Conitel ASYNC Adapter

TABLE OF CONTENTS

1.   DESCRIPTION

The DCB Conitel Async Adapter (CAA) converts 32 bit Conitel SCADA protocol to asynchronous data. The CAA converts each 32-bit protocol word into an ASCII, byte oriented protocol. The CAA allows migration of Conitel SCADA from the ever more expensive and hard to order analog phone lines to digital asynchronous data circuits, including DDS, radio links, or Ethernet/IP networks using the DCB EtherPath or EtherPoll.

The Conitel Async Adapter can be used in conjunction with the DCB 202T modem for connection to RTU devices with built in modems. The transmit output of the 202T can be set to –16 dBm for connection to built in modems that are sensitive to high receive levels.
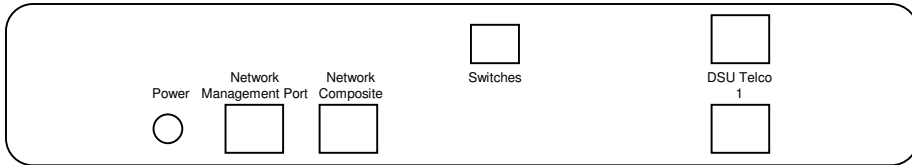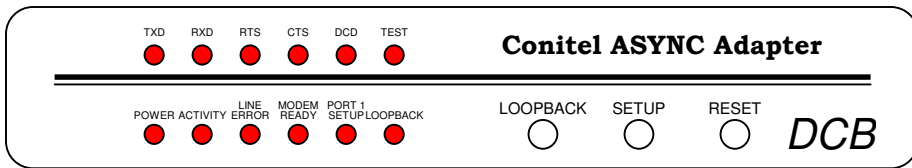
The data port can be configured for speeds from 1200 to 57,600 bps.

Network speeds may be as high as 57.6 Kbps asynchonous or 128 Kbps synchronous.

The unit is configured using a network management port and an asynchronous terminal or PC with terminal emulation software. Configuration information is kept in non-volatile memory.

Some features of the CAA include:
- Monitor functions allow network management port user to monitor transmit or receive of any data port.
- Many test features allow diagnostics of the system and communications link.
- Power supplies available for 120 VAC, and 240 VAC.
- DC power options available.
- Built-in 56 or 64Kbps DSU/CSU option available.
- Rack mount options available.

TXD   RXD   RTS   CTS   DCD   TEST

Conitel ASYNC Adapter

POWER ACTIVITY LINE ERROR MODEM READY PORT 1 SETUP LOOPBACK

LOOPBACK   SETUP   RESET

DCB

Power   Network Management Port   Network Composite   Switches   DSU Telco 1

CAA shown with optional built-in DSU/CSU

2.   SPECIFICATIONS

2.1   Data Port

Port Speeds
   Asynchronous only
   1200, 2400, 4800, 9600, 19,200, 38,400, or 57,600 bps

Port Rate Selection
   Selected through network management port control with an
   asynchronous terminal.

Data Format
   32 bit Conitel 2020

Interface
   CCITT V.24, RS-232D, implemented in RJ-45, 8 position
   connectors. (RS-561 standard physical pin-out used on RJ-45
   connectors)

Buffering
   32K dynamically allocated

Data Delay
   DCD to RX data delay [5-250 ms]
   DCD holdover delay [2-250 ms]

2.2   Composite Port

Full Duplex

Speed
   Synchronous up to 128 Kbps
   Asynchronous from 2400 to 57,600 bps

Interface
   RS-232D, implemented in RJ-45, 8 position connector

2.3   Physical / Electrical

10¼" W x 9¾" D x 2½" H
120 VAC external power supply
Optional DC and 240VAC power supplies available
30 watts, .25 amps

2.4   Environmental

        Operation: -40 to +70° C, 10 to 95% relative humidity
        Storage: -40 to +85° C, 10 to 95% relative humidity

2.5   Network Management Port Commands

        Show Port Configuration
        Show Network Status
        Change Port Configuration
        Change Data Delay
        Configure Network
        Show / Change ID
        Set NMP Password
        Activity Counters
        Zero Activity Counters
        Test Tools
            Monitor Port Tx
            Monitor Port Rx
            NMP Parity
            Ping Remote Unit
            Reset Unit
        Type
        Repeat Last Command
        Disconnect NMP

