AN-X-PBCAPT

Profibus

Capture

Module

User Manual

Quest Technical Solutions

4110 Mourning Dove Court
Melbourne FL 32934
321 757-8483

www.qtsusa.com

Throughout this manual we use notes to make you aware of safety considerations.

WARNING!

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

These warnings help to:

- identify a hazard
- avoid the hazard
- recognize the consequences

IMPORTANT!

Identifies information that is especially important for successful application and understanding of the product.

TIP

Identifies information that explains the best way to use the AN-X-PBCAPT

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AN-X-PBCAPT Module Overview

This document is a user guide for the AN-X-PBCAPT capture module. It connects to a computer using Ethernet and makes it possible to capture frames on a Profibus network.

The module passively monitors network traffic and captures all network frames, with timestamps. It does not occupy a node on the network or disrupt existing network traffic.

The Windows utility supplied transfers the network frames captured by AN-X to the host computer over Ethernet.

You can choose to store network frames to one continuous file, or you can have AN-X act as a ring buffer, storing only the data for the previous user-specified number of minutes.

Post-capture filtering lets you select specific frames to store to a text file, based on the criteria you supply. Filtered network data can be viewed with any text editor.

The module firmware can be updated over Ethernet using the Windows utility supplied. Refer to page 54 for details.

Hardware Features

The module has:

- LEDs to indicate the status of the connection to the Ethernet, its own internal state, and the state of the connection to the network

- an Ethernet connector

- a 9-pin D-shell connector to connect to the Profibus network

- a power connector

Package Contents

- AN-X-PBCAPT module

• CD containing software and documentation

Other Requirements

To transfer data over Ethernet requires:

• 100 Mbit/second Ethernet network and hardware

• Ethernet network should uses switches, not hubs

• For the higher baud rates (3Mbaud and above), data capture requires a fast computer, to keep up with the amount of data being transferred. In addition, you should avoid starting or running other tasks on the computer, since the overhead may interfere with the data capture.

To understand the contents of the captured frames, you should be thoroughly familiar with the Profibus specification and network protocols.

Modes of Operation

There are three AN-X modes of operation:

• Boot mode. The AN-X is running its low level startup firmware.

• Configuration mode. This is the mode when you are updating the firmware in the AN-X.

• Production mode. This is the normal runtime mode of operation.

Installation

Prevent Electrostatic Discharge

The module is sensitive to electrostatic discharge.

WARNING!

Electrostatic discharge can damage integrated circuits or semiconductors. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential
- Do not touch the connector pins

Power

AN-X requires a DC power input of anywhere from 12 to 24 VDC.
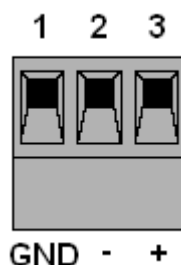
Left to right the pins on the power connector are chassis ground, negative voltage and positive voltage.

The chassis ground should be connected.

Power consumption internally is 300 mA @ 12VDC or 150 mA @ 24VDC.

The part number for the power connector is Phoenix MSTB 2.5/3-ST-5.08

Cabling and Termination

Use a standard Profibus cable to connect the module to the network.

The network must be terminated at the physical ends of the network. There should be two and only two terminators on the network.

Ethernet Cabling

AN-X has a standard RJ-45 connector for connecting to Ethernet.

If you are connecting AN-X to an existing network through a router, switch or hub, use a standard Ethernet cable.

If you are connecting directly between a computer and AN-X, use a crossover cable.

Software Installation

You must uninstall any previous version of the software before you can install a new version. Use the Windows Control Panel Add and Remove Programs to remove the old version.

Insert the CD supplied with the AN-X module and run the program setup.exe on the CD.

Basic Configuration

The AN-X-PBCAPT module connects a computer or other device on Ethernet to a Profibus network.

Before you can use the AN-X-PBCAPT, you must configure its network properties on Ethernet.
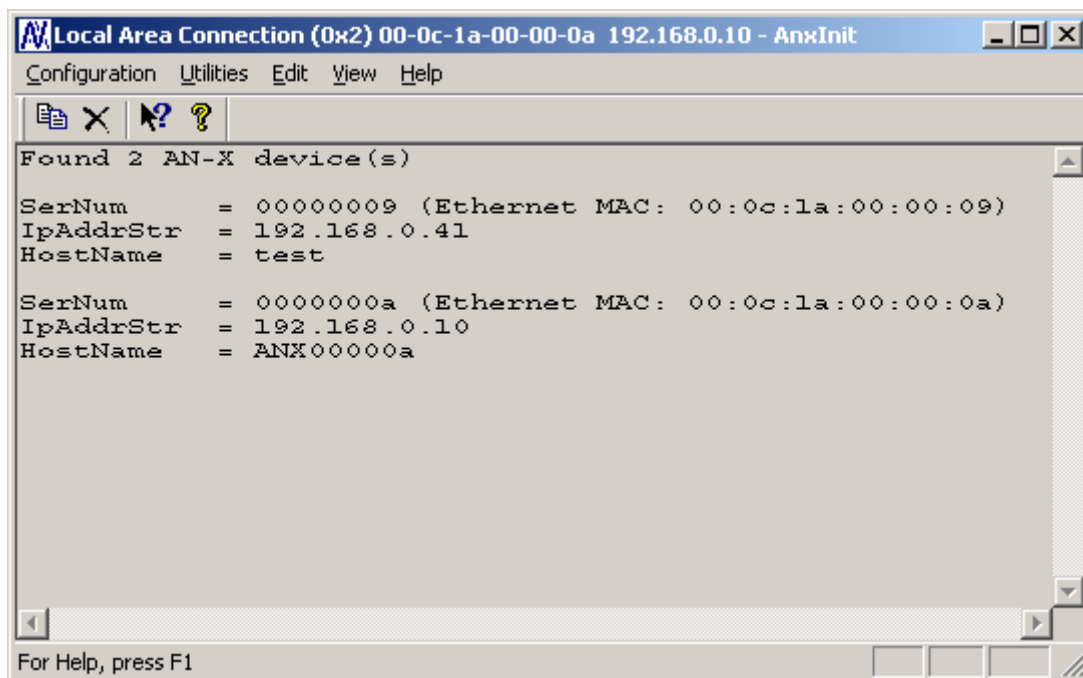
No configuration is required on the Profibus network.

Ethernet Configuration

AN-X can be configured to use a static (unchanging) IP address or it can be configured to obtain its IP address from a DHCP server.

Unless you have control of the DHCP server, in most applications you will want to configure AN-X to use a static IP address. Otherwise the DHCP server may assign a different IP address each time AN-X powers up, and any software that accesses the AN-X module would have to be reconfigured.

AN-X is shipped with DHCP enabled. If it finds a DHCP server on the network, the DHCP server assigns it an IP address. You can use the utility AnxInit to find the IP address that the DHCP server has assigned. Select *Utilities/Locate All AN-X Modules* and AnxInit will locate the AN-X and display its IP address.

```
Local Area Connection (0x2) 00-0c-1a-00-00-0a  192.168.0.10 - AnxInit

Configuration  Utilities  Edit  View  Help

Found 2 AN-X device(s)

SerNum       = 00000009 (Ethernet MAC: 00:0c:1a:00:00:09)
IpAddrStr    = 192.168.0.41
HostName     = test

SerNum       = 0000000a (Ethernet MAC: 00:0c:1a:00:00:0a)
IpAddrStr    = 192.168.0.10
HostName     = ANX00000a

For Help, press F1
```

If AN-X does not find a DHCP server within about three minutes of starting up, it reverts to a temporary static IP address of 192.168.0.41 If

AN-X is using this temporary IP address, it repeatedly flashes the SYS LED three times followed by a pause.

IMPORTANT!   Use this temporary IP address only for initial setup of AN-X. AN-X will not function for its intended purpose at the temporary IP address.

If you are using multiple AN-X modules, configure one at a time, especially if there is no DHCP server on the network, since they will all revert to the same temporary IP address when they fail to find a DHCP server.

IMPORTANT!   If you are connecting AN-X to an existing Ethernet network, consult the network administrator to obtain information about how you should configure AN-X and to obtain a static IP address for AN-X.

IMPORTANT!   The AN-X must be on the local Ethernet when you set its IP address.

You configure the Ethernet properties using the Windows utility AnxInit supplied with AN-X.

Use the *Configuration/AN-X IP Settings* command to start the AN-X IP configuration wizard, which takes you step by step through the IP configuration process.

Step 1

In step 1, you identify the AN-X you are configuring.

1. Select the Ethernet adapter that's connected to the AN-X. In most cases there will be just one Ethernet adapter in the computer. The AN-X must be on the same subnet as the computer.

2. Enter the MAC address of the AN-X you are configuring. This is printed on the AN-X label. It consists of six pairs of hexadecimal digits, separated by hyphens. In the example above, it's 00-0c-1a-00-00-09.

If the AN-X is already online, you can obtain its MAC address using the *Utilities/Locate All AN-X Modules* command.

