ARCnet Hardware

> **Note**
>
> 1. This file is a supplement to arcnet.txt. Please read that for general driver configuration help.
> 2. This file is no longer Linux-specific. It should probably be moved out of the kernel sources. Ideas?

Because so many people (myself included) seem to have obtained ARCnet cards without manuals, this file contains a quick introduction to ARCnet hardware, some cabling tips, and a listing of all jumper settings I can find. Please e-mail apenwarr@worldvisions.ca with any settings for your particular card, or any other information you have!

Introduction to ARCnet

ARCnet is a network type which works in a way similar to popular Ethernet networks but which is also different in some very important ways.

First of all, you can get ARCnet cards in at least two speeds: 2.5 Mbps (slower than Ethernet) and 100 Mbps (faster than normal Ethernet). In fact, there are others as well, but these are less common. The different hardware types, as far as I'm aware, are not compatible and so you cannot wire a 100 Mbps card to a 2.5 Mbps card, and so on. From what I hear, my driver does work with 100 Mbps cards, but I haven't been able to verify this myself, since I only have the 2.5 Mbps variety. It is probably not going to saturate your 100 Mbps card. Stop complaining. :)

You also cannot connect an ARCnet card to any kind of Ethernet card and expect it to work.

There are two "types" of ARCnet - STAR topology and BUS topology. This refers to how the cards are meant to be wired together. According to most available documentation, you can only connect STAR cards to STAR cards and BUS cards to BUS cards. That makes sense, right? Well, it's not quite true; see below under "Cabling."

Once you get past these little stumbling blocks, ARCnet is actually quite a well-designed standard. It uses something called "modified token passing" which makes it completely incompatible with so-called "Token Ring" cards, but which makes transfers much more reliable than Ethernet does. In fact, ARCnet will guarantee that a packet arrives safely at the destination, and even if it can't possibly be delivered properly (ie. because of a cable break, or because the destination computer does not exist) it will at least tell the sender about it.

Because of the carefully defined action of the "token", it will always make a pass around the "ring" within a maximum length of time. This makes it useful for realtime networks.

In addition, all known ARCnet cards have an (almost) identical programming interface. This means that with one ARCnet driver you can support any card, whereas with Ethernet each manufacturer uses what is sometimes a completely different programming interface, leading to a lot of different, sometimes very similar, Ethernet drivers. Of course, always using the same programming interface also means that when high-performance hardware facilities like PCI bus mastering DMA appear, it's hard to take advantage of them. Let's not go into that.

One thing that makes ARCnet cards difficult to program for, however, is the limit on their packet sizes; standard ARCnet can only send packets that are up to 508 bytes in length. This is smaller than the Internet "bare minimum" of 576 bytes, let alone the Ethernet MTU of 1500. To compensate, an extra level of encapsulation is defined by RFC1201, which I call "packet splitting," that allows "virtual packets" to grow as large as 64K each, although they are generally kept down to the Ethernet-style 1500 bytes.

For more information on the advantages and disadvantages (mostly the advantages) of ARCnet networks, you might try the "ARCnet Trade Association" WWW page:

> http://www.arcnet.com

Cabling ARCnet Networks

This section was rewritten by

> Vojtech Pavlik <vojtech@suse.cz>

using information from several people, including:

- Avery Pennraun <apenwarr@worldvisions.ca>
- Stephen A. Wood <saw@hallc1.cebaf.gov>
- John Paul Morrison <jmorriso@bogomips.ee.ubc.ca>
- Joachim Koenig <jojo@repas.de>

and Avery touched it up a bit, at Vojtech's request.

ARCnet (the classic 2.5 Mbps version) can be connected by two different types of cabling: coax and twisted pair. The other

ARCnet-type networks (100 Mbps TCNS and 320 kbps - 32 Mbps ARCnet Plus) use different types of cabling (Type1, Fiber, C1, C4, C5).

For a coax network, you "should" use 93 Ohm RG-62 cable. But other cables also work fine, because ARCnet is a very stable network. I personally use 75 Ohm TV antenna cable.

Cards for coax cabling are shipped in two different variants: for BUS and STAR network topologies. They are mostly the same. The only difference lies in the hybrid chip installed. BUS cards use high impedance output, while STAR use low impedance. Low impedance card (STAR) is electrically equal to a high impedance one with a terminator installed.

Usually, the ARCnet networks are built up from STAR cards and hubs. There are two types of hubs - active and passive. Passive hubs are small boxes with four BNC connectors containing four 47 Ohm resistors:

```
   |          | wires
   R          + junction
-R-+-R-       R 47 Ohm resistors
   R
   |
```

The shielding is connected together. Active hubs are much more complicated; they are powered and contain electronics to amplify the signal and send it to other segments of the net. They usually have eight connectors. Active hubs come in two variants - dumb and smart. The dumb variant just amplifies, but the smart one decodes to digital and encodes back all packets coming through. This is much better if you have several hubs in the net, since many dumb active hubs may worsen the signal quality.

And now to the cabling. What you can connect together:

1. A card to a card. This is the simplest way of creating a 2-computer network.
2. A card to a passive hub. Remember that all unused connectors on the hub must be properly terminated with 93 Ohm (or something else if you don't have the right ones) terminators.

   (Avery's note: oops, I didn't know that. Mine (TV cable) works anyway, though.)
3. A card to an active hub. Here is no need to terminate the unused connectors except some kind of aesthetic feeling. But, there may not be more than eleven active hubs between any two computers. That of course doesn't limit the number of active hubs on the network.
4. An active hub to another.
5. An active hub to passive hub.

Remember that you cannot connect two passive hubs together. The power loss implied by such a connection is too high for the net to operate reliably.

An example of a typical ARCnet network:

```
       R                    S - STAR type card
S------H--------A-------S    R - Terminator
       |        |            H - Hub
       |        |            A - Active hub
       |   S----H----S
       S        |
                |
                S
```

The BUS topology is very similar to the one used by Ethernet. The only difference is in cable and terminators: they should be 93 Ohm. Ethernet uses 50 Ohm impedance. You use T connectors to put the computers on a single line of cable, the bus. You have to put terminators at both ends of the cable. A typical BUS ARCnet network looks like:

```
  RT----T------T------T------T------TR
   B    B      B      B      B      B

B - BUS type card
R - Terminator
T - T connector
```

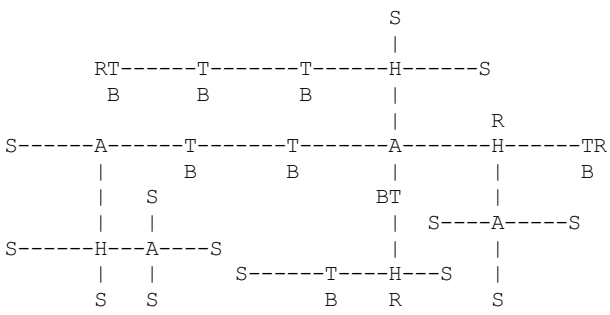
But that is not all! The two types can be connected together. According to the official documentation the only way of connecting them is using an active hub:

```
    A------T------T------TR
    |      B      B      B
S---H---S
    |
    S
```

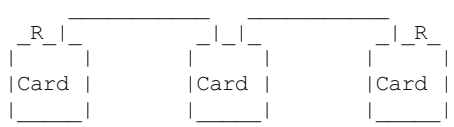
The official docs also state that you can use STAR cards at the ends of BUS network in place of a BUS card and a terminator:

```
S------T------T------S
       B      B
```

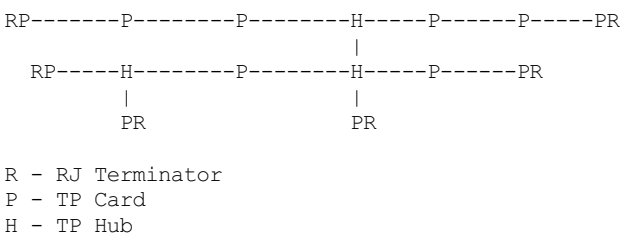
But, according to my own experiments, you can simply hang a BUS type card anywhere in middle of a cable in a STAR topology network. And more - you can use the bus card in place of any star card if you use a terminator. Then you can build very complicated networks fulfilling all your needs! An example:



A basically different cabling scheme is used with Twisted Pair cabling. Each of the TP cards has two RJ (phone-cord style) connectors. The cards are then daisy-chained together using a cable connecting every two neighboring cards. The ends are terminated with RJ 93 Ohm terminators which plug into the empty connectors of cards on the ends of the chain. An example:



There are also hubs for the TP topology. There is nothing difficult involved in using them; you just connect a TP chain to a hub on any end or even at both. This way you can create almost any network configuration. The maximum of 11 hubs between any two computers on the net applies here as well. An example:



Like any network, ARCnet has a limited cable length. These are the maximum cable lengths between two active ends (an active end being an active hub or a STAR card).

RG-62	93 Ohm	up to 650 m
RG-59/U	75 Ohm	up to 457 m
RG-11/U	75 Ohm	up to 533 m
IBM Type 1	150 Ohm	up to 200 m
IBM Type 3	100 Ohm	up to 100 m

The maximum length of all cables connected to a passive hub is limited to 65 meters for RG-62 cabling; less for others. You can see that using passive hubs in a large network is a bad idea. The maximum length of a single "BUS Trunk" is about 300 meters for RG-62. The maximum distance between the two most distant points of the net is limited to 3000 meters. The maximum length of a TP cable between two cards/hubs is 650 meters.

Setting the Jumpers

All ARCnet cards should have a total of four or five different settings:

- the I/O address: this is the "port" your ARCnet card is on. Probed values in the Linux ARCnet driver are only from 0x200 through 0x3F0. (If your card has additional ones, which is possible, please tell me.) This should not be the same as any other device on your system. According to a doc I got from Novell, MS Windows prefers values of 0x300 or more, eating net connections on my system (at least) otherwise. My guess is this may be because, if your card is at 0x2E0, probing for a serial port at 0x2E8 will reset the card and probably mess things up royally.
    - Avery's favourite: 0x300.
- the IRQ: on 8-bit cards, it might be 2 (9), 3, 4, 5, or 7.
  on 16-bit cards, it might be 2 (9), 3, 4, 5, 7, or 10-15.

  Make sure this is different from any other card on your system. Note that IRQ2 is the same as IRQ9, as far as Linux is concerned. You can "cat /proc/interrupts" for a somewhat complete list of which ones are in use at any given time. Here is a list of common usages from Vojtech Pavlik <vojtech@suse.cz>:

("Not on bus" means there is no way for a card to generate this interrupt)

IRQ 0	Timer 0 (Not on bus)
IRQ 1	Keyboard (Not on bus)
IRQ 2	IRQ Controller 2 (Not on bus, nor does interrupt the CPU)
IRQ 3	COM2
IRQ 4	COM1
IRQ 5	FREE (LPT2 if you have it; sometimes COM3; maybe PLIP)
IRQ 6	Floppy disk controller
IRQ 7	FREE (LPT1 if you don't use the polling driver; PLIP)
IRQ 8	Realtime Clock Interrupt (Not on bus)
IRQ 9	FREE (VGA vertical sync interrupt if enabled)
IRQ 10	FREE
IRQ 11	FREE
IRQ 12	FREE
IRQ 13	Numeric Coprocessor (Not on bus)
IRQ 14	Fixed Disk Controller
IRQ 15	FREE (Fixed Disk Controller 2 if you have it)

> **Note**
>
> IRQ 9 is used on some video cards for the "vertical retrace" interrupt. This interrupt would have been handy for things like video games, as it occurs exactly once per screen refresh, but unfortunately IBM cancelled this feature starting with the original VGA and thus many VGA/SVGA cards do not support it. For this reason, no modern software uses this interrupt and it can almost always be safely disabled, if your video card supports it at all.

If your card for some reason CANNOT disable this IRQ (usually there is a jumper), one solution would be to clip the printed circuit contact on the board: it's the fourth contact from the left on the back side. I take no responsibility if you try this.

  - Avery's favourite: IRQ2 (actually IRQ9). Watch that VGA, though.

- the memory address: Unlike most cards, ARCnets use "shared memory" for copying buffers around. Make SURE it doesn't conflict with any other used memory in your system!

```
A0000           - VGA graphics memory (ok if you don't have VGA)
B0000           - Monochrome text mode
C0000           \  One of these is your VGA BIOS - usually C0000.
E0000           /
F0000           - System BIOS
```

  Anything less than 0xA0000 is, well, a BAD idea since it isn't above 640k.

  - Avery's favourite: 0xD0000

- the station address: Every ARCnet card has its own "unique" network address from 0 to 255. Unlike Ethernet, you can set this address yourself with a jumper or switch (or on some cards, with special software). Since it's only 8 bits, you can only have 254 ARCnet cards on a network. DON'T use 0 or 255, since these are reserved (although neat stuff will probably happen if you DO use them). By the way, if you haven't already guessed, don't set this the same as any other ARCnet on your network!

  - Avery's favourite: 3 and 4. Not that it matters.

- There may be ETS1 and ETS2 settings. These may or may not make a difference on your card (many manuals call them "reserved"), but are used to change the delays used when powering up a computer on the network. This is only necessary when wiring VERY long range ARCnet networks, on the order of 4km or so; in any case, the only real requirement here is that all cards on the network with ETS1 and ETS2 jumpers have them in the same position. Chris Hindy <chrish@io.org> sent in a chart with actual values for this:

ET1	**ET2**	**Response Time**	**Reconfiguration Time**
open	open	74.7us	840us
open	closed	283.4us	1680us
closed	open	561.8us	1680us
closed	closed	1118.6us	1680us

Make sure you set ETS1 and ETS2 to the SAME VALUE for all cards on your network.

