SMC®

CONFIGURATION GUIDE FOR
ARCNET-PC600/650 SERIES
NETWORK CONTROLLER BOARDS

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Trademarks:

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FCC Compliance

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordánce with the instructions in this guide, 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.

CSA Compliance

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

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INTRODUCTION

Thank you for purchasing an SMC 16-bit ARCNET® board. SMC is proud to bring to you the latest technologies and highest quality products.

Our ARCNET-PC600 family of high-performance boards combines the best features of our PC500 long and short board families. They offer the same I/O-mapped architecture and ease of installation available with our original PC500 long boards and incorporate the same state-of-the-art hardware found on our PC500 short boards. And simply by changing to optional drivers, these boards can operate in memory-mapped mode.

State-of-the-Art Hardware:

- SMC-developed VLSI (Very Large-Scale Integration) ARCNET Controller incorporates:
  - Transceiver and AT®-bus interface support logic
  - 16-bit data path
  - Dual-ported Packet Buffer RAM
  - Zero Wait State arbitration
- Discrete transceivers provide a cleaner, more reliable signal transmission
- On-board circuitry for Nodal Priority® [Patent No. 4,866,706] improves throughput in a NetWare® environment:
  - Actual benchmark tests using PERFORM2.EXE have shown a performance improvement of 63% on a 55 node network!
  - Theoretical performance improvements of over 200% are possible on larger networks!
- Coax cable interface circuitry supports a maximum point-to-point distance of 2,000 feet (610m)

High-Performance, I/O-Mapped Turbo II Drivers for NetWare:*

- Performance improvements of up to 127% over RX-Net™ drivers (additional performance improvement is provided by the Nodal Priority Feature)
- Interoperable with all drivers conforming to the new ARCNET Packet Header Definition Standard

* Memory-mapped drivers are available as an option.

Easy to Install:

- I/O mapped drivers eliminate memory conflicts with other peripherals for "plug-n-play" installation
- SMC-supplied menu-driven program simplifies ARCNET driver selection by matching the driver to the board for you

These boards also include features which users have come to expect as standard on premium quality boards:

- Reduced board size through:
  - Extensive chip-level integration which lowers the chip count
  - Surface Mount Technology (SMT) design and manufacture which, by reducing the number of through-holes, offers higher component density
- External node ID switches for ease of configuration
- External diagnostic LEDs for monitoring both board and network activity
- On-board auto-boot PROM socket for use in workstations
- Jumper-selectable for coax star or bus topology. When the jumper is set for star topology, the board is self-terminating.

TECHNICAL FEATURES

System Compatibility

SMC's 16-bit, high-performance network controller boards are designed to operate with any high-speed IBM® AT or compatible system.

ARCNET-PC600 boards are for coax networks; PC650 boards are for twisted pair networks. For each cabling type, there is a file server (FS) board and a workstation (WS) board.

These new generation boards are fully compatible with all existing ARCNET networks. They are interoperable with SMC's previous generation boards, as well as with boards from other vendors. However, maximum throughput improvements are achieved when these boards are used in *all* the file servers and workstations on the network.

State-of-the-Art Hardware

The boards contain the same SMC-developed VLSI ARCNET Controller used in the PC500-S boards. This controller incorporates the core ARCNET logic with an on-chip 2K by 8 Dual-ported Data Packet Buffer RAM designed to hold up to four data packets.

The same discrete transceiver design has been used to provide a cleaner, more reliable signal transmission. And, the same cable interface circuitry has been employed to allow the coax boards to support 2,000 foot (610m) point-to-point distances.

High Performance

With our Nodal Priority Feature [Patent No. 4,866,706], our newest VLSI technology, and our Turbo II drivers for NetWare, these boards offer exceptionally high performance. In fact, a network consisting solely of PC600 boards can achieve *more than twice the performance* of standard 8-bit boards. Even with our 8-bit boards in the workstations, performance improvements of over 100% can be achieved.

Nodal Priority for the File Server

ARCNET's token-passing access method guarantees equal access to the network for all nodes. This means that each PC can send a single data packet before passing the token. With Nodal Priority, however, the ARCNET-PC600FS and PC650FS can send multiple data packets without interruption, speeding up throughput in a NetWare environment. The performance improvements attributable to Nodal Priority are most apparent on networks with a large number of nodes, particularly when larger files are being downloaded.

NetWare Drivers

Each board is shipped with SMC's high-performance, interoperable Turbo II drivers for NetWare, v2.1x through v3.11. Instructions for installing the drivers can be found in a README.EXE file on the driver diskette.

"FS" Boards for Network File Servers

The ARCNET-PC600FS and ARCNET-PC650FS boards are designed for a network file server. They improve performance through the use of the SMC patented Nodal Priority Feature, an ARCNET enhancement.

"WS" Boards for Network Workstations

The ARCNET-PC600WS and ARCNET-PC650WS boards are designed for network workstations. They offer the same advanced hardware found on the file server boards, with the exception of Nodal Priority. When used in conjunction with the new PC600 FS series file server boards, network performance is maximized.

PC600's for Coax Networks

The PC600 boards are equipped with a standard BNC female connector for connection to RG-62/U coaxial cable. The boards are designed both for point-to-point connection in traditional star networks and for connection to the newer bus networks. When the star/bus jumper is set to star, the board is self-terminating.

PC650's for Twisted Pair Networks

The PC650 boards are equipped with two 6-position modular jacks for connection to twisted pair wiring. Either jack may be used for point-to-point connection in the traditional star network. Both jacks are used when daisy-chaining these boards un-

less the boards are located at the beginning or end of a wire segment. Note that a terminator must be placed in each unused jack on these boards.

