TECHNICAL BULLETIN INDEX
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DATE: March 1, 1983

REVISION DATE: March 1, 1983

BULLETIN NO.: ARCNET:01

PRODUCT: 26-6501 ARCNET

SUBASSEMBLY: 278-104 BNC Connectors

PURPOSE: BNC Connector installation instructions.

DISCUSSION: The ARCNET system uses coaxial cable with BNC connections for high speed data transfer. The correct installation of the BNC connectors can save valuable time and prevent system failures in the future.

PROCEDURE: The procedure for installing the BNC connectors are:

1) Trim the cable as shown in figure 1. Take care not to nick the center conductor or the outer shield.

2) Push the braided shield back as shown in figure 2 and figure 3.

3) Gently insert the center conductor down into the back end of the connector, "feeling" into the guide hole.

4) Firmly push the cable home as far as possible then screw the connector on the cable in a clockwise direction until it stops.

After the BNC connectors are installed it important that they be tested for opens or shorts. The following procedure should be used to test the connections:

Each connection should be checked for opens. This is done by shorting the center conductor to the shield using a jumper clip and going to the other end of the cable and measure the continuity between the two. There should be a short or in the case of very long cables a small resistance measured. Then remove the jumper clips. Each connection should be then checked for shorts. This is done by measuring the continuity between the center conductor and the shield. There should be a reading of infinity between the two.

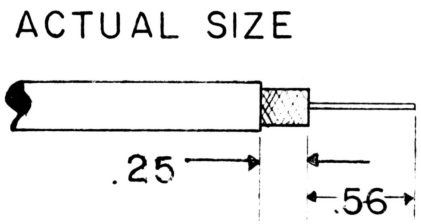

Figure 1

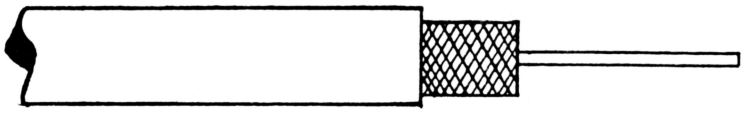

Figure 2

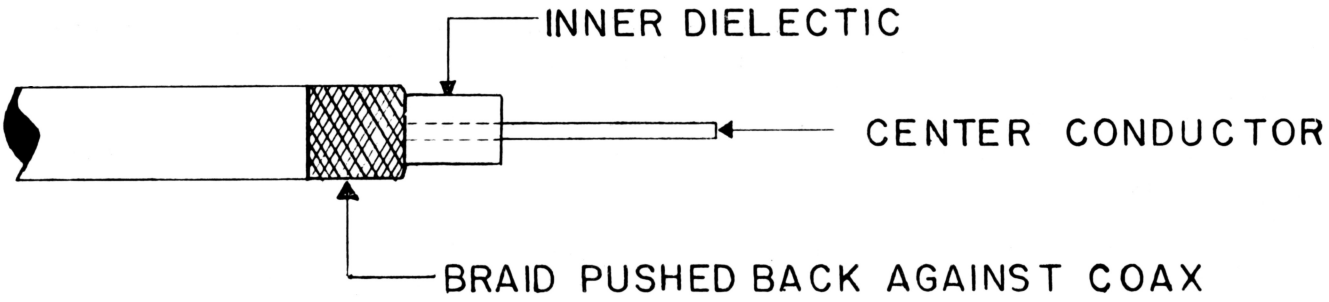

Figure 3

DATE: June 16, 1983

REVISION DATE: July 31, 1984

BULLETIN NO.: ARCNET:2

PRODUCT: 26-6501 ARCNET

SUBASSEMBLY: AX-9371 ARCNET PCB REV PP2

PURPOSE: 1.) To correct improper installation of transistors on the ARCNET PCB.
2.) Connect resistor R15 to +5 VDC.

PROCEDURE: On early production revision PP2 ARCNET interface boards, transistors Q1, Q2, and Q3 are installed backwards, and resistor R15 is not connected to +5 VDC. The transistors are used as active pullups for the clock signals on the ARCNET interface board. The resistor is used in a driver circuit along with Q3 to provide timing of RIM bus arbitration and RECON timeout. With these transistors installed incorrectly and +5 VDC missing from R15, the clock signal supplied to the COM 9026 does not meet the manufacturers specifications. This can cause intermittent and unreliable operation of the ARCNET interface. It is important to note that this modification is required on **revision PP2 boards only. The silk screening on the PCB at Q1, Q2, and Q3 is backwards.**

INSURE COMPLIANCE WITH THIS MANDATORY MODIFICATION ON ALL UNITS SERVICED

PROCEDURE:

1.) Install a wire Jumper from R15 (the side closest to C31) to R14 (the side closest to C30).