Also, on many cards (not mine, though) there are red and green LED's. Vojtech Pavlik <vojtech@suse.cz> tells me this is what they mean:

GREEN	RED	Status
OFF	OFF	Power off
OFF	Short flashes	Cabling problems (broken cable or not terminated)
OFF (short)	ON	Card init
ON	ON	Normal state - everything OK, nothing happens
ON	Long flashes	Data transfer
ON	OFF	Never happens (maybe when wrong ID)

The following is all the specific information people have sent me about their own particular ARCnet cards. It is officially a mess, and contains huge amounts of duplicated information. I have no time to fix it. If you want to, PLEASE DO! Just send me a 'diff -u' of all your changes.

The model # is listed right above specifics for that card, so you should be able to use your text viewer's "search" function to find the entry you want. If you don't KNOW what kind of card you have, try looking through the various diagrams to see if you can tell.

If your model isn't listed and/or has different settings, PLEASE PLEASE tell me. I had to figure mine out without the manual, and it WASN'T FUN!

Even if your ARCnet model isn't listed, but has the same jumpers as another model that is, please e-mail me to say so.

Cards Listed in this file (in this order, mostly):

Manufacturer	Model #	Bits
SMC	PC100	8
SMC	PC110	8
SMC	PC120	8
SMC	PC130	8
SMC	PC270E	8
SMC	PC500	16
SMC	PC500Longboard	16
SMC	PC550Longboard	16
SMC	PC600	16
SMC	PC710	8
SMC?	LCS-8830(-T)	8/16
Puredata	PDI507	8
CNet Tech	CN120-Series	8
CNet Tech	CN160-Series	16
Lantech?	UM9065L chipset	8
Acer	5210-003	8
Datapoint?	LAN-ARC-8	8
Topware	TA-ARC/10	8
Thomas-Conrad	500-6242-0097 REV A	8
Waterloo?	(C)1985 Waterloo Micro.	8
No Name	--	8/16
No Name	Taiwan R.O.C?	8
No Name	Model 9058	8
Tiara	Tiara Lancard?	8

- SMC = Standard Microsystems Corp.
- CNet Tech = CNet Technology, Inc.

Unclassified Stuff

- Please send any other information you can find.
- And some other stuff (more info is welcome!):

```
From: root@ultraworld.xs4all.nl (Timo Hilbrink)
To: apenwarr@foxnet.net (Avery Pennarun)
Date: Wed, 26 Oct 1994 02:10:32 +0000 (GMT)
Reply-To: timoh@xs4all.nl

[...parts deleted...]
```

```
About the jumpers: On my PC130 there is one more jumper, located near the
cable-connector and it's for changing to star or bus topology;
closed: star - open: bus
On the PC500 are some more jumper-pins, one block labeled with RX,PDN,TXI
and another with ALE,LA17,LA18,LA19 these are undocumented..

[...more parts deleted...]

--- CUT ---
```

Standard Microsystems Corp (SMC)

PC100, PC110, PC120, PC130 (8-bit cards) and PC500, PC600 (16-bit cards)

- mainly from Avery Pennarun <apenwarr@worldvisions.ca>. Values depicted are from Avery's setup.
- special thanks to Timo Hilbrink <timoh@xs4all.nl> for noting that PC120, 130, 500, and 600 all have the same switches as Avery's PC100. PC500/600 have several extra, undocumented pins though. (?)
- PC110 settings were verified by Stephen A. Wood <saw@cebaf.gov>
- Also, the JP- and S-numbers probably don't match your card exactly. Try to find jumpers/switches with the same number of settings - it's probably more reliable.

```
     JP5                      [|]    :    :    :    :
(IRQ Setting)                IRQ2  IRQ3 IRQ4 IRQ5 IRQ7
               Put exactly one jumper on exactly one set of pins.


                          1  2   3  4  5  6   7  8  9 10
     S1                /----------------------------------\
(I/O and Memory        |  1  1 * 0  0  0  0 * 1  1  0  1  |
 addresses)            \----------------------------------/
                          |--|   |--------|   |--------|
                          (a)        (b)           (m)

               WARNING.  It's very important when setting these which way
               you're holding the card, and which way you think is '1'!

               If you suspect that your settings are not being made
               correctly, try reversing the direction or inverting the
               switch positions.

               a: The first digit of the I/O address.
                       Setting         Value
                       -------         -----
                       00              0
                       01              1
                       10              2
                       11              3

               b: The second digit of the I/O address.
                       Setting         Value
                       -------         -----
                       0000            0
                       0001            1
                       0010            2
                       ...             ...
                       1110            E
                       1111            F

               The I/O address is in the form ab0.  For example, if
               a is 0x2 and b is 0xE, the address will be 0x2E0.

               DO NOT SET THIS LESS THAN 0x200!!!!!


               m: The first digit of the memory address.
                       Setting         Value
                       -------         -----
                       0000            0
                       0001            1
                       0010            2
                       ...             ...
                       1110            E
                       1111            F

               The memory address is in the form m0000.  For example, if
               m is D, the address will be 0xD0000.

               DO NOT SET THIS TO C0000, F0000, OR LESS THAN A0000!
```

```
                          1  2  3  4  5  6  7  8
     S2                  /--------------------------\
(Station Address)        |  1  1  0  0  0  0  0  0  |
                         \--------------------------/

                          Setting         Value
                          -------         -----
                          00000000        00
                          10000000        01
                          01000000        02
                          ...
                          01111111        FE
                          11111111        FF

                    Note that this is binary with the digits reversed!

                    DO NOT SET THIS TO 0 OR 255 (0xFF)!
```

PC130E/PC270E (8-bit cards)

- from Juergen Seifert <seifert@htwm.de>

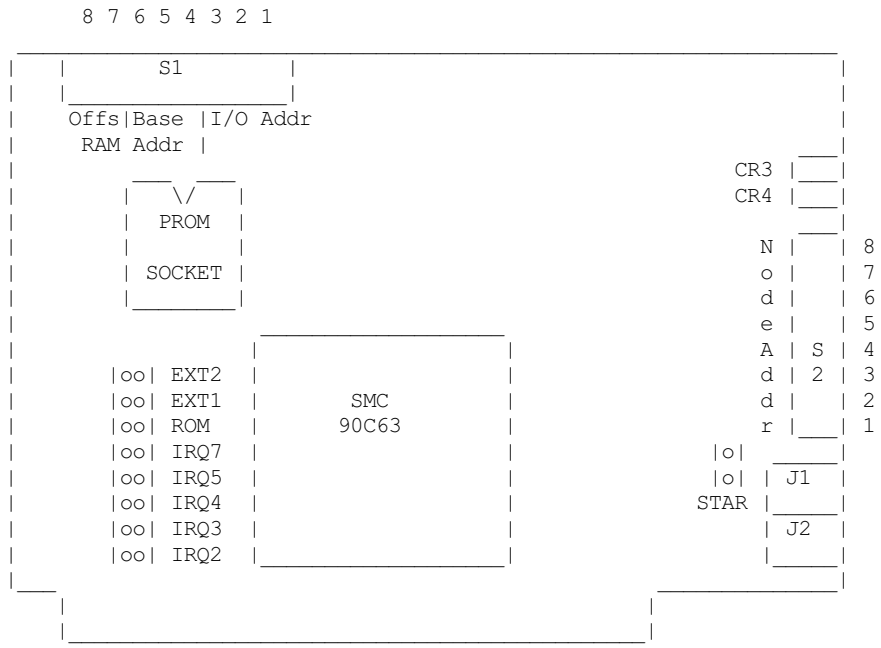
This description has been written by Juergen Seifert <seifert@htwm.de> using information from the following Original SMC Manual

> "Configuration Guide for ARCNET(R)-PC130E/PC270 Network Controller Boards Pub. # 900.044A June, 1989"

ARCNET is a registered trademark of the Datapoint Corporation SMC is a registered trademark of the Standard Microsystems Corporation

The PC130E is an enhanced version of the PC130 board, is equipped with a standard BNC female connector for connection to RG-62/U coax cable. Since this board is designed both for point-to-point connection in star networks and for connection to bus networks, it is downwardly compatible with all the other standard boards designed for coax networks (that is, the PC120, PC110 and PC100 star topology boards and the PC220, PC210 and PC200 bus topology boards).

The PC270E is an enhanced version of the PC260 board, is equipped with two modular RJ11-type jacks for connection to twisted pair wiring. It can be used in a star or a daisy-chained network.



Legend:

```
SMC 90C63     ARCNET Controller / Transceiver /Logic
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
EXT           Extended Timeout Select
ROM           ROM Enable Select
STAR          Selected - Star Topology        (PC130E only)
              Deselected - Bus Topology       (PC130E only)
CR3/CR4       Diagnostic LEDs
J1            BNC RG62/U Connector            (PC130E only)
J1            6-position Telephone Jack       (PC270E only)
J2            6-position Telephone Jack       (PC270E only)
```

Setting one of the switches to Off/Open means "1", On/Closed means "0".

Setting the Node ID

The eight switches in group S2 are used to set the node ID. These switches work in a way similar to the PC100-series cards; see that entry for more information.

Setting the I/O Base Address

The first three switches in switch group S1 are used to select one of eight possible I/O Base addresses using the following table:

```
Switch | Hex I/O
1 2 3  | Address
-------|--------
0 0 0  |  260
0 0 1  |  290
0 1 0  |  2E0  (Manufacturer's default)
0 1 1  |  2F0
1 0 0  |  300
1 0 1  |  350
1 1 0  |  380
1 1 1  |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer requires 2K of a 16K block of RAM. The base of this 16K block can be located in any of eight positions. Switches 4-6 of switch group S1 select the Base of the 16K block. Within that 16K address space, the buffer may be assigned any one of four positions, determined by the offset, switches 7 and 8 of group S1.

```
 Switch     | Hex RAM | Hex ROM
 4 5 6  7 8 | Address | Address *)
 -----------|---------|-----------
 0 0 0  0 0 |  C0000  |  C2000
 0 0 0  0 1 |  C0800  |  C2000
 0 0 0  1 0 |  C1000  |  C2000
 0 0 0  1 1 |  C1800  |  C2000
            |         |
 0 0 1  0 0 |  C4000  |  C6000
 0 0 1  0 1 |  C4800  |  C6000
 0 0 1  1 0 |  C5000  |  C6000
 0 0 1  1 1 |  C5800  |  C6000
            |         |
 0 1 0  0 0 |  CC000  |  CE000
 0 1 0  0 1 |  CC800  |  CE000
 0 1 0  1 0 |  CD000  |  CE000
 0 1 0  1 1 |  CD800  |  CE000
            |         |
 0 1 1  0 0 |  D0000  |  D2000  (Manufacturer's default)
 0 1 1  0 1 |  D0800  |  D2000
 0 1 1  1 0 |  D1000  |  D2000
 0 1 1  1 1 |  D1800  |  D2000
            |         |
 1 0 0  0 0 |  D4000  |  D6000
 1 0 0  0 1 |  D4800  |  D6000
 1 0 0  1 0 |  D5000  |  D6000
 1 0 0  1 1 |  D5800  |  D6000
            |         |
 1 0 1  0 0 |  D8000  |  DA000
 1 0 1  0 1 |  D8800  |  DA000
 1 0 1  1 0 |  D9000  |  DA000
 1 0 1  1 1 |  D9800  |  DA000
            |         |
 1 1 0  0 0 |  DC000  |  DE000
 1 1 0  0 1 |  DC800  |  DE000
 1 1 0  1 0 |  DD000  |  DE000
 1 1 0  1 1 |  DD800  |  DE000
            |         |
 1 1 1  0 0 |  E0000  |  E2000
 1 1 1  0 1 |  E0800  |  E2000
 1 1 1  1 0 |  E1000  |  E2000
 1 1 1  1 1 |  E1800  |  E2000

*) To enable the 8K Boot PROM install the jumper ROM.
   The default is jumper ROM not installed.
```

Setting the Timeouts and Interrupt

The jumpers labeled EXT1 and EXT2 are used to determine the timeout parameters. These two jumpers are normally left open.

To select a hardware interrupt level set one (only one!) of the jumpers IRQ2, IRQ3, IRQ4, IRQ5, IRQ7. The Manufacturer's default

is IRQ2.

Configuring the PC130E for Star or Bus Topology

The single jumper labeled STAR is used to configure the PC130E board for star or bus topology. When the jumper is installed, the board may be used in a star network, when it is removed, the board can be used in a bus topology.

Diagnostic LEDs

Two diagnostic LEDs are visible on the rear bracket of the board. The green LED monitors the network activity: the red one shows the board activity:

```
Green  | Status               Red      | Status
-------|------------------   ---------|------------------
 on    | normal activity      flash/on | data transfer
 blink | reconfiguration      off      | no data transfer;
 off   | defective board or            | incorrect memory or
       | node ID is zero               | I/O address
```

PC500/PC550 Longboard (16-bit cards)

- from Juergen Seifert <seifert@htwm.de>

> **Note**
>
> There is another Version of the PC500 called Short Version, which is different in hard- and software! The most important differences are:
>
> - The long board has no Shared memory.
> - On the long board the selection of the interrupt is done by binary coded switch, on the short board directly by jumper.

[Avery's note: pay special attention to that: the long board HAS NO SHARED MEMORY. This means the current Linux-ARCnet driver can't use these cards. I have obtained a PC500Longboard and will be doing some experiments on it in the future, but don't hold your breath. Thanks again to Juergen Seifert for his advice about this!]

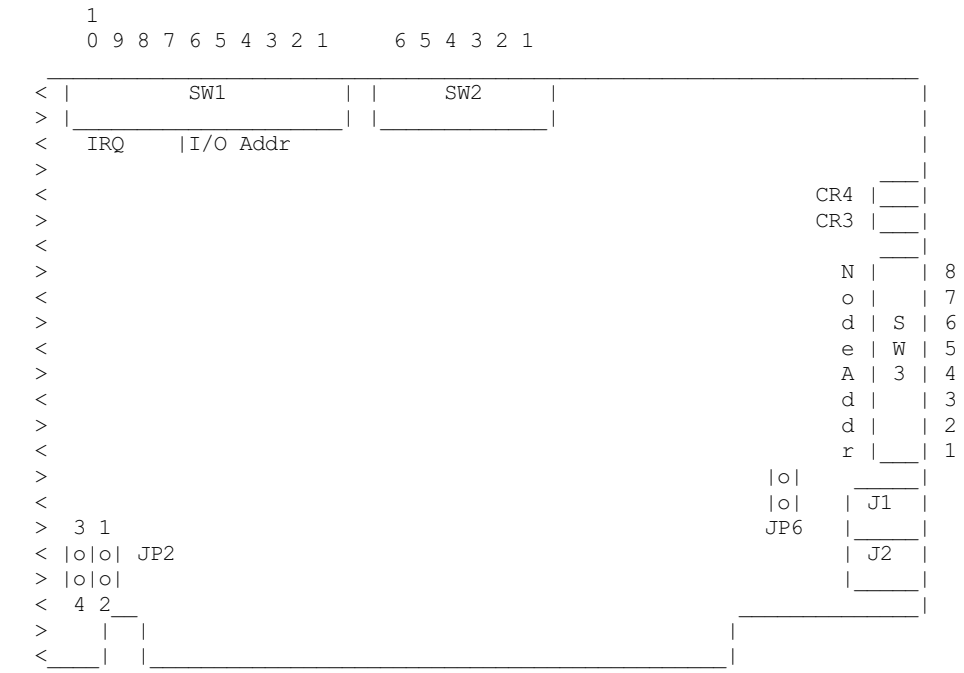
This description has been written by Juergen Seifert <seifert@htwm.de> using information from the following Original SMC Manual

> "Configuration Guide for SMC ARCNET-PC500/PC550 Series Network Controller Boards Pub. # 900.033 Rev. A November, 1989"

ARCNET is a registered trademark of the Datapoint Corporation SMC is a registered trademark of the Standard Microsystems Corporation

The PC500 is equipped with a standard BNC female connector for connection to RG-62/U coax cable. The board is designed both for point-to-point connection in star networks and for connection to bus networks.

The PC550 is equipped with two modular RJ11-type jacks for connection to twisted pair wiring. It can be used in a star or a daisy-chained (BUS) network.



Legend:

```
SW1   1-6:    I/O Base Address Select
      7-10:   Interrupt Select
SW2   1-6:    Reserved for Future Use
SW3   1-8:    Node ID Select
JP2   1-4:    Extended Timeout Select
JP6           Selected - Star Topology        (PC500 only)
              Deselected - Bus Topology       (PC500 only)
CR3   Green   Monitors Network Activity
CR4   Red     Monitors Board Activity
J1            BNC RG62/U Connector            (PC500 only)
J1            6-position Telephone Jack       (PC550 only)
J2            6-position Telephone Jack       (PC550 only)
```

Setting one of the switches to Off/Open means "1", On/Closed means "0".

Setting the Node ID

The eight switches in group SW3 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 1 serves as the least significant bit (LSB).

The node ID is the sum of the values of all switches set to "1" These values are:

```
Switch | Value
-------|-------
  1    |   1
  2    |   2
  3    |   4
  4    |   8
  5    |  16
  6    |  32
  7    |  64
  8    | 128
```

Some Examples:

```
 Switch          | Hex     | Decimal
8 7 6 5 4 3 2 1  | Node ID | Node ID
-----------------|---------|---------
0 0 0 0 0 0 0 0  |    not allowed
0 0 0 0 0 0 0 1  |    1    |    1
0 0 0 0 0 0 1 0  |    2    |    2
0 0 0 0 0 0 1 1  |    3    |    3
     . . .       |         |
0 1 0 1 0 1 0 1  |   55    |   85
     . . .       |         |
1 0 1 0 1 0 1 0  |   AA    |  170
     . . .       |         |
1 1 1 1 1 1 0 1  |   FD    |  253
1 1 1 1 1 1 1 0  |   FE    |  254
1 1 1 1 1 1 1 1  |   FF    |  255
```

Setting the I/O Base Address

The first six switches in switch group SW1 are used to select one of 32 possible I/O Base addresses using the following table:

```
Switch        | Hex I/O
6 5  4 3 2 1  | Address
--------------|--------
0 1  0 0 0 0  |  200
0 1  0 0 0 1  |  210
0 1  0 0 1 0  |  220
0 1  0 0 1 1  |  230
0 1  0 1 0 0  |  240
0 1  0 1 0 1  |  250
0 1  0 1 1 0  |  260
0 1  0 1 1 1  |  270
0 1  1 0 0 0  |  280
0 1  1 0 0 1  |  290
0 1  1 0 1 0  |  2A0
0 1  1 0 1 1  |  2B0
0 1  1 1 0 0  |  2C0
0 1  1 1 0 1  |  2D0
0 1  1 1 1 0  |  2E0 (Manufacturer's default)
0 1  1 1 1 1  |  2F0
1 1  0 0 0 0  |  300
1 1  0 0 0 1  |  310
1 1  0 0 1 0  |  320
1 1  0 0 1 1  |  330
1 1  0 1 0 0  |  340
```

```
1 1  0 1 0 1 |  350
1 1  0 1 1 0 |  360
1 1  0 1 1 1 |  370
1 1  1 0 0 0 |  380
1 1  1 0 0 1 |  390
1 1  1 0 1 0 |  3A0
1 1  1 0 1 1 |  3B0
1 1  1 1 0 0 |  3C0
1 1  1 1 0 1 |  3D0
1 1  1 1 1 0 |  3E0
1 1  1 1 1 1 |  3F0
```

Setting the Interrupt

Switches seven through ten of switch group SW1 are used to select the interrupt level. The interrupt level is binary coded, so selections from 0 to 15 would be possible, but only the following eight values will be supported: 3, 4, 5, 7, 9, 10, 11, 12.

```
Switch   | IRQ
10 9 8 7 |
---------|--------
 0 0 1 1 |  3
 0 1 0 0 |  4
 0 1 0 1 |  5
 0 1 1 1 |  7
 1 0 0 1 |  9 (=2) (default)
 1 0 1 0 | 10
 1 0 1 1 | 11
 1 1 0 0 | 12
```

Setting the Timeouts

The two jumpers JP2 (1-4) are used to determine the timeout parameters. These two jumpers are normally left open. Refer to the COM9026 Data Sheet for alternate configurations.

Configuring the PC500 for Star or Bus Topology

The single jumper labeled JP6 is used to configure the PC500 board for star or bus topology. When the jumper is installed, the board may be used in a star network, when it is removed, the board can be used in a bus topology.

Diagnostic LEDs

Two diagnostic LEDs are visible on the rear bracket of the board. The green LED monitors the network activity: the red one shows the board activity:

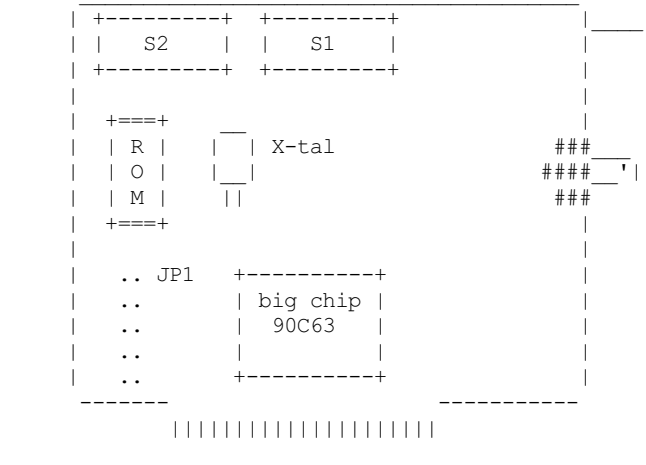
```
Green  | Status               Red      | Status
-------|------------------   ---------|------------------
 on    | normal activity      flash/on | data transfer
 blink | reconfiguration      off      | no data transfer;
 off   | defective board or            | incorrect memory or
       | node ID is zero               | I/O address
```

PC710 (8-bit card)

- from J.S. van Oosten <jvoosten@compiler.tdcnet.nl>

Note: this data is gathered by experimenting and looking at info of other cards. However, I'm sure I got 99% of the settings right.

The SMC710 card resembles the PC270 card, but is much more basic (i.e. no LEDs, RJ11 jacks, etc.) and 8 bit. Here's a little drawing:



The row of jumpers at JP1 actually consists of 8 jumpers, (sometimes labelled) the same as on the PC270, from top to bottom: EXT2, EXT1, ROM, IRQ7, IRQ5, IRQ4, IRQ3, IRQ2 (gee, wonder what they would do? :-))

S1 and S2 perform the same function as on the PC270, only their numbers are swapped (S1 is the nodeaddress, S2 sets IO- and RAM-address).

I know it works when connected to a PC110 type ARCnet board.

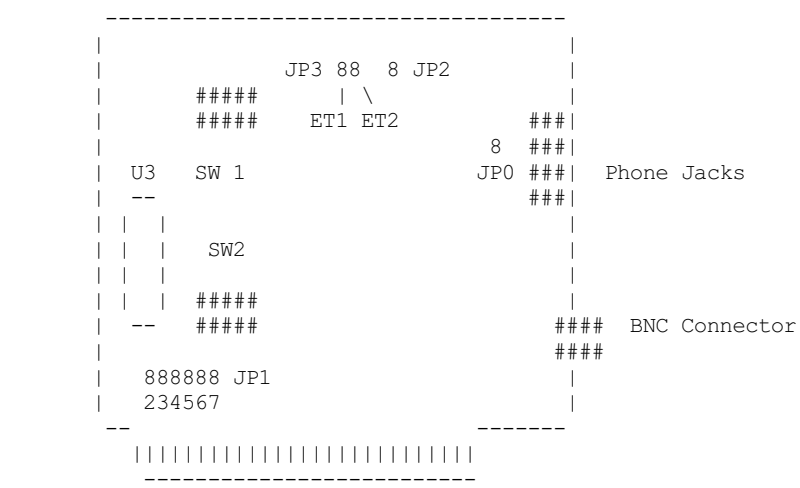
Possibly SMC

LCS-8830(-T) (8 and 16-bit cards)

- from Mathias Katzer <mkatzer@HRZ.Uni-Bielefeld.DE>
- Marek Michalkiewicz <marekm@i17linuxb.ists.pwr.wroc.pl> says the LCS-8830 is slightly different from LCS-8830-T. These are 8 bit, BUS only (the JP0 jumper is hardwired), and BNC only.

This is a LCS-8830-T made by SMC, I think ('SMC' only appears on one PLCC, nowhere else, not even on the few Xeroxed sheets from the manual).

SMC ARCnet Board Type LCS-8830-T:




```
SW1: DIP-Switches for Station Address
SW2: DIP-Switches for Memory Base and I/O Base addresses

JP0: If closed, internal termination on (default open)
JP1: IRQ Jumpers
JP2: Boot-ROM enabled if closed
JP3: Jumpers for response timeout

U3: Boot-ROM Socket


ET1 ET2     Response Time     Idle Time    Reconfiguration Time

              78                86              840
 X           285               316             1680
     X       563               624             1680
 X   X      1130              1237             1680

(X means closed jumper)

(DIP-Switch downwards means "0")
```

The station address is binary-coded with SW1.

The I/O base address is coded with DIP-Switches 6,7 and 8 of SW2:

Switches	**Base**
678	**Address**
000	260-26f
100	290-29f
010	2e0-2ef
110	2f0-2ff
001	300-30f
101	350-35f

Switches	Base
678	Address

011	380-38f
111	3e0-3ef

DIP Switches 1-5 of SW2 encode the RAM and ROM Address Range:

Switches	RAM	ROM
12345	Address Range	Address Range
00000	C:0000-C:07ff	C:2000-C:3fff
10000	C:0800-C:0fff	
01000	C:1000-C:17ff	
11000	C:1800-C:1fff	
00100	C:4000-C:47ff	C:6000-C:7fff
10100	C:4800-C:4fff	
01100	C:5000-C:57ff	
11100	C:5800-C:5fff	
00010	C:C000-C:C7ff	C:E000-C:ffff
10010	C:C800-C:Cfff	
01010	C:D000-C:D7ff	
11010	C:D800-C:Dfff	
00110	D:0000-D:07ff	D:2000-D:3fff
10110	D:0800-D:0fff	
01110	D:1000-D:17ff	
11110	D:1800-D:1fff	
00001	D:4000-D:47ff	D:6000-D:7fff
10001	D:4800-D:4fff	
01001	D:5000-D:57ff	
11001	D:5800-D:5fff	
00101	D:8000-D:87ff	D:A000-D:bfff
10101	D:8800-D:8fff	
01101	D:9000-D:97ff	
11101	D:9800-D:9fff	
00011	D:C000-D:c7ff	D:E000-D:ffff
10011	D:C800-D:cfff	
01011	D:D000-D:d7ff	
11011	D:D800-D:dfff	
00111	E:0000-E:07ff	E:2000-E:3fff
10111	E:0800-E:0fff	
01111	E:1000-E:17ff	
11111	E:1800-E:1fff	

PureData Corp

PDI507 (8-bit card)

- from Mark Rejhon <mdrejhon@magi.com> (slight modifications by Avery)
- Avery's note: I think PDI508 cards (but definitely NOT PDI508Plus cards) are mostly the same as this. PDI508Plus cards appear to be mainly software-configured.

Jumpers:

There is a jumper array at the bottom of the card, near the edge connector. This array is labelled J1. They control the IRQs and something else. Put only one jumper on the IRQ pins.

ETS1, ETS2 are for timing on very long distance networks. See the more general information near the top of this file.

There is a J2 jumper on two pins. A jumper should be put on them, since it was already there when I got the card. I don't know what this jumper is for though.

There is a two-jumper array for J3. I don't know what it is for, but there were already two jumpers on it when I got the card. It's a six pin grid in a two-by-three fashion. The jumpers were configured as follows:

```
    .-------.
  o | o   o | 
```

```
  :-------:    ------> Accessible end of card with connectors
o | o   o |             in this direction ------->
  `-------'
```

Carl de Billy <CARL@carainfo.com> explains J3 and J4:

J3 Diagram:

```
   .-------.
o | o   o |
  :-------:    TWIST Technology
o | o   o |
  `-------'

  .-------.
  | o   o | o
  :-------:    COAX Technology
  | o   o | o
  `-------'
```

- If using coax cable in a bus topology the J4 jumper must be removed; place it on one pin.
- If using bus topology with twisted pair wiring move the J3 jumpers so they connect the middle pin and the pins closest to the RJ11 Connectors. Also the J4 jumper must be removed; place it on one pin of J4 jumper for storage.
- If using star topology with twisted pair wiring move the J3 jumpers so they connect the middle pin and the pins closest to the RJ11 connectors.

DIP Switches:

The DIP switches accessible on the accessible end of the card while it is installed, is used to set the ARCnet address. There are 8 switches. Use an address from 1 to 254

Switch No.	**ARCnet address**
12345678	
00000000	FF (Don't use this!)
00000001	FE
00000010	FD
...	
11111101	2
11111110	1
11111111	0 (Don't use this!)

There is another array of eight DIP switches at the top of the card. There are five labelled MS0-MS4 which seem to control the memory address, and another three labelled IO0-IO2 which seem to control the base I/O address of the card.

This was difficult to test by trial and error, and the I/O addresses are in a weird order. This was tested by setting the DIP switches, rebooting the computer, and attempting to load ARCETHER at various addresses (mostly between 0x200 and 0x400). The address that caused the red transmit LED to blink, is the one that I thought works.

Also, the address 0x3D0 seem to have a special meaning, since the ARCETHER packet driver loaded fine, but without the red LED blinking. I don't know what 0x3D0 is for though. I recommend using an address of 0x300 since Windows may not like addresses below 0x300.

IO Switch No.	**I/O address**
210	
111	0x260
110	0x290
101	0x2E0
100	0x2F0
011	0x300
010	0x350
001	0x380
000	0x3E0

The memory switches set a reserved address space of 0x1000 bytes (0x100 segment units, or 4k). For example if I set an address of 0xD000, it will use up addresses 0xD000 to 0xD100.

The memory switches were tested by booting using QEMM386 stealth, and using LOADHI to see what address automatically became excluded from the upper memory regions, and then attempting to load ARCETHER using these addresses.

I recommend using an ARCnet memory address of 0xD000, and putting the EMS page frame at 0xC000 while using QEMM stealth mode. That way, you get contiguous high memory from 0xD100 almost all the way the end of the megabyte.

Memory Switch 0 (MS0) didn't seem to work properly when set to OFF on my card. It could be malfunctioning on my card. Experiment with it ON first, and if it doesn't work, set it to OFF. (It may be a modifier for the 0x200 bit?)

MS Switch No.	
43210	**Memory address**
00001	0xE100 (guessed - was not detected by QEMM)
00011	0xE000 (guessed - was not detected by QEMM)
00101	0xDD00
00111	0xDC00
01001	0xD900
01011	0xD800
01101	0xD500
01111	0xD400
10001	0xD100
10011	0xD000
10101	0xCD00
10111	0xCC00
11001	0xC900 (guessed - crashes tested system)
11011	0xC800 (guessed - crashes tested system)
11101	0xC500 (guessed - crashes tested system)
11111	0xC400 (guessed - crashes tested system)

CNet Technology Inc. (8-bit cards)

120 Series (8-bit cards)

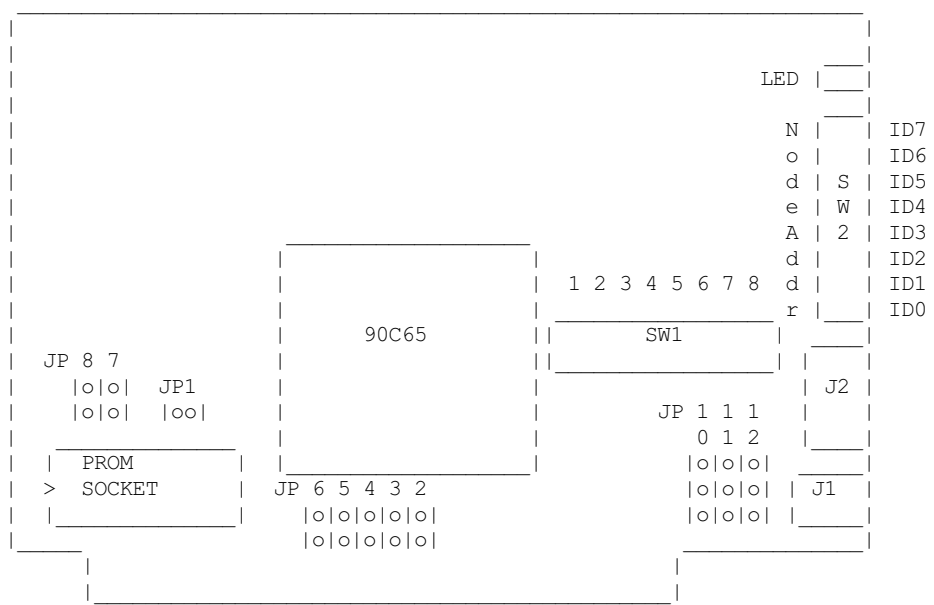
- from Juergen Seifert <seifert@htwm.de>

This description has been written by Juergen Seifert <seifert@htwm.de> using information from the following Original CNet Manual

> "ARCNET USER'S MANUAL for CN120A CN120AB CN120TP CN120ST CN120SBT P/N:12-01-0007 Revision 3.00"

ARCNET is a registered trademark of the Datapoint Corporation

- P/N 120A ARCNET 8 bit XT/AT Star
- P/N 120AB ARCNET 8 bit XT/AT Bus
- P/N 120TP ARCNET 8 bit XT/AT Twisted Pair
- P/N 120ST ARCNET 8 bit XT/AT Star, Twisted Pair
- P/N 120SBT ARCNET 8 bit XT/AT Star, Bus, Twisted Pair



Legend:

```
90C65       ARCNET Probe
S1  1-5:    Base Memory Address Select
    6-8:    Base I/O Address Select
S2  1-8:    Node ID Select (ID0-ID7)
```

```
JP1     ROM Enable Select
JP2     IRQ2
JP3     IRQ3
JP4     IRQ4
JP5     IRQ5
JP6     IRQ7
JP7/JP8     ET1, ET2 Timeout Parameters
JP10/JP11   Coax / Twisted Pair Select  (CN120ST/SBT only)
JP12        Terminator Select       (CN120AB/ST/SBT only)
J1      BNC RG62/U Connector        (all except CN120TP)
J2      Two 6-position Telephone Jack   (CN120TP/ST/SBT only)
```

Setting one of the switches to Off means "1", On means "0".

Setting the Node ID

The eight switches in SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 1 (ID0) serves as the least significant bit (LSB).

The node ID is the sum of the values of all switches set to "1" These values are:

Switch	Label	Value
1	ID0	1
2	ID1	2
3	ID2	4
4	ID3	8
5	ID4	16
6	ID5	32
7	ID6	64
8	ID7	128

Some Examples:

```
 Switch          | Hex      | Decimal
8 7 6 5 4 3 2 1  | Node ID  | Node ID
-----------------|----------|---------
0 0 0 0 0 0 0 0  |    not allowed
0 0 0 0 0 0 0 1  |    1     |    1
0 0 0 0 0 0 1 0  |    2     |    2
0 0 0 0 0 0 1 1  |    3     |    3
    . . .        |          |
0 1 0 1 0 1 0 1  |   55     |   85
    . . .        |          |
1 0 1 0 1 0 1 0  |   AA     |  170
    . . .        |          |
1 1 1 1 1 1 0 1  |   FD     |  253
1 1 1 1 1 1 1 0  |   FE     |  254
1 1 1 1 1 1 1 1  |   FF     |  255
```

Setting the I/O Base Address

The last three switches in switch block SW1 are used to select one of eight possible I/O Base addresses using the following table:

```
Switch      | Hex I/O
 6   7   8  | Address
------------|--------
ON  ON  ON  |  260
OFF ON  ON  |  290
ON  OFF ON  |  2E0  (Manufacturer's default)
OFF OFF ON  |  2F0
ON  ON  OFF |  300
OFF ON  OFF |  350
ON  OFF OFF |  380
OFF OFF OFF |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer (RAM) requires 2K. The base of this buffer can be located in any of eight positions. The address of the Boot Prom is memory base + 8K or memory base + 0x2000. Switches 1-5 of switch block SW1 select the Memory Base address.

```
Switch              | Hex RAM | Hex ROM
 1   2   3   4   5  | Address | Address *)
--------------------|---------|-----------
ON  ON  ON  ON  ON  |  C0000  |  C2000
ON  ON  OFF ON  ON  |  C4000  |  C6000
ON  ON  ON  OFF ON  |  CC000  |  CE000
ON  ON  OFF OFF ON  |  D0000  |  D2000  (Manufacturer's default)
```

```
 ON  ON  ON  ON  OFF |  D4000  |  D6000
 ON  ON  OFF ON  OFF |  D8000  |  DA000
 ON  ON  ON  OFF OFF |  DC000  |  DE000
 ON  ON  OFF OFF OFF |  E0000  |  E2000

*) To enable the Boot ROM install the jumper JP1
```

> **Note**
>
> Since the switches 1 and 2 are always set to ON it may be possible that they can be used to add an offset of 2K, 4K or 6K to the base address, but this feature is not documented in the manual and I haven't tested it yet.

Setting the Interrupt Line

To select a hardware interrupt level install one (only one!) of the jumpers JP2, JP3, JP4, JP5, JP6. JP2 is the default:

```
Jumper | IRQ
-------|-----
  2    |  2
  3    |  3
  4    |  4
  5    |  5
  6    |  7
```

Setting the Internal Terminator on CN120AB/TP/SBT

The jumper JP12 is used to enable the internal terminator:

```
                        -----
    0                  |  0  |
  -----   ON           |     |  ON
 |  0  |               |  0  |
 |     |  OFF           -----   OFF
 |  0  |                  0
  -----
Terminator           Terminator
 disabled             enabled
```

Selecting the Connector Type on CN120ST/SBT

```
 JP10    JP11         JP10    JP11
                      -----   -----
   0       0         |  0  | |  0  |
 -----   -----       |     | |     |
|  0  | |  0  |      |  0  | |  0  |
|     | |     |      -----   -----
|  0  | |  0  |        0       0
 -----   -----
 Coaxial Cable        Twisted Pair Cable
   (Default)
```

Setting the Timeout Parameters

The jumpers labeled EXT1 and EXT2 are used to determine the timeout parameters. These two jumpers are normally left open.

CNet Technology Inc. (16-bit cards)

160 Series (16-bit cards)

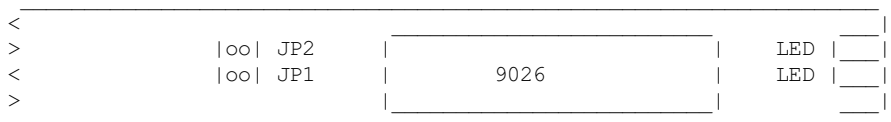
- from Juergen Seifert <seifert@htwm.de>

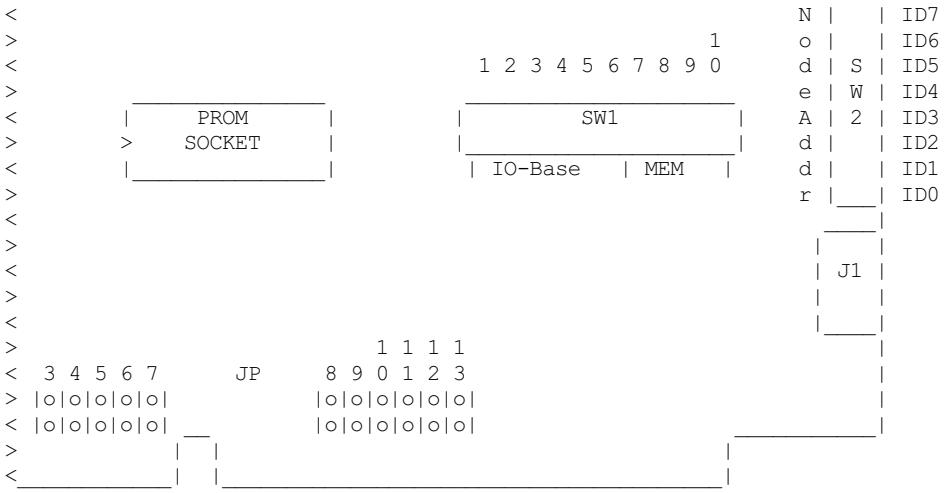
This description has been written by Juergen Seifert <seifert@htwm.de> using information from the following Original CNet Manual

"ARCNET USER'S MANUAL for CN160A CN160AB CN160TP P/N:12-01-0006 Revision 3.00"

ARCNET is a registered trademark of the Datapoint Corporation

- P/N 160A ARCNET 16 bit XT/AT Star
- P/N 160AB ARCNET 16 bit XT/AT Bus
- P/N 160TP ARCNET 16 bit XT/AT Twisted Pair





Legend:

```
9026            ARCNET Probe
SW1 1-6:    Base I/O Address Select
    7-10:   Base Memory Address Select
SW2 1-8:    Node ID Select (ID0-ID7)
JP1/JP2     ET1, ET2 Timeout Parameters
JP3-JP13    Interrupt Select
J1      BNC RG62/U Connector        (CN160A/AB only)
J1      Two 6-position Telephone Jack   (CN160TP only)
LED
```

Setting one of the switches to Off means "1", On means "0".