SMC's Twisted Pair Installation Kit contains two modular plugs, one terminator and one modular coupler. See the topic titled "Twisted Pair Wiring and Components" for wiring specifications and details of these components.

Clearly Labeled Switches and Jumpers

All switches and jumpers are clearly labeled, and the address switches, located on the top edge of each board, are easily accessible so they can be modified without removing the board. Table mapping has been utilized to simplify installation and to reduce the number of switches.

The node ID switches are accessible through the rear bracket for ease of installation. The placement of these switches also simplifies network expansion. Without disassembling the PCs, you can check the switches on each board in the network to verify that the node ID you have selected for an additional PC is unique.

Instructions for configuring the switches and jumpers are provided in this guide.

Diagnostic LEDs

Two diagnostic LEDs are visible on the rear bracket of each board. The green LED monitors network activity; the red LED,

board activity. When the green LED is on, either the token is being passed, or a message or data from the board is being transmitted over the network. During the reconfiguration process—this occurs whenever a workstation joins or leaves the network —the green LED blinks. When the red LED is on, the board is being accessed by the computer.

Optional Auto-Boot PROM for Workstations

An 8K by 8 PROM socket is provided on the workstation boards for an optional auto-boot PROM. This PROM, available for all NetWare 2.x and 3.x software, enables a diskless PC to access the network. The PROM also may be used as a convenience on any system with floppy and/or hard disk drives.

Note that a PROM is factory-installed on all file server boards. This PROM is required for the Nodal Priority Feature.

PRODUCT SPECIFICATIONS

MECHANICAL	PC600	PC650
Size	6.2" x 3.9" (15.75cm x 9.9cm)	
Connector	one BNC, isolated ground	two modular 6-position jacks
Cable Type	RG-62/U coax	one twisted pair
Max. Length:		
point-to-point	2,000' (610m)	400' (122m)
with multiple PCs	1,000' (305m) w/ 8 PCs	400' (122m) w/ 10 PCs

ENVIRONMENTAL		
Temperature		Humidity, non-condensing
Operating	Storage	
0° to 70° C	- 40° to + 70° C	10% to 80%

ELECTRICAL	RESOURCE REQUIREMENTS	
Max. Power	Interrupt Levels	Base I/O Addresses
+ 5 volts @ 200mA – 5 volts @ 20mA	3, 4, 5, 7, 9(2), 10	260, 290, 2E0, 2F0, 300, 350, 380, 3E0

TWISTED PAIR WIRING AND COMPONENTS

SMC's twisted pair network operates with a single pair of unshielded twisted pair wires. The wires may be used in a standalone network, or they may be connected to a pair of unused wires from the telephone bundle.

Caution ... *If you plan to connect the network to existing telephone wiring, you are limited to one pair of wires for data and one pair of wires for voice within the same bundle.*

Wiring Specifications

For reliable operation and to meet FCC requirements, be sure to use wiring that meets the specifications listed below. Note that most pre-installed twisted pair telephone wiring in use today does meet these specifications. For further information, please contact your local cable supplier or call SMC's Tech Support Hotline.

Specification	Twisted Pair Wiring
Wiring	copper
Gauge:* Solid Stranded	 22, 24, 26 AWG 24, 26 AWG
Number of Twists per foot (.305m)	2 min.
DC Resistance per 1,000' (305m)	28.4 ohms max.
Characteristic Impedance	100 ohms +/-20% @ 1MHz
Maximum Attenuation per 1,000' (305m)	16.0 dB @ 5MHz

* Only the 24 and 26 gauge solid and the 26 gauge stranded wires may actually be connected directly to SMC's twisted pair products. This is due to the physical limitation of the plug which mates with the 6-position modular jack used on these products.

If any other type of wiring is installed, an adapter or modular wall plate is required to convert this wiring to the type that can be connected to the modular plug.

Components

Be sure to have the following components on-hand before installing a twisted pair network:

Modular Plug

6-position RJ11-type plug (for 24 and 26 gauge solid wire and 26 gauge stranded wire only) — must be installed at both ends of each length of twisted pair wiring.

Terminator

6-position modular plug containing a 100 ohm, 1/2 watt terminating resistor with 5% or less tolerance — must be placed at both ends of each wire segment to eliminate signal reflections.

Modular Coupler

dual, 6-position jack designed to maintain proper phase— can be used to join any two lengths of twisted pair wiring or to rejoin two parts of a wire segment after a PC, repeater or link has been removed from the network.

SMC's Twisted Pair Installation Kit contains two modular plugs, one terminator and one modular coupler. If you plan to purchase these components elsewhere, note that they ***must*** have 30 microinches (.000030") of gold plating on the contacts in order to meet FCC requirements. Also, the modular coupler ***must*** be straight through (that is, it must maintain proper phase). See the list of suggested suppliers in this guide.

Pin Assignments

The pin assignments for the modular plugs are given below. Be sure to use a Modular Plug Stripper/Crimper when connecting the plugs to the twisted pair wiring (see the list of suggested suppliers in this guide).

Pin	Assignment
1	not used
2	not used
3	data +
4	data -
5	not used
6	not used

Caution ... *To eliminate polarity reversal problems, be sure the two wires are in proper phase — straight through, rather than reversed.*

Note ... The "+" and "-" signs are used to represent the polarity of the two wires that make up each wire pair.

To maintain the proper phase, hold the plugs in the same orientation, for example, with the spring tabs at the bottom and the pins facing you. This way, both pins will be numbered in the same direction. Be sure you are using a pair of wires (e.g., the red pair or the blue pair) and that the same color wire is connected to the same pin on each plug. Thus, if a red pair is being used, the red and white striped wire must be connected to the same pin (e.g., pin 4) on each plug.