3. Enter the IP address you intend the AN-X to use.

Step 2

In step 2, you choose a method of restarting AN-X to put it in boot mode.
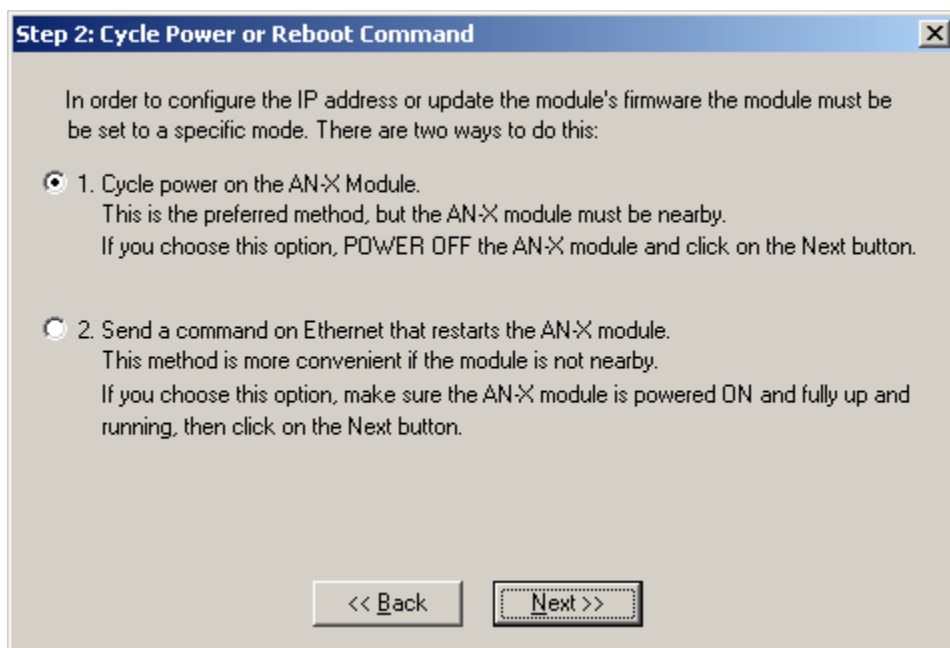
The preferred method is to cycle power on the AN-X. Select the first option on the screen and click the *Next >>* button.

The second method, useful if the AN-X in not easily accessible, is to send it a command over Ethernet. The AN-X must be powered on and completely running for this method to work. For example, if this is the first time you are configuring a new AN-X, allow sufficient time for it to acquire an IP address from a DHCP server or to time out and use its default IP address (about 3 minutes). Select the second option on the screen and click the *Next >>* button.

Step 3:

Wait for AN-X to enter boot mode. While AnxInit is waiting, the *Next>>* button will be disabled. When AN-X is in boot mode, the *Next>>* button will be enabled.
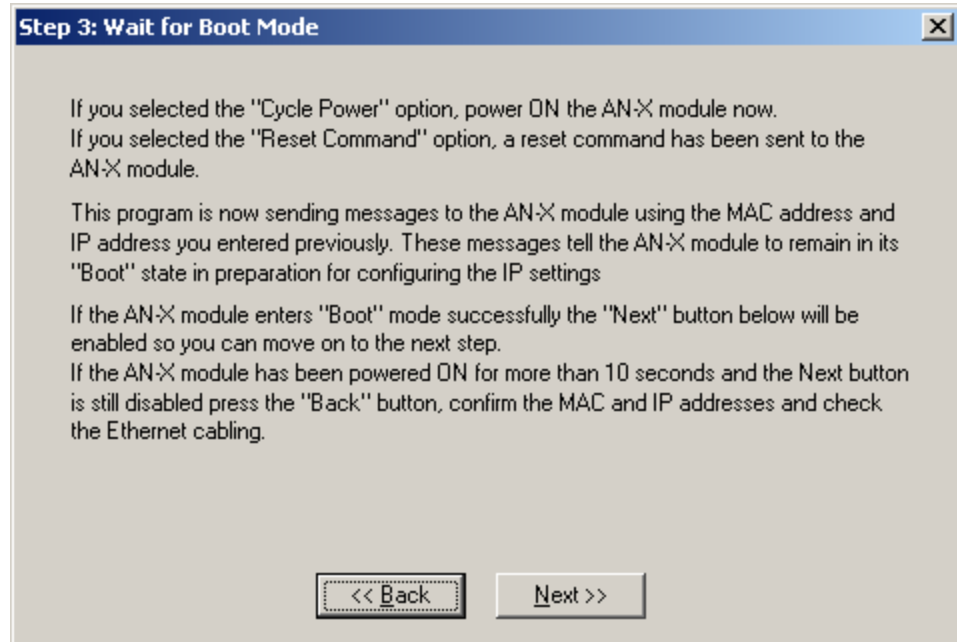
If the AN-X does not enter boot mode within about 10 seconds, return to the previous screens and check the entries.

The *AN-X TCP/IP Configuration* dialog appears.
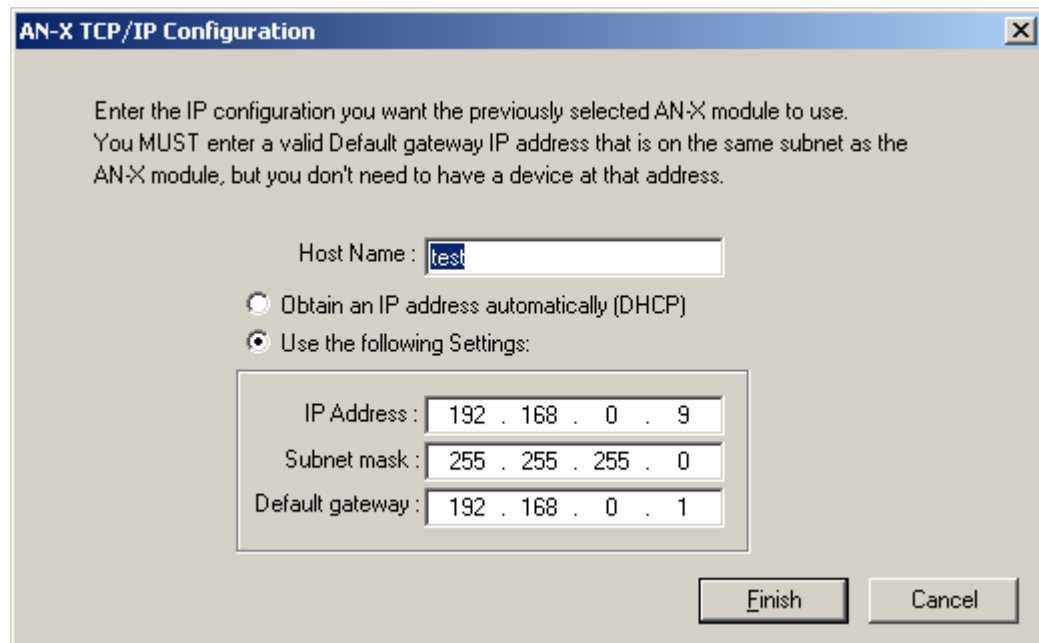
Enter a *Host Name* for the AN-X. This name is used internally by AN-X and may be used to identify the AN-X if you have a DNS server on your network. The name can be from 1 to 31 characters long.

To configure the AN-X to obtain its IP address from a DHCP server on the network, select *Obtain an IP address automatically (DHCP)*

To configure the AN-X to use a static IP address, select *Use the following Settings* and enter:

• the desired IP address for the AN-X.

• the Subnet mask for the AN-X

• the default gateway for your network.

You must enter a valid default gateway address even if there is no device at the gateway address on the network.

Click OK to complete the configuration.

If you Cancel the *Configuration/AN-X IP Settings* command, AN-X is left running the boot code. Use the *Utilities/Restart AN-X* command to restart the AN-X.

Example: Standalone Computer

A typical example is a laptop computer running the AutoMax programming software and connecting directly to an AN-X to program an AutoMax processor.

Since you are connecting directly from the computer to AN-X, use a crossover Ethernet cable.

The following instructions assume Windows 2000. The procedure for Windows NT and Windows XP is very similar. They also assume that an Ethernet network card has been installed in the computer and that AnxInit has been installed on the computer.

TIP The parameters in this example will work when you set up any standalone computer to work with AN-X.

First configure the computer to use a static IP address. From the Start menu, select *Start/Settings/Network and Dialup Connections*. Double click on *Local Area Connection*.
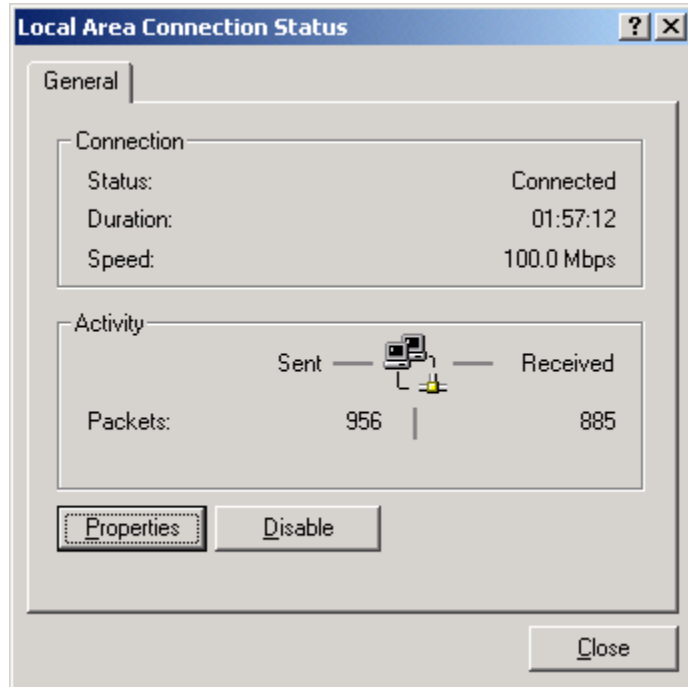
Click the *Properties* button.

