANCE WITH FCC CLASS A.**

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## SECTION ONE

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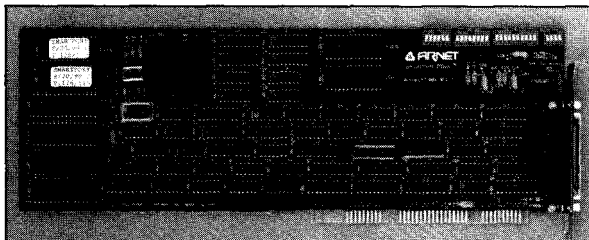
### Introduction

The Arnet SmartPort *Plus* expansion board adds intelligent serial ports to computers for connecting terminals, printers, and modems in multiuser systems. SmartPort *Plus* boards use an onboard 80186 processor to handle most of the overhead of serial communications, leaving the system processor more time to run applications.

There are various SmartPort *Plus* models available adding eight, sixteen, twenty-four, or thirty-two ports to your computer. Each board is supplied with all the hardware and software needed for a complete board installation.

All Arnet SmartPort *Plus* models include SurgeBlock™, which is designed to help protect the board and the computer in which it is installed against damage from data line surges.

Figure 1, **SmartPort Plus PCB**





## SECTION TWO

---

### Protecting Your Equipment and Data

#### **Electrical Surge and Power Protection**

Lightning, electrical surges, and power fluctuations can damage your equipment and/or data through the power lines and /or the serial data lines. When electrical storms occur, the most effective method of protecting your computer system is to unplug your computer and peripherals, and disconnect all data and telephone lines.

To protect against lightning, electrical surges, and power fluctuations, Arnet recommends uninterruptible power supplies (UPS), power line filters, and surge protectors for every installation.

A UPS can provide protection from electrical surges and fluctuations in the power supplied to the computer. However, it does little to protect the main console if you have no protection on the other devices attached to the system. Power line filters protect against electrical surges and transient spikes. Some filters even have a shutdown feature that drops power to the device if voltage drops below a preset level. This prevents the spikes and surges caused by the typical “off and on” electrical problems that occur during a thunderstorm. AC line filters should be used with all electrical devices connected to a computer system, no matter how small or simple.

The serial cables themselves present another potential danger. Nearby lightning strikes can induce high-voltage surges into RS-232 cables. Machinery, especially commercial machines with electric motors, often generates electrical noise that can be picked up by serial cables and cause data errors or equipment damage. Arnet includes “SurgeBlock” on every SmartPort *Plus*. “SurgeBlock” clips fast-rising peak voltages to help protect against spikes over 25 volts caused by lightning, static, or induced voltage. For maximum protection we recommend surge suppressors on the peripheral end of all serial cables as well.

---

Cables running long distances and/or through electrically noisy areas are subject to noise pickup that can cause data errors or equipment damage. To minimize this danger, we recommend low capacitance shielded cable for all installations. (Refer to Section 9, “Making Terminal, Printer, and Modem Cables.”)

Destructive power surges can also enter through modems via telephone connections. Filters made specifically for this purpose should be included on all telephone line connections.

### **Grounding Technique**

Many terminals and computers are dependent on earth ground to set a reference for signal ground. Improper grounding or differences in ground potential between your computer and terminals can damage your equipment, or worse, create a safety hazard. Consequently, you should make sure that every component in your system is properly grounded. Note that most surge protectors and uninterruptible power supplies DO NOT protect against grounding problems.

Connect your computer and all terminals and other peripherals to three-prong grounded receptacles, making sure that the receptacles are wired properly. If you must use three-prong to two-prong adapters, make sure that the adapter ground tabs are properly grounded.

Pin 1 (chassis ground) of the data connector of your terminal or modem, is connected to the frame of the terminal or modem or to earth ground. When you connect the data cables, make sure that the cable shield is connected to the chassis ground. (Section 9 and Appendices H and I give connector pinout details.) A proper chassis ground guarantees that no dangerous voltages exist on terminal or modem frames. Proper grounding also helps cancel noise that can otherwise be induced on the frame or equipment.

---

Local electrical codes may also dictate special grounding arrangements. Your electrician can make sure that your installation complies with all codes. **If you have any doubt about the integrity of the grounding system in your location, have the system checked by a licensed electrician.**

### **Static Protection**

Your computer's case not only houses its family of PC components, but it also protects these sensitive electronic components from stray electromagnetic (EMI) and electrical (RFI, static) fields.



*Using proper static control methods is essential whenever you use, moue, or open your computerfor modifications.*

Make sure that you are working in a static-controlled area which includes at least a conductive benchtop mat or chair mat that is electrically connected to earth ground. Conductive wrist straps in conjunction with ground cords provide extra protection when handling electronic components. Always store and/or move individual printed circuit boards in a conductive bag. Consult your local electronics and/or office supply distributor for static control products.

If you would like an overview of grounding and static protection theories and techniques, you can obtain a copy of Federal Information Processing Standards Publication 94: Guideline on Electrical Power for ADP Installations. This booklet is available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161 703/487-4650.

## SECTION THREE

---

### Checking Your Package Contents

After opening the shipping box, check the contents. The contents of the SmartPort *Plus* are shown below.

#### **SmartPort *Plus* 8** (Figure 2):

- SmartPort *Plus* board
- Eight port DB-25 connector box
- DB-37 cable
- Information packet, including
  - User's Manual
  - Diagnostic diskette
  - Warranty card
  - Introductory letter
  - Driver **diskette** is supplied as required when using some operating systems

**Figure 2, SmartPort *Plus* 8** contents



---

**SmartPort Plus 16** (Figure 3):

- SmartPort Plus board
- Sixteen port DB-25 connector box
- DB-37 cable
- Information packet, including
  - User's Manual
  - Diagnostic diskette
  - Warranty card
  - Introductory letter
  - Driver diskette is supplied as required when using some operating systems

**Figure 3, SmartPort Plus 16** contents

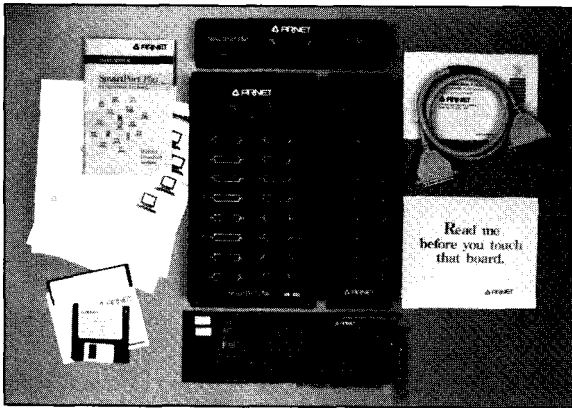


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**SmartPort Plus 24** (Figure 4):

- SmartPort *Plus* board
- Eight port DB-25 connector box
- Sixteen port DB-25 connector box
- Bridge assembly
- DB-37 cable
- Information packet, including
  - User's Manual
  - Diagnostic diskette
  - Warranty card
  - Introductory letter
  - Driver diskette is supplied as required when using some operating systems

Figure 4, **SmartPort Plus 24** contents

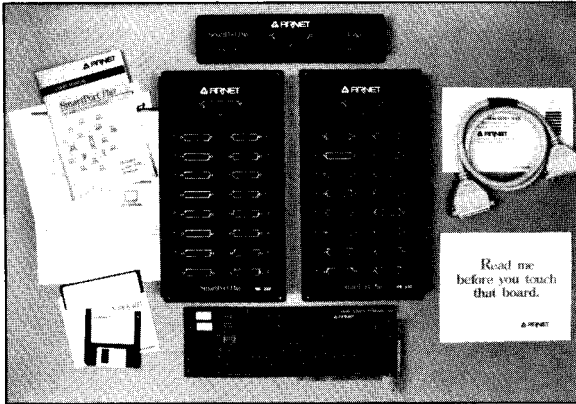


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**SmartPort Plus 32** (Figure 5):

- SmartPort Plus board
- Two sixteen port DB-25 connector boxes
- Bridge assembly
- DE37 cable
- Information packet, including
  - User's Manual
  - Diagnostic diskette
  - Warranty card
  - Introductory letter
  - Driver diskette is supplied as required when using some operating systems

Figure 5, **SmartPort Plus 32** contents



 **WARNING**

Leave the *SmartPort Plus* in its protective anti-static bag until installation. When installing the board, use adequate precautions (such as a grounding wrist strap that is connected to earth ground) to prevent electrostatic damage.

If you are an experienced user, this section provides the information necessary to configure and install your **SmartPort Plus**. If you need additional information, read the detailed sections referenced.

**WARNING**

*Leave the SmartPort Plus in its protective anti-static bag until installation. When installing the board, use adequate precautions (such as a grounding wrist strap that is connected to earth ground) to prevent electrostatic damage.*

1. Set the switches on the **SmartPort Plus** circuit board (Section 6) as shown for your operating system in Appendix A.
2. Turn off your computer; disconnect the power cord from the power source and remove the computer cover.

**NOTE**

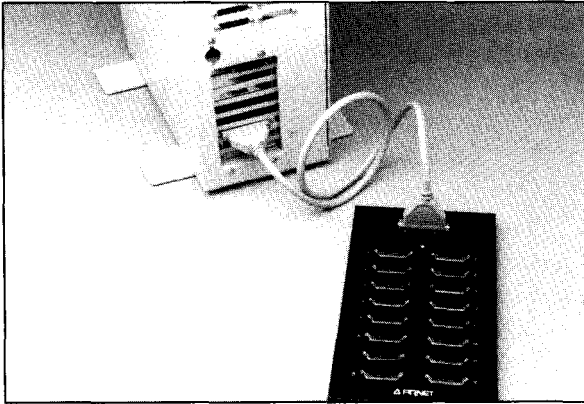
*Before installing the SmartPort Plus locate the PCA revision number and the serial number on the board. Write the numbers in the space provided. PCA revision number \_\_\_\_\_  
PCA serial number \_\_\_\_\_*

3. Install the **SmartPort Plus** board in your computer (Section 7).
4. Replace the computer cover.
5. Attach one end of the board-toconnector box cable to the exposed DB-37 connector on the end of the **SmartPort Plus**.



- 
6. Connect the other end of the cable to the connector box. (For the 24-or 32-port boards, attach the connector boxes to the bridge assembly, tighten the screws, then connect the cable to the bridge assembly.)
  7. Connect the cables of your peripherals to the DB-25 connectors on the connector box. Figure 6 shows a computer equipped with a *SmartPort Plus*.

Figure 6, Computer equipped with ISA **SmartPort Plus**



8. Reconnect the power cord to the power source and, if necessary, install the driver. (Refer to your operating system manual.)

## Micro Channel

If you are an experienced user, this section provides the information necessary to configure and install your Micro Channel SmartPort *Plus*. If you need additional information, read the detailed sections referenced.