List of Suggested Suppliers*

Product	Part #	Supplier
Modular Coupler	30-9678-2	G.C. Thorsen P.O. Box 1209 Rockford, Illinois 61105-1209
Modular Plug¤	5-555042-3	AMP Incorporated Worldwide Headquarters Harrisburg, PA
Modular Plug Stripper/Crimper	231652-2	AMP Incorporated Worldwide Headquarters Harrisburg, PA

* The above manufacturers have the option of modifying these parts without first notifying SMC that a change will be taking place. Therefore, SMC cannot be held responsible for their application or operation.

¤ The modular plug may be used only with 24 or 26-gauge solid wire or 26-gauge stranded wire.

CONFIGURING THE BOARDS

The ARCNET-PC600 and ARCNET-PC650 series network controller boards contain a sufficient number of switches and jumpers to allow for a wide range of configurations. Before a board is installed in a PC, these switches and jumpers must be set.

The switches and jumpers are described below and are shown in the diagrams on the following pages. Also provided are detailed explanations of how to set them for a particular configuration, as well as the most common settings for NetWare.

Switch Group S1 — I/O Base and Memory Address Select:

Switch group S1 is located on the top edge of the board. The first three switches are used to set the I/O base address. Switches four through eight are used to set the memory (RAM) buffer address and its associated PROM address.

Note ... With I/O-mapped drivers, the settings of switches four through eight are significant *only* if an auto-boot PROM has been installed; without the PROM, these settings are ignored. With memory-mapped drivers, these same switches are always significant.

Switch Group S2 — Node Addess Select:

Switch group S2 is accessible through the rear bracket for ease of configuration. The eight switches in this group are used to select the unique PC identification number or node ID.

Jumper Set JP2 — PROM Enable and Memory Reserve Select

This jumper, which reserves 16K of memory address space and enables a PROM, should always be installed on all workstation boards, even if they do not contain an auto-boot PROM. It is located near the center of the board.

If the I/O-mapped drivers are being used and an auto-boot PROM is installed, or if the optional memory-mapped drivers are being used (with or without an auto-boot PROM), the base I/O address of this memory must be selected using switches four through eight of switch group S1.

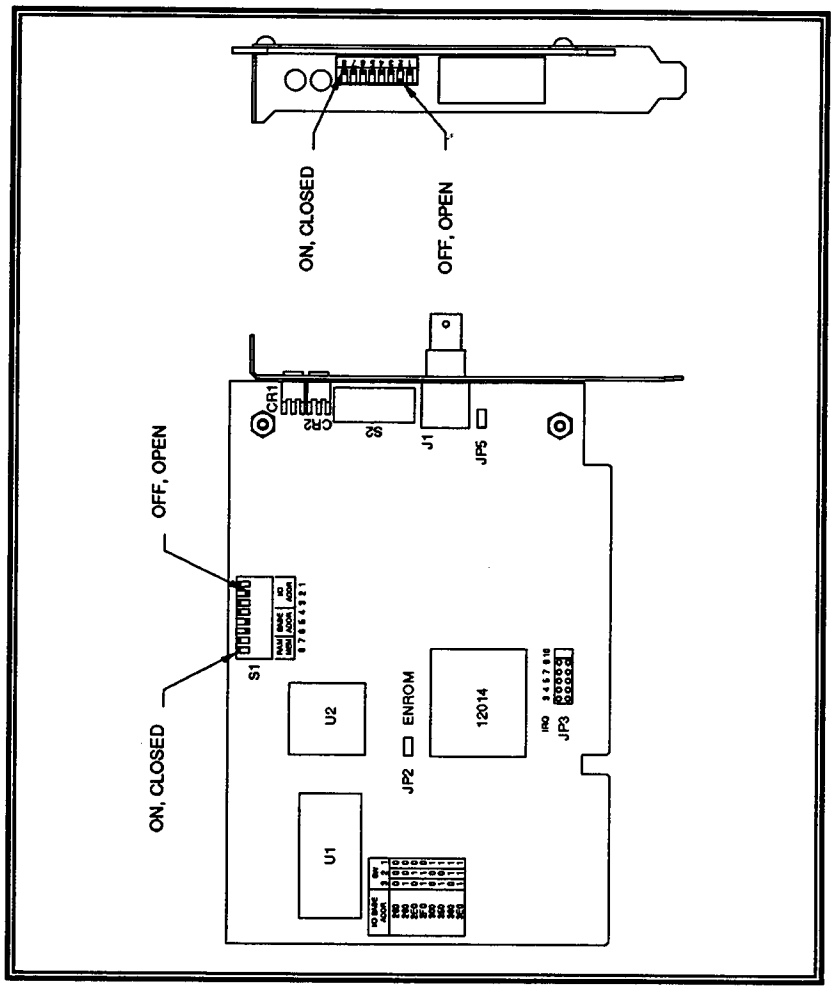
Note ... If memory-mapped drivers are being used and this jumper is not installed, 128K of memory address space will be reserved for 16-bit operation. Use of the board in this configuration is *not* recommended, as conflicts may occur if 8-bit peripherals are mapped into this address space.

Jumper Set JP3 — Interrupt Select

Jumper set JP3 is located just above the board's edge connectors. Interrupt level selections are indicated directly above each jumper.