Double click on *Internet Protocol (TCP/IP)*.
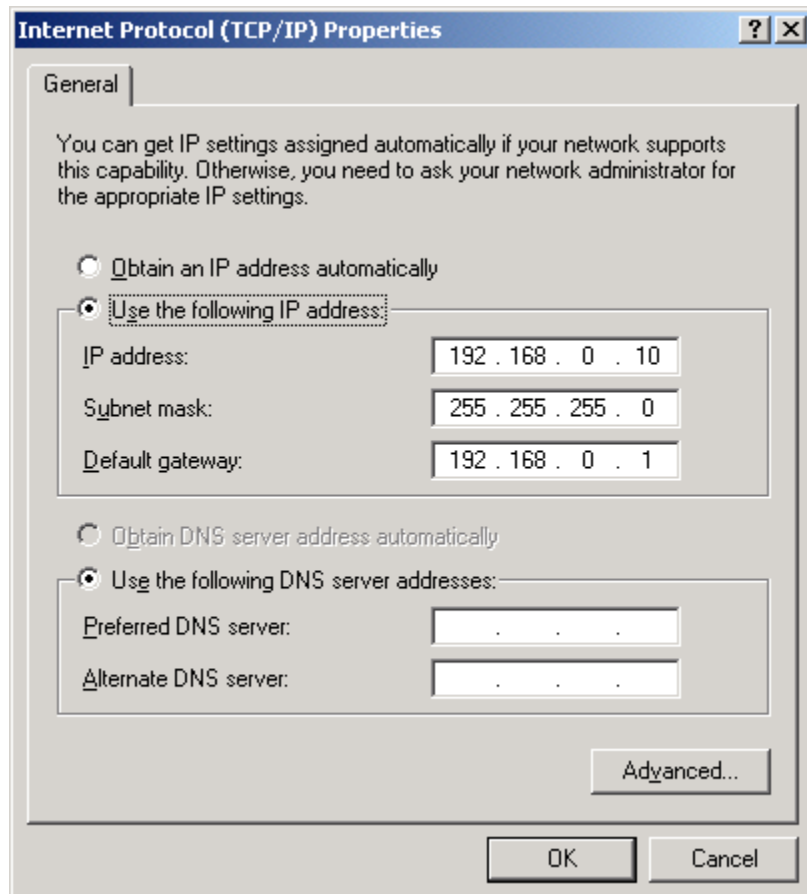
In this example, we will assign the computer an IP address of 192.168.0.10

Set the Subnet mask to 255.255.255.0 (standard mask for the Class C network address of 192.168.0.x).

Set the Default gateway to 192.168.0.1 (this address does not exist on the Ethernet network but AN-X requires a valid default gateway entry).

Click OK to accept the settings

Connect the computer to AN-X using the crossover cable.

If this is the first time you have used the AN-X module, it will look for a DHCP server on the network. It waits about three minutes, then reverts to a default IP address of 192.168.0.41

Power up the AN-X and wait for the search for a DHCP server to time out. When the search for a DHCP server times out, AN-X will flash the SYS LED red three times followed by a pause repeatedly.

Run AnxInit. Select *Utilities/Locate All AN-X Modules* and confirm that the AN-X is found.
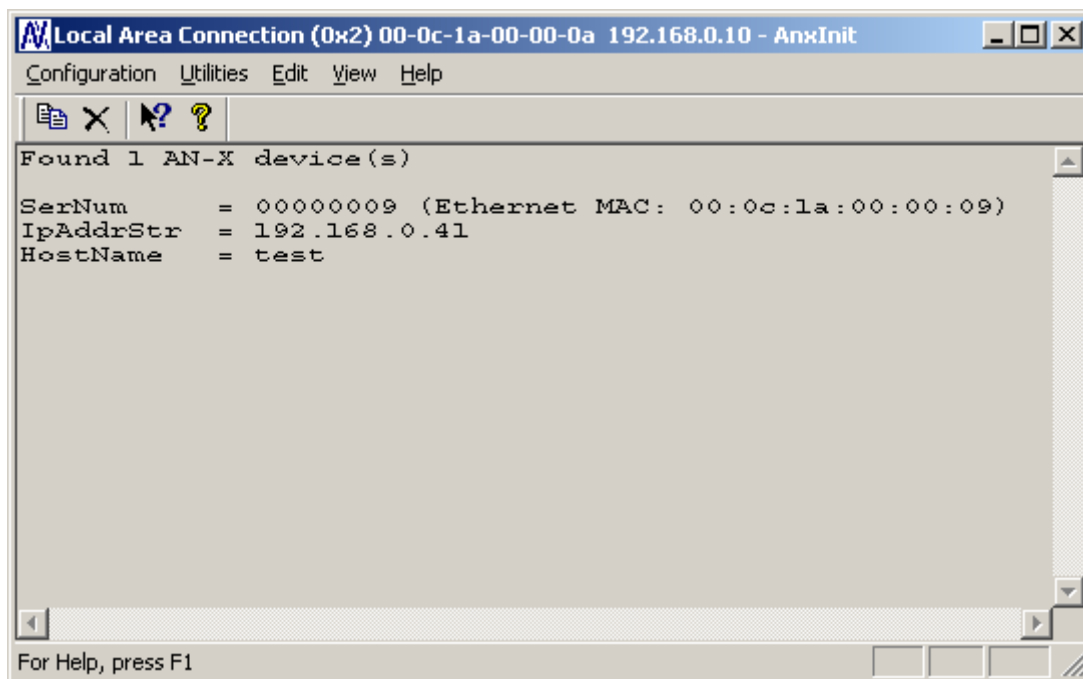
Select *Utilities/Select An AN-X* and enter the MAC Address and IP address.

Set Ethernet & IP Address

Adapter : Local Area Connection

Ethernet MAC Address : 00-0c-1a-00-00-09

IP Address : 192 . 168 . 0 . 41

OK   Cancel

Click *OK* to accept the setting.

Select *Utilities/AN-X IP Configuration*.

AN-X TCP/IP Configuration

Enter the IP configuration you want the previously selected AN-X module to use. You MUST enter a valid Default gateway IP address that is on the same subnet as the AN-X module, but you don't need to have a device at that address.

Host Name : test

○ Obtain an IP address automatically (DHCP)

● Use the following Settings:

IP Address : 192 . 168 . 0 . 20

Subnet mask : 255 . 255 . 255 . 0

Default gateway : 192 . 168 . 0 . 1

Finish   Cancel

Enter an IP Address. In this case we chose 192.168.0.20

Enter the same Subnet mask and Default gateway that you entered for the computer. The default gateway address does not exist on the network but AN-X requires that the field have a valid entry.

Click *Finish* to accept the settings.

Select *Utilities/Restart AN-X* to restart AN-X with the new parameters.

When the AN-X has restarted (SYS LED is solid green), select *Utilities/Locate All AN-X Modules* and confirm that the AN-X is found with the new parameters.

```
Local Area Connection (0x2) 00-0c-1a-00-00-09 192.168.0.20 - AnxInit    _ □ ×
Configuration  Utilities  Edit  View  Help

Found 1 AN-X device(s)

SerNum      = 00000009 (Ethernet MAC: 00:0c:1a:00:00:09)
IpAddrStr   = 192.168.0.20
HostName    = test

For Help, press F1
```
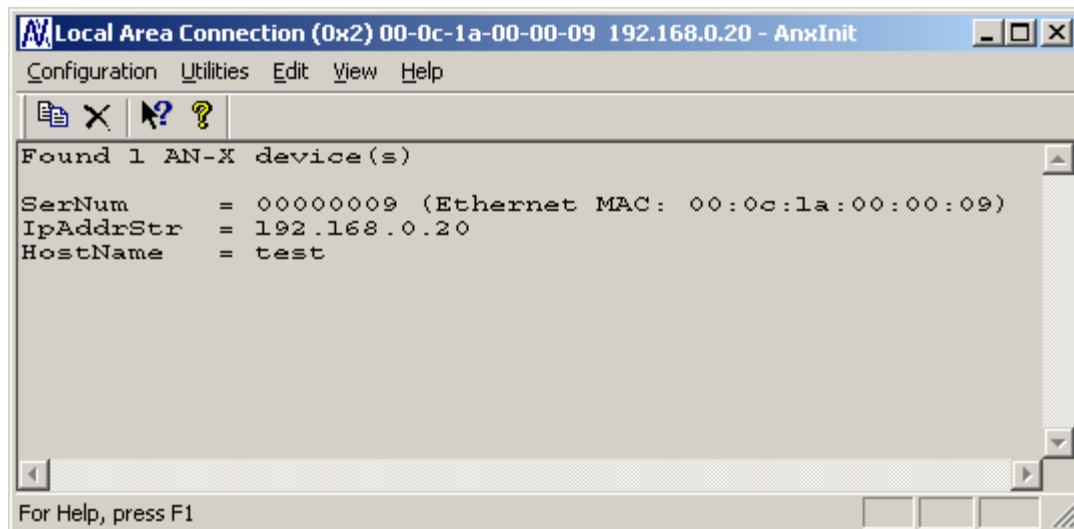
Reconfiguring an AN-X from an Unknown State

It sometimes happens that an AN-X has been previously configured with an IP address that causes it to be inaccessible on the current Ethernet network. To reconfigure it to a known state, run the command *Configuration/AN-X IP Settings* to start the AN-X IP Configuration Wizard and reconfigure AN-X.