2.6   Other Specifications

        Front Panel Indicators
            Power
            Activity
            Line Error
            Modem Ready

        Front Panel Switches
            Reset

2.7   Optional Built-In DSU/CSU Specifications
        Compatible with Common Carrier digital signalling
        56 or 64 Kbps
        4 wire digital line
        Can be used as high speed 4 wire line driver in 56K mode

3.   INSTALLATION

3.1   Unpacking

Remove the unit from the shipping container and examine it carefully for external damage. If shipping damage is apparent, notify the shipper immediately.

The following accessories are included with the unit:

- external power supply
- manual
- warranty, maintenance contract and repair information
- Modem to Composite cable (black) for connecting the unit to an external modem or DSU/CSU
- Network Management Port cable (green) for connecting the network management port to an asynchronous terminal or PC for configuration
- If your unit has the optional built-in DSU/CSU, a cable is also included for connection to the phone line.

3.2   Setup

The composite port must be configured properly for the type of link used (Sync or Async). In addition, the data port must have the proper speed setting. This is done using the network management port CN and CP commands (see Section 5).

3.3   Using Leased Line Modems

In this section, a reference to modem includes modems, digital radios or DSU/CSUs for leased line installations.

Connect the modems to the phone line and power ON the modems. Confirm the presence of carrier at each modem. If carrier is not detected at both ends, recheck the option settings. If carrier is still not present, check the cable from the telephone line to the modem. If everything is correct and still no carrier call the manufacturer of the modem or contact the telephone company for assistance.

Connect the CAA composite port to the modem. A two foot RJ45 to DB-25 male cable connects the composite port of the CAA (the RJ45 connector second from the left when viewed from the rear) to the data port of the modem (usually a DB-25 female connector). See Section 6 for cabling information.

Connect the unit to power.

Power and Modem Ready indicators on the front panel of the CAA must be ON indicating the on-line condition. (See Section 4).

3.4 Optional Built-In 56 or 64 Kbps DSU/CSU

The optional DSU/CSU is configured using DIP switches accessable from the rear of the unit. See Section 4 for a description and location of these switches. The default settings should be correct for most applications.

For line driver applications over customer owned wire (56K only), set one unit for Master Clock and the other unit to Slave Clock.

3.5 Cabling

Cabling between the unit and the computer ports or terminal devices is a common source of installation problems. The CAA must have data from attached terminal devices or computer ports, as an input on Position 6 of the RJ45 connector. Data from the CAA to any attached equipment will be transmitted on position 5 of the RJ45 connector. See paragraph 6.1 for position location on the RJ45 connector.

See Section 6 to determine the correct cables for your computer and terminal devices.

3.6   Resetting Factory Defaults

The factory default settings for the CAA are as follows:

Data Port:
Rate	1200 bps
DCD to RxD delay	5ms
DCD holdover	12ms

Composite Port:
Modem type	ASYNC
Rate	9600 bps

To reset the unit to factory defauls use the !R command from the network management port or perform the following steps using the front panel switches:

1. Depress and hold the SETUP switch while depressing the RESET switch.

2. Be sure to continue to hold the SETUP switch until the unit completes the reset and the lights return to normal.

3. All settings should be at the factory defaults. Use the SC (Show Configuration) command to check the port settings.

4. CONTROLS AND INDICATORS

4.1   Switches
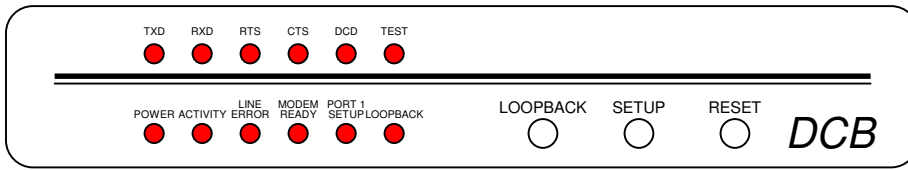
4.1.1   Front Panel Switches (shown with built-in DSU)

Setup – Used in conjunction with Reset to recall factory default settings

Loopback – Disabled.