STAR Jumper JP5 (PC600 Boards Only) — Coax Topology Select:

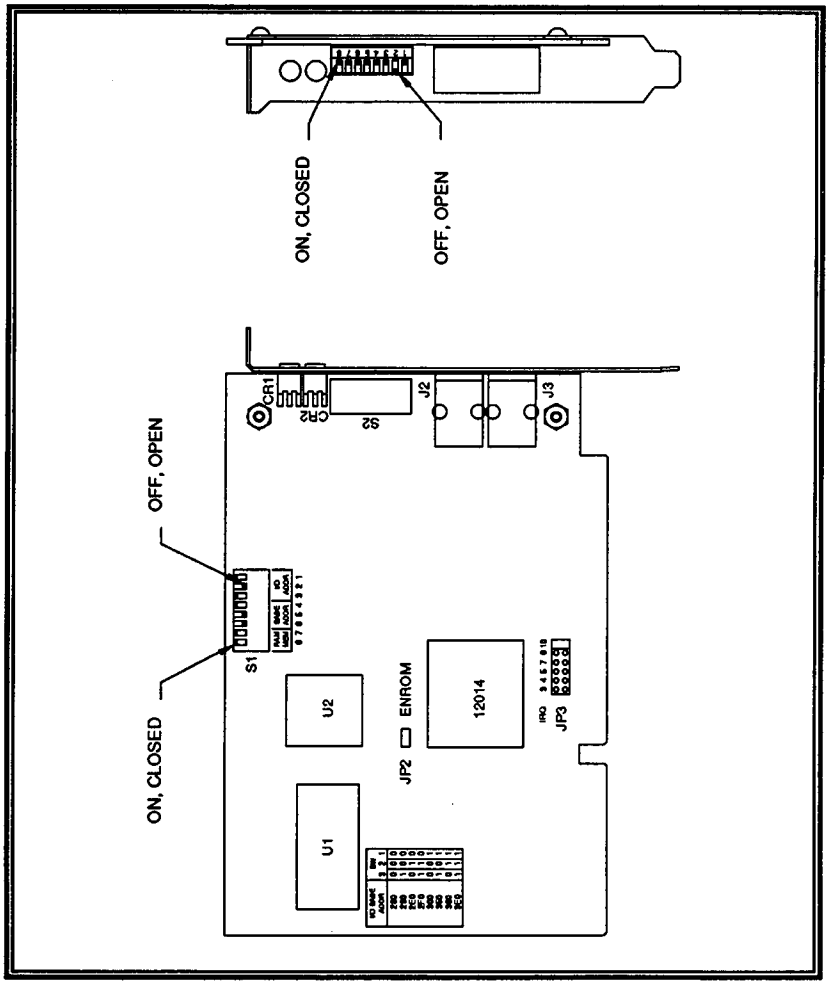
The single STAR jumper, JP5, is located on the right side of the PC600 boards near the BNC connector. This jumper is used to configure these coax boards for either star or bus topology.



ARCNET-PC600 Block Diagram

Legend:

SMC 12014		VLSI ARCNET Controller
SMC U1		PROM Socket (PC600WS) or Nodal Priority Circuitry (PC600FS)
SMC U2		Nodal Priority Circuitry (PC600FS)
S1	1-3:	I/O Base Address Select
	4-6:	Memory Base Address Select
	7-8:	RAM Offset Select
S2	1-8:	Node ID Select
JP2	Installed	PROM Enable & Memory Reserve Select
JP3	1-6:	Interrupt Select
JP5	Installed:	Star Topology
	Not Installed:	Bus Topology
CR1	Green LED:	Monitors Network Activity
CR2	Red LED:	Monitors Board Activity
J1		BNC RG-62/U Connector



ARCNET-PC650 Block Diagram

Legend:

SMC 12014		VLSI ARCNET Controller
SMC U1		PROM Socket (PC650WS) or Nodal Priority Circuitry (PC650FS)
SMC U2		Nodal Priority Circuitry (PC650FS)
S1	1-3:	I/O Base Address Select
	4-6:	Memory Base Address Select
	7-8:	RAM Offset Select
S2	1-8:	Node ID Select
JP2	Installed	PROM Enable & Memory Reserve Select
JP3	1-6:	Interrupt Select
CR1	Green LED:	Monitors Network Activity
CR2	Red LED:	Monitors Board Activity
J2/J3		6-position Modular Telephone Jacks

Setting the Switches and Jumpers

Each switch is equivalent to a logical zero (0) when set to the ON or CLOSED position and a logical one (1) when set to the OFF or OPEN position.

- For lever-type switches, push the switch up (towards the OFF position) to set it to a logical one, or down to set it to a logical zero.
- For slider-type switches, DOWN is the same as OFF.
- For rocker-type switches, press in as far as possible on the side of the switch labeled ON to set it to the ON position.

To select a jumper, connect the two pins of the jumper with a shorting plug.

- When the plug is in, the jumper is selected.
- When the plug is out, the jumper is not selected.

The most common switch settings for Novell®'s NetWare are given on the next page. Following this, you will find detailed explanations of how to set the switches and jumpers.

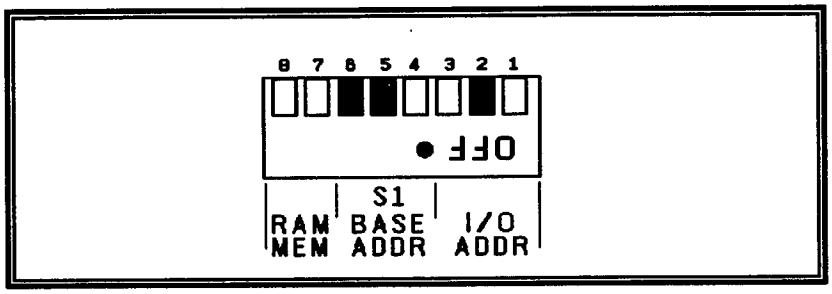
Once the board has been configured, please refer to the manufacturers' instructions for installing expansion cards in each PC.