Capturing and Displaying Network Data

Use the Windows AnxPbCapt utility to capture network frames, transfer them from the AN-X to the computer, store them to hard disk, and view them.

Setting the AN-X IP Address

Select *Config/Set AN-X-PBC IP*.

AnxPbCapt displays the AN-X-IP Address dialog.
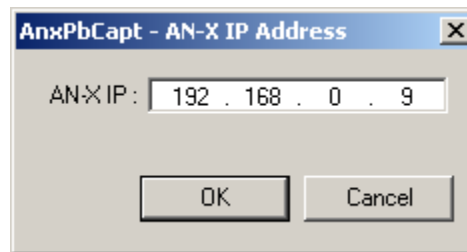
Enter the IP address of the AN-X module that you wish to use to capture Profibus network data.

Refer to page 6 for information on setting the AN-X IP address.

Capturing Network Frames

Select *Capture/Acquire* or click on the Capture button.

AnxPbCapt displays the Capture Control dialog.
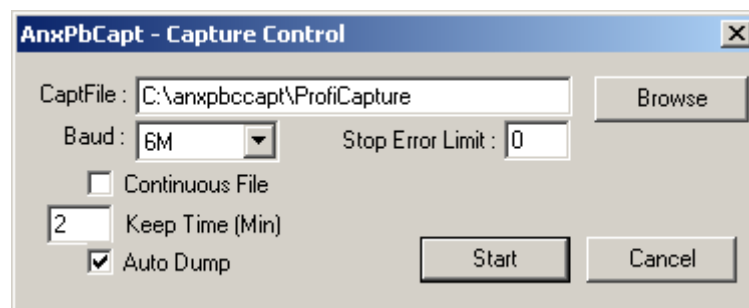
Type or browse in the capture file (*CaptFile*) name.

Select the *Baud* rate for the Profibus network.

Enter a value for the *Stop Error Limit*. The stop error limit is the number of network errors that can occur in the current file before the capture stops automatically. A value of 1 means that the capture stops on the

first error. The default value of 0 causes the capture to continue if there are network errors. If you are using the ring buffer method of capture, and the error limit is not 0, the error count is reset to 0 each time a new file is opened.

TIP You can use the Stop Error Limit to trap a transient or rarely occurring error. Uncheck *Continuous File*, set the *Keep Time* to 2 minutes and set the *Stop Error Limit* to 1. The capture will capture network frames until the first error occurs, then stop.

You can also use the Stop Error limit to capture bursts of errors. Set the Stop Error Limit to the threshold value, for example 5 or 10, and run the capture as in the previous example.

If you check *Continuous File*, the network data is stored in one continuous file.

If *Continuous File* is unchecked, AnxPbCapt acts as a ring buffer, creating new files and deleting old ones. It creates a new file for each minute the capture is running, naming the file based on the name you supply and the current time. For example, if you supply the name Test and the current time is 14:53 (2:53 P.M.), it starts storing data in a file called Test1453.PbcCapt. The next file is called Test1454.PbcCapt, and so on.

TIP For captures over long periods of time, use ring buffer mode. Continuous capture is better suited for short captures. If you use continuous capture and the computer is turned off or anything goes wrong, all captured data could be lost. Using ring buffer mode, if the computer is turned off, only data for the last minute is lost.

If *Continuous File* is unchecked, you must enter a value for *Keep Time (min)*. The keep time is the number of minutes of data that will be stored. The default is 2. As AnxPbCapt creates each new file, it deletes the file older that is then older than the keep time. The value of Keep Time can range from 2 to 1439 minutes.

TIP If you want to preserve a capture file, move it to another directory, since otherwise a later capture could inadvertently delete it.

If *Auto Dump* is checked, AnxPbCapt automatically executes a *Capture/Dump* command when the capture ends.

Click *Start* to begin capturing network frames.

AnxPbCapt displays the *Capture Status* dialog box.
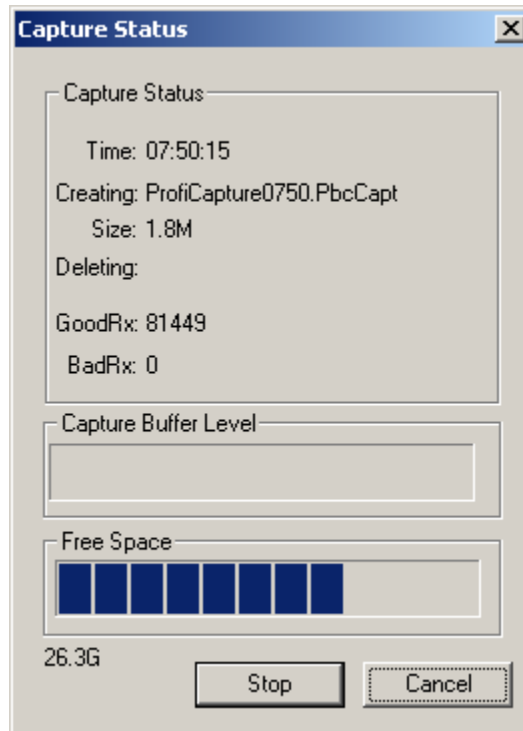
It shows the current time, the file currently being used to store the capture data, the file size, the file being deleted (ring buffer mode only), the number of good frames received, and the number of bad frames received.

GoodRx is the number of frames with good status that have been captured.

BadRx is the number of frames with bad status that have been captured in the current file. If you are using the ring buffer method of capture and the stop error limit is non-zero, BadRx is reset each time a new file opens.

The *Capture Buffer Level* progress bar shows the backlog of data being transferred from AN-X to the computer.

The *Free Space* progress bar shows the amount of free space remaining on the disk drive.

To stop the capture, click *Stop*.

To cancel the capture, click *Cancel*. This stops the capture but does not delete any captured data files. If AutoDump was checked, the Dump command is not executed.

Selecting Frames of Interest

Select *Capture/Dump* or click the *Dump to Text* button.

AnxPbCapt displays the TextDump dialog.
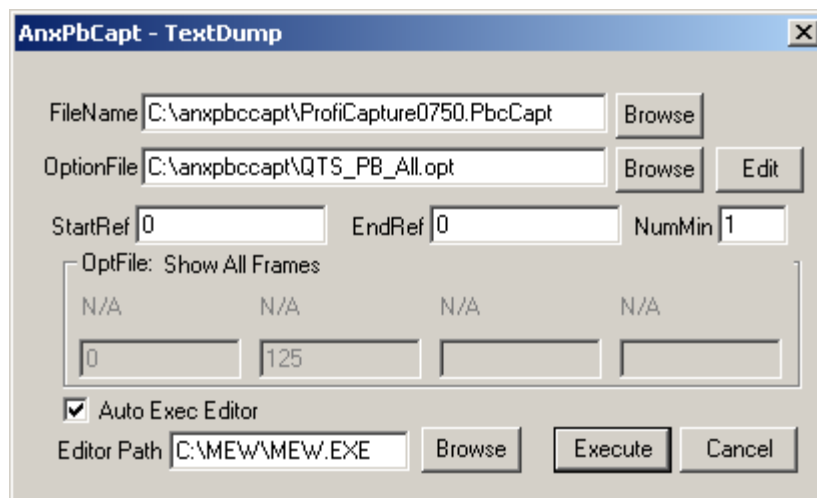
Browse or type the capture file name into the *FileName* box. AnxPbCapt appends the option file name to the name you supply, and then appends the extension ".txt". For example, if the capture file is Test1413.PbcCapt and the option file is QTS_PB_All.opt, the text file created is Test1413_QTS_PB_All.txt

Browse or type the Option File name into the *OptionFile* box. Option files control which frames are selected from the capture file, and the format they are saved in. To display all messages, select the QTS_PB_All.opt option file. For detailed information on option files, refer to page 20.

Click *Edit* to edit the option file. If you make changes to the option file, you may need to browse it in again in order for the changes to take effect.

If you want to select just a portion of the file, enter starting (*StartRef*) and ending (*EndRef*) reference numbers. Leave both as 0 if you want to include all the network frames. Normally you locate the event of interest, then use the starting and ending reference numbers to display frames around that event.

To select frames from the start of the capture to a specific reference number, set StartRef to 0 and set EndRef to the desired frame.

To select frames from a specific frame to the end of the capture, set StartRef to the desired reference number and EndRef to 0.

If the capture has been saved using the ring buffer method, *NumMin* determines the number of consecutive capture files from which frames are to be extracted. If the capture has been stored to a continuous file, set *NumMin* to 1.