Reset – Performs a hardware reset of the unit.

4.1.2   Optional Built-In DSU Switches

The DSU switches are located at the rear of the unit. Switch functions are shown in the following table:

Switch	Down	Up
1	56K	64K (optional)
2	Slave Clock	Master Clock
3	Must Be Down	
4	RTS Normal	RTS Forced ON
5	Normal	Local Loop ON
6	Not Used	

NOTE

RTS mode (sw 4) is active in 56Kbps mode only. In 64Kbps mode, RTS is forced on.
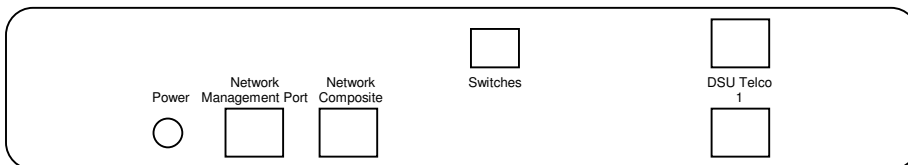
For normal operation with a telephone company line, set the DSU for SLAVE clock timing (switch position 2 DOWN). For in-house line driver applications (56K only), set the host DSU for MASTER timing (switch position 2 UP). The remote unit should remain set for Slave clock.

4.2   Indicators

POWER – ON when the CAA is connected to power.

ACTIVITY

    OFF – no data activity.

    ON – data is being transmitted.

LINE ERROR – flashes when a network error is detected.

MODEM READY

    ON – Data Carrier Detect is present from the composite link device indicating an active composite link.

    OFF – Data Carrier Detect is not present from the composite modem or DSU/CSU indicating a problem with the composite link.

PORT 1 SETUP – Disabled

LOOPBACK – Disabled

4.3   Optional DSU/CSU Indicators

TxD	Flashing	Data is being sent over the link.
RxD	Flashing	Data is being received from the link.
RTS	ON	Forced on or high from the multiplexer.
	OFF	No RTS from the multiplexer.
CTS	Follows RTS	CTS signal to the multiplexer.
DCD	ON	Normal condition.
	OFF	No carrier signal received from the far end.
TEST	ON	Unit is in loopback (DIP switch 5 UP)
	Flashing	Telephone line in loopback.

5.   NETWORK MANAGEMENT PORT

5.1   Introduction

The Network Management port (NMP) is used to configure the unit
for proper operation. This connection must be used to configure the
CAA composite and data ports. The NMP can also be used to
configure remote CAA parameters after a link is established between
the host and remote sites.

5.2   Connections and Setup

Connection to the NMP is made either through a port on the rear of
the unit.

5.2.1   Dedicated Terminal or PC

The NMP functions are also available through a port on the rear of
the unit labeled Network Management Port. To connect a dedicated
terminal to this port, use the green cable provided and the
appropriate adapter for either a terminal or PC. Set the terminal
device for 9600 bps, 8 data bits, no parity, one stop bit and no flow
control.

5.2.2   Dedicated Modem

For remote access to NMP functions, a dial-up modem may be
connected to the Network Management Port. You must fix the DTE
interface speed of the modem at 9600 bps, 8 data bits, no parity and
one stop bit. Refer to your modem manual for appropriate setup
procedures. Use the appropriate cable from paragraph 6.3.3 for
connection.

5.3   Using the Network Management port

To activate the NMP, press the ENTER key. When you see **AT YOUR COMMAND >>**, the NMP is active and ready for your commands. Type H <Enter> to display the command set.

5.4   Commands

5.4.1   Help (H or ?)

COMMAND	LOCAL	REMOTE	PARAGRAPH
Show: Config	SC	RSC	5.4.2
Network	SN		5.4.3
Change: Port Config	CP	RCP	5.4.4
Data Delay	CD	RCD	5.4.5
Config Network	CN		5.4.6
Set ID	ID	RID	5.4.7
Set Password	PW		5.4.8
Activity Counters/Zero	AC/Z	RAC/RZ	5.4.9
Test Tools	TT		5.4.13
Type	TY	RTY	5.4.10
Repeat Last Command	*		5.4.11
Disconnect NMP	BYE		5.4.12

This Help screen shows the choice of commands available. The commands allow you to display the selected options (Show network and configuration), configure the CAA (Configure ports and Set ID), and perform many different diagnostic functions such as send a test message, monitor data, perform loopbacks, show flow control state, show activity and other useful tests.