Settings for NetWare

The most common switch settings for Novell's NetWare are an I/O base address of 2E0 and, if the memory-mapped driver is used, a memory address of D0000. The switch settings for these addresses are given below. In addition, an interrupt level of 9 (which maps to 2) is usually used.

Software	S1 Switches		
	1 to 3	4 to 6	7 and 8
	I/O Base Address (I/O ADDR)	Memory Base Address (BASE ADDR)	RAM Offset (RAM MEM)
NetWare	0 1 0 (2E0)	0 1 1 (D0000)	0 0

For these settings, switches 2, 5 and 6 must be OFF, and switches 1, 3, 4, 7, and 8 must be ON, as shown below. Note that if the I/O-mapped driver is used, the position of switches four through eight is unimportant.



Default Address Settings

Note that with different hardware configurations and newer versions of software, other switch settings may be required. Refer to the guide shipped with your network operating system for the appropriate settings.

Caution ... *If the PC contains more than one add-in board, be sure to assign a unique interrupt to each board. Otherwise, the system will not operate properly.* (See "Setting the Interrupts.")

Setting the Node ID

The eight switches in group S2 are used to set the PC identification number or node ID. Each node attached to the network must have a unique node ID. An explanation of how to set the switches to correspond to a particular node ID appears below. To simplify the installation procedure, a table of decimal node IDs and corresponding switch settings follows.

Caution ... *A node ID of zero is not permitted.*

Switch 1 serves as the least significant bit (LSB) for the node ID. Note that the decimal value of each switch is shown below to simplify the conversion of the node ID from decimal to binary.

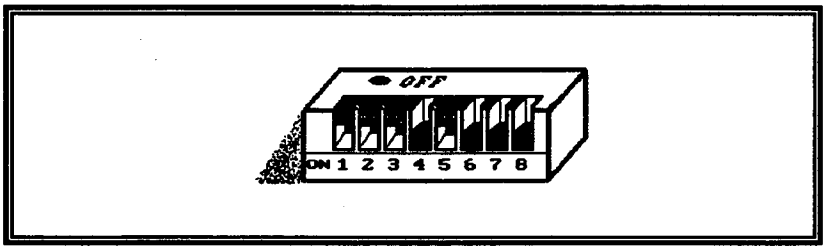
For example, to set the node ID to 23 decimal, find the numbers in the "Decimal Value" row below that add up to 23 (23 = 16 + 4 + 2 + 1). Set those switches to the OFF position and the remaining switches to the ON position

LSB
⇓

Switches	1	2	3	4	5	6	7	8	
Switch Group S2	1	1	1	-	1	-	-	-	Off/Open=1
	-	-	-	0	-	0	0	0	On/Closed=0
Decimal Value	1	2	4	8	16	32	64	128	

Node ID = 23 decimal = 1 + 2 + 4 + 16 = 11101000 binary

For a node ID of 23, switches 1, 2, 3 and 5 must be OFF and switches 4, 6, 7 and 8 must be ON, as shown below.



Node ID Switches Set to 23

Now, enter the decimal node ID you wish to use in the box at the right. Circle the numbers in the "Decimal Value" row of the chart below that add up to the number you have selected. Place a "1" in the "Off/Open" row above each circled decimal value.

Switches	1	2	3	4	5	6	7	8
Off/Open								
On/Closed								
Decimal Value	1	2	4	8	16	32	64	128

Set those switches to the OFF or Open position and the rest of the switches to the ON or Closed position.

Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8
1	1000 0000	31	1111 1000	61	1011 1100
2	0100 0000	32	0000 0100	62	0111 1100
3	1100 0000	33	1000 0100	63	1111 1100
4	0010 0000	34	0100 0100	64	0000 0010
5	1010 0000	35	1100 0100	65	1000 0010
6	0110 0000	36	0010 0100	66	0100 0010
7	1110 0000	37	1010 0100	67	1100 0010
8	0001 0000	38	0110 0100	68	0010 0010
9	1001 0000	39	1110 0100	69	1010 0010
10	0101 0000	40	0001 0100	70	0110 0010
11	1101 0000	41	1001 0100	71	1110 0010
12	0011 0000	42	0101 0100	72	0001 0010
13	1011 0000	43	1101 0100	73	1001 0010
14	0111 0000	44	0011 0100	74	0101 0010
15	1111 0000	45	1011 0100	75	1101 0010
16	0000 1000	46	0111 0100	76	0011 0010
17	1000 1000	47	1111 0100	77	1011 0010
18	0100 1000	48	0000 1100	78	0111 0010
19	1100 1000	49	1000 1100	79	1111 0010
20	0010 1000	50	0100 1100	80	0000 1010
21	1010 1000	51	1100 1100	81	1000 1010
22	0110 1000	52	0010 1100	82	0100 1010
23	1110 1000	53	1010 1100	83	1100 1010
24	0001 1000	54	0110 1100	84	0010 1010
25	1001 1000	55	1110 1100	85	1010 1010
26	0101 1000	56	0001 1100	86	0110 1010
27	1101 1000	57	1001 1100	87	1110 1010
28	0011 1000	58	0101 1100	88	0001 1010
29	1011 1000	59	1101 1100	89	1001 1010
30	0111 1000	60	0011 1100	90	0101 1010

Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8
91	1101 1010	121	1001 1110	151	1110 1001
92	0011 1010	122	0101 1110	152	0001 1001
93	1011 1010	123	1101 1110	153	1001 1001
94	0111 1010	124	0011 1110	154	0101 1001
95	1111 1010	125	1011 1110	155	1101 1001
96	0000 0110	126	0111 1110	156	0011 1001
97	1000 0110	127	1111 1110	157	1011 1001
98	0100 0110	128	0000 0001	158	0111 1001
99	1100 0110	129	1000 0001	159	1111 1001
100	0010 0110	130	0100 0001	160	0000 0101
101	1010 0110	131	1100 0001	161	1000 0101
102	0110 0110	132	0010 0001	162	0100 0101
103	1110 0110	133	1010 0001	163	1100 0101
104	0001 0110	134	0110 0001	164	0010 0101
105	1001 0110	135	1110 0001	165	1010 0101
106	0101 0110	136	0001 0001	166	0110 0101
107	1101 0110	137	1001 0001	167	1110 0101
108	0011 0110	138	0101 0001	168	0001 0101
109	1011 0110	139	1101 0001	169	1001 0101
110	0111 0110	140	0011 0001	170	0101 0101
111	1111 0110	141	1011 0001	171	1101 0101
112	0000 1110	142	0111 0001	172	0011 0101
113	1000 1110	143	1111 0001	173	1011 0101
114	0100 1110	144	0000 1001	174	0111 0101
115	1100 1110	145	1000 1001	175	1111 0101
116	0010 1110	146	0100 1001	176	0000 1101
117	1010 1110	147	1100 1001	177	1000 1101
118	0110 1110	148	0010 1001	178	0100 1101
119	1110 1110	149	1010 1001	179	1100 1101
120	0001 1110	150	0110 1001	180	0010 1101

Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8	Node ID Decimal	Switches 1 to 8
181	1010 1101	206	0111 0011	231	1110 0111
182	0110 1101	207	1111 0011	232	0001 0111
183	1110 1101	208	0000 1011	233	1001 0111
184	0001 1101	209	1000 1011	234	0101 0111
185	1001 1101	210	0100 1011	235	1101 0111
186	0101 1101	211	1100 1011	236	0011 0111
187	1101 1101	212	0010 1011	237	1011 0111
188	0011 1101	213	1010 1011	238	0111 0111
189	1011 1101	214	0110 1011	239	1111 0111
190	0111 1101	215	1110 1011	240	0000 1111
191	1111 1101	216	0001 1011	241	1000 1111
192	0000 0011	217	1001 1011	242	0100 1111
193	1000 0011	218	0101 1011	243	1100 1111
194	0100 0011	219	1101 1011	244	0010 1111
195	1100 0011	220	0011 1011	245	1010 1111
196	0010 0011	221	1011 1011	246	0110 1111
197	1010 0011	222	0111 1011	247	1110 1111
198	0110 0011	223	1111 1011	248	0001 1111
199	1110 0011	224	0000 0111	249	1001 1111
200	0001 0011	225	1000 0111	250	0101 1111
201	1001 0011	226	0100 0111	251	1101 1111
202	0101 0011	227	1100 0111	252	0011 1111
203	1101 0011	228	0010 0111	253	1011 1111
204	0011 0011	229	1010 0111	254	0111 1111
205	1011 0011	230	0110 0111	255	1111 1111

Setting the I/O Base Address

The first three switches in switch group S1 are mapped to the table of eight I/O base addresses shown below. This table mapping greatly simplifies the installation procedure.

To select an I/O base address of 2E0, for example, set the switches to 010.

I/O Address Hex	Switches 1 to 3
260	0 0 0
290	0 0 1
2E0	0 1 0
2F0	0 1 1
300	1 0 0
350	1 0 1
380	1 1 0
3E0	1 1 1

Setting the Base Memory (RAM) Buffer Address

With the PROM Enable and Memory Reserve Select jumper installed, a 16K block of RAM is reserved. If an auto-boot PROM is installed or the optional memory-mapped driver is used, or both, a base address for this block must be selected. The base address can be located in any one of eight positions. The memory buffer requires 2K of this block and the PROM requires 8K.

Switches four through six of switch group S1 select the base address of the 16K block. Within that 16K address space, the buffer may be assigned to any one of four positions (0 to 3), determined by the offset, switches seven and eight.

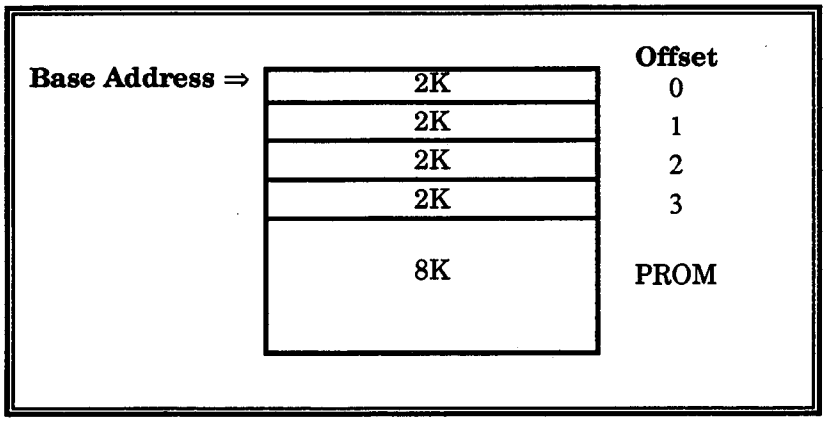


Illustration of 16K Memory Buffer Address Space

Three additional expansion cards may utilize the three unused 2K blocks of memory.

Care should be exercised in selecting the RAM address to avoid conflicts with other equipment in your computer.