2.) Remove and DISCARD transistors Q1, Q2, and Q3. Once these transistors have been in the circuit while reversed, their performance may be degraded.

3.) Install NEW transistors at positions Q1, Q2, and Q3.
NOTE: **Install all of these transistors opposite of the silk screening on the PCB.**

4.) Install the ARCNET board in a known good machine and check using the ARCTST diagnostic.

DATE: August 11, 1983

REVISION DATE: April 13, 1984

BULLETIN NO.: ARCNET:3

PRODUCT: 26-65Ø1 ARCNET

SUBASSEMBLY: AX-9371 ARCNET PCB

PURPOSE: Some COM9Ø26 Local Area Network Controller LSI chips cause continuous reconfigurations.

DISCUSSION: Early releases of the ARCNET board (AX-9371) contain a version of the COM9Ø26 Local Area Network Controller LSI (MX-5717 catalog number 26-65Ø1) that would cause continuous reconfigurations. When a new unit comes on line it destroys the token (authorization to control the coax). This is known as a reconfiguration (recon). A reconfiguration can also be started when the COM9Ø26 receive data line is inactive for more than 78 usec. The bad COM9Ø26 is unable to receive any data because of a failure in its receive circuitry. This violates the 78 usec time frame causing the COM9Ø26 to constantly try to reconfigure the system. This can cause the system to slow down, cause time-out errors (ERROR 252), and/or totally crash the system.

PROCEDURE: If the date code of the COM9Ø26 is 8311 or earlier then **you MUST replace it.** The date code is located just under the part number (COM9Ø26).

After replacement, use ARCTST to test the new COM9Ø26. It is normal to have a few reconfigurations. Once all the connected computers are turned on, the RECON count should not change unless a computer is turned on or off. If there is only one computer on, the RECON counter will increase because it has no received data.

DATE: August 26, 1983

REVISION DATE: August 26, 1983

BULLETIN NO.: ARCNET:4

PRODUCT: 26-6501 ARCNET Board

SUBASSEMBLY: AXX-9371 ARCNET Board

PURPOSE: To identify proper jumpers for the ARCNET board.

DISCUSSION/PROCEDURE: Some ARCNET boards have been received jumpered improperly. All boards should be checked for proper jumpering before installation. The jumpers are as follows:

E2 to E3
E4 to E5 E1, E2, E3, E4, E5, and E6 define the address of the ARCNET RAM chip.

E8 to E9 E7, E8, and E9 define whether the board is version '001' or '002'. All revision PP2 are version '001'. '001' boards do not have Z21 installed.

DATE: November 18, 1983

REVISION DATE: November 18, 1983

BULLETIN NO.: ARCNET:5

PRODUCT: 26-65Ø2 ARCNET File PRocessor software package

SUBASSEMBLY: N/A

PURPOSE: Use of hidden command in ARCNET File Processor software as a troubleshooting tool.

DISCUSSION:

The Radio Shack ARCNET File Processor software contains a hidden command which may be helpful when troubleshooting the system. This command is only useful when the the system is running after START FP has been entered.

PROCEDURE:

The command is SHOW RAM, and has the syntax:

SHOW RAM [address]

where [address] is an optional address location pointer, pointing to the block of memory to be inspected.

While much of the RAM used by ARCNET will be meaningless for trouble-shooting, there is a small area of RAM where certain system status bytes are stored. To see this area, at the CI prompt type:

SHOW RAM A342 <ENTER>

on the FILE PROCESSOR. The software will respond with a dump listing similar to DEBUG.

```
A342  ST ST ST ST SR SR SR SR RC RC RC RC TO TO TO TO
A352  BR BR BR BR -- -- -- -- -- -- -- -- -- -- -- --
A362  -- --[REMAINDER OF DISPLAY IS MEANINGLESS]-- --
```

In the above, five blocks of four hexadecimal bytes each are indicated. Each block is a four-byte hexadecimal number, so a reading of ØØ ØØ ØØ A3 equals 163 decimal, ØØ Ø3 42 Ø5 equals 213,5Ø6 decimal [(3 * 65535) + (66 * 256) + 5], and so on.