 **WARNING**

*Leave the SmartPort Plus in its protective anti-static bag until installation. When installing the board, use adequate precautions (such as a grounding wrist strap that is connected to earth ground) to prevent electrostatic damage.*

1. Copy the @6361.ADF file from the Arnet Diagnostic Disk to the backup copy of your computer's reference disk.

 **NOTE**

*@6361.ADF contains the most commonly used address options. If more options are needed, copy file @6361.AD1 to the reference disk as @6361.ADF. See Section 8 for more information.*

2. Turn off your computer; disconnect the power cord from the power source and remove the computer cover.

 **NOTE**

*Before installing the Micro Channel SmartPort Plus locate the PCA revision number and the serial number on the board. Write the numbers in the space provided.*

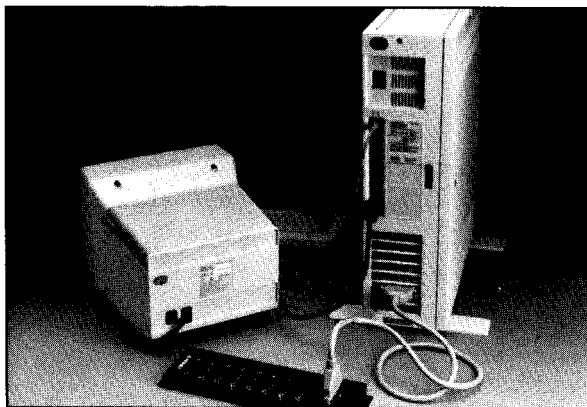
PCA revision number: \_\_\_\_\_

PCA serial number: \_\_\_\_\_

3. Install the SmartPort *Plus* board in your computer.
-

- 
4. Attach one end of the board-to-connector box cable to the exposed DB-37 connector on the end of the *SmartPort Plus* board
  5. Connect the other end of the cable to the connector box.
  6. Replace the computer cover and reconnect the power cord to the power source.
  7. Boot the system using the backup copy you made of your computer's reference disk.
  8. Configure the board according to your operating system. (Refer to Section 8.)
  9. Connect the cables of your peripherals to the DB-25 connectors on the connector box. Figure 7 shows a computer equipped with a Micro Channel *SmartPort Plus*.

Figure 7, Computer **equipped** with Micro Channel **SmartPort Plus**



- 
10. Install **the** driver if necessary. (Refer to your operating system manual or device driver manual.)



*To prevent damage to your Micro Channel SmartPort Plus, never connect or disconnect the cab& if the computer is plugged into the power source.*

## SECTION SIX

### Setting the Switches on the ISA **SmartPort Plus**

---

Before installing the **SmartPort Plus** in your system, set the four multi-segment switches. These switches, labelled S1, S2, S3, and S4, are located on **the SmartPort Plus** board as shown in Figure 7. Set the four switches to match the configuration you choose via your operating system software.

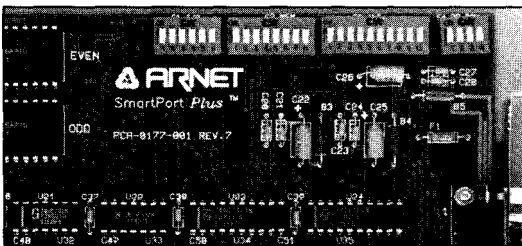
**S1** selects the starting address of the block of sixteen I/O locations used by **SmartPort Plus**.

**S2** selects the starting address of the 64k block of dual-ported memory on **SmartPort Plus**. **The** dual-ported memory address block must be outside the caching memory range.

**S3** selects the system interrupt line, if any, to be used by **SmartPort Plus**.

**S4** selects the size and location of dual-ported memory.

Figure 8, **SmartPort Plus** switches



---

## Proper Switch Settings

The flexible design of **SmartPort Plus** allows many combinations of switch settings. This makes it possible for you to use the **SmartPort Plus** in a variety of systems with a wide range of software.

Vendors of operating systems supporting **SmartPort Plus** specify settings that work with their systems. Appendix A lists the recommended settings that were available when this manual was printed. Two or more different combinations are usually provided; at least one should work with your system. However, if your computer has a certain style of memory cache or has 16 megabytes or more of RAM installed, **SmartPort Plus** may not work properly at our recommended memory (S2) addresses. In this case, you must reconfigure **SmartPort Plus** on your computer to avoid a memory conflict with cache or RAM. Appendix D provides conflict symptoms and solutions as well as S2 settings. Refer to your operating system documentation for any additional setup information.

Appendices C, D, E, and F show all the possible settings for the four switches. If you need more information, call Arnet Customer Support,

## SECTION SEVEN

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### Installing the **SmartPort Plus**

ISA and Micro Channel



#### **WARNING**

**Turn off power to your computer and disconnect the power cord**  
*Inserting a board in the system with power applied could damage the system, the board, or both. Such abuse will void your warranty.*



#### **WARNING**

*Leave the SmartPort Plus in its protective anti-static bag until installation. When installing the board, use adequate precautions (such as a grounding wrist strap that is connected to earth ground) to prevent electrostatic damage.*

1. Remove the cover of the computer (see computer manufacturer's instructions).
2. ISA - After you have set the switches (Section 6) determine which 16-bit slot your **SmartPort Plus** will occupy. (16-bit slots have double length motherboard connectors). Remove the hold-down screw and the blank card bracket of the chosen slot. The blank card bracket will not be reused.

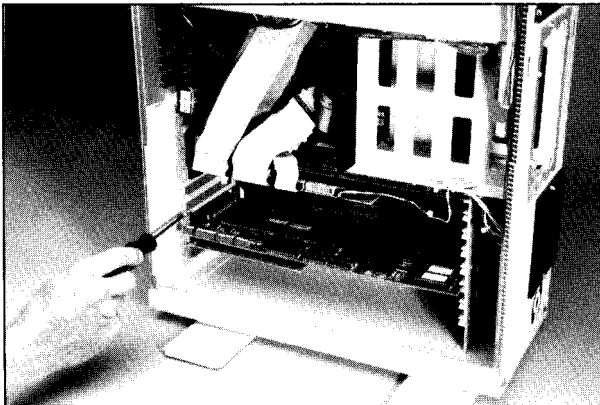
**Micro Channel** - Determine which 8/16-bit Micro Channel slot your **SmartPort Plus** will occupy. (These slots have the shortest of the three types of motherboard connectors.) Remove the hold-down screw and the blank card bracket of the chosen slot. The blank card bracket will not be reused

- 
3. Insert the **SmartPort Plus** board into the mating motherboard socket. Push the board firmly into place (Figure 9).

**Figure 9, Inserting the SmartPort Plus**



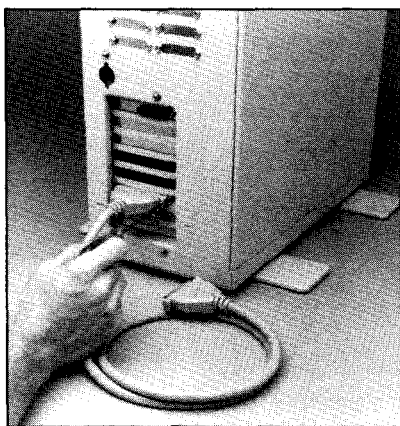
**Figure 10, Replacing the hold-down screw**





- 
4. Secure the board by replacing the hold-down screw that was removed in Step 2 (Figure 9).
  5. Securely attach the **DB-37** cable to the exposed **DB-37** connector on the end of the *SmartPort Plus* (Figure 11).

Figure 11, Connecting the cable to the **SmartPort Plus**

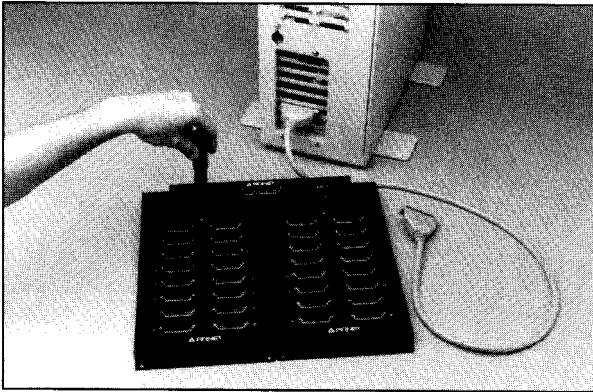


**For the 8 and 16 port boards, skip steps 6 and 7:**

6. Locate the female **DB-37** connector on each 8 or 16-port connector box. Remove and save the two screws found above and below this connector.

- 
7. Locate the two male DB-37 connectors on the underside of the bridge assembly. Connect these to the female DB-37 connectors on the two connector boxes. Secure the connector boxes to the bridge assembly as shown in Figure 12 by reinstalling the screws removed in Step 6.

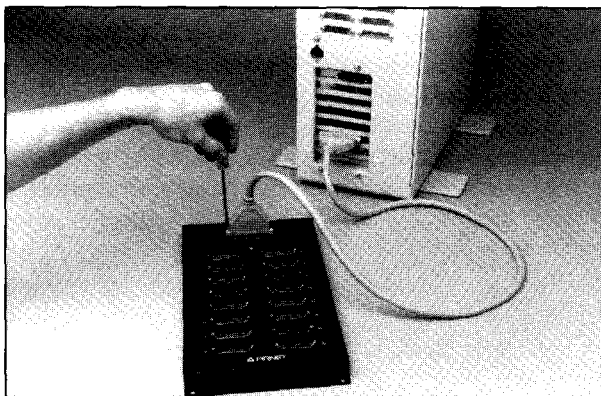
Figure 12, Connecting the bridge assembly to the connector boxes



8. Connect the free end of the DB-37 cable to the connector box (or in the case of the 24- and 32-port boards, connect the free end of the DB-37 cable to the bridge assembly). Refer to Figure 13.

---

Figure 13, **Connecting the cable** to the connector box



 **NOTE**

*If you are installing the SmartPort Plus in a computer with Micro Channel architecture, configure the board as described in Section 8 before continuing the installation procedure below.*

9. Use the diagnostics disk to verify your installation. Instructions for using the diagnostics disk are in Section 10.
10. When you have verified your installation, turn off the power, disconnect the power cord, and replace the computer cover.
11. Connect the cables of your peripherals to the DB-25 connectors on the connector box.

- 
12. Install the **Arnet** driver if you received one with your **SmartPort Plus**. Follow the instructions in the Driver Manual. If your operating system supplies the driver, refer to the operating system manual for driver installation instructions (the driver may be already installed).

## SECTION EIGHT

---

### Configuring Micro Channel **SmartPort Plus**

Configuring the **SmartPort Plus** board through your computer's Micro Channel Programmable Options Select (POS) system, using data from the Arnet Adapter Definition File (ADF) on the diagnostic diskette. This system uses hardware registers, selected and loaded through software, to assign system resources to an expansion board. Each type of expansion board has its own unique code number, assigned in conjunction with the computer manufacturer, which identifies it to the system. (If you cannot determine the proper setup information, check with the operating system vendor or Arnet Customer Support.)



*Refer to your computer system documentation for information on the Programmable Option Select.*

1. Turn off the machine. Disconnect power and install the board as described in Section 7.
2. Reboot the computer with the backup copy of your computer system's reference diskette. The computer will show error 165 and beep twice. Continue as instructed.
3. Follow the instructions shown on the screen to select the mode necessary to manually set the configuration -- do **not use the automatic configuration**. (The instructions for manual configuration will vary for computers made by different manufacturers).
4. When you are prompted to copy the new adapter files, insert the Arnet Diagnostics Diskette.
5. Press ENTER. The computer will read the @6361.ADF file.
6. At the prompt, remove the diagnostics disk and reinsert the reference diskette.