Switches four through eight of switch group S2 are mapped to the table of 32 hexadecimal base memory buffer addresses for the board shown below and on the next page. For example, to select a base memory buffer address of D0000, set switches four through eight to 011 00.

RAM Address	PROM Address	Switches 4 to 8
C0000	C2000	0 0 0 0 0
C0800		0 0 0 0 1
C1000		0 0 0 1 0
C1800		0 0 0 1 1
C4000	C6000	0 0 1 0 0
C4800		0 0 1 0 1
C5000		0 0 1 1 0
C5800		0 0 1 1 1
CC000	CE000	0 1 0 0 0
CC800		0 1 0 0 1
CD000		0 1 0 1 0
CD800		0 1 0 1 1
D0000	D2000	0 1 1 0 0
D0800		0 1 1 0 1
D1000		0 1 1 1 0
D1800		0 1 1 1 1
D4000	D6000	1 0 0 0 0
D4800		1 0 0 0 1
D5000		1 0 0 1 0
D5800		1 0 0 1 1

RAM Address	PROM Address	Switches 4 to 8
D8000	DA000	1 0 1 0 0
D8800		1 0 1 0 1
D9000		1 0 1 1 0
D9800		1 0 1 1 1
DC000	DE000	1 1 0 0 0
DC800		1 1 0 0 1
DD000		1 1 0 1 0
DD800		1 1 0 1 1
E0000	E2000	1 1 1 0 0
E0800		1 1 1 0 1
E1000		1 1 1 1 0
E1800		1 1 1 1 1

Caution ... If the PROM Enable and Memory Reserve Select jumper, JP2, is removed and the board is operated in memory-mapped mode, the entire 128K block will be reserved for 16-bit operation. In this mode, compatibility problems may occur if 8-bit peripherals are also mapped to this space.

Setting the Interrupts

Six of the jumpers in set JP3 are used to set the interrupt level. These jumpers are clearly labeled, as follows:

Interrupt
IRQ3
IRQ4
IRQ5
IRQ7
IRQ9
IRQ10

Be sure to select only a single interrupt. Please refer to the appropriate network operating system documentation for the proper interrupt values.

Caution ... *If the PC contains more than one add-in board, be sure to assign a unique interrupt to each board. Otherwise, the system will not operate properly.*

Note ... If you select drivers to work on interrupt 2, the board must be set for interrupt 9, as interrupt 9 maps to interrupt 2.

PROM Enable and Memory Reserve Select Jumper Function

An auto-boot PROM will be recognized *only* if a jumper plug is installed on JP2, the PROM Enable and Memory Reserve Select jumper. This jumper also plays a role in setting the memory mode. When a jumper plug is present, the PC600 series boards can be installed within the same 128K memory segment as other 8- and 16-bit boards. When absent, the PC600 reserves a 128K memory segment for 16-bit operation and so all boards installed within this segment must be 16-bit.

Note ... Removal of this jumper is not recommended. It may cause compatibility problems with 8-bit boards.

Configuring the PC600 for Star or Bus Topology

The single jumper labeled JP5 is used to configure the PC600 boards for star or bus topology. When the jumper is installed, the board is terminated for use in a star network. To configure the board for a bus network, simply remove the jumper.

Installing an Auto-Boot PROM for the Workstation

An optional auto-boot PROM for NetWare, available from SMC, may be installed in the PROM socket on either workstation board. With this PROM, a diskless PC can access the network by booting from the network disk. The PROM can also be used on PCs having floppy and/or hard disk drives.

The PROM requires 8K of memory space on the board (see the topic titled "Setting the Base Memory Buffer Address" for an illustration of this memory space).

To install the PROM, follow the steps below and refer to the illustration on the next page.

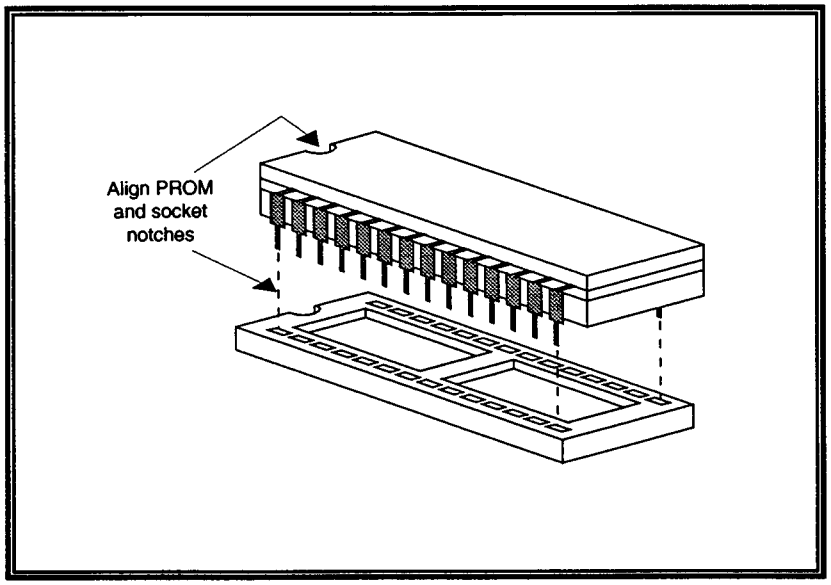
1. Locate the notch at one end of both the PROM and the socket. Position the PROM over the socket so that these notches coincide. Note that some sockets may use a dot instead of a notch to indicate pin 1.

   Warning ... *Be sure to install the PROM properly. If the PROM is installed backwards, it will be damaged.*

2. Place the PROM on top of the socket and check to be sure that each pin is aligned with one of the receptacles on the socket.