After AnxPbCapt stores the selected frames to a text file, you can have it automatically open the file in your text editor. Check *Auto Exec Editor* and browse or type the path to the editor in the *Editor Path* box.

Click *Execute* to dump the selected frames to the text file.

Option Files

Option files are used to define which frames are extracted from captured data.

Option files consist of various option lines that control which frames are selected.

Comments

Lines beginning with a semicolon are comments and are ignored.

Example:

;Copyright (c) 2003 Quest Technical Solutions Inc.

;Capture Frame Text Dump Utility

Description

Use the Descrip= option line to display a description in AnxPbCapt. "Descrip=" is followed by the text to be displayed. For example,

Descrip=Show All Frames

causes the description to appear as shown:
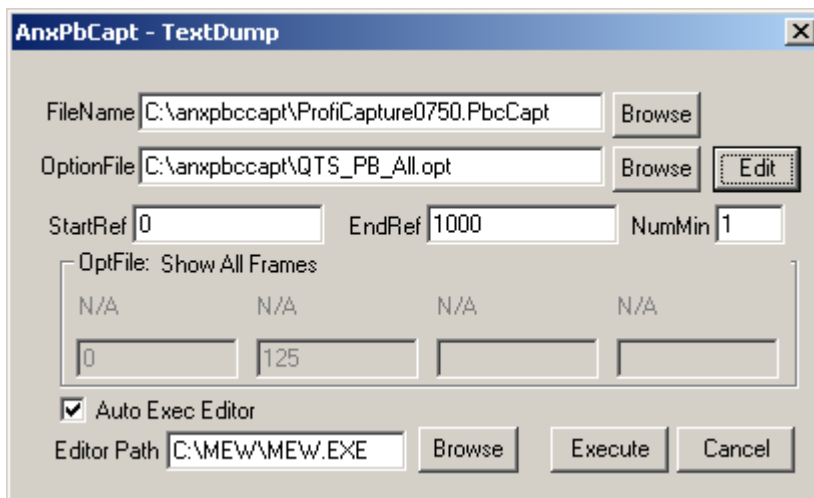
The description can be up to 55 characters long.

Reference Numbers

Each frame has an associated reference number, which can be used to uniquely identify that frame.

To suppress the inclusion of reference numbers, include the NoRef option line.

Example:

NoRef

Frames with Bad Status

Frames with bad status are shown with an asterisk before the frame data. For example,

```
357: a 0:00.748,593 *255< 05^  55- 00 00 00 00 00
```

To suppress the inclusion of frames with bad status, include the NoBad option line.

However, badly formed frames are automatically displayed, whether they are selected by the contents of the option file or not, along with some indication of the cause of the problem. For example,

```
   9289: a 0:00:19.423,410 d  5,666 g  2,545 ....FrmLen?(1)1e
```

See also Detailed Status on page 29.

Timestamps

The TmeAbs option line sets the format of the frame timestamp. It specifies the units used to display the timestamp. Possible values are:

hr – hours

mn – minutes

sc – seconds

ms – milliseconds

us – microseconds

ns – nanoseconds

Any character after the unit is included in the timestamp. For example, hr:mn causes the format of the timestamp to be 12:37, with a colon between the hours and the minutes.

Example:

TimeAbs hr:mn:sc.ms,us

The frame timestamp can be identified by a leading 'a' in the captured data, for example,

```
2: a11.000,517 ........ 54<0   SRDH      00
```

Two other times can be displayed using the same format.

The TimeGap option line displays the gap time, which is the time from the end of the previous frame to the start of the current frame.

Example:

TmeGap   sc.ms,us

The gap time can be identified by a leading 'g' in the capture, for example,

```
2: a11.000,517 g 0.000,010 ........ 54<0   SRDH      00
```

The TmeDelta option line displays the delta time, which is the time from the start of the previous selected frame to the start of the current frame.

Example:

TmeDelta sc.ms,us

The delta time can be identified by a leading 'd' in the capture, for example,

```
145: a11.003,248 d 0.000,000    0<125 DL        00

401: a11.010,346 d 0.006,634    0<125 DL        00
```

The delta time for the first selected frame is set to 0.

TIP

You can use the delta time to display update times for a node. Modify the option file QTS_PBToNodeFromNode.opt to display the delta time and include a delta time graph.

Example: Updates from node 125 to node 0

```
145: a11.003,248 d 0.000,000 d                  |   0<125

401: a11.010,346 d 0.006,634 d.............     |   0<125

659: a11.017,016 d 0.006,669 d.............     |   0<125

915: a11.023,651 d 0.006,635 d.............     |   0<125
```

Graphs

The gap time and the delta time can be displayed as a text graph in the frame data.

The GrphGap option line sets the format of the gap time graph. The parameters are the full scale width, in characters, and the full scale time, using the time units described previously. Times are shown graphically using period '.' characters.

Example: The following option line reserves 20 character spaces, corresponding to a full scale of 5 ms

GrphGap 20 5ms

The gap time graph can be identified by a leading 'g'. The end of the graph can be identified by a '|' character.

Example of a gap graph, showing the gap times and gap graph, produced using GrphGap 20,12us:

```
441: a11.011,321 g 0.000,004 g.......              |   0<16  DL

442: a11.011,350 g 0.000,010 g.................. |  17<0   SRDH

443: a11.011,373 g 0.000,004 g.......              |   0<17  DL

444: a11.011,403 g 0.000,010 g.................. |  18<0   SRDH

445: a11.011,426 g 0.000,004 g.......              |   0<18  DL

446: a11.011,455 g 0.000,010 g.................. |  19<0   SRDH

447: a11.011,478 g 0.000,004 g.......              |   0<19  DL

448: a11.011,507 g 0.000,010 g.................. |  20<0   SRDH
```

If the gap time graph overflows the given scale, the beginning and end of the graph are shown as asterisks, for example,

```
452: a11.011,613 g 0.000,012 g*           *  22<0   SRDH
```

The GrphDelta option line sets the format of the delta time graph. The parameters are the full scale width, in characters, and the full scale time, using the time units described previously. Times are shown graphically using period '.' characters.

Example:

GrphDelta 20 30us

The delta time graph can be identified by a leading 'd'. The end of the graph can be identified by a '|' character.

Example of a delta time graph, showing the delta times and delta time graph:

```
 33: a11.000,323 d 0.000,022 d..............     |   0<69  DL

 34: a11.000,352 d 0.000,029 d...................| 70<0   SRDH

 35: a11.000,375 d 0.000,022 d..............     |   0<70  DL

 36: a11.000,404 d 0.000,029 d...................| 71<0   SRDH

 37: a11.000,427 d 0.000,022 d..............     |   0<71  DL

 38: a11.000,456 d 0.000,029 d...................| 72<0   SRDH

 39: a11.000,479 d 0.000,022 d..............     |   0<72  DL

 40: a11.001,509 d 0.000,029 d...................| 73<0   SRDH
```

If the delta time graph overflows the given scale, the beginning and end of the graph are shown as asterisks, for example,

```
6: a11.000,621 d 0.000,029 d*                  *  56<0   SRDH
```

Frame Data

Delimiters

To suppress the inclusion of the start and end delimiters, include the NoDelim option line.

Possible start delimiters are:

Start delimiter	Value	Description
SD1	0x10	Fixed Length, No Data
SD2	0x68	Variable Length, With Data
SD3	0xa2	Fixed Length, With Data
SD4	0xdc	Token Pass
SC	0xe5	Single Character, Short Ack

The end delimiter is shown as ED.

Example: Frames with delimiters:

```
144: a11.003,225,638  SD2 125<0   SRDH       00 ED

145: a11.003,248,060  SD2   0<125 DL         00 ED

146: a11.003,277,602  SD1 107<0   RFDL       ED

147: a11.003,291,394  SD1   0<107 OK         ED

148: a11.003,313,066  SD4   0<0

149: a11.003,328,733  SD1 108<0   RFDL       ED

150: a11.003,343,524  SD1   0<108 OK         ED

151: a11.003,364,566  SD4   0<0

152: a11.003,381,530  SD2   1<0   SRDH       00 ED

153: a11.003,404,488  SD2   0<1   DL         00 ED
```

The same frames, with no delimiters:

```
144: a11.003,225,638  125<0   SRDH       00

145: a11.003,248,060    0<125 DL         00

146: a11.003,277,602  107<0   RFDL

147: a11.003,291,394    0<107 OK

148: a11.003,313,066    0<0
```

```
149: a11.003,328,733   108<0    RFDL

150: a11.003,343,524     0<108 OK

151: a11.003,364,566     0<0

152: a11.003,381,530     1<0    SRDH        00

153: a11.003,404,488     0<1    DL          00
```

Source and Destination Nodes

To suppress the display of the destination node, include the NoDst option line.

To suppress the display of the source node, include the NoSrc option line.

Frames are shown with the destination node and source node separated by a less than (<) sign. For example, the following frame has a source of 0 and a destination of 107:

```
146: a11.003,277,602  107<0   RFDL
```

The same frame with the destination node suppressed:

```
146: a11.003,277,602  <0   RFDL
```

with the source node suppressed:

```
146: a11.003,277,602  107< RFDL
```

and finally, with both destination and source node suppressed:

```
146: a11.003,277,602  RFDL
```

Frame Count Bit or Station Type

This corresponds to bits 4 and 5 in the the Control Octet in the Profibus specification.