- 
7. Press ENTER. The file @6361.ADF copies to the reference disk.
  8. Follow the instructions shown on the screen to set or change the configuration for the Arnet SmartPort *Plus*.
  9. Choose your operating system and the COM channel or board number desired from the list.
  10. Follow the instructions to save the configuration you have chosen and to exit the program.
  11. Remove the copy of the reference diskette.

**NOTE**

*The diagnostics diskette actually contains three ADF files: @6361.ADF, @6361.AD1, and @6361.AD2. The files @6361.ADF and @6361.AD2 are identical. (This ADF file is the one that is copied to your reference diskette.) The @6361.AD1 file contains every possible option for configuration. The operating systems setups given in Appendix G, as well as other commonly used addresses, are contained in @6361.ADF. It is necessary to use setups other than those given in @6361.ADF, you must copy the AD1 file to the reference diskette as @6361.ADF to be read. The reference diskette will copy only the .ADF file. Therefore, if you need to use the AD1 file, copy the file and rename it .ADF.*

## SECTION NINE

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### Making Terminal, Printer and Modem Cables

Your operating system probably specifies the cable configuration required for connecting terminals or modems to a computer. If so, you should follow their recommendations. If cable configuration is not specified, you can probably use one or more of the cable types discussed below.

We recommend shielded cable (30pF or less capacitance per foot) for all installations. The FCC requires the use of shielded cables to comply with EMI/RFI emission limits. In addition, cables that run long distances or through electrically noisy areas are subject to noise pickup that can cause data errors or equipment damage.

### **RS-232**

RS-232 specifies a maximum cable length of 50 feet. If you run cables farther than 50 feet, you increase the risk of surge damage. (However, using shielded cable of 10-15 pF capacitance per foot somewhat lessens the risk of data errors.)

#### **WARNING**

*When muting your cables, do not run them parallel to AC wiring or on top of fluorescent light ballasts. Bundling several RS-232 cables together is acceptable.*

The SmartPort Plus uses cables with 25-pin D-subminiature connectors. A typical RS-232 cable may have between three and eight conductors, depending on its use.

---

## DB-25 Terminal or Printer Cables

Cables for use with terminals or printers need a minimum of three wires—transmit (TXD), receive (RXD), and ground—plus a shield.



*Many operating systems require the use of at least one hardware flow control signal (hardware handshaking). In this case you will need a cable with four wires plus a shield. The cable wiring diagram for this application is shown below.*

**Figure 14, RS-232** to terminal or printer cable wiring with flow control

Computer end	2	_____	3	Terminal end
Male D-sub	3	<u>RXD</u>	2	Male D-sub
(DTE)	,	<u>Signal Ground</u>	7	(DTE)
	N/C	<u>Shield</u>	1	
	5	<u>CTS</u>	<u>DTR</u>	20



*Printer cabling may vary. Use manufacturer's recommended cable configuration.*



---

## DE25 Modem Cables

Cables for use with modems require eight conductors plus a shield. No looping back of signals is needed for this application.

Figure 15, RS-232 to modem cable wiring

	2	— TXD —	2	
	3	— RXD —	3	
Computer End	4	— RTS —	4	Modem End
Male D-sub	5	— CTS —	5	Male D-sub
(DTE)	6	— DSR —	6	(DCE)
	7	— Signal Ground —	7	
	8	— DCD —	8	
	20	— DTR —	20	
	N/C	— Shield —	1	

## RS-422

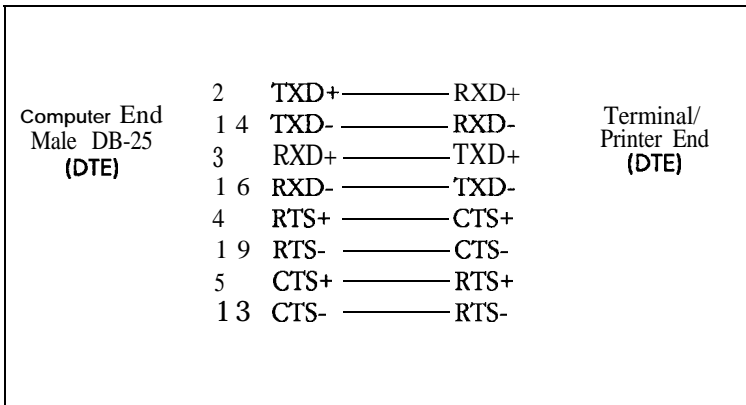
RS-422 utilizes a balanced interface that can support high baud rates up to 4000 feet. (However, twisted pair shielded cable of 20pF capacitance or less should be used to minimize data loss.)

The SmartPort *Plus* uses cables with 25-pin D-subminiature connectors supporting the following signals: TXD  $\pm$ , RXD  $\pm$ , CTS  $\pm$  and RTS  $\pm$ .



*There is no standard connector or pinout defined for RS-422 and, therefore it will be important to identify the proper connector and pinout defined by the peripheral manufacturer.*

Figure 16, RS-422 to terminal or printer cable wiring with flow control



 **NOTE**

RS-422 uses the voltage *difference* between the positive and negative wires for each signal. Greater noise immunity will be achieved *if the positive and negative wires are twisted for each signal pair within the cable*. For instance, TXD+ and TXD- should be a twisted pair in the cable; RXD+ and RXD- should be another twisted pair, etc.

 **NOTE**

The SmartPort Plus RS-422 provides no modem signals and, therefore, should not be used *with* modems. Modem signals are supported *with* the RS-232 option and should be used when modems are required.

---

You should only use RS-422 peripherals to connect to the **SmartPort Plus** RS-422 ports. However, if it is necessary to use RS-232 peripherals, appropriate RS-422 to RS-232 converters are commercially available and should be placed at the peripheral end of the cable.

## SECTION TEN

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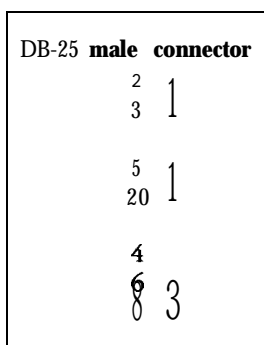
### Using the Diagnostics Disk

The diagnostics disk provided with your SmartPort *Plus* is designed to verify correct installation and function. Keep this disk so that should a problem develop, you can run the diagnostics to locate the problem.

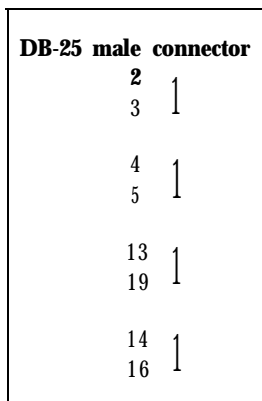
Proceed as follows:

1. With the computer off, insert the diagnostics disk into Drive A.
2. Turn the power on and boot the system from the diagnostics disk.
3. When the introduction screens come into view, strike any key to proceed to the progressive information screens.
4. At the next screen, move the cursor to SmartPort *Plus* (or Micro Channel SmartPort *Plus*) and press ENTER.
5. Follow the instructions that appear on your screen. You will be prompted to choose between INTERNAL, INTERNAL and EXTERNAL, or EXTERNAL modes. If you choose INTERNAL (which puts the DUARTs in internal loopback mode), the test will run automatically for each port and display the results. The INTERNAL and EXTERNAL mode tests the DUARTs, then prompts you for the EXTERNAL test as described below. The EXTERNAL mode tests the line drivers and receivers. If you choose EXTERNAL, the screen will show you how to wire loopback connectors (or breakout boxes) to test each port. Figures 17 and 18 on the following page show the appropriate loopback connection diagrams. The results for each port will be given following each port test.

Figun 17, RS-232 **loopback connection** diagram



Figun 18, RS-422 **loopback** connection diagmm



## SECTION ELEVEN

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### In Case of Trouble



#### **WARNING**

Make *sure* your computer *is* turned off *before* installing or removing boards. Your computer must also be off to change switch settings on the boards. *When installing or removing boards, always use adequate precautions (such as a **grounding** strap) to prevent electrostatic damage.*

Test your SmartPort *Plus* using the diagnostics disk provided. If the SmartPort *Plus* passes all the tests, the problem is probably elsewhere. The symptoms of particular problems may vary between operating systems. Common problems are listed below.

#### **Address/Interrupt Conflicts**

All devices in your system must have unique addresses that must not overlap. The memory location for dual-ported memory addresses must be outside the caching memory range. If you think you have a **conflict** problem, try the alternate settings listed for your operating system.

#### **Inconsistent Baud Rate**

The baud rate and other RS-232 parameters chosen via the operating system must be the same for the SmartPort *Plus* and all other peripherals.

#### **No Handshaking Signals**

Some peripheral devices, especially modems, may need some or all of the handshaking signals that SmartPort *Plus* supports.

#### **Incomplete or Incorrect Installation**

Some operating systems require that an installation procedure be run before SmartPort *Plus* is recognized. Refer to your operating system user's manual. Verify correct hardware installation, referring to Sections 5, 6, 7 and 8 in this manual.

---

## **Improper Grounding**

Make sure that every component in your system is properly grounded. Differences in ground potential between your computer and terminals can damage equipment.

If your board fails the diagnostics or you are unable to isolate the problem, call us (800/366-8844) anytime between 8 a.m. and 7 p.m. Central Time (Monday through Friday). We can give you suggestions for things to try. Please have the following information ready when you call:

- ✓ Computer make
- ✓ Computer model number
- ✓ Operating system
- ✓ Which Arnet board you are using
- ✓ Your board's serial number and PCA revision number
- ✓ Failure symptoms
- ✓ Results of diagnostics
- ✓ Whether the board has worked before  
(was it installed successfully?)

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### **If You Have to Return a Board**

Sometime your boards may have to be returned for service. In this case, you'll need to call us for an **RMA** number. You must have an RMA number to return a board to Arnet. The RMA number must appear on the outside of the package used to return the product. We recommend returning our products in their original shipping boxes. Before calling for the number, make sure you can answer the following questions:

1. Where did you buy your board? If you bought it from a dealer, you should go through the dealer to return the board. If you bought it from Arnet, you can deal directly with us for repair.
2. What is your board's serial number and PCA revision number? (Did you record them in Section 4 or 5 before you installed the board?)
3. Have you followed the checklist at the beginning of this section and tried all of the steps? We've found that these procedures eliminate most problems encountered during installation.
4. Have you contacted the dealer from whom you originally purchased the board for his advice and assistance?

Your Arnet board is one of the most reliable parts of your multiuser system. We feel so strongly about this that we back our products with the Arnet Full Lifetime Warranty. (Refer to Appendix L.) As a matter of fact, if you purchase a board from us and it doesn't work in your application, or if you decide not to keep it for any reason during the first 30 days, we will refund your money. But remember, we're here to help in any case -- because our ultimate goal is to keep your system up and running, and to keep you as a satisfied customer.



Try primary settings first. In case of I/O address or IRQ conflicts, try alternate settings. Please refer to your Arnet Driver Manual or your operating system's documentation for detailed instructions on configuring your operating system.