5.4.2   Show (Port) Configuration

The Show Config (SC) command shows the current port configuration settings for either the local or the remote (RSC) ports. Port numbers may be included with this command to limit the display range. If no port numbers are included, settings for all ports are shown. Use this command to verify proper port configuration.

5.4.3   Show Network (Configuration)

The Show Network (SN) command displays the current network (composite port) configuration (SYNC or ASYNC).

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NOTE

Several commands allow port numbers or port number ranges to be included on the command line. When port numbers are included, the syntax is as follows:

(Command)1	Port 1
(Command)1,2,4	Ports 1, 2 & 4
(Command)1 3 4	Ports 1, 3 & 4
(Command)2–4	Ports 2 thru 4

5.4.4   Change Port Configuration

The Change Port Config (CP / RCP) command sets the data port rate configuration. Follow the prompts on the screen to select the rate. The factory default setting is 1200 bps.

5.4.5   Change Delay Timeout

This command (CD) is used to change two timeout parameters, DCD to Rx data delay (5-250ms) and DCD holdover delay(2-250ms). These delays may be adjusted to insure data block integrity.

5.4.6   Configure Network

The Configure Network command (CN) allows configuration of the composite port for asynchronous or synchronous operation and to enable or disable remote commands. Disabling remote commands will increase throughput but you will no longer be able to manage the far end CAA remotely.

5.4.7   Set ID

The Set ID (ID / RID) command allows you to set or change either the local or remote unit identifier. IDs can be a maximum of 15 characters in length. Pressing <Enter> with no entry will leave the ID unchanged.

5.4.8   Set Password

Use the Set Password (PW) command to set a password for access to
the network management port. The password may be up to 15
characters long and is case sensitive.

To clear the password, type DELETE at the PW prompt or reset the
unit to defaults as described in paragraph 3.6.

5.4.9   Activity Counts / Zero

The Activity Counts (AC / RAC) command shows transmit and receive
data statistics for all ports. The data are presented in terms of blocks
of information sent and received by the network and each data port.
Error counts are also shown. A range of ports may be included with
this command to reduce the number of ports shown.

The Z and RZ commands are used to zero the counters so that current
activity can be monitored.

5.4.10   Type

The Type (TY) command displays information about the local unit
including firmware version, number of ports and CAA ID. The
Remote Type (RTY) command is used to display similar information
about the remote unit.

5.4.11   Repeat Last Command

To repeat the last command, simply press the * key. This is handy
for repeating screens of constantly changing data.

5.4.12   Disconnect NMP

The BYE command toggles the CTS output from the Network
Management port. This is used to disconnect equipment such as dial-
up modems or the DCB Access Switch.

5.4.13   Test Tools

The Test Tools (TT) menu summarizes the test and troubleshooting commands. These commands are listed separately to reduce the clutter in the main help list, but are always available from the command prompt.

COMMAND	LOCAL	REMOTE	PARAGRAPH
Monitor Port Tx	MT		5.4.14
Monitor Port Rx	MR		5.4.14
NMP Parity	P		5.4.15
Ping Remote Mux	PING		5.4.16
Reset CAA	RESET	RRESET	5.4.17

5.4.14   Monitor Port TX or RX

The Monitor Port TX (MT) command monitors data transmitted from the data port of the local unit to the data port of the remote unit. The Monitor Port RX (MR) command monitors data received by the data port of the local unit from the data port of the remote unit.

When port monitor is active, two ESC characters are needed to end the test.