To display frame count bits for a request or station type for a response, include the ShowFcbTyp option line.

On a command, the frame count bit alternates between 0 and 1. The value is shown with a 'v' if the alternating function of the frame count bit is valid and with a blank if it is not.

On a response, possible values are:

Station type	Description
ss	Slave station
mn	Master station not ready to enter logical token ring
mr	Master station ready to enter logical token ring

Station type	Description
mi	Master station in logical token ring

```
780: a32.013,053,000   6<0   0  RFDL

781: a32.013,067,792   0<6   ss OK

782: a32.013,088,834   0<0

783: a32.013,105,167   1<0   0v SRDH 60{62

784: a32.013,130,714   0<1   ss DL   62{60 00 0c 00 00 08 57

785: a32.013,171,964   7<0   0  RFDL

786: a32.013,186,220   0<7   ss OK

787: a32.013,207,428   0<0

788: a32.013,223,095   8<0   0  RFDL

789: a32.013,238,887   0<8   ss OK

790: a32.013,259,392   0<0
```

Frame Control Values

The frame control is extracted from the control octet in the network frame.

To suppress the display of the frame control, include the NoFc option line.

Possible frame control values:

Name	Value	Description
MTM1	0x40	Cmd: Station Management Time 1
MSRD	0x41	Cmd: Station Management Send and Request Data
MSDN	0x42	Cmd: Station Management Send Data No Acknowledge
SDAL	0x43	Cmd: Send Data with Acknowledge (Low Priority)
SDNL	0x44	Cmd: Send Data No Acknowledge (Low Priority)
SDAH	0x45	Cmd: Send Data with Acknowledge (High Priority)
SDNH	0x46	Cmd: Send Data No Acknowledge (High Priority)
RDD	0x47	Cmd: Request Diagnosis Data
GSRD	0x48	Cmd: Diagnostic Send and Request Data

Name	Value	Description
RFDL	0x49	Cmd: Request FDL Status (check for node presence)
MDLY	0x4a	Cmd: Station Management Send and Request Data Slot Delay
MKEP	0x4b	Cmd: Station Management Send and Request Data Slot Keep
SRDL	0x4c	Cmd: Send and Request Data (Low Priority)
SRDH	0x4d	Cmd: Send and Request Data (High Priority)
RIR	0x4e	Cmd: Request Ident with Reply
RLSR	0x4f	Cmd: Request LSAP Status with Reply
OK	0x00	Rsp: OK
UE	0x01	Rsp: User Error
RR	0x02	Rsp: No Resource for Send Data
RS	0x03	Rsp: No Service Activated
DL	0x08	Rsp: Ok with Data (Low Priority)
NR	0x09	Rsp: No Response
DH	0x0a	Rsp: Ok with Data (High Priority)
RDL	0x0c	Rsp: No Resource for Send Data, with Data (Low Priority)
RDH	0x0d	Rsp: No Resource for Send Data, with Data (High Priority)
MTM2	0xc0	Cmd: Station Management Time 2

Example: Frames showing various frame control values:

```
144: a11.003,225,638  125<0   SRDH       00

145: a11.003,248,060    0<125 DL         00

146: a11.003,277,602  107<0   RFDL

147: a11.003,291,394    0<107 OK

148: a11.003,313,066    0<0

149: a11.003,328,733  108<0   RFDL

150: a11.003,343,524    0<108 OK

151: a11.003,364,566    0<0

152: a11.003,381,530    1<0   SRDH       00

153: a11.003,404,488    0<1   DL         00
```

The same frames with the frame control suppressed:

```
144: a11.003,225,638  125<0         00

145: a11.003,248,060    0<125       00

146: a11.003,277,602  107<0

147: a11.003,291,394    0<107

148: a11.003,313,066    0<0

149: a11.003,328,733  108<0

150: a11.003,343,524    0<108

151: a11.003,364,566    0<0

152: a11.003,381,530    1<0         00

153: a11.003,404,488    0<1         00
```

Source and Desination SAPs

To suppress the display of the destination SAP, include the NoDstSap option line.

To suppress the display of the source SAP, include the NoSrcSap option line.

Frames are shown with the destination and source SAP separated by a curly brace { . For example, the first frame shown has a source SAP of 62 and a destination SAP of 60. The second frame has a source SAP of 60 and a destination SAP of 62:

```
783: a32.013,105,167    1<0   SRDH 60{62

784: a32.013,130,714    0<1   DL   62{60 00 0c 00 00 08 57
```

The same frames with the destination SAP suppressed:

```
783: a32.013,105,167    1<0   SRDH {62

784: a32.013,130,714    0<1   DL   {60 00 0c 00 00 08 57
```

with the source SAP suppressed:

```
783: a32.013,105,167    1<0   SRDH 60{

784: a32.013,130,714    0<1   DL   62{ 00 0c 00 00 08 57
```

and finally, with both destination and source SAPs suppressed:

```
783: a32.013,105,167    1<0   SRDH

784: a32.013,130,714    0<1   DL   00 0c 00 00 08 57
```

Detailed Status

If the DetailSts option line is present, detailed status information is displayed for each frame.

Immediately before the frame data are eight columns, one for each possible type of status error: stop bit error, parity bit error, invalid start delimiter, start delimiter repeat error, frame underrun, frame overrun, checksum incorrect or invalid end delimiter.

For frames with errors, the corresponding column contains a letter that indicates the type of error. If the column contains a period, there has been no error or the corresponding type in the frame.

Error name	Value	Column	Letter	Description
STSSTP	0x01	1	s	Stop bit error
STSPAR	0x02	2	p	Parity error
STSSD	0x04	3	d	Invalid start delimiter
STSRPT	0x08	4	r	Start delimiter repeat
STSUND	0x10	5	u	Frame underrun
STSOVR	0x20	6	o	Frame overrun
STSCHK	0x40	7	c	Checksum incorrect
STSED	0x80	8	e	Invalid end delimiter

Example:

In the following, frame 2774 has a parity error and an underrun error, frame 2789 has a stop bit error, a parity error and an invalid start delimiter, and so on.

```
2774: a32.529,859,313 .p..u...SD2 SD2 LE?(46) 68

2789: a34.535,961,275 spd.....SD?54 54 d5 d5 d5

2790: a34.536,408,690 .p.ru...SD2 SD2 LE?(19) 68

2791: a34.536,989,699 ..d.....SD?a3 a3 a3 a3 a3

2792: a34.537,046,708 sp.ru...SD2 SD2 LE?(51) 68
```

If DetailedSts is not present, frames with bad status are shown with an asterisk in place of the detailed status information.

With detailed status on:

```
366: a 0.184,865,694 .p..u...SD2 SD2 LE?(16) 68 59…
```

With detailed status off:

```
366: a 0.184,865,694 *SD2 SD2 LE?(16) 68 59…
```

Frame Data

To suppress the display of the data portion of the frame, include the NoData option line.

By default, frame data is shown as bytes, in hexadecimal format.

```
205: a 1.016242644 ........  4<0   SRDH      01 7f 80 ff
```

Data values can also be shown in several other formats.

If you include the DataUns option line, data values are shown in unsigned integer format. Values range from 0 to 255.

```
205: a 1.016242644 ........  4<0   SRDH       1 127 128 255
```

If you include the DataSgn option line, data values are shown in signed integer format. Values range from –128 to 127.

```
205: a 1.016242644 ........  4<0   SRDH       1  127 –128  –1
```

If you include the Data16 option line, data values are shown in as 16-bit hexadecimal values. The frame data length must be an even number. Byte order is high byte-low byte from the original frame.

```
205: a 1.016242644 ........  4<0   SRDH      017f 80ff
```

FCS

To include the frame checksum, use the ShowFcs option line.

The checksum is shown at the end of the frame, enclosed in square brackets.

Example:

```
3: a11.000,540   0<54  DL        00 [3e]
```

Equations

You can create an equation to control which frames are stored and displayed. The beginning of the equation is marked by the option line showonly. The end of the equation is marked by the option line consisting of the '#' character. There can be only one equation in an option file.

Example:

showonly

(STS&STSCHK) = STSCHK

#

Equations consists of keywords, parameters, and constants, connected by operators.

| TIP | Use parentheses freely in your equations to avoid problems associated with precedence of operators. |

Keywords

The equation can include the following keywords, which are described in detail below.

Keyword	Description
STS	Frame status
Len	Date length, does not include the checksum
SD	Start delimiter
DA	Frame destination
SA	Frame source
FC	Frame control
DSAP	Destination SAP
SSAP	Source SAP
DataByte[ofs]	Data byte at byte offset 'ofs' into the frame data
DataWord[ofs]	Data word at byte offset 'ofs' into the frame data
CmdArg[num]	Passed parameters, see page 35
GapTme	Gap time, in microseconds, see page 21

Frame Status, STS

The frame status can be one of the following:

Symbolic name	Value	Description
STSSTP	0x01	Stop bit error
STSPAR	0x02	Parity bit error
STSSD	0x04	Invalid Start Delimiter
STSRPT	0x08	Start Delimiter Repeat error
STSUND	0x10	Frame Underrun
STSOVR	0x20	Frame Overrun
STSCHK	0x40	Checksum Incorrect
STSED	0x80	Invalid End Delimiter

Since multiple bits may be set in STS, mask STS with the bit you wish to examine before you make any comparisons.