#### **NOTE**

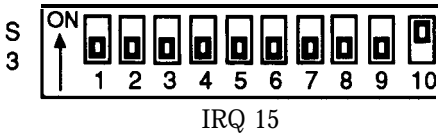
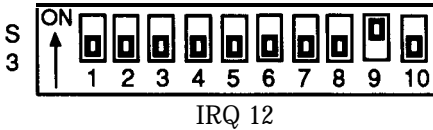
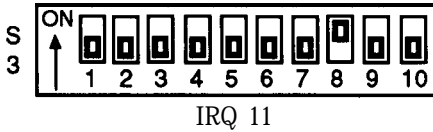
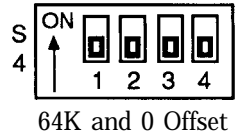
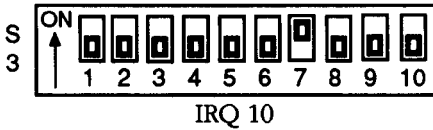
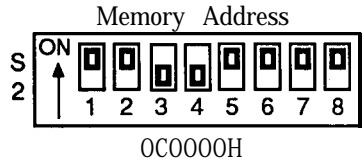
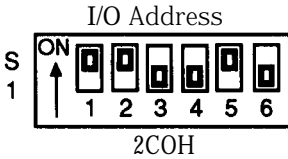
*Dual-ported memory, assigned by S2, is mapped into the system's memory map, usually at locations suggested by operating system vendors. These addresses are only suggested starting points; they are not absolutes.*

*This Appendix provides recommended S2 settings that are appropriate for most computers. However, if your computer has a certain style of memory cache or has 16 megabytes or more of RAM installed, the SmartPort Plus may not work properly at the recommended memory addresses. In this case, you must reconfigure the SmartPort Plus or your computer to avoid a memory conflict with cache or RAM. Refer to Appendix D for a description of memory conflict symptoms and solutions.*

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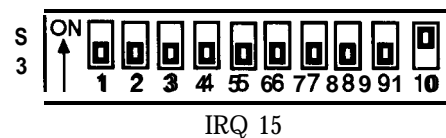
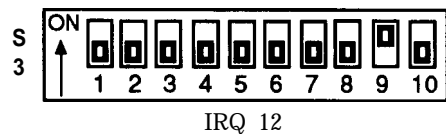
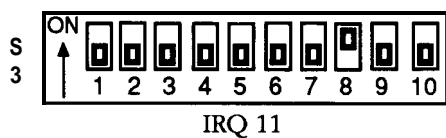
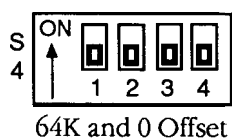
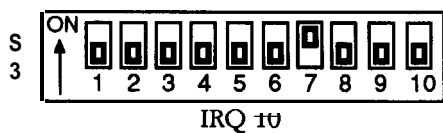
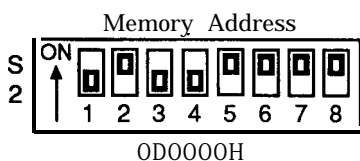
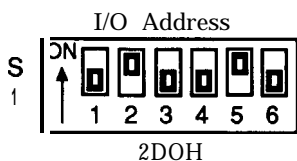
## **BOS/LAN, MBOS/5**

*by TIS Software Ltd.*



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## Alternate Address

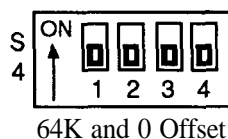
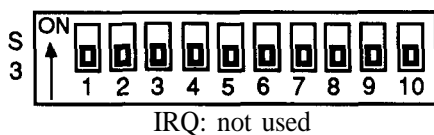
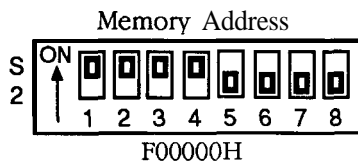
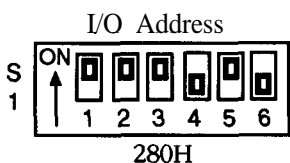


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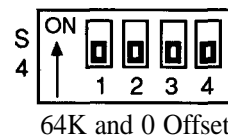
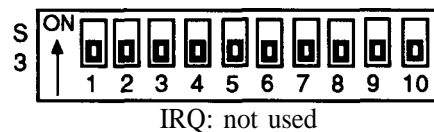
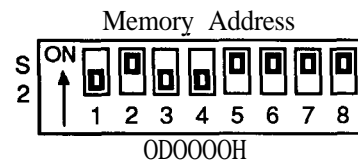
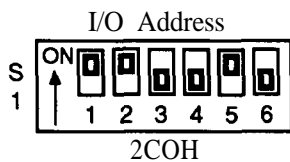
## CONCURRENT DOS 386

by Digital Research, Inc.

### Primary Address



### Alternate Address



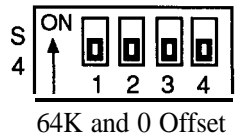
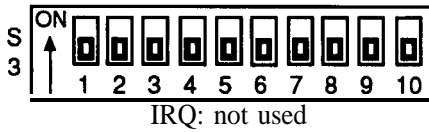
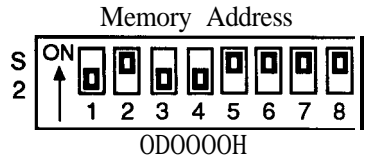
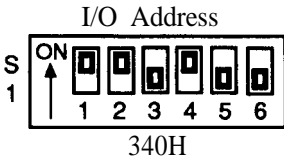
See DRI's documentation for more information.

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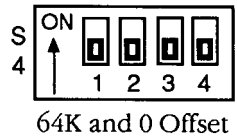
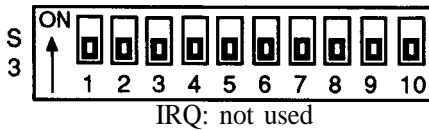
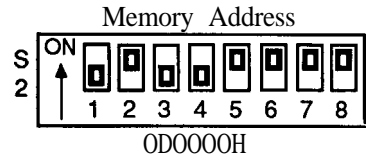
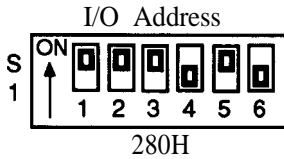
## DTM-PC MUMPS

by Data Tree

### Primary Address



### Alternate Address

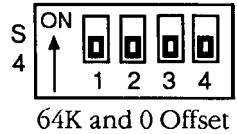
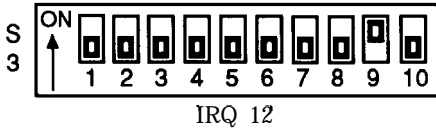
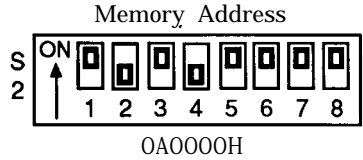
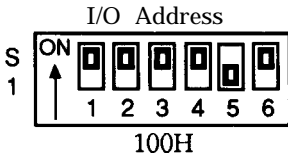


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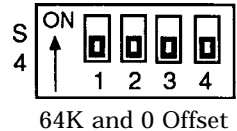
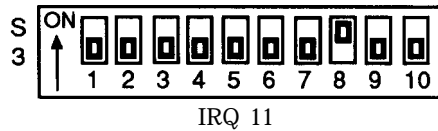
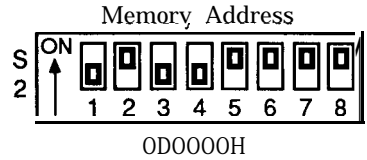
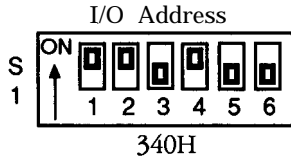
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by Micrometrics Design Corp.

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## Board 2:

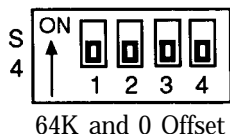
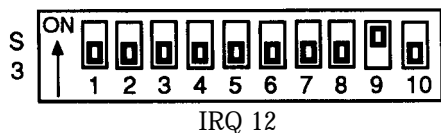
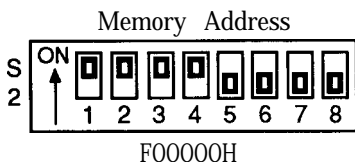
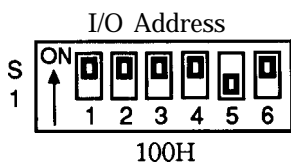


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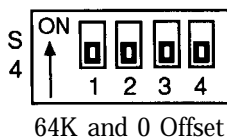
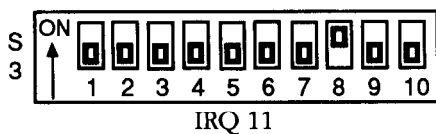
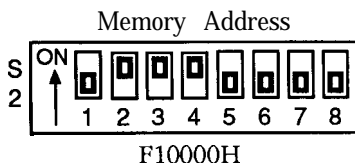
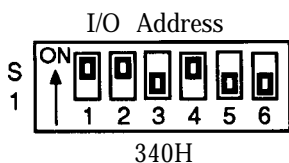
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by *Micrometics Design Corp.*

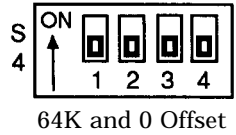
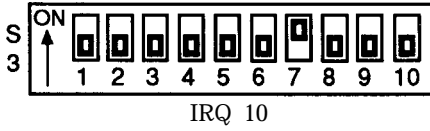
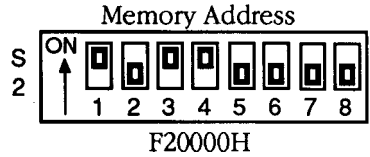
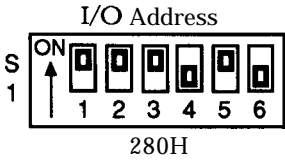
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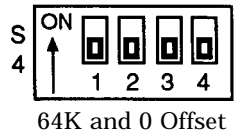
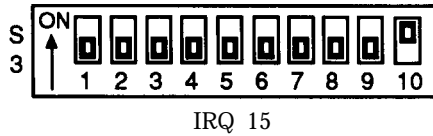
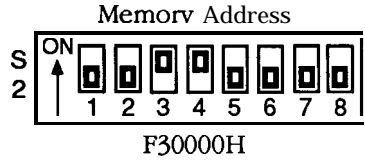
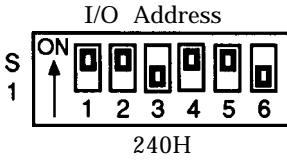
### Board 2:



**Board 3:**



**Board 4:**



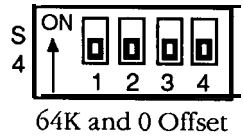
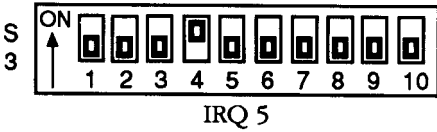
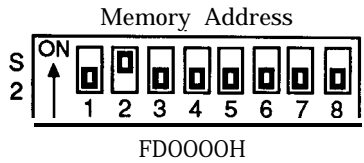
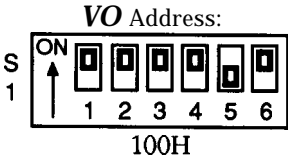


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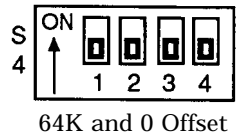
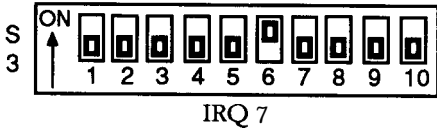
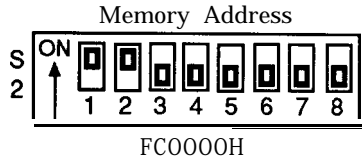
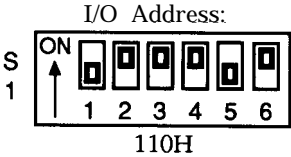
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by THEOS Software Corp.