3. Push the PROM into the socket gently, making sure not to bend the pins on the PROM.

4. Be sure a jumper plug is installed on the ENROM jumper, JP2.



Installing the PROM

SUMMARY OF CONNECTION RULES

A summary of connection rules for both coax and twisted pair networks follows. For more detailed information, please refer to the appropriate ARCNET Configuration Guide.

Configuring a Coax Network

Note ... Each length of network cable must have BNC male connectors at both ends.

Star Topology Rules

1. Up to eight PCs, Active Hubs, Passive Hubs, Active Links and 1,000 foot (305m) bus cables may be connected to an Active Hub; up to four PCs may be connected to a Passive Hub.
2. The maximum point-to-point distance between the Active Hub and an Active Link is 1,500 feet (457m); the minimum distance is three feet (1m).
3. The maximum point-to-point distance between the Active Hub and the PC600 or between two Active Hubs is 2,000 feet (610m); the minimum distance is three feet (1m).
4. The maximum point-to-point distance between the Passive Hub and the PC or an Active Hub is 100 feet (30m); the minimum distance is three feet (1m).

A PC600 configured for star topology can be connected to:

- one star topology board (forming a 2-node network), using up to 2,000 feet (610m) of cable
- an Active Hub, using up to 2,000 feet (610m) of cable
- a Passive Hub, using up to 100 feet (30m) of cable

Bus Topology Rules

1. Up to eight PCs may be connected to a single bus.
2. Each bus may be a maximum of 1,000 feet (305m) in length and *must* be terminated at both ends by a 93 ohm BNC terminator.
3. Pairs of buses may be joined by an Active Link; however, each Active Link reduces by one the number of PCs allowed on both buses.
4. The PCs and Active Links must be separated by a minimum of three feet (1m) of cable.
5. An Active Hub may be connected only to one end of a bus in place of a terminator.

A PC600 configured for bus topology can be connected to:

- any point on a bus, even the ends, either by splicing the bus or by extending its length with a minimum of three feet (1m) of cable and then attaching the board directly to the bus with a BNC T-connector. Remember to terminate the bus if this is the last board on the cable.

Configuring a Twisted Pair Network

Note ... Each section of twisted pair wiring must have 6-position modular plugs at both ends.

Star Topology Rules

1. Up to eight PCs, Active Hubs, Links, Repeaters and 400 foot (122m) daisy-chained wire segments may be connected to a Twisted Pair Active Hub.
2. The maximum point-to-point distance between the Twisted Pair Active Hub and the PC650 is 400 feet (122m); the minimum distance is six feet (2m). The wiring may be connected to either jack on the board, but a terminator *must* be placed in the open jack.
3. The maximum point-to-point distance between the Twisted Pair Active Hub and the Link, Repeater or another Twisted Pair Active Hub is 400 feet (122m); the minimum distance is six feet (2m).

Daisy-Chain Configuration Rules

1. Up to ten PCs may be daisy-chained to a single wire segment.
2. Each wire segment may be a maximum of 400 feet (122m) in length and *must* be properly terminated at both ends.
3. Pairs of wire segments may be joined by a Twisted Pair Repeater, or a Twisted Pair Link may be used to combine coax and twisted pair products.
4. The PCs, Repeaters and Links must be separated by a minimum of six feet (2m) of wiring.
5. A Twisted Pair Active Hub may be connected only to one end of a wire segment in place of a terminator.

6. For each Twisted Pair Repeater, Link and Active Hub attached to a wire segment, the number of PCs allowed on that wire segment is reduced by one.
7. Each wire segment may contain no more than 15 attachments—twisted pair products and connectors, such as modular couplers and modular wall plugs.

A PC650 can be:

- connected to an Active Hub, using up to 400 feet (122m) of wiring
- daisy-chained to a wire segment, using a minimum of six feet (2m) of wiring

WARRANTY AND SERVICE POLICY

Should you experience difficulty with your SMC ARCNET Network Systems Product and be unable to diagnose or correct the problem, you may return the product to your place of purchase for repair. Please be certain that your product is properly packed before shipment. If possible, use the original packaging.

Note ... All SMC products are warranted *only* when configured in accordance with the specifications listed in the appropriate guides.

In-Warranty Service

All SMC ARCNET Network Systems Products are warranted by Standard Microsystems Corporation against defects in workmanship and materials for a period of five (5) years from date of delivery to the end user. During the warranty period, Standard Microsystems Corporation will repair or, if necessary, replace defective components at no charge. Consult your Authorized SMC Dealer or Distributor for In-Warranty Service.

This warranty does not apply if the product has been damaged by accident or misuse, or as a result of repairs or modifications made by unauthorized personnel.

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Beyond the five (5) year warranty period, Standard Microsystems Corporation will repair or replace defective components for a reasonable fee. All service work is warranted by Standard Microsystems Corporation for an additional one year period from date of shipment of the repaired product. Consult your Authorized SMC Dealer or Distributor for service repairs.

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Tech Support Hotline

For technical support, please contact your place of purchase. Then, if further assistance is required, call our Tech Support Department, toll-free, between 8:30 AM and 6:00 PM, E.S.T., Monday through Friday:

1-800-992-4762 (U.S.A.)

1-800-433-5345 (Canada)

1-516-435-6250 (Elsewhere)

Or, you may prefer to contact us through our CompuServe® bulletin board.

If you are a CompuServe subscriber, just type "GO SMC" at the CompuServe prompt (!) and follow the instructions to become an SMC Forum member. If not, you can obtain an access number and personal password by contacting Tech Support at the number listed above and requesting an SMC Forum Kit.

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STANDARD MICROSYSTEMS
CORPORATION
80 Arkay Drive
Hauppauge, NY 11788