Setting the Node ID

The eight switches in SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 1 (ID0) serves as the least significant bit (LSB).

The node ID is the sum of the values of all switches set to "1" These values are:

Switch	Label	Value
1	ID0	1
2	ID1	2
3	ID2	4
4	ID3	8
5	ID4	16
6	ID5	32
7	ID6	64
8	ID7	128

Some Examples:

Switch	Hex	Decimal
8 7 6 5 4 3 2 1	Node ID	Node ID
0 0 0 0 0 0 0 0	not allowed	
0 0 0 0 0 0 0 1	1	1
0 0 0 0 0 0 1 0	2	2
0 0 0 0 0 0 1 1	3	3
. . .		
0 1 0 1 0 1 0 1	55	85
. . .		
1 0 1 0 1 0 1 0	AA	170
. . .		
1 1 1 1 1 1 0 1	FD	253
1 1 1 1 1 1 1 0	FE	254
1 1 1 1 1 1 1 1	FF	255

Setting the I/O Base Address

The first six switches in switch block SW1 are used to select the I/O Base address using the following table:

Switch						Hex I/O
1	2	3	4	5	6	Address
OFF	ON	ON	OFF	OFF	ON	260
OFF	ON	OFF	ON	ON	OFF	290
OFF	ON	OFF	OFF	OFF	ON	2E0 (Manufacturer's default)
OFF	ON	OFF	OFF	OFF	OFF	2F0

```
OFF OFF ON  ON  ON  ON  |  300
OFF OFF ON  OFF ON  OFF |  350
OFF OFF OFF ON  ON  ON  |  380
OFF OFF OFF OFF OFF ON  |  3E0
```

Note: Other IO-Base addresses seem to be selectable, but only the above combinations are documented.

Setting the Base Memory (RAM) buffer Address

The switches 7-10 of switch block SW1 are used to select the Memory Base address of the RAM (2K) and the PROM:

```
Switch          | Hex RAM | Hex ROM
 7   8   9  10  | Address | Address
----------------|---------|-----------
OFF OFF ON  ON  |  C0000  |  C8000
OFF OFF ON  OFF |  D0000  |  D8000 (Default)
OFF OFF OFF ON  |  E0000  |  E8000
```

> **Note**
>
> Other MEM-Base addresses seem to be selectable, but only the above combinations are documented.

Setting the Interrupt Line

To select a hardware interrupt level install one (only one!) of the jumpers JP3 through JP13 using the following table:

```
Jumper | IRQ
-------|-----------------
  3    |  14
  4    |  15
  5    |  12
  6    |  11
  7    |  10
  8    |   3
  9    |   4
 10    |   5
 11    |   6
 12    |   7
 13    |   2 (=9) Default!
```

> **Note**
>
> - Do not use JP11=IRQ6, it may conflict with your Floppy Disk Controller
> - Use JP3=IRQ14 only, if you don't have an IDE-, MFM-, or RLL- Hard Disk, it may conflict with their controllers

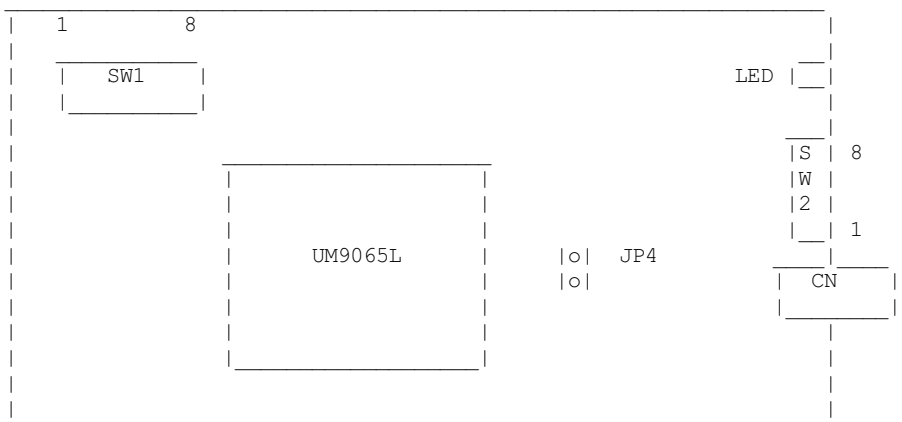
Setting the Timeout Parameters

The jumpers labeled JP1 and JP2 are used to determine the timeout parameters. These two jumpers are normally left open.

Lantech

8-bit card, unknown model

- from Vlad Lungu <vlungu@ugal.ro> - his e-mail address seemed broken at the time I tried to reach him. Sorry Vlad, if you didn't get my reply.



UM9065L : ARCnet Controller

SW 1 : Shared Memory Address and I/O Base

```
ON=0

12345|Memory Address
-----|--------------
00001|  D4000
00010|  CC000
00110|  D0000
01110|  D1000
01101|  D9000
10010|  CC800
10011|  DC800
11110|  D1800
```

It seems that the bits are considered in reverse order. Also, you must observe that some of those addresses are unusual and I didn't probe them; I used a memory dump in DOS to identify them. For the 00000 configuration and some others that I didn't write here the card seems to conflict with the video card (an S3 GENDAC). I leave the full decoding of those addresses to you.

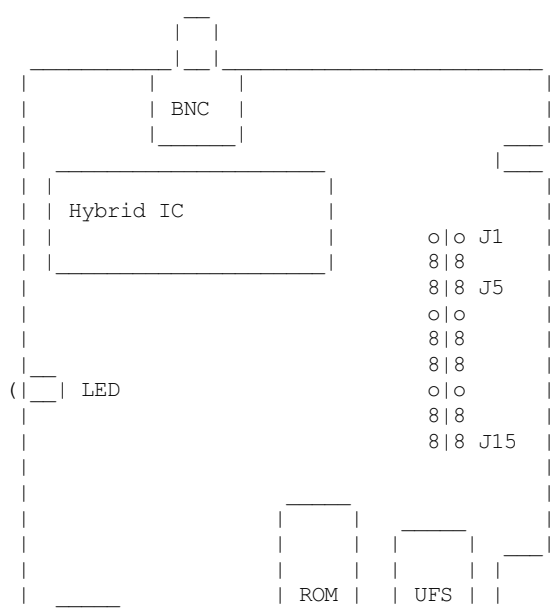
```
678| I/O Address
---|------------
000|    260
001|    failed probe
010|    2E0
011|    380
100|    290
101|    350
110|    failed probe
111|    3E0

SW 2  : Node ID (binary coded)

JP 4  : Boot PROM enable   CLOSE - enabled
                           OPEN  - disabled

JP 6  : IRQ set (ONLY ONE jumper on 1-5 for IRQ 2-6)
```

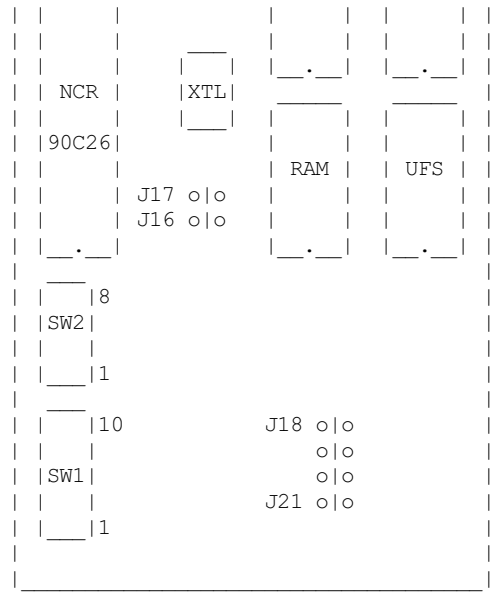
Acer

8-bit card, Model 5210-003

- from Vojtech Pavlik <vojtech@suse.cz> using portions of the existing arcnet-hardware file.

This is a 90C26 based card. Its configuration seems similar to the SMC PC100, but has some additional jumpers I don't know the meaning of.





Legend:

```
90C26       ARCNET Chip
XTL         20 MHz Crystal
SW1 1-6     Base I/O Address Select
    7-10    Memory Address Select
SW2 1-8     Node ID Select (ID0-ID7)
J1-J5       IRQ Select
J6-J21      Unknown (Probably extra timeouts & ROM enable ...)
LED1        Activity LED
BNC         Coax connector (STAR ARCnet)
RAM         2k of SRAM
ROM         Boot ROM socket
UFS         Unidentified Flying Sockets
```

Setting the Node ID

The eight switches in SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must not be 0. Switch 1 (ID0) serves as the least significant bit (LSB).

Setting one of the switches to OFF means "1", ON means "0".

The node ID is the sum of the values of all switches set to "1" These values are:

```
Switch | Value
-------|-------
  1    |   1
  2    |   2
  3    |   4
  4    |   8
  5    |  16
  6    |  32
  7    |  64
  8    | 128
```

Don't set this to 0 or 255; these values are reserved.

Setting the I/O Base Address

The switches 1 to 6 of switch block SW1 are used to select one of 32 possible I/O Base addresses using the following tables:

```
       | Hex
Switch | Value
-------|-------
  1    | 200
  2    | 100
  3    |  80
  4    |  40
  5    |  20
  6    |  10
```

The I/O address is sum of all switches set to "1". Remember that the I/O address space bellow 0x200 is RESERVED for mainboard, so switch 1 should be ALWAYS SET TO OFF.

Setting the Base Memory (RAM) buffer Address

The memory buffer (RAM) requires 2K. The base of this buffer can be located in any of sixteen positions. However, the addresses

below A0000 are likely to cause system hang because there's main RAM.

Jumpers 7-10 of switch block SW1 select the Memory Base address:

```
Switch          | Hex RAM
 7   8   9  10  | Address
----------------|---------
OFF OFF OFF OFF |  F0000 (conflicts with main BIOS)
OFF OFF OFF ON  |  E0000
OFF OFF ON  OFF |  D0000
OFF OFF ON  ON  |  C0000 (conflicts with video BIOS)
OFF ON  OFF OFF |  B0000 (conflicts with mono video)
OFF ON  OFF ON  |  A0000 (conflicts with graphics)
```

Setting the Interrupt Line

Jumpers 1-5 of the jumper block J1 control the IRQ level. ON means shorted, OFF means open:

```
 Jumper              |  IRQ
 1   2   3   4   5   |
---------------------------
 ON  OFF OFF OFF OFF |  7
 OFF ON  OFF OFF OFF |  5
 OFF OFF ON  OFF OFF |  4
 OFF OFF OFF ON  OFF |  3
 OFF OFF OFF OFF ON  |  2
```

Unknown jumpers & sockets

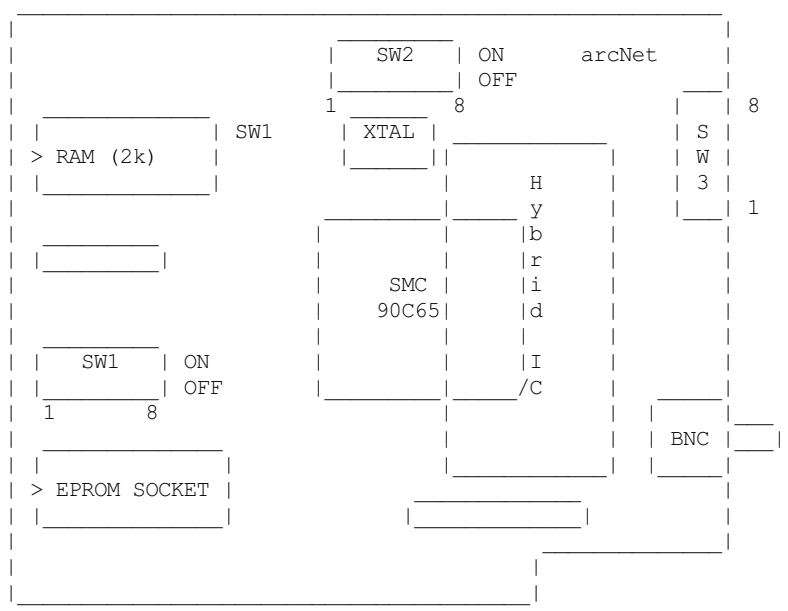
I know nothing about these. I just guess that J16&J17 are timeout jumpers and maybe one of J18-J21 selects ROM. Also J6-J10 and J11-J15 are connecting IRQ2-7 to some pins on the UFSs. I can't guess the purpose.

Datapoint?

LAN-ARC-8, an 8-bit card

- from Vojtech Pavlik <vojtech@suse.cz>

This is another SMC 90C65-based ARCnet card. I couldn't identify the manufacturer, but it might be DataPoint, because the card has the original arcNet logo in its upper right corner.



Legend:

```
90C65       ARCNET Chip
SW1 1-5:    Base Memory Address Select
    6-8:    Base I/O Address Select
SW2 1-8:    Node ID Select
SW3 1-5:    IRQ Select
    6-7:    Extra Timeout
    8  :    ROM Enable
BNC         Coax connector
XTAL        20 MHz Crystal
```

Setting the Node ID

The eight switches in SW3 are used to set the node ID. Each node attached to the network must have an unique node ID which must not be 0. Switch 1 serves as the least significant bit (LSB).

Setting one of the switches to Off means "1", On means "0".

The node ID is the sum of the values of all switches set to "1" These values are:

Switch	Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

Setting the I/O Base Address

The last three switches in switch block SW1 are used to select one of eight possible I/O Base addresses using the following table:

Switch 6 7 8	Hex I/O Address	
ON ON ON	260	
OFF ON ON	290	
ON OFF ON	2E0	(Manufacturer's default)
OFF OFF ON	2F0	
ON ON OFF	300	
OFF ON OFF	350	
ON OFF OFF	380	
OFF OFF OFF	3E0	

Setting the Base Memory (RAM) buffer Address

The memory buffer (RAM) requires 2K. The base of this buffer can be located in any of eight positions. The address of the Boot Prom is memory base + 0x2000.