5.4.15   NMP Parity

The NMP Parity command (P) sets the parity for the network management port. The factory default is SPACE (8,N,1).
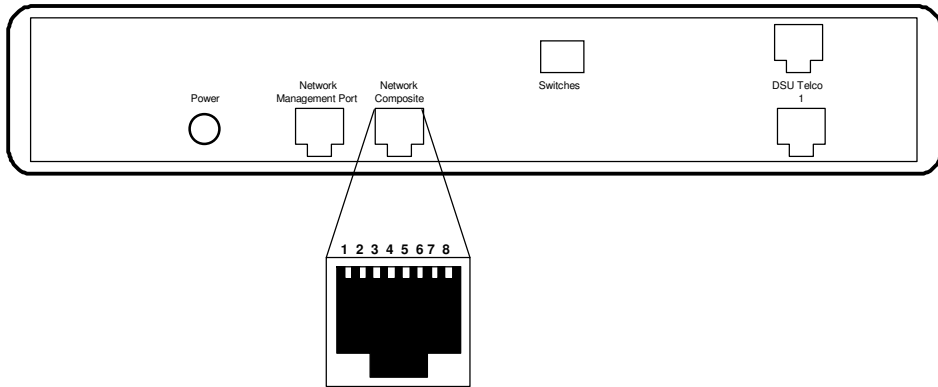
5.4.16   Ping Remote Mux

The PING command pings the remote CAA and displays the response time in milliseconds.

5.4.17   Reset CAA
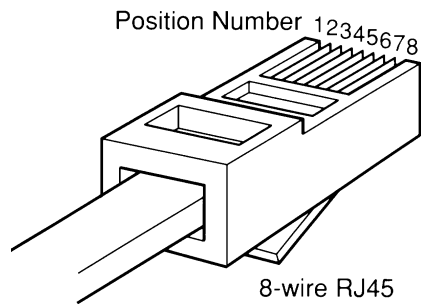
The Reset CAA (RESET) command performs a local unit reset. To reset the remote unit use RRESET.

6.   INTERFACE SIGNALS AND CABLING

6.1   Connector Location and Pin Reference

CAA Rear Panel and RJ-45 Jacks

RJ-45 Plug Positions

6.2   Port Interface

6.2.1   Composite Port (RJ-45)

Pin	Signal	In/Out
1	Receive Clock	IN
2	Transmit Clock	IN
3	Data Carrier Detect	IN
4	Signal Ground	
5	Transmit Data	OUT
6	Receive Data	IN
7	Request to Send	OUT
8	Clear to Send	IN

6.2.2   Data Port (Conitel In, RJ-45)

Pin	Signal	In/Out
1	Data Set Ready	OUT
2	Data Carrier Detect	OUT
3	Busy	IN
4	Signal Ground	
5	Receive Data	OUT
6	Transmit Data	IN
7	Clear to Send	OUT
8	Request to Send	IN

6.2.3   Network Management Port (RJ-45)

Pin	Signal	In/Out
1	Not Used	
2	Not Used	
3	Data Carrier Detect	IN
4	Signal Ground	
5	Transmit Data	OUT
6	Receive Data	IN
7	Request to Send	OUT
8	Clear to Send	IN

6.2.4   Optional Built-In DSU Interface (RJ-48S)

Pin	Signal	In/Out
1	Transmit Data	OUT
2	Transmit Data	OUT
7	Receive Data	IN
8	Receive Data	IN

6.3   Cables

6.3.1   Composite Port to Modem

A two foot composite to modem cable is included with each unit. The
configuration is as follows:

```
      CAA                   Modem
      RJ-45                 DB-25P

       1 ───────────────── 17
       2 ───────────────── 15
       3 ───────────────── 8
       4 ───────────────── 7
       5 ───────────────── 2
       6 ───────────────── 3
       7 ─────────────┐─── 4
                      └─── 20
       8 ───────────────── 5
```
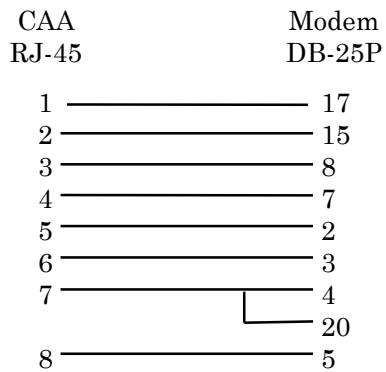
6.3.2   Data Port to Host Computer