Example: The following equation selects frames with checksum errors.

showonly

(STS&STSCHK) = STSCHK

#

Example: The following equation selects all frames with errors.

showonly

STS <> 0

#

Frame Length, Len

The length refers to the data portion of the frame but does not include the checksum.

Example: The following equation selects frames with data lenth greater than 10.

showonly

Len > 10

#

Start Delimiter, SD

Possible start delimiters are:

Start delimiter	Value	Description
SD1	0x10	Fixed Length, No Data
SD2	0x68	Variable Length, With Data
SD3	0xa2	Fixed Length, With Data
SD4	0xdc	Token Pass
SC	0xe5	Single Character, Short Ack

Example: The following equation selects frames with data start delimiter SD1.

showonly

SD = SD1

#

Frame Destination Address, DA

You can select frames based on the destination node address.

Example: The following equation selects frames with destination node 25.

showonly

DA = 25

#

Frame Source Address, SA

You can select frames based on the source node address.

Example: The following equation selects frames with source node 2.

showonly

SA = 2

#

Frame Control, FC

The frame control identifies the type of frame. Refer to page 26 for possible values. The symbolic names can be used in the equation.

Mask the FC byte using the predefind TYPMSK before using the FC in comparisons.

Example: The following equation selects frames that consist of updates to slaves or to the master.

showonly

(FC & TYPMASK) = SDNL

#

Destination SAP, DSAP

You can select frames based on the destination SAP. SAP values are decimal.

Example: The following equation selects frames with destination SAP 62.

showonly

DSAP = 62

#

Source SAP, SSAP

You can select frames based on the source SAP. SAP values are decimal.

Example: The following equation selects frames with source SAP 60.

showonly

SSAP = 60

#

Data Values, DataByte[ofs] and DataWord[ofs]

You can use data values in equations. Offsets start from 0 and are always byte offsets, even for word values.

Example:

Showonly

DataByte[0] = 0x55

#

Byte order in data words is high byte – low byte

For example, to select the following frame based on DataWord[1]

```
175: a30.120,268,769  SD2   0<125 ss DL     01 02 03 04 8d 8d…
```

use

showonly

DataWord[1] = 0x0203

#

Parameters

If you have passed in one or more parameters, you can access them using CmdArg[0], CmdArg[1], CmdArg[2], or CmdArg[3].

Example:

The following equation, from the option file QTS_PB_ToNodeFromNode.opt, selects frames that have a destination address obtained from the first parameter and a source address obtained from the second parameter.

showonly

da=cmdarg[0] && sa=cmdarg[1]

#

See page 35 for information on how to pass in parameters.

Gap Time, GapTme

The gap time, GapTme, is the time in microseconds between the end of the previous frame and the start of the current frame.

Example: The following equation selects frames with gap times greater than 1 milliseconds (1000 microseconds)

showonly

GapTme > 1000

#

Constants

Constants can be entered in the following formats:

| Format	Data range
Signed integer	-32768 to 32767
Hexadecimal	0x0000 to 0xFFFF

Passing In Parameters

You can pass in up to four parameters to be used in the equation. Parameters are defined by the keywords "ArgName0=", "ArgName1=", "ArgName2=", "ArgName3="

followed by the parameter description, for example,

ArgName0=ToNode

AnxPbCapt displays the description and lets you enter a value, as shown.
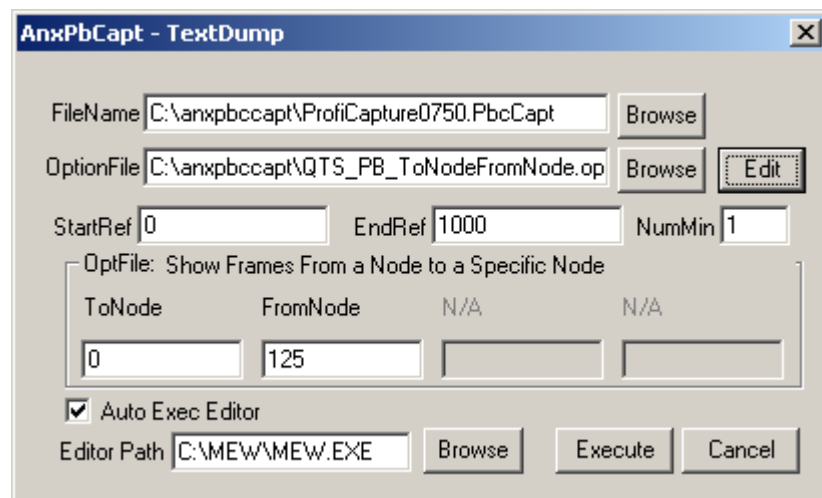
Operators

You can use the following operators to define the equation.

Operator	Description
<>	not equal
!=	not equal
<=	less than or equal
>=	greater than or equal
==	equal
=	equal
>	greater than
<	less than
&&	logical AND
AND	logical AND
||	logical OR
OR	logical OR
!	logical NOT
&	bitwise AND
|	bitwise OR
^	bitwise exclusive OR
*	multiply
/	divide
%	modulus
+	add
-	subtract
~	complement
(	left parenthesis
)	right parenthesis

Sample Option Files

Some of the sample option files provided with the AN-X module
include:

Option File	Description
QTS_PB_All.opt	Selects all frames
QTS_PB_ToNodeFromNode.opt	Selects frames to a specific node from another node
QTS_PB_DPData.OPT	Selects all DP update frames
QTS_PB_NodeTraffic.OPT	Selects all frames to or from a specific node

Typically you create a new option file by editing and modifying one of the sample option files.

Captured Data Format

The following sample output shows a capture, selected using the sample option file QTS_PB_All.opt. Lines have been truncated for clarity.

```
46: a 3.040,029 g  0,027 g.................. |........SD2 120<0
SRDH      8a 8a 8a 8a 8a

47: a 3.041,992 g  0,016 g...........        |........SD2   0<120
DL        8d 8d 8d 8d 8d

48: a 3.042,966 g  0,027 g.................. |........SD2   4<0
SRDH      8a 8a 8a 8a ED

49: a 3.042,078 g  0,016 g...........        |........SD2   0<4
DL        8d 8d 8d 8d ED

50: a 3.042,201 g  0,027 g.................. |........SD2   5<0
SRDH      8a 8a 8a 8a 8a ED

51: a 3.042,321 g  0,016 g...........        |........SD2   0<5
DL        8d 8d 8d 8d 8d ED

52: a 3.043,451 g  0,027 g.................. |........SD2   6<0
SRDH      8a 8a 8a 8a 8a ED
```

Each line starts with a reference number. For example, the first line shown has a reference number of 46.

Next is the frame timestamp. The first frame has a timestamp of 3.040,029 seconds.

This is followed by the gap time in milliseconds and a graph of the gap time.

The eight columns after the gap time graph show the detailed status. All frames shown have good status.

Next comes the start delimiter. All frames shown have start delimiter SD2.

This is followed by by the destination and source nodes, separated by a < sign. Frame 48 has a destination of 4 and a source of 0.

Next is the frame control. Frame 48 has frame control SRDH.

Next comes the frame data. Frame 48 has four bytes of data, each of which is 8a hexadecimal.

Finally, the frame ends with an end delimiter, ED.

Example 2: Frame with error

The following frame has a parity error and an underrun error, as shown by the letters in the detailed status. The frame has been truncated for clarity.

```
3270: a 5.683,064 g  0,016 g..........        |.p..u...SD2…
```


Example 3: Frame with SAPs

The following two frames show how service access points (SAPs) are displayed. Source and destination SAPs are shown separated by a { brace

```
87: a 0.016,578 g  0,028 g.................. |........SD2  28<0
SRDH 60{62 ED

88: a 0.016,676 g  0,017 g...........        |........SD2   0<28
DL   62{60 00 0c 00 00 08 57 ED
```

Frame 87 has a source SAP of 62 and a destination SAP of 60

Frame 88 has a source SAP of 60 and a destination SAP of 62.

Using AnxInit

AnxInit is a 32-bit Windows application supplied with AN-X to perform the following functions:

*   Locate and identify AN-X modules on the Ethernet network

*   Select a specific AN-X for configuration

*   Set the IP address and other network parameters for an AN-X

*   Restart an AN-X

*   Display information about the selected AN-X

*   Read the kernel parameters for the selected AN-X

*   Update the flash (low level firmware) on the selected AN-X

*   Update the firmware on the selected AN-X

*   Patch the firmware on the selected AN-X

In addition, it can be used to:

*   clear the AnxInit log

*   copy the contents of the log to the clipboard for use by another application. This is often useful for technical support

AnxInit Log

AnxInit logs messages in its main window. These messages are often useful for determining the cause of errors or for technical support.

To clear the log, select *Edit/ClearLog*.