Jumpers 3-5 of switch block SW1 select the Memory Base address.

Switch 1 2 3 4 5	Hex RAM Address	Hex ROM Address *)	
ON ON ON ON ON	C0000	C2000	
ON ON OFF ON ON	C4000	C6000	
ON ON ON OFF ON	CC000	CE000	
ON ON OFF OFF ON	D0000	D2000	(Manufacturer's default)
ON ON ON ON OFF	D4000	D6000	
ON ON OFF ON OFF	D8000	DA000	
ON ON ON OFF OFF	DC000	DE000	
ON ON OFF OFF OFF	E0000	E2000	

*) To enable the Boot ROM set the switch 8 of switch block SW3 to position ON.

The switches 1 and 2 probably add 0x0800 and 0x1000 to RAM base address.

Setting the Interrupt Line

Switches 1-5 of the switch block SW3 control the IRQ level:

Jumper 1 2 3 4 5	IRQ
ON OFF OFF OFF OFF	3
OFF ON OFF OFF OFF	4
OFF OFF ON OFF OFF	5
OFF OFF OFF ON OFF	7
OFF OFF OFF OFF ON	2

Setting the Timeout Parameters

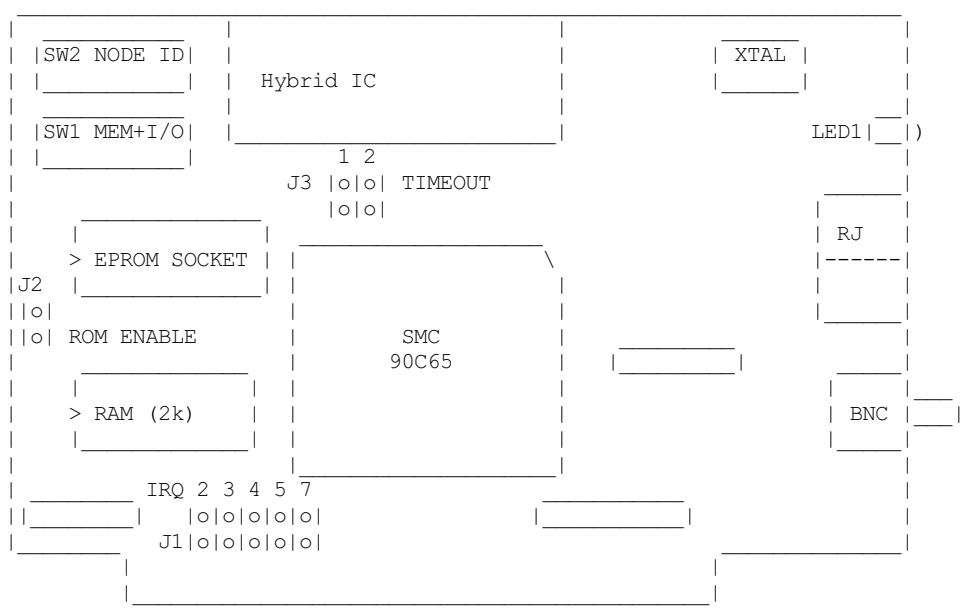
The switches 6-7 of the switch block SW3 are used to determine the timeout parameters. These two switches are normally left in the OFF position.

Topware

8-bit card, TA-ARC/10

- from Vojtech Pavlik <vojtech@suse.cz>

This is another very similar 90C65 card. Most of the switches and jumpers are the same as on other clones.



Legend:

```
90C65       ARCNET Chip
XTAL        20 MHz Crystal
SW1 1-5     Base Memory Address Select
    6-8     Base I/O Address Select
SW2 1-8     Node ID Select (ID0-ID7)
J1          IRQ Select
J2          ROM Enable
J3          Extra Timeout
LED1        Activity LED
BNC         Coax connector (BUS ARCnet)
RJ          Twisted Pair Connector (daisy chain)
```

Setting the Node ID

The eight switches in SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must not be 0. Switch 1 (ID0) serves as the least significant bit (LSB).

Setting one of the switches to Off means "1", On means "0".

The node ID is the sum of the values of all switches set to "1" These values are:

```
Switch | Label | Value
-------|-------|-------
  1    | ID0   |   1
  2    | ID1   |   2
  3    | ID2   |   4
  4    | ID3   |   8
  5    | ID4   |  16
  6    | ID5   |  32
  7    | ID6   |  64
  8    | ID7   | 128
```

Setting the I/O Base Address

The last three switches in switch block SW1 are used to select one of eight possible I/O Base addresses using the following table:

```
Switch      | Hex I/O
 6   7   8  | Address
------------|--------
ON  ON  ON  |  260  (Manufacturer's default)
OFF ON  ON  |  290
ON  OFF ON  |  2E0
OFF OFF ON  |  2F0
ON  ON  OFF |  300
OFF ON  OFF |  350
ON  OFF OFF |  380
OFF OFF OFF |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer (RAM) requires 2K. The base of this buffer can be located in any of eight positions. The address of the Boot Prom is memory base + 0x2000.

Jumpers 3-5 of switch block SW1 select the Memory Base address.

Switch 1	2	3	4	5	Hex RAM Address	Hex ROM Address *)	
ON	ON	ON	ON	ON	C0000	C2000	
ON	ON	OFF	ON	ON	C4000	C6000	(Manufacturer's default)
ON	ON	ON	OFF	ON	CC000	CE000	
ON	ON	OFF	OFF	ON	D0000	D2000	
ON	ON	ON	ON	OFF	D4000	D6000	
ON	ON	OFF	ON	OFF	D8000	DA000	
ON	ON	ON	OFF	OFF	DC000	DE000	
ON	ON	OFF	OFF	OFF	E0000	E2000	

*) To enable the Boot ROM short the jumper J2.

The jumpers 1 and 2 probably add 0x0800 and 0x1000 to RAM address.

Setting the Interrupt Line

Jumpers 1-5 of the jumper block J1 control the IRQ level. ON means shorted, OFF means open:

Jumper 1	2	3	4	5	IRQ
ON	OFF	OFF	OFF	OFF	2
OFF	ON	OFF	OFF	OFF	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	OFF	ON	OFF	5
OFF	OFF	OFF	OFF	ON	7

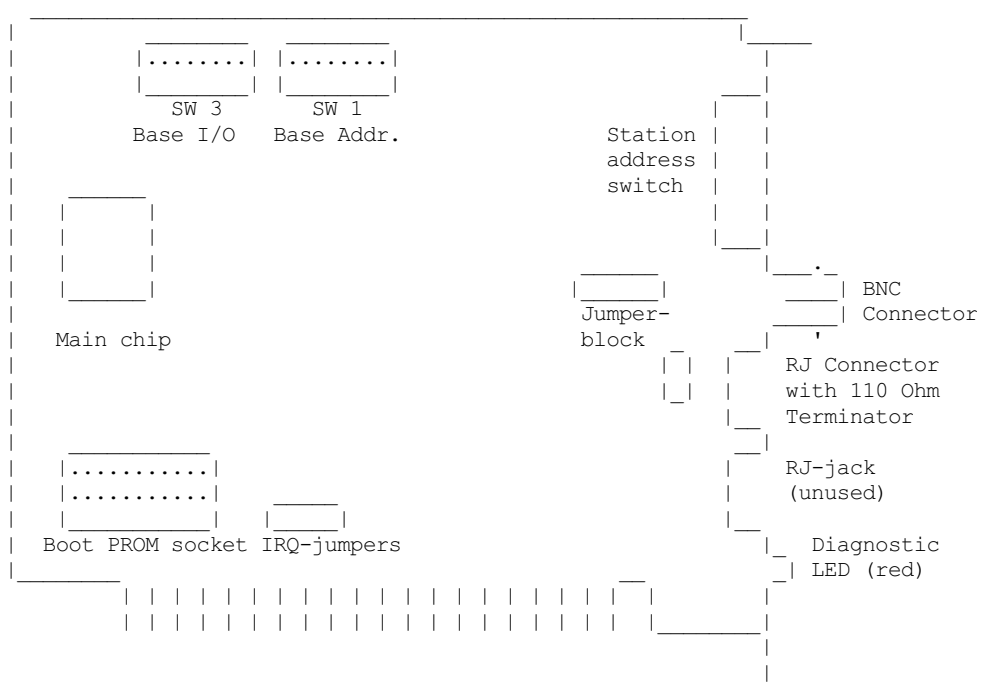
Setting the Timeout Parameters

The jumpers J3 are used to set the timeout parameters. These two jumpers are normally left open.

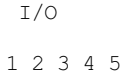
Thomas-Conrad

Model #500-6242-0097 REV A (8-bit card)

- from Lars Karlsson <100617.3473@compuserve.com>



And here are the settings for some of the switches and jumpers on the cards.



```
2E0----- 0 0 0 1 0 0 0 1
2F0----- 0 0 0 1 0 0 0 0
300----- 0 0 0 0 1 1 1 1
350----- 0 0 0 0 1 1 1 0
```

"0" in the above example means switch is off "1" means that it is on.

```
    ShMem address.

      1 2 3 4 5 6 7 8

CX00--0 0 1 1 | |   |
DX00--0 0 1 0       |
X000--------- 1 1   |
X400--------- 1 0   |
X800--------- 0 1   |
XC00--------- 0 0
ENHANCED----------- 1
COMPATIBLE--------- 0

    IRQ


3 4 5 7 2
. . . . .
. . . . .
```

There is a DIP-switch with 8 switches, used to set the shared memory address to be used. The first 6 switches set the address, the 7th doesn't have any function, and the 8th switch is used to select "compatible" or "enhanced". When I got my two cards, one of them had this switch set to "enhanced". That card didn't work at all, it wasn't even recognized by the driver. The other card had this switch set to "compatible" and it behaved absolutely normally. I guess that the switch on one of the cards, must have been changed accidentally when the card was taken out of its former host. The question remains unanswered, what is the purpose of the "enhanced" position?

[Avery's note: "enhanced" probably either disables shared memory (use IO ports instead) or disables IO ports (use memory addresses instead). This varies by the type of card involved. I fail to see how either of these enhance anything. Send me more detailed information about this mode, or just use "compatible" mode instead.]

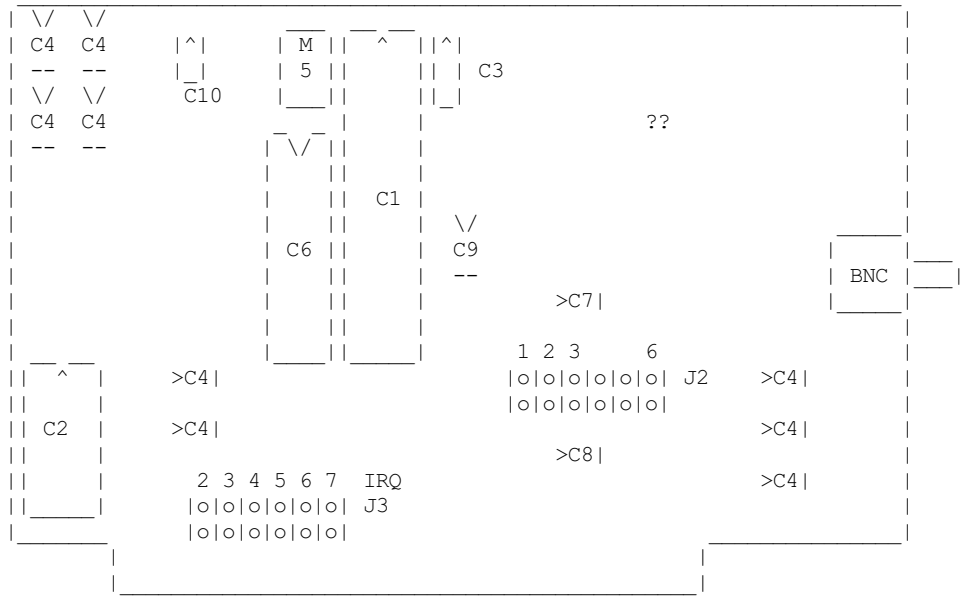
Waterloo Microsystems Inc. ??

8-bit card (C) 1985

- from Robert Michael Best <rmb117@cs.usask.ca>

[Avery's note: these don't work with my driver for some reason. These cards SEEM to have settings similar to the PDI508Plus, which is software-configured and doesn't work with my driver either. The "Waterloo chip" is a boot PROM, probably designed specifically for the University of Waterloo. If you have any further information about this card, please e-mail me.]

The probe has not been able to detect the card on any of the J2 settings, and I tried them again with the "Waterloo" chip removed.




```
C1 -- "COM9026
       SMC 8638"
```

```
      In a chip socket.

C2 -- "@Copyright
       Waterloo Microsystems Inc.
       1985"
      In a chip Socket with info printed on a label covering a round window
      showing the circuit inside. (The window indicates it is an EPROM chip.)

C3 -- "COM9032
       SMC 8643"
      In a chip socket.

C4 -- "74LS"
      9 total no sockets.

M5 -- "50006-136
       20.000000 MHZ
       MTQ-T1-S3
       0 M-TRON 86-40"
      Metallic case with 4 pins, no socket.

C6 -- "MOSTEK@TC8643
       MK6116N-20
       MALAYSIA"
      No socket.

C7 -- No stamp or label but in a 20 pin chip socket.

C8 -- "PAL10L8CN
       8623"
      In a 20 pin socket.

C9 -- "PAl16R4A-2CN
       8641"
      In a 20 pin socket.

C10 -- "M8640
          NMC
         9306N"
       In an 8 pin socket.