Configured as DTE

```
      CAA                   Computer
      RJ-45                 DB-25

       1 ───────────────── 6
       2 ───────────────── 8
       3 ───────────────── 20   (or other flow control output pin)
       4 ───────────────── 7
       5 ───────────────── 3
       6 ───────────────── 2
       7 ───────────────── 5    (or other flow control input pin)
       8 ───────────────── 4    (or 20 if 4 is flow control)
```
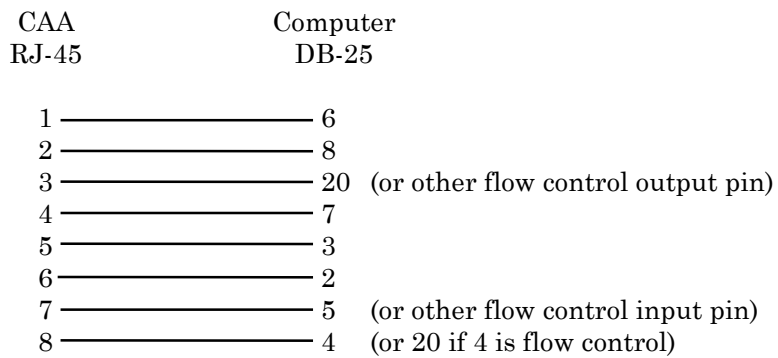
6.3.2   Data Port to Host Computer, continued

Configured as DCE

```
CAA                   Computer
RJ-45                 DB-25

  1
  2 ————————————— 20  (or 4 if 20 is flow control)
  3 ————————————— 5   (or other flow control output pin)
  4 ————————————— 7
  5 ————————————— 2
  6 ————————————— 3
  7 ————————————— 4   (or other flow control input pin)
  8 ————————————— 8
```

To a PC

```
CAA                        Computer
RJ-45                 DB-25S    DE-9S

  1 ————————————— 6    or    6
  2 ————————————— 8    or    1
  3 ————————————— 4    or    7
  4 ————————————— 7    or    5
  5 ————————————— 3    or    2
  6 ————————————— 2    or    3
  7 ————————————— 5    or    8
  8 ————————————— 20   or    4
```
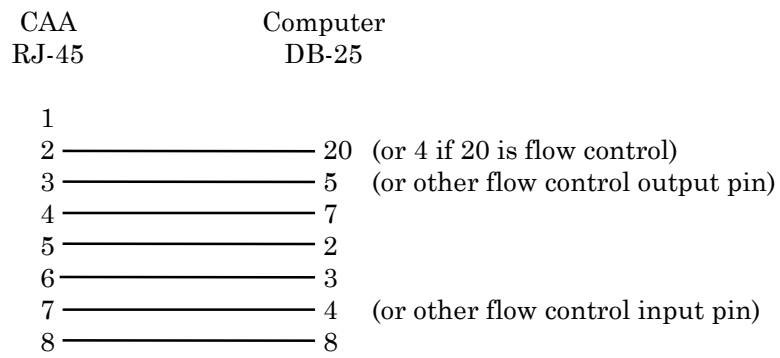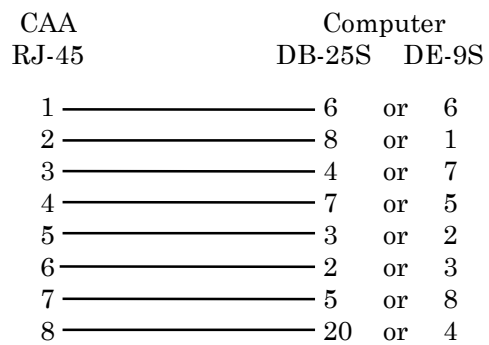
6.3.3 Network Management Port