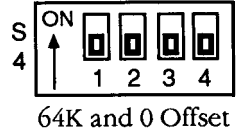
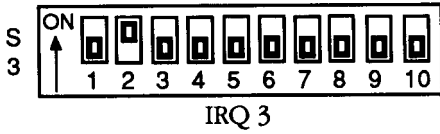
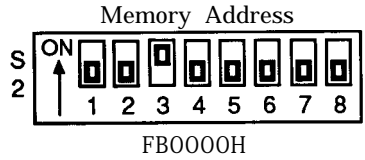
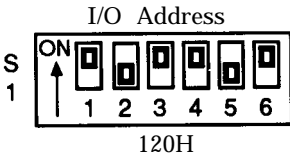
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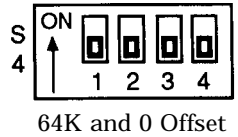
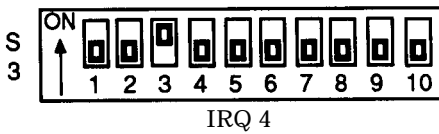
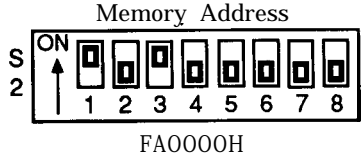
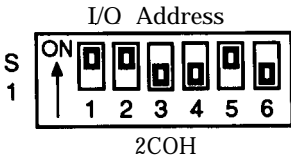
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**Board 3:**



**Board 4:**



UNIX

AT&T UNIX

**ESIX**, by Everex Systems

Interactive UNIX System V/386, by Interactive Systems

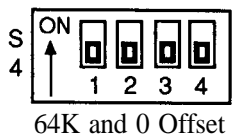
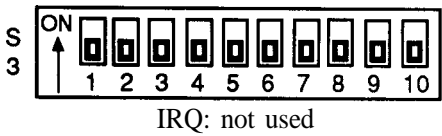
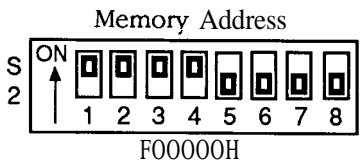
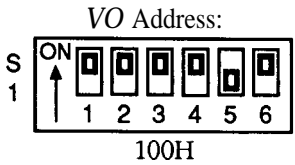
**Microport UNIX**, by Microport Systems

**SCO UNIX System V/386**, by The Santa Cruz Operation

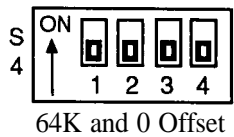
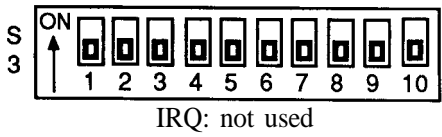
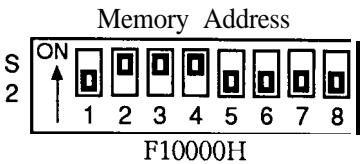
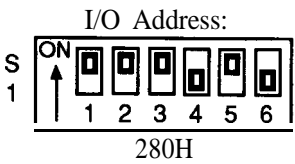
**SCO XENIX System V**, by The Santa Cruz Operation

When using **SmartPort Plus** as COM3

Primary Address



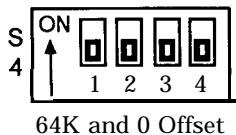
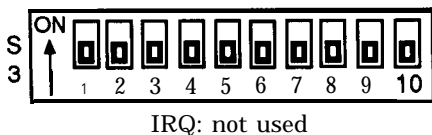
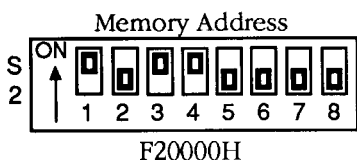
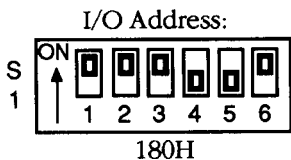
Alternate Address



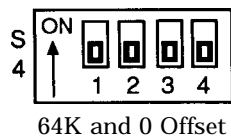
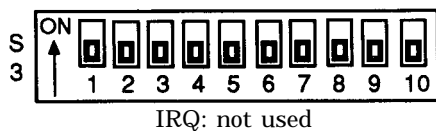
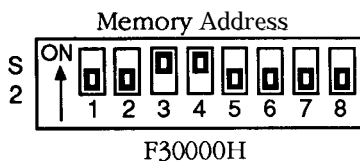
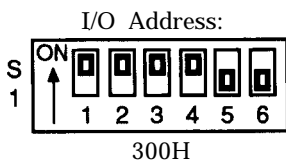
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When using **SmartPort Plus** as COM4

Primary Address



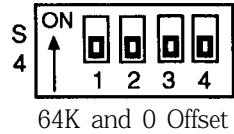
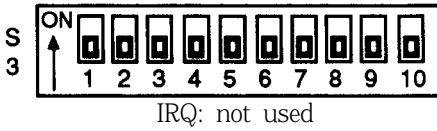
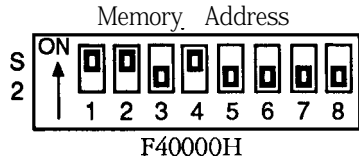
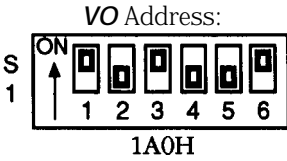
Alternate Address



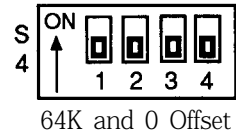
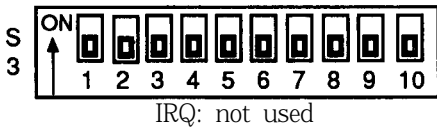
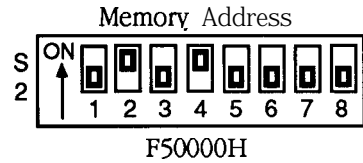
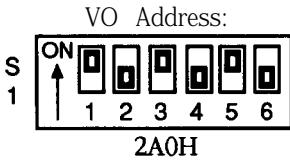
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## When using SmartPort *Plus* as COM5

### Primary Address

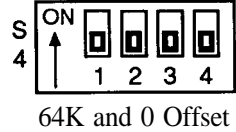
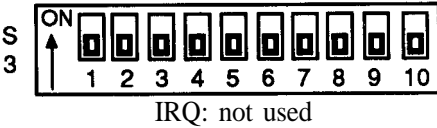
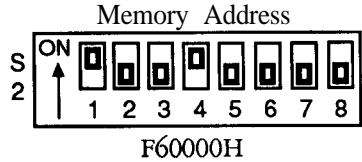
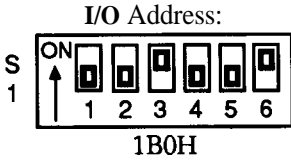


### Alternate Address

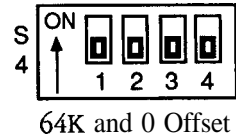
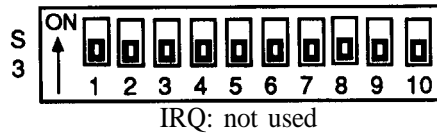
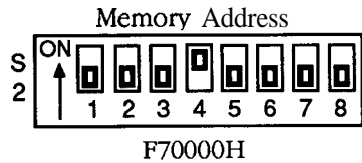
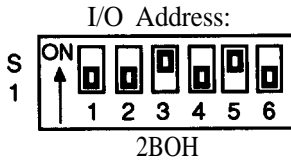


## When using SmartPort *Plus* as COM6

### Primary Address



### Alternate Address

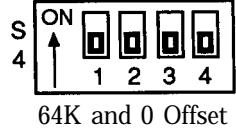
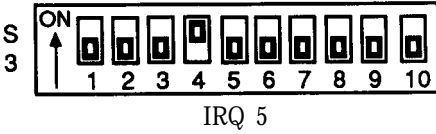
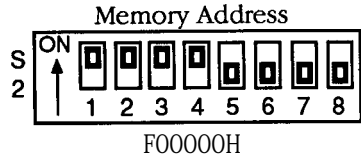
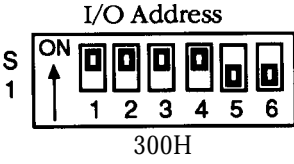


*These settings map the board at 15 megabytes. If your computer has physical memory or other cards at this address, please check your driver manual for alternate ways to configure your board.*

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## **VM/386**

by Intelligent Graphics Corp.

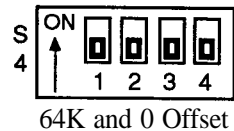
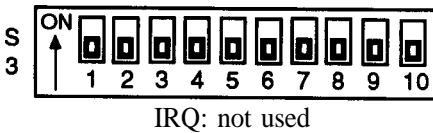
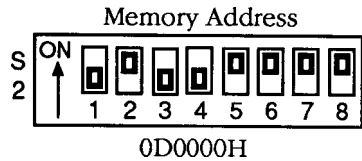
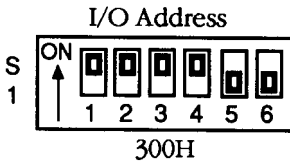


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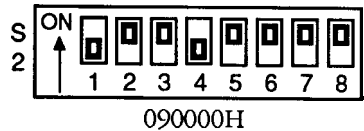
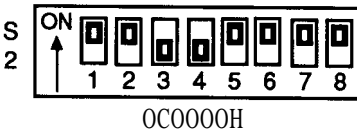
## **XMM-DOS**

*by Concurrent Controls, Inc.*

### **Primary Address**



### Alternate **Memory** Addresses



Use the same settings for S1 and S3 with either primary or alternate memory addresses.

The presence of other &vices (EGA or EEMS boards, etc.) in the system may require setting the memory at an alternate address.

Contact Concurrent Controls, Inc. for details.