?? -- Some components on a smaller board and attached with 20 pins all
      along the side closest to the BNC connector.  The are coated in a dark
      resin.
```

On the board there are two jumper banks labeled J2 and J3. The manufacturer didn't put a J1 on the board. The two boards I have both came with a jumper box for each bank.

```
J2 -- Numbered 1 2 3 4 5 6.
      4 and 5 are not stamped due to solder points.

J3 -- IRQ 2 3 4 5 6 7
```

The board itself has a maple leaf stamped just above the irq jumpers and "-2 46-86" beside C2. Between C1 and C6 "ASS 'Y 300163" and "@1986 CORMAN CUSTOM ELECTRONICS CORP." stamped just below the BNC connector. Below that "MADE IN CANADA"

No Name

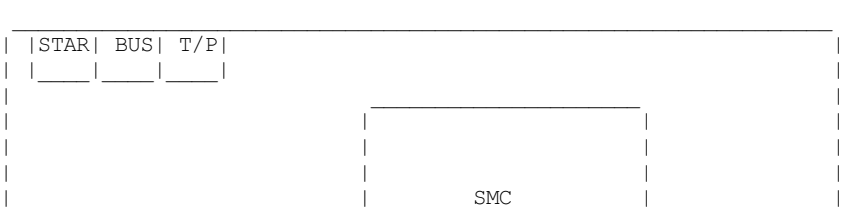
8-bit cards, 16-bit cards

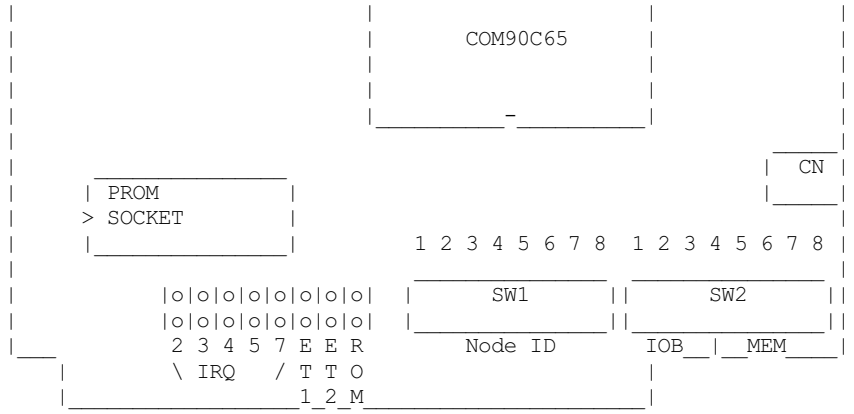
- from Juergen Seifert <seifert@htwm.de>

I have named this ARCnet card "NONAME", since there is no name of any manufacturer on the Installation manual nor on the shipping box. The only hint to the existence of a manufacturer at all is written in copper, it is "Made in Taiwan"

This description has been written by Juergen Seifert <seifert@htwm.de> using information from the Original

"ARCnet Installation Manual"





Legend:

```
COM90C65:       ARCnet Probe
S1  1-8:    Node ID Select
S2  1-3:    I/O Base Address Select
    4-6:    Memory Base Address Select
    7-8:    RAM Offset Select
ET1, ET2    Extended Timeout Select
ROM     ROM Enable Select
CN              RG62 Coax Connector
STAR| BUS | T/P Three fields for placing a sign (colored circle)
                indicating the topology of the card
```

Setting one of the switches to Off means "1", On means "0".

Setting the Node ID

The eight switches in group SW1 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 8 serves as the least significant bit (LSB).

The node ID is the sum of the values of all switches set to "1" These values are:

```
Switch | Value
-------|-------
  8    |   1
  7    |   2
  6    |   4
  5    |   8
  4    |  16
  3    |  32
  2    |  64
  1    | 128
```

Some Examples:

```
 Switch          | Hex     | Decimal
1 2 3 4 5 6 7 8 | Node ID | Node ID
----------------|---------|---------
0 0 0 0 0 0 0 0 |    not allowed
0 0 0 0 0 0 0 1 |    1    |    1
0 0 0 0 0 0 1 0 |    2    |    2
0 0 0 0 0 0 1 1 |    3    |    3
    . . .       |         |
0 1 0 1 0 1 0 1 |   55    |   85
    . . .       |         |
1 0 1 0 1 0 1 0 |   AA    |  170
    . . .       |         |
1 1 1 1 1 1 0 1 |   FD    |  253
1 1 1 1 1 1 1 0 |   FE    |  254
1 1 1 1 1 1 1 1 |   FF    |  255
```

Setting the I/O Base Address

The first three switches in switch group SW2 are used to select one of eight possible I/O Base addresses using the following table:

```
Switch      | Hex I/O
 1   2   3  | Address
------------|--------
ON  ON  ON  |  260
ON  ON  OFF |  290
ON  OFF ON  |  2E0  (Manufacturer's default)
ON  OFF OFF |  2F0
OFF ON  ON  |  300
OFF ON  OFF |  350
```

```
OFF OFF ON  |  380
OFF OFF OFF |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer requires 2K of a 16K block of RAM. The base of this 16K block can be located in any of eight positions. Switches 4-6 of switch group SW2 select the Base of the 16K block. Within that 16K address space, the buffer may be assigned any one of four positions, determined by the offset, switches 7 and 8 of group SW2.

```
Switch     | Hex RAM | Hex ROM
4 5 6  7 8 | Address | Address *)
-----------|---------|-----------
0 0 0  0 0 |  C0000  |  C2000
0 0 0  0 1 |  C0800  |  C2000
0 0 0  1 0 |  C1000  |  C2000
0 0 0  1 1 |  C1800  |  C2000
           |         |
0 0 1  0 0 |  C4000  |  C6000
0 0 1  0 1 |  C4800  |  C6000
0 0 1  1 0 |  C5000  |  C6000
0 0 1  1 1 |  C5800  |  C6000
           |         |
0 1 0  0 0 |  CC000  |  CE000
0 1 0  0 1 |  CC800  |  CE000
0 1 0  1 0 |  CD000  |  CE000
0 1 0  1 1 |  CD800  |  CE000
           |         |
0 1 1  0 0 |  D0000  |  D2000  (Manufacturer's default)
0 1 1  0 1 |  D0800  |  D2000
0 1 1  1 0 |  D1000  |  D2000
0 1 1  1 1 |  D1800  |  D2000
           |         |
1 0 0  0 0 |  D4000  |  D6000
1 0 0  0 1 |  D4800  |  D6000
1 0 0  1 0 |  D5000  |  D6000
1 0 0  1 1 |  D5800  |  D6000
           |         |
1 0 1  0 0 |  D8000  |  DA000
1 0 1  0 1 |  D8800  |  DA000
1 0 1  1 0 |  D9000  |  DA000
1 0 1  1 1 |  D9800  |  DA000
           |         |
1 1 0  0 0 |  DC000  |  DE000
1 1 0  0 1 |  DC800  |  DE000
1 1 0  1 0 |  DD000  |  DE000
1 1 0  1 1 |  DD800  |  DE000
           |         |
1 1 1  0 0 |  E0000  |  E2000
1 1 1  0 1 |  E0800  |  E2000
1 1 1  1 0 |  E1000  |  E2000
1 1 1  1 1 |  E1800  |  E2000

*) To enable the 8K Boot PROM install the jumper ROM.
   The default is jumper ROM not installed.
```

Setting Interrupt Request Lines (IRQ)

To select a hardware interrupt level set one (only one!) of the jumpers IRQ2, IRQ3, IRQ4, IRQ5 or IRQ7. The manufacturer's default is IRQ2.

Setting the Timeouts

The two jumpers labeled ET1 and ET2 are used to determine the timeout parameters (response and reconfiguration time). Every node in a network must be set to the same timeout values.

```
ET1 ET2 | Response Time (us) | Reconfiguration Time (ms)
--------|--------------------|--------------------------
Off Off |         78         |          840   (Default)
Off On  |        285         |         1680
On  Off |        563         |         1680
On  On  |       1130         |         1680
```

On means jumper installed, Off means jumper not installed

16-BIT ARCNET

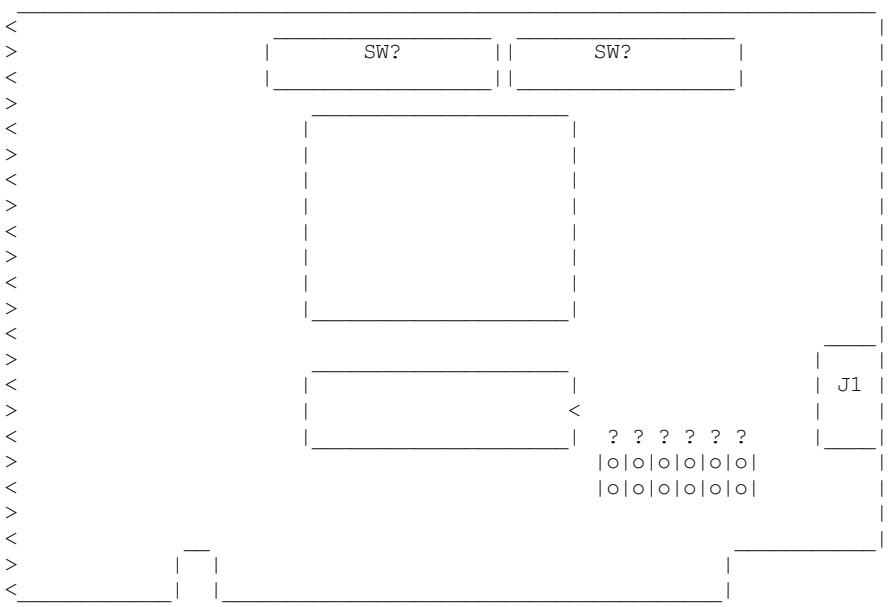
The manual of my 8-Bit NONAME ARCnet Card contains another description of a 16-Bit Coax / Twisted Pair Card. This description is incomplete, because there are missing two pages in the manual booklet. (The table of contents reports pages ... 2-9, 2-11, 2-12, 3-1, ... but inside the booklet there is a different way of counting ... 2-9, 2-10, A-1, (empty page), 3-1, ..., 3-18, A-1

(again), A-2) Also the picture of the board layout is not as good as the picture of 8-Bit card, because there isn't any letter like "SW1" written to the picture.

Should somebody have such a board, please feel free to complete this description or to send a mail to me!

This description has been written by Juergen Seifert <seifert@htwm.de> using information from the Original

"ARCnet Installation Manual"



Setting one of the switches to Off means "1", On means "0".

Setting the Node ID

The eight switches in group SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 8 serves as the least significant bit (LSB).

The node ID is the sum of the values of all switches set to "1" These values are:

Switch	Value
8	1
7	2
6	4
5	8
4	16
3	32
2	64
1	128

Some Examples:

Switch	Hex	Decimal
1 2 3 4 5 6 7 8	Node ID	Node ID
0 0 0 0 0 0 0 0	not allowed	
0 0 0 0 0 0 0 1	1	1
0 0 0 0 0 0 1 0	2	2
0 0 0 0 0 0 1 1	3	3
. . .		
0 1 0 1 0 1 0 1	55	85
. . .		
1 0 1 0 1 0 1 0	AA	170
. . .		
1 1 1 1 1 1 0 1	FD	253
1 1 1 1 1 1 1 0	FE	254
1 1 1 1 1 1 1 1	FF	255

Setting the I/O Base Address

The first three switches in switch group SW1 are used to select one of eight possible I/O Base addresses using the following table:

Switch	Hex I/O
3 2 1	Address
ON ON ON	260
ON ON OFF	290

```
ON  OFF ON  |  2E0  (Manufacturer's default)
ON  OFF OFF |  2F0
OFF ON  ON  |  300
OFF ON  OFF |  350
OFF OFF ON  |  380
OFF OFF OFF |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer requires 2K of a 16K block of RAM. The base of this 16K block can be located in any of eight positions. Switches 6-8 of switch group SW1 select the Base of the 16K block. Within that 16K address space, the buffer may be assigned any one of four positions, determined by the offset, switches 4 and 5 of group SW1:

```
Switch     | Hex RAM | Hex ROM
8 7 6  5 4 | Address | Address
-----------|---------|-----------
0 0 0  0 0 |  C0000  |  C2000
0 0 0  0 1 |  C0800  |  C2000
0 0 0  1 0 |  C1000  |  C2000
0 0 0  1 1 |  C1800  |  C2000
           |         |
0 0 1  0 0 |  C4000  |  C6000
0 0 1  0 1 |  C4800  |  C6000
0 0 1  1 0 |  C5000  |  C6000
0 0 1  1 1 |  C5800  |  C6000
           |         |
0 1 0  0 0 |  CC000  |  CE000
0 1 0  0 1 |  CC800  |  CE000
0 1 0  1 0 |  CD000  |  CE000
0 1 0  1 1 |  CD800  |  CE000
           |         |
0 1 1  0 0 |  D0000  |  D2000  (Manufacturer's default)
0 1 1  0 1 |  D0800  |  D2000
0 1 1  1 0 |  D1000  |  D2000
0 1 1  1 1 |  D1800  |  D2000
           |         |
1 0 0  0 0 |  D4000  |  D6000
1 0 0  0 1 |  D4800  |  D6000
1 0 0  1 0 |  D5000  |  D6000
1 0 0  1 1 |  D5800  |  D6000
           |         |
1 0 1  0 0 |  D8000  |  DA000
1 0 1  0 1 |  D8800  |  DA000
1 0 1  1 0 |  D9000  |  DA000
1 0 1  1 1 |  D9800  |  DA000
           |         |
1 1 0  0 0 |  DC000  |  DE000
1 1 0  0 1 |  DC800  |  DE000
1 1 0  1 0 |  DD000  |  DE000
1 1 0  1 1 |  DD800  |  DE000
           |         |
1 1 1  0 0 |  E0000  |  E2000
1 1 1  0 1 |  E0800  |  E2000
1 1 1  1 0 |  E1000  |  E2000
1 1 1  1 1 |  E1800  |  E2000
```

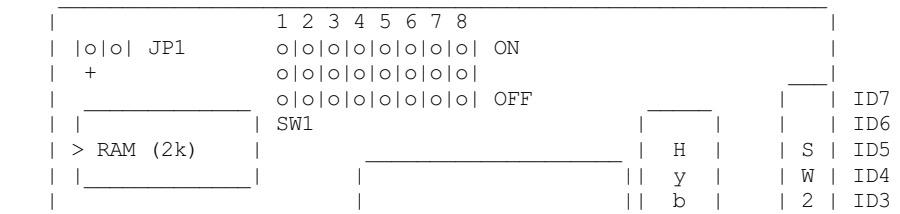
Setting Interrupt Request Lines (IRQ)

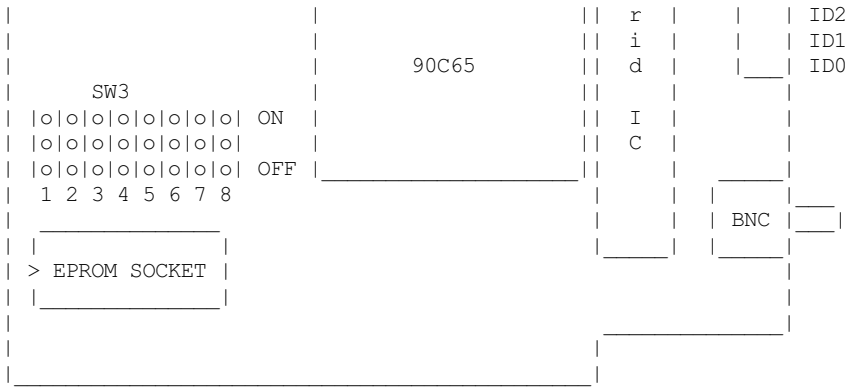
Setting the Timeouts

8-bit cards ("Made in Taiwan R.O.C.")

- from Vojtech Pavlik <vojtech@suse.cz>

I have named this ARCnet card "NONAME", since I got only the card with no manual at all and the only text identifying the manufacturer is "MADE IN TAIWAN R.O.C" printed on the card.





Legend:

```
90C65       ARCNET Chip
SW1 1-5:    Base Memory Address Select
    6-8:    Base I/O Address Select
SW2 1-8:    Node ID Select (ID0-ID7)
SW3 1-5:    IRQ Select
    6-7:    Extra Timeout
    8  :    ROM Enable
JP1         Led connector
BNC         Coax connector
```

Although the jumpers SW1 and SW3 are marked SW, not JP, they are jumpers, not switches.

Setting the jumpers to ON means connecting the upper two pins, off the bottom two - or - in case of IRQ setting, connecting none of them at all.

Setting the Node ID

The eight switches in SW2 are used to set the node ID. Each node attached to the network must have an unique node ID which must not be 0. Switch 1 (ID0) serves as the least significant bit (LSB).

Setting one of the switches to Off means "1", On means "0".

The node ID is the sum of the values of all switches set to "1" These values are:

Switch	Label	Value
1	ID0	1
2	ID1	2
3	ID2	4
4	ID3	8
5	ID4	16
6	ID5	32
7	ID6	64
8	ID7	128

Some Examples:

Switch								Hex	Decimal
8	7	6	5	4	3	2	1	Node ID	Node ID
0	0	0	0	0	0	0	0	not allowed	
0	0	0	0	0	0	0	1	1	1
0	0	0	0	0	0	1	0	2	2
0	0	0	0	0	0	1	1	3	3
			.	.	.				
0	1	0	1	0	1	0	1	55	85
			.	.	.				
1	0	1	0	1	0	1	0	AA	170
			.	.	.				
1	1	1	1	1	1	0	1	FD	253
1	1	1	1	1	1	1	0	FE	254
1	1	1	1	1	1	1	1	FF	255

Setting the I/O Base Address

The last three switches in switch block SW1 are used to select one of eight possible I/O Base addresses using the following table:

Switch 6	Switch 7	Switch 8	Hex I/O Address
ON	ON	ON	260
OFF	ON	ON	290
ON	OFF	ON	2E0 (Manufacturer's default)

```
OFF OFF ON  |  2F0
ON  ON  OFF |  300
OFF ON  OFF |  350
ON  OFF OFF |  380
OFF OFF OFF |  3E0
```

Setting the Base Memory (RAM) buffer Address

The memory buffer (RAM) requires 2K. The base of this buffer can be located in any of eight positions. The address of the Boot Prom is memory base + 0x2000.

Jumpers 3-5 of jumper block SW1 select the Memory Base address.

```
Switch              | Hex RAM | Hex ROM
 1   2   3   4   5  | Address | Address *)
--------------------|---------|-----------
ON  ON  ON  ON  ON  |  C0000  |  C2000
ON  ON  OFF ON  ON  |  C4000  |  C6000
ON  ON  ON  OFF ON  |  CC000  |  CE000
ON  ON  OFF OFF ON  |  D0000  |  D2000  (Manufacturer's default)
ON  ON  ON  ON  OFF |  D4000  |  D6000
ON  ON  OFF ON  OFF |  D8000  |  DA000
ON  ON  ON  OFF OFF |  DC000  |  DE000
ON  ON  OFF OFF OFF |  E0000  |  E2000

*) To enable the Boot ROM set the jumper 8 of jumper block SW3 to position ON.
```

The jumpers 1 and 2 probably add 0x0800, 0x1000 and 0x1800 to RAM adders.

Setting the Interrupt Line

Jumpers 1-5 of the jumper block SW3 control the IRQ level:

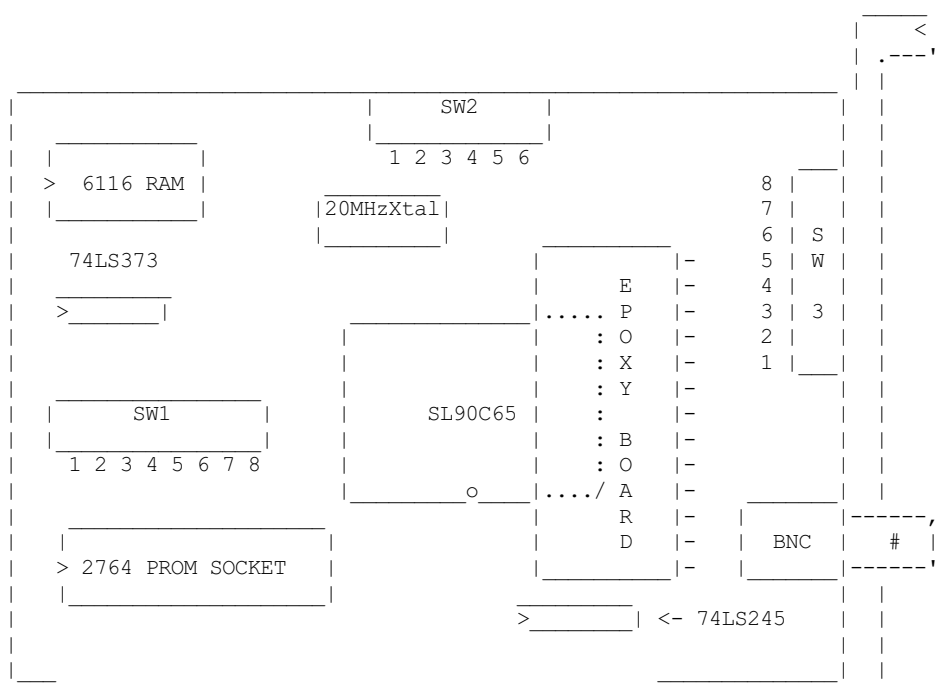
```
Jumper              |  IRQ
1   2   3   4   5   |
---------------------------
ON  OFF OFF OFF OFF |  2
OFF ON  OFF OFF OFF |  3
OFF OFF ON  OFF OFF |  4
OFF OFF OFF ON  OFF |  5
OFF OFF OFF OFF ON  |  7
```

Setting the Timeout Parameters

The jumpers 6-7 of the jumper block SW3 are used to determine the timeout parameters. These two jumpers are normally left in the OFF position.

(Generic Model 9058)

- from Andrew J. Kroll <ag784@freenet.buffalo.edu>
- Sorry this sat in my to-do box for so long, Andrew! (yikes - over a year!)



```
     |H H H H H H H H H H H H H H H H H H H H H H H H|              | |
     |U U U U U U U U U U U U U U U U U U U U U U U U|              | |
                                                                    \|
```

Legend:

```
SL90C65       ARCNET Controller / Transceiver /Logic
SW1   1-5:    IRQ Select
        6:    ET1
        7:    ET2
        8:    ROM ENABLE
SW2   1-3:    Memory Buffer/PROM Address
      3-6:    I/O Address Map
SW3   1-8:    Node ID Select
BNC           BNC RG62/U Connection
              *I* have had success using RG59B/U with *NO* terminators!
              What gives?!
```

SW1: Timeouts, Interrupt and ROM

To select a hardware interrupt level set one (only one!) of the dip switches up (on) SW1...(switches 1-5) IRQ3, IRQ4, IRQ5, IRQ7, IRQ2. The Manufacturer's default is IRQ2.

The switches on SW1 labeled EXT1 (switch 6) and EXT2 (switch 7) are used to determine the timeout parameters. These two dip switches are normally left off (down).

To enable the 8K Boot PROM position SW1 switch 8 on (UP) labeled ROM. The default is jumper ROM not installed.

Setting the I/O Base Address

The last three switches in switch group SW2 are used to select one of eight possible I/O Base addresses using the following table:

```
Switch | Hex I/O
4 5 6  | Address
-------|--------
0 0 0  |  260
0 0 1  |  290
0 1 0  |  2E0  (Manufacturer's default)
0 1 1  |  2F0
1 0 0  |  300
1 0 1  |  350
1 1 0  |  380
1 1 1  |  3E0
```

Setting the Base Memory Address (RAM & ROM)

The memory buffer requires 2K of a 16K block of RAM. The base of this 16K block can be located in any of eight positions. Switches 1-3 of switch group SW2 select the Base of the 16K block. (0 = DOWN, 1 = UP) I could, however, only verify two settings...

```
Switch| Hex RAM | Hex ROM
1 2 3 | Address | Address
------|---------|-----------
0 0 0 |  E0000  |  E2000
0 0 1 |  D0000  |  D2000  (Manufacturer's default)
0 1 0 |  ?????  |  ?????
0 1 1 |  ?????  |  ?????
1 0 0 |  ?????  |  ?????
1 0 1 |  ?????  |  ?????
1 1 0 |  ?????  |  ?????
1 1 1 |  ?????  |  ?????
```

Setting the Node ID

The eight switches in group SW3 are used to set the node ID. Each node attached to the network must have an unique node ID which must be different from 0. Switch 1 serves as the least significant bit (LSB). switches in the DOWN position are OFF (0) and in the UP position are ON (1)

The node ID is the sum of the values of all switches set to "1" These values are:

```
Switch | Value
-------|-------
  1    |   1
  2    |   2
  3    |   4
  4    |   8
  5    |  16
  6    |  32
  7    |  64
```

```
    8    | 128
```

Some Examples:

```
     Switch#     |   Hex    | Decimal
8 7 6 5 4 3 2 1 | Node ID  | Node ID
----------------|----------|---------
0 0 0 0 0 0 0 0 |    not allowed  <-.
0 0 0 0 0 0 0 1 |     1    |    1    |
0 0 0 0 0 0 1 0 |     2    |    2    |
0 0 0 0 0 0 1 1 |     3    |    3    |
    . . .       |          |         |
0 1 0 1 0 1 0 1 |    55    |   85    |
    . . .       |          |        + Don't use 0 or 255!
1 0 1 0 1 0 1 0 |    AA    |  170    |
    . . .       |          |         |
1 1 1 1 1 1 0 1 |    FD    |  253    |
1 1 1 1 1 1 1 0 |    FE    |  254    |
1 1 1 1 1 1 1 1 |    FF    |  255  <-'
```

Tiara

(model unknown)

- from Christoph Lameter <christoph@lameter.com>

Here is information about my card as far as I could figure it out:

```
---------------------------------------------- tiara
Tiara LanCard of Tiara Computer Systems.

+----------------------------------------------+
!           ! Transmitter Unit !               !
!           +------------------+              -------
!          MEM                               Coax Connector
!  ROM    7654321 <- I/O                      -------
!  :  :   +--------+                            !
!  :  :   ! 90C66LJ!                           +++
!  :  :   !        !                           !D  Switch to set
!  :  :   !        !                           !I  the Nodenumber
!  :  :   +--------+                           !P
!                                              !++
!         234567 <- IRQ                        !
+------------!!!!!!!!!!!!!!!!!!!!!!!!!--------+
             !!!!!!!!!!!!!!!!!!!!!!!!!
```

- 0 = Jumper Installed
- 1 = Open

Top Jumper line Bit 7 = ROM Enable 654=Memory location 321=I/O

Settings for Memory Location (Top Jumper Line)

456	Address selected
000	C0000
001	C4000
010	CC000
011	D0000
100	D4000
101	D8000
110	DC000
111	E0000

Settings for I/O Address (Top Jumper Line)

123	Port
000	260
001	290
010	2E0
011	2F0
100	300
101	350
110	380
111	3E0

Settings for IRQ Selection (Lower Jumper Line)

234567	
011111	IRQ 2
101111	IRQ 3
110111	IRQ 4
111011	IRQ 5
111110	IRQ 7

Other Cards

I have no information on other models of ARCnet cards at the moment. Please send any and all info to:

apenwarr@worldvisions.ca

Thanks.