To a TERMINAL

```
     NMP                    Terminal
     RJ-45                  DB-25P

      3 ————————————————— 20
      4 ————————————————— 7
      5 ————————————————— 3
      6 ————————————————— 2
      7 ————————————————— 5
                          ┌— 6
                          └— 8
      8 ————————————————— 4
```
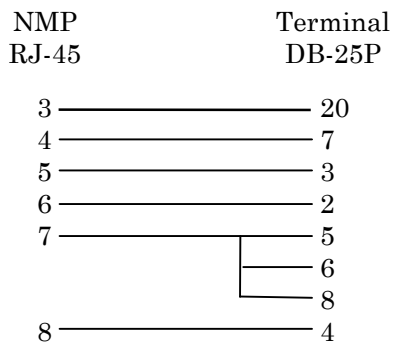
To a PC using terminal emulation

```
     NMP                        Computer
     RJ-45                   DE-9S    DB-25S

      3 ————————————————— 4      or    20
      4 ————————————————— 5      or    7
      5 ————————————————— 2      or    3
      6 ————————————————— 3      or    2
      7 ————————————————— 8      or    5
                          ┌— 6   or    6
                          └— 1   or    8
      8 ————————————————— 7      or    4
```
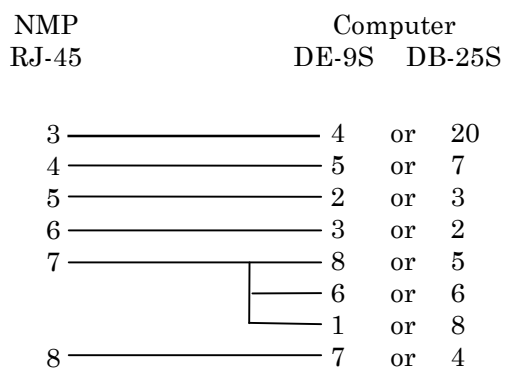
To a dial-up MODEM for remote access

```
     NMP                    Modem
     RJ-45                  DB-25P

      3 ————————————————— 8
      4 ————————————————— 7
      5 ————————————————— 2
      6 ————————————————— 3
      7 ————————————————— 4
                          └— 20
      8 ————————————————— 5
```
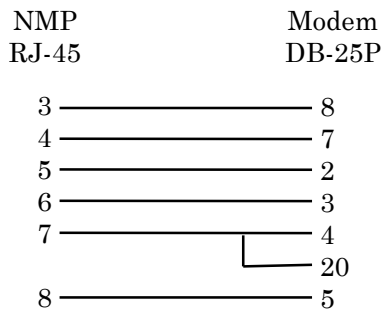
7.   TROUBLESHOOTING

7.1   General Approach

When troubleshooting problems, a rational plan can save you many hours of frustration. The following is a brief outline of standard troubleshooting procedures.

1. Gather the facts to determine the exact nature of the problem.

2. Draw a picture of the system showing the equipment at both the host and remote ends and the phone lines or in-house wiring. Use this as a reference to note your observations, test steps and test results. A picture keeps you focused and often saves duplicate effort.

3. Record the front panel indications before changing anything. This is an important part of fact gathering

4. If you change anything, change only one thing at a time.

5. Use the built-in test functions, and record your results.

7.2   Installation Troubleshooting, Modems or DSUs

First, set up the Modems or DSUs without connecting the units. If DSUs are used they should be set to constant carrier, also called forced Request To Send, or constant RTS.

Carrier Detect should be ON at both locations.

7.3   Assistance

If you need assistance troubleshooting your system, contact DCB customer support at (217) 897-6600 between 8:00 am and 5:00 pm central time Monday through Friday.

8.   WARRANTY

DCB products are warranted to be free of defects in materials and workmanship for two years. Data Comm for Business will repair or replace any equipment proven to be defective within the warranty period. All warranty work is F.O.B. Dewey, IL. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. DCB liability shall not exceed the original purchase price.

All equipment returned for repair must be accompanied by a Returned Material Authorization (RMA) number. To receive an RMA number, call (217) 897-6600 between the hours of 8 AM and 5 PM central time. Equipment must be shipped prepaid to DCB and will be returned at DCB's expense.

Ship returned items to:

Data Comm for Business
2949 County Road 1000E
Dewey, IL 61840
ATTN: RMA#

Data Comm for Business, Inc.
PO Box 6329
Champaign, IL 61826-6329

Tel   (217) 897-6600
Fax   (217) 897-1331
Email   support@dcbnet.com