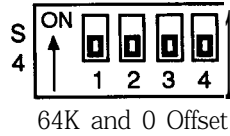
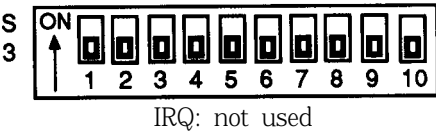
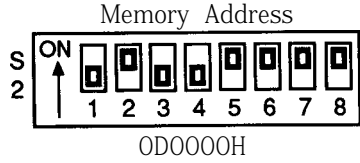
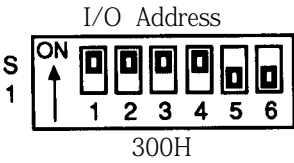


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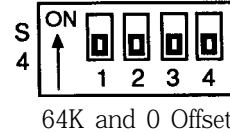
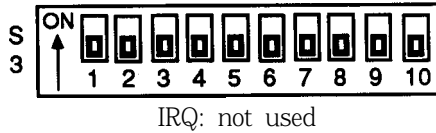
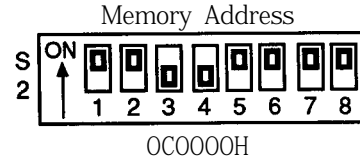
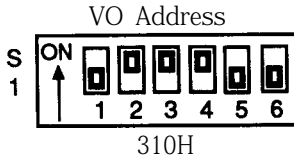
# 386-DOS

by *Concurrent Controls, Inc.*

## Board 1:



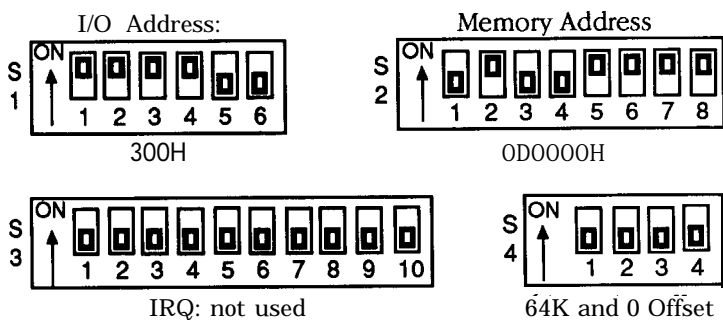
## Board 2:



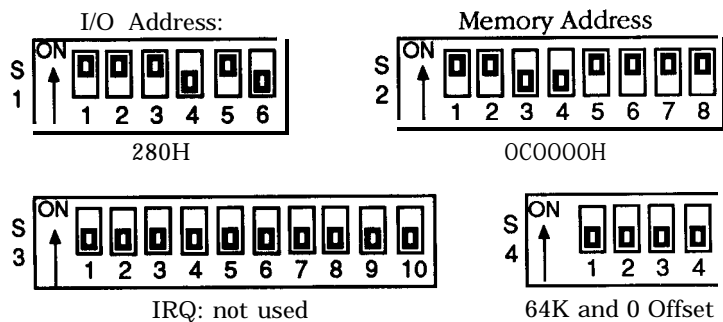


*If you received an Arnet driver with your Arnet board, refer to the driver manual for switch setting information.*

### Primary Address



### Alternate Address



## APPENDIX C

### Switch Settings for S1, I/O Address



**All of the I/O addresses mentioned in this manual are in hexadecimal format. Hex numbers are noted by the letter "H" following the number, e.g., 20H.**

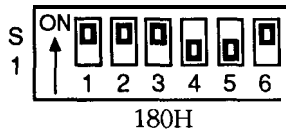
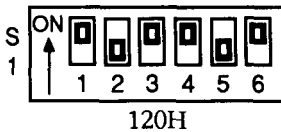
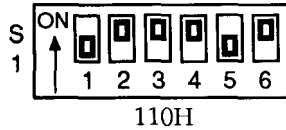
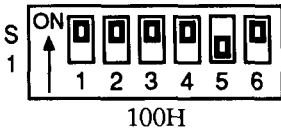
1. Find the setup listing for your operating system in Appendix A.
2. Set S1 to match the proper illustration.

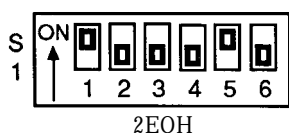
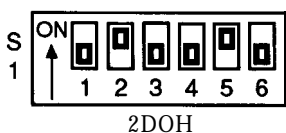
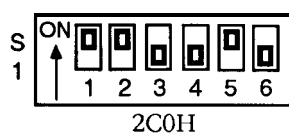
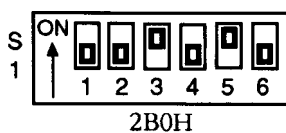
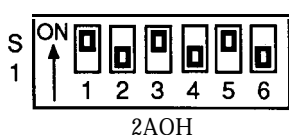
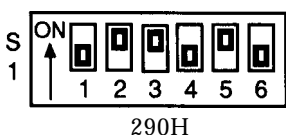
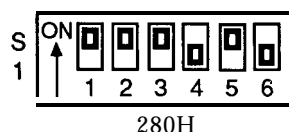
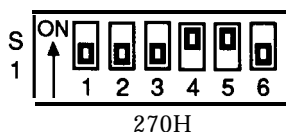
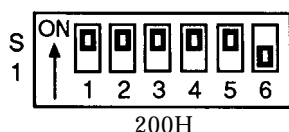
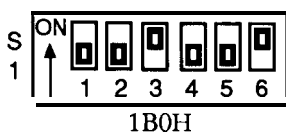
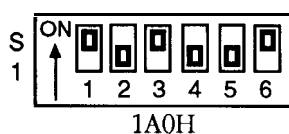
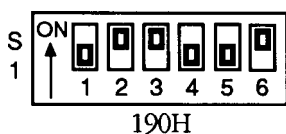


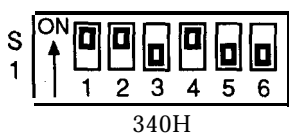
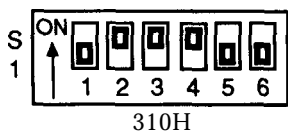
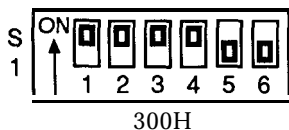
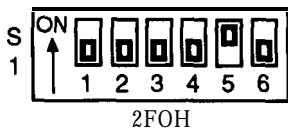
**S1 selects the starting address of the block of I/O addresses. The I/O locations you select with S1 must match the locations you choose via your operating system software.**

If you need switch settings for an operating system not listed in Appendix A, consult your dealer, the operating system supplier, or Arnet. The most commonly used settings are shown below.

#### Commonly Used I/O location Switch Settings







## APPENDIX D

### Switch Settings for S2, Memory Address, Conflict Symptoms and Solutions - ISA Only



**All of the memory addresses mentioned in this manual are in hexadecimal format. Hex numbers are noted by the letter "H" following the number, e.g., 20H.**

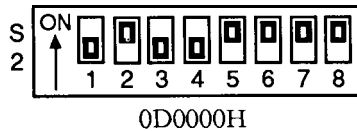
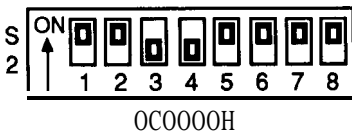
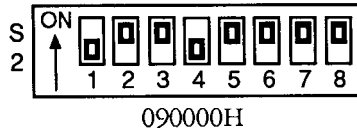
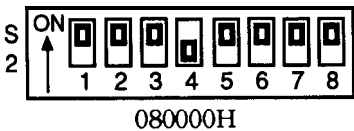
1. Find the setup listing for your operating system in Appendix A.
2. Set S2 to match the proper illustration.

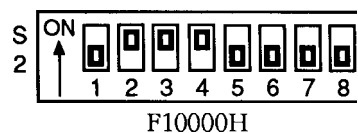
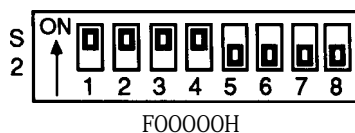
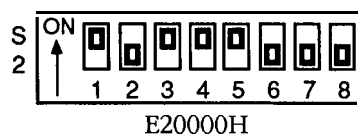
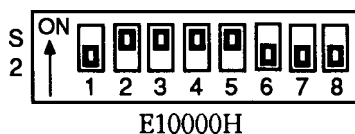
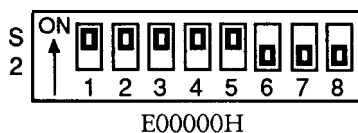
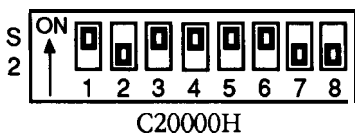
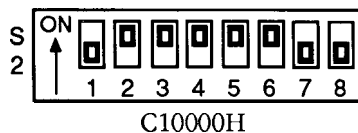
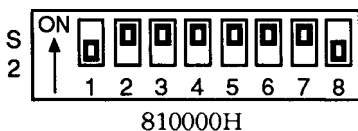
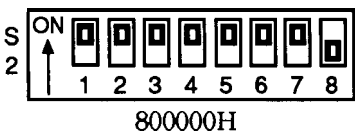
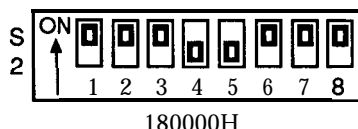
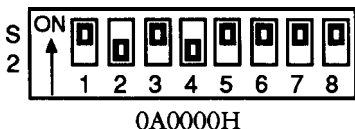


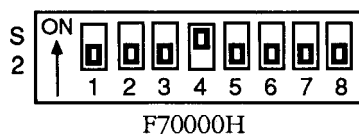
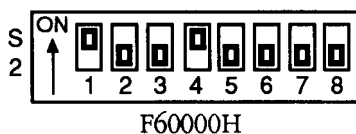
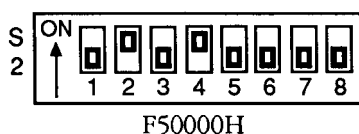
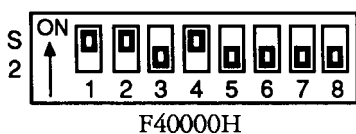
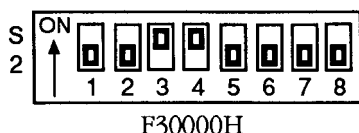
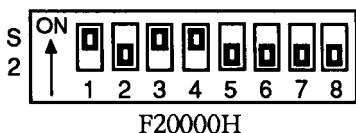
**S2 selects the starting address of the block of dual-ported memory locations. The memory address you select with S2 must be outside the caching memory range and must match the address you choose via your operating system software.**

If you need switch settings for an operating system not listed in Appendix A, consult your dealer, the operating system supplier, or Arnet. The most commonly used settings are shown below.

#### Commonly Used Memory Address Switch Settings







## Memory **Addresses**

The **Arnet SmartPort Plus** intelligent board family employs dual-ported RAM technology. A block of memory on the board is accessible to both the **onboard** and system processors. This dual-ported RAM is used for communications and data passing between the host system, the board, and peripherals connected to it.

### Conflict Symptoms

If memory cache or shadow RAM is conflicting with the **SmartPort Plus** memory address, the computer system may display one or more of the following symptoms:

- Response time is extremely slow. When you press a key on a terminal connected to the **SmartPort Plus**, it may take 30 seconds or more before a character appears on the terminal screen.



- 
- Arnet diagnostics reports that the SmartPort **Plus** failed to initialize properly.
  - The Arnet diagnostics status check fails,

### Conflict Solutions

If your computer has 16 megabytes or more of RAM, you must either address the SmartPort **Plus** below one megabyte in memory or disable the upper two megabytes of RAM. (If the above symptoms occur with memory addresses below one megabyte, disable shadow RAM on your system.)

Setting S2 for OD0000H works in most cases. However, you may need to try other settings, such as OA0000H or OC0000H (usually available in a system with a monochrome graphics adapter) before you find an available 64k block of memory.

If you cannot find an available address below one megabyte, you can free up some space by switching to a monochrome video card. If this is not an option, you may have to disable cache. Cache is disabled by changing BIOS setup and/or jumpers on the motherboard. Refer to your system manual or computer vendor's technical support representative if you need help finding an available memory address, disabling shadow RAM, or disabling cache.

If you have an EISA system with 14 or more megabytes of RAM, you can selectively disable a selected window of memory. Many EISA systems will even allow that disabled memory to be relocated to the top of system RAM. Follow the addressing instructions your EISA configuration utility gives you. When you follow the instructions correctly, the utility will probably disable more than 64k of RAM. By disabling a "notch" of memory on either side of the SmartPort **Plus**, the SmartPort **Plus** memory will not be seen as system RAM.