The blocks should be interpreted as follows:

ST -- Successful Transmits -- This is the number of successful packets transmitted by the File Processor.

SR -- Successful Receives -- This is the number of successful packets received by the File Processor. The number of successful receives does not necessarily match the number of successful transmits.

RC -- Reconfigurations -- This is a count of the number of times the system has been reconfigured. Each power on of a unit will force a system recon. These recons can be considered normal.

TO -- System Timeouts -- counts the number of SYSTEM TIMEOUT errors.

BR -- Bad Receives -- Number of packets received bad.

The above information can be used to gather some information on the actual operation of an ARCNET system, information unavailable through ARCTEST diagnostics.

Some explanations may help to interpret or use the above information.

1) A packet transmit is considered successful if the destination processor transmits an acknowledge (ACK) signal after the File Processor sends a packet.

2) A packet receive is considered successful if the packet meets all of several criteria, particularly a match between the CRC (Cyclic Redundancy Check) value transmitted and the CRC value figured by the receiving computer. If all conditions check the File Processor will send an ACK signal to the computer transmitting the packet.

3) Bad receives are those packets received which do not meet the requirements of a successful receive. These can be caused by excessive noise on the line, low line levels, unterminated lines, or a large number of recons.

4) A reconfiguration will occur any time any unit is turned on or reset, therefore the RC count will be no less than the number of machines turned on or reset after the FP is turned on. Large numbers of RECONS may indicate a problem with the COM 9Ø26 RIM processor. Check the date code as per Technical Bulletin ARCNET:3.

If only one unit is turned on it will attempt continuous RECONS until a second unit is turned on. If the only unit turned on is the FP, and the FP software is activated (START FP) before the second unit is turned on, the FP software will count the RECONS until the second unit is turned on. This may give a RECON count much higher than actually present. To prevent this, make sure that at least two units are active before doing START FP.

5) Timeouts can be caused by two things: A) The DESTINATION unit did not make a buffer free to receive the packet in time. B) No data packet is received after the receiver is enabled. Both of these can be caused by a variety of errors -- faulty RIM chip or board, faulty cable, faulty Hub (active or passive), faulty Z-8Ø, excessive recons, improper system modifications, etc.

The screen display is not continuously updated, so it will be necessary to **SHOW RAM A342** each time to see if a count value has changed

DATE: January 18, 1984

REVISION DATE: January 18, 1984

BULLETIN NO.: ARCNET:6

PRODUCT: 26-65Ø1 ARCNET

SUBASSEMBLY: AX-9371 ARCNET Interface PC board

PURPOSE: Some ID DIP switches (Z26) have been found to be faulty. This will cause the board to change its address and confuse the system. This problem may be intermittent.

DISCUSSION:

The ARCNET RIM chip (COM 9Ø26) reads the DIP switch settings at certain times during its operation. The setting of this switch determines the "address" in the ARCNET system which the board occupies. This address is often referred to as the SOURCE ID (SID).

If the switch setting is changed (due to a faulty switch) during system operation, the "address" of the board is changed. Since other boards in the system will be transmitting to the previous address, and this board will be receiving at the faulty address, the board with the faulty switch will not receive any messages and will attempt to reconfigure the system using the faulty address.

If the faulty switch again changes state the board will attempt to reconfigure. The result is a relatively high number of system reconfigurations (RECONS) and slowed system response.

Any ARCNET system in for repairs should have ARCNET board address switches checked against the following procedure.

PROCEDURE:

At least two causes have been found for this problem. The first is a series of defective switches from American Research. These switches can be identified by their black body. The American Research switches should be replaced with an identical switch manufactured by AMP (DIP SWITCH part #AS-Ø94Ø catalog #26-65Ø1). The AMP switch can be identified by its blue body.

In an emergency situation, and only if a proper replacement part is not available, it may be necessary to remove the defective switch and replace it with a 16-pin DIP shunt (part #AL-Ø9Ø7 catalog #26-1ØØ4) and a 16-pin socket (part #AJ-6581 catalog #26-1ØØ4). Intact DIP shunts should be considered "closed" and broken DIP shunts should be considered "open".

The second cause are switches which do not get properly seated. Either manufacturer may exhibit this problem. Using a ball point pen or metal stylus, make sure the each switch is firmly seated in its proper position. A pencil is not a good choice for a stylus as the lead often breaks inside the switch.

In those cases where reseating the switch does not produce a consistant cure, the switch will have to be replaced, using the AMP version of the switch.