---

## Changing Memory Size

You may change the memory size on the SmartPort *Plus* to 32K or 16K by setting switch S4. By changing the memory size you can fit the board into a system with memory cache, a VGA adapter (which usually occupies 0A000H to 0C800H), and an ESDI (at 0C800H) or SCSI (at 0D800H) controller by addressing the SmartPort *Plus* at 0D000H with 32K dual port RAM size. Refer to the Appendix “Switch Settings For S4, Memory Size and Location” in the User’s Manual for more details.

## Memory Map of AT System

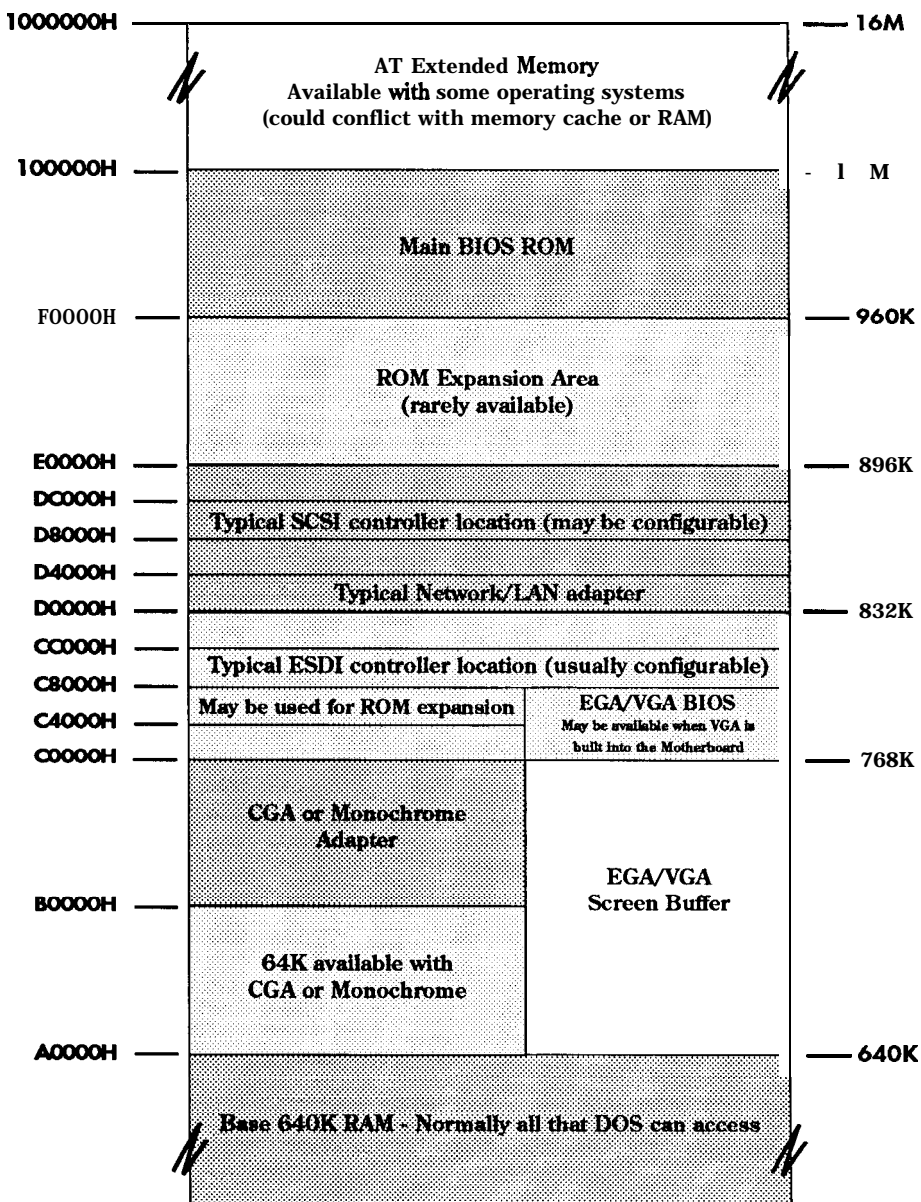


*Convert the segmented addresses to physical addresses by adding a zero to the end of the segment and then adding this number to the offset. For example, convert the address C800:0005 (a common entry in an ESDI controller’s format routine) to a physical address:*

$$C8000 + 0005 = C8005$$

Refer to *the memory map on page 68* and see that *this address is in the area identified as the usual ESDI ROM BIOS location.*

*If you are using a system that uses EXPANDED memory, be aware that a 64k block of memory somewhere between A0000h and EFFFFh needs to be allocated for that. This is true whether you are using a hardware board (286 systems) or an emulator program (386 systems).*

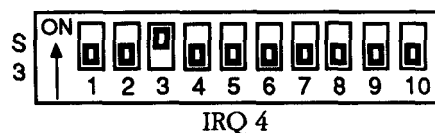
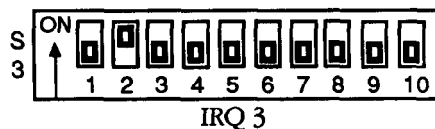
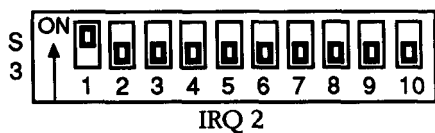
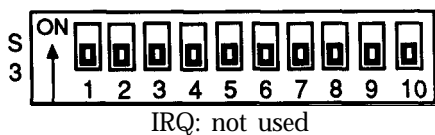


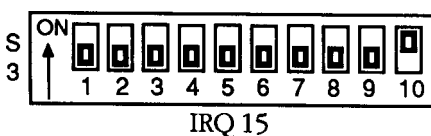
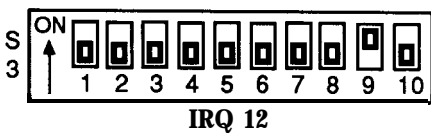
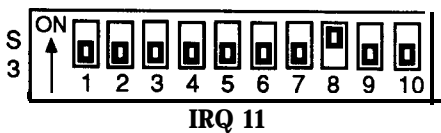
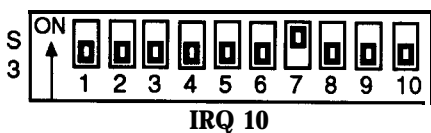
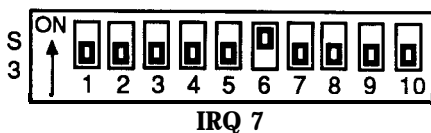
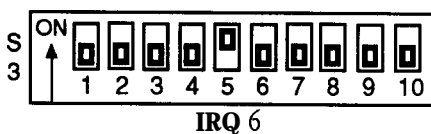
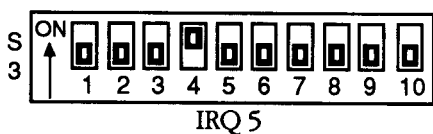
1. Find the setup listing for your operating system in Appendix A.
2. Set S3 to match the proper illustration.

**NOTE**

*The interrupt you select with S3 must be compatible with existing system hardware and supported by your operating system software.*

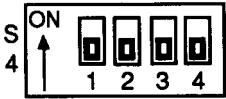
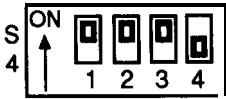
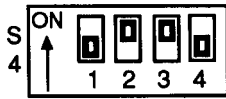
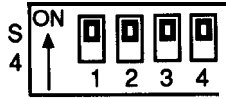
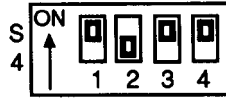

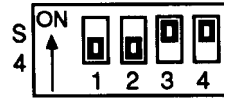
If you need switch settings for an operating system not listed in Appendix A, consult your dealer, the operating system supplier, or Arnet.

**IRQ Select Switch Settings**



## APPENDIX F

### Switch Settings for S4, Memory Size and Location

<u>Switch Setting</u>	<u>Size of Dual-Port+</u>	<u>Location*</u>
	64K	Address set by S2
	32K	s2 + 0
	32K	S2 + 32K (8000 H)
	16K	s2 + 0
	16K	s2 + 16K (4000 H)
	16K	S2 + 32K (8000 H)
	16K	S2 + 48K (C000 H)

- Add the appropriate offset to the address to determine the address. For example, for the third switch setting given above, if the address is A0000, add 32K (which is 8000H) to arrive at the address of A8000.

## APPENDIX G

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Multiuser Operating System Setups for Micro Channel *SmartPort Plus*

The operating system setups in this appendix are contained in the @6361 .ADF file.

### CCI

*by Concurrent Controls, Inc.*

Requirement: 32K

Primary Address:

I/O Address: 300H - 30FH

Memory I/O Address: 0D0000H - 0D7FFFH

IRQ: Not Used

Alternate Address:

I/O Address: 310H - 31FH

Memory Address: 0D8000H - 0DFFFFH

IRQ: Not Used

### DataTree MUMPS

*by Data Tree*

Requirement: **64K**

Primary Address:

I/O Address: 320H - 32FH

Memory I/O Address: 0D0000H - 0DFFFFH

IRQ: Not Used

Alternate Address:

I/O Address: 330H - 33FH

Memory I/O Address: 0C0000H - 0CFFFFH

IRQ: Not Used

The MUMPS.HDW file may be used to configure Micro Channel *SmartPort Plus*.

---

## **IGC VM/386**

by *Intelligent* Graphics Corp.

**Requirement: 64K**

### **Primary Address:**

I/O Address: 300H - 30FH

Memory I/O Address: F00000H - F0FFFFH

IRQ: 5

### **Alternate Address:**

I/O Address: 310H - 31FH

Memory Address: F10000H - F1FFFFH

IRQ: 15

## **Interactive UNIX System V/386**

by *Interactive Systems*

Refer to the SCO XENIX setups.

## **MGLOBAL MUMPS**

by *MGlobal*

**Requirement: 32K**

### **Primary Address (Board 1):**

I/O Address: 1A0H - 1AFH

Memory I/O Address: OD0000H - OD7FFFH

IRQ: 12

### **Alternate Address:**

I/O Address: 1B0H - 1BFH

Memory I/O Address: OD8000H - ODFFFFH

IRQ: 14



---

**Micronetic MUMPS**  
by *Micronetics Design Corporation*

**Requirement: 64K**

**Primary Address (Board 1) :**

I/O Address: 340H - 34FH

Memory I/O Address: F00000H - F0FFFFH

IRQ: 12

**Alternate Address (Board 2):**

I/O Address: 280H - 28FH

Memory Address: F10000H - F1FFFFH

IRQ: 15

**Board 3:**

**I/O** Address: 240H - 24FH

Memory I/O Address: F20000H - F2FFFFH

IRQ: 14

**Board 4:**

I/O Address: 2C0H - 2CFH

Memory I/O Address: F30000H - F3FFFFH

IRQ: 2

These settings are recommended but others are possible.

**SCO UNIX System V/386**  
by *The Santa Cruz* Operation

Refer to the SCO XENIX setups.

---

## **SCO XENIX System V** *by The Santa Cruz Operation*

Requirement: **64K**

### **COM3**

primary Address:

I/O Address: 2COH - 2CFH

Memory I/O Address: E00000H - E0FFFFH

IRQ: Not Used

Alternate Address:

I/O Address: 2DOH - 2DFH

Memory Address: C00000H - C0FFFFH

IRQ: Not Used

### **COM4**

Primary Address:

I/O Address: 2EOH - 2EFH

Memory Address: E10000H - E1FFFFH

IRQ: Not Used

Alternate Address:

I/O Address: 2FOH - 2FFH

Memory Address: C10000H - C1FFFFH

IRQ: Not Used

### **COM5**

Primary Address:

I/O Address: 300H - 30FH

Memory Address: E20000H - E2FFFFH

IRQ: Not Used

---

**Alternate Address:**

I/O Address: 310H - 31FH

Memory I/O Address: C20000H - C2FFFFH

IRQ: Not Used

**COM6**

**Primary Address:**

I/O Address: 320H - 32FH

Memory Address: E30000H - E3FFFFH

IRQ: Not Used

**Alternate Address:**

I/O Address: 330H - 33FH

Memory Address: C30000H - C3FFFFH

IRQ: Not Used

**XENIX/UNIX Operating Systems for Tandy\***

**Requirement: 16K**

**COM3**

**Primary Address:**

I/O Address: 2COH - 2CFH

Memory Address: OD0000H - 0D3FFFH

IRQ: Not Used

**Alternate Address:**

I/O Address: 2DOH - 2DFH

Memory Address: OD0000H - 0D3FFFH

IRQ Address: Not Used

---

## COM4

### **Primary Address:**

I/O Address: 2E0H - 2EFH

Memory Address: 0D4000H - 0D7FFFH

IRQ: Not Used

### **Alternate Address:**

I/O Address: 2F0H - 2FFH

Memory Address: 0D4000H - 0D7FFFH

IRQ: Not Used

## COM5

### **Primary Address:**

I/O Address: 300H - 30FH

Memory Address: 0D8000H - 0DCFFFH

IRQ: Not Used

### **Alternate Address:**

I/O Address: 310H - 31FH

Memory Address: 0D80000H - 0DCFFFH

IRQ: Not Used

## COM6

### **Primary Address:**

I/O Address: 320H - 32FH

Memory Address: DC0000H - 0DFFFFH

IRQ: Not Used

### **Alternate Address:**

I/O Address: 330H - 33FH

Memory Address: DC0000H - 0DFFFFH

IRQ: Not Used

- The Tandy addresses in the @6361.ADF are for Micro Channel computers with cached memory.

## APPENDIX H

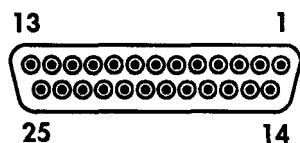
### RS-232 Connector Pin Assignments

**SmartPort Plus** provides an EIA RS-232C-like interface. Each port has a 25-pin D-subminiature female connector on the connector box for attaching a peripheral. Data transmission and reception is in serial form. The communication interface of the DB-25 connector supports certain data and control signals as indicated below.

Figure 19, RS-232 DB-25 pin assignments

Pin	<u>Signal</u>	<b>SmartPort Plus</b> <u>Input/Output</u>
1	Chassis Ground	
2	Transmitted Data (TXD)	output
3	Received Data (RXD)	Input
4	Request to Send (RTS)	output
5	Clear to Send (CTS)	Input
6	Data Set Ready (DSR)	Input
7	Signal Ground	
8	Data Carrier Detect (DCD)	Input
20	Data Terminal Ready (DTR)	output

Figure 20, RS-232 DB-25 connector



The optional RS-422A interface is available with the Arnet SmartPort *Plus* for applications requiring long distance serial communications (up to 4000 feet) between PC systems and peripherals. In addition, greater immunity to electrical noise (which can cause data loss or errors in transmission) is achieved through the use of a balanced interface. RS-422 and RS-232 connector boxes may be combined with a SmartPort *Plus* bridge on the same SmartPort *Plus* board so that both are supported simultaneously.

Unlike RS-232 where signals are measured from a common signal ground, RS-422 signals are measured by a voltage difference between the positive and negative wires for each signal. Therefore, each signal supported requires 2 pins on each DB-25 connector used in the SmartPort *Plus* RS-422 connector box. The signals supported in the RS-422 SmartPort *Plus* option are TXD $\pm$ , RXD $\pm$ , CTS $\pm$  and RTS $\pm$  as shown below.

Figure 2 1, **RS-422** DB-25 pin assignments

Pin	<u>Signal</u>
1	Chassis Ground
2	Transmitted Data (TXD+)
3	Received Data (RXD+)
4	Request to Send (RTS+)
5	Clear to Send (CTS+)
7	Signal Ground
13	Clear to Send (CTS-)
14	Transmitted Data (TXD-)
16	Received Data (RXD-)
19	Request to Send (RTS-)

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 **NOTES**

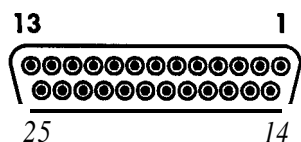
The *SmartPort Plus RS-422 connector box* does not support modem signals and therefore should not be used with modems. Modem signals are supported with the RS-232 option and should therefore be used when modems are required.

Although the RS-232 and RS-422 connector boxes utilize the same DB-25 connectors, the pinouts are not compatible and, therefore, cannot be used for the same peripherals. For the RS-422 option, compatible RS-422 peripherals should be used with appropriate cabling and connector type for the peripherals. If RS-232 peripherals are used with the RS-422 connector box, appropriate converters are commercially available and should be placed at the peripheral end of the cable.

 **NOTE**

Like the *SmartPort Plus RS-232 connector boxes*, the *SmartPort Plus RS-422 connector boxes* provide SurgeBlock that will prevent damage in the event RS-232 peripherals are inadvertently plugged into an RS-422 port.

Figure 22, RS-422 DB-25 connector



## APPENDIX J

### **SmartPort Plus** Configurable Private RAM

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You may add additional private I to the *SmartPort Plus*. Standard configuration is 64K; options include a total of 128K, 256K, 384K or 512K (256K only for Micro Channel *SmartPort Plus*). *These* are useful when using *SimulPort*. Larger amounts of private RAM do not increase *SmartPort Plus*'s performance but will increase *SimulPort*'s performance. You may also utilize larger amounts of private RAM for custom applications or special operating systems that can take advantage of such a resource.

below are our recommendations for adequate amounts of private RAM depending on the number of ports.

Amount of Private RAM	# of Ports	Screens per Port (blocking)	Screens per Port (throw away)
64K	8	4	12
	16	2	6
	24		4
	32		3
128K	8	8	24
	16	4	12
	24	3	8
	32	2	6
256K	8	16	48
	16	8	24
	24	6	18
	32	4	12



## Glossary

### **Address**

A location in computer memory or I/O space. Devices and peripheral are identified to the computer by their addresses.

### **AT-bus**

The expansion bus system used in the IBM AT and IBM compatibles.

### **CTS**

Clear to Send - an RS-232 control signal

### **DCD**

Data Carrier Detect - an RS-232 control signal used with modems

### **DSR**

Data Set Ready - an RS-232 control signal

### **DTR**

Data Terminal Ready - an RS-232 control signal

### **I/O**

Input/Output - describes computer ports which are used to indicate status of internal and external devices. I/O port locations are identified by addresses.

### **Interrupt**

A signal indicating a change in device status which requires action. Interrupts are prioritized by the urgency of the action they trigger. In IBM terminology, these are known as IRQ signals (Interrupt Request).

### **IRQ**

See Interrupt.

### **Micro Channel**

The expansion bus system used in high-end IBM Personal System/2 computers.

---

## Port

A gateway through which data or status information is passed.

## Receive

The connector pin which is the destination of incoming data in an RS-232 serial port.

## RS-232C

The communication protocol used in SmartPort *Plus* communications. RS-232-C (also called RS-232) is a serial protocol.

## RTS

Request to Send - an RS-232 control signal

## **Serial**

A type of data transfer in which data bits are transmitted one after the other on a single wire.

## Transmit

The connector pin which is the source of outgoing data in an RS-232 serial port.

## UART

Universal Asynchronous Receiver/Transmitter, the communication devices used on all Smartport boards. These are similar to the devices used by IBM for its standard serial ports.

## APPENDIX L

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### Arnet Full Lifetime Warranty Details

#### **Length of Warranty:**

The Arnet Lifetime Warranty extends to the original purchaser of the product as well as all subsequent owners. The warranty is a full lifetime warranty that is in existence for the life of the computer equipment in which the Arnet product is originally installed.

#### **What the Warranty Will Cover:**

**Any** and all defects, malfunctions, or failures of the Arnet product, including electrical and mechanical components that fail, defects in software supplied with the boards, and any and all defects in material or workmanship.

#### **What the Warranty Will Not Cover:**

Defects, malfunctions or failure of any warranted product if caused by damage (not resulting from a defect or malfunction of product) while in the consumer's possession or caused by an unreasonable use of the product. Such causes may include:

- A. Damage by acts of God (such as flood, fire, etc.); damage caused by other external forces such as power line disturbances, host computer malfunction, plugging the board in under power, or incorrect cabling, and damage caused by misuse, abuse, or otherwise failing to follow instructions.
- B. Modification of any type without authorization from the Arnet Customer Support Department.
- C. Use with unapproved operating system software or computers. A list of approved operating systems and hardware can be obtained from the Arnet Customer Support Department.
- D. Use in research and development of new software products.
- E. Installation in a computer different from the unit in which it was originally installed.

---

What Arnet **Will Do Under Warranty claims:** In the event of a defect, malfunction, or failure to perform to written specifications, Arnet at its option will repair, replace, or refund the original purchase price of the item. If a product still fails after a reasonable number of attempts to remedy the defect or malfunction, you may elect for a full refund of your purchase price. Generally, boards returned from within the U.S. are repaired or replaced within two working days of receipt by the factory. International returns require from three to five days. In any event, Arnet will notify you as quickly as possible if your repair will exceed these periods. For customers in the U.S., Arnet will pay shipping charges to return repaired or replacement boards via UPS ground. For customers in other countries, Arnet will pay for return shipping by standard air carrier. If you want repaired or replacement boards shipped by some other method, you must pay the shipping charges.

*What To Do In The Event Of A Claim:* *First, contact the dealer from whom you originally purchased the board for his advice and assistance.* Arnet dealers are authorized to perform warranty obligations. If you bought the product directly from Arnet, call Arnet Customer Support for an RMA number. Then send the unit postage paid to the following address:

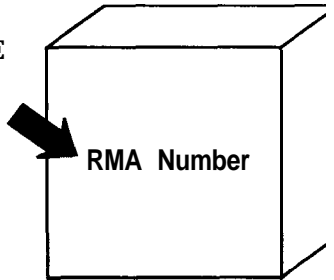
Attention: Customer Support Dept.  
Arnet Corporation  
618 Grassmere Park Drive, #6  
Nashville, Tennessee 372 11  
Telephone: (800) 366-8844; (615) 834-8000

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Include the following information *with the return*:

- Your name and address
- Daytime telephone number
- **A** written explanation of the defect (s) and the circumstances under which it arose

**THE RMA NUMBER MUST  
APPEAR ON THE OUTSIDE  
OF THE PACKAGE.**



**Disclaimer: Arnet's remedies and obligations are only to repair, replace, or refund the purchase price of the Arnet product. Arnet disclaims and shall not be liable for an incidental or consequential damages in connection with any Warranty claim and /or product defect or malfunction. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitations for exclusion may not apply to you. This Warranty gives you specific legal rights and you may also have rights that vary from state to state.**