To copy the contents of the Log to the Windows clipboard so that they can be pasted into another application, select *Edit/Copy*.
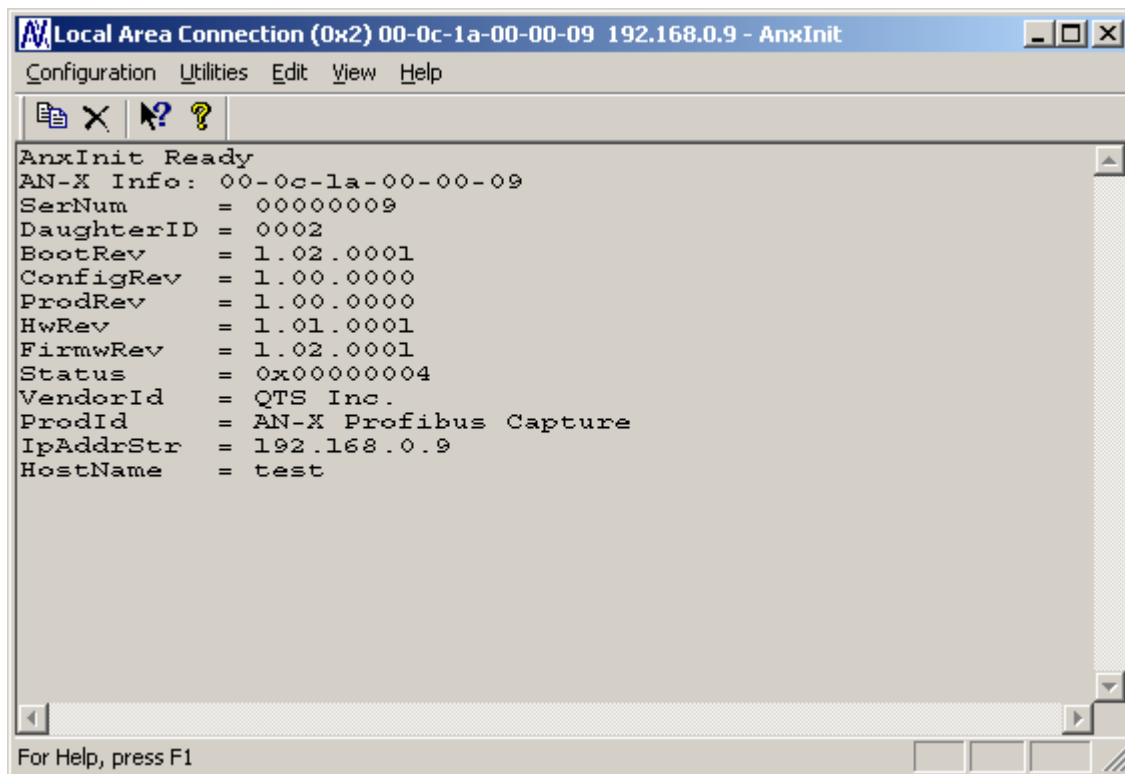
AN-X Log

Locating Available AN-X Modules

To locate all accessible AN-X modules on the Ethernet network, select *Utilities/Locate All AN-X Modules.*

AnxInit displays a list of the AN-X modules it finds, showing their MAC IDs, IP addresses and host names.

This command is useful for determining IP addresses when they have been set by a DHCP server or for confirming that an AN-X is accessible.
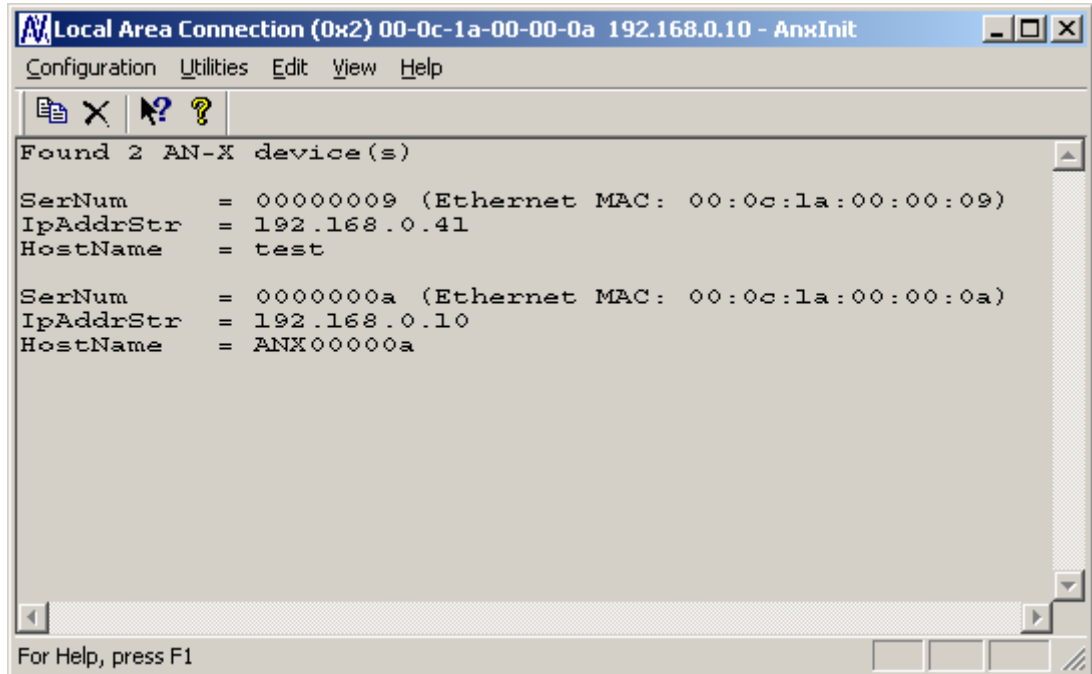
Selecting an AN-X

Before you can perform an operation on an AN-X, you must select it. Choose *Utilities/Select An AN-X* to select a specific AN-X.
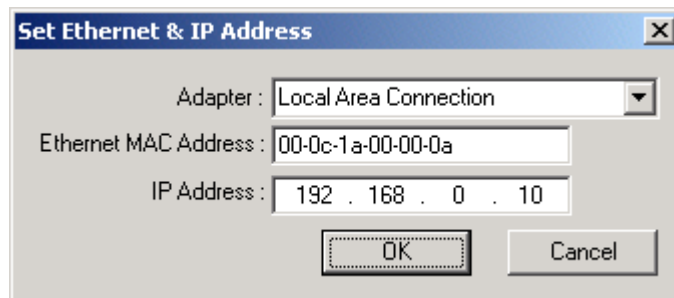
From the Adapter list, select the network adapter that connects to the Ethernet network that contains the AN-X.

In the *Ethernet MAC Address* field, enter the MAC Address of the AN-X you wish to select. It can be found on the AN-X label or using the *Locate All AN-X Modules* command. The format is as shown above, six pairs of hexadecimal digits separated by hyphens.

In the *IP Address* field, enter the Ethernet IP address of the AN-X you wish to select. It can be found using the *Locate All AN-X Modules* command. The format is as shown above, four decimal numbers each in the range 0 to 255.

Both MAC address and IP address must match the settings on the AN-X in order for communication to occur.

Click OK to select the AN-X.

The title bar of AnxInit shows the MAC Address and IP Address of the currently selected AN-X.

Set AN-X IP Configuration

Utilities/AN-X IP Configuration sets the AN-X IP address and hostname.

The AN-X must be on the local Ethernet to set its IP address.

First select the AN-X using the *Utilities/Select An AN-X command.*

Next select *Utilities/AN-X IP Configuration.* The *AN-X TCP/IP Configuration* dialog appears.

Enter a *Host Name* for the AN-X. This name is used internally by AN-X and may be used to identify the AN-X if you have a DNS server on your network. The name can be from 1 to 31 characters long.

To configure the AN-X to obtain its IP address from a DHCP server on the network, select *Obtain an IP address automatically (DHCP)*

To configure the AN-X to use a static IP address, select *Use the following Settings* and enter the following:

• the desired IP address for the AN-X.

• the Subnet mask for the AN-X

• the default gateway for your network.

You must enter a valid default gateway address even if there is no device at the gateway address on the network.

Click OK to complete the configuration.

Utilities/AN-X IP Configuration resets the selected AN-X. Use the *Utilities/Restart AN-X* to restart the AN-X in production mode.

If you Cancel the *Utilities/AN-X IP Configuration* command, AN-X is left running the boot code. Use the *Utilities/Restart AN-X* command to restart the AN-X.

Restart an AN-X

Use the *Utilities/Restart AN-X* command to restart the currently selected AN-X.

AN-X Info

The *Utilities/AN-X Info* command provides information about the currently selected AN-X in the log window.

The information shown:

AN-X Info	Ethernet MAC address
SerNum	Serial number
DaughterID	Daughterboard ID, 2 for AN-X-PBCAPT
BootRev	Boot code version
ConfigRev	Configuration kernel version
ProdRev	Production kernel version
HwRev	Hardware version
FirmwRev	Firmware release version (depends on current operating mode)
Status	see below
VendorId	Vendor ID
ProdId	Product ID
IpAddrStr	IP address assigned using Utilities/AN-X IP Configuration
HostName	name assigned using Utilities/AN-X IP Configuration

In boot mode, FirmwRev, Vendor ID and Product ID and not valid, and IpAddrStr and HostName are not shown.

Possible status values are:

Value	Meaning
1	Boot mode
2	Configuration mode
4	Production mode

Read Kernel Parameters

The *Utilities/Read Kernel Parameters* command displays various communications parameters for the currently selected AN-X

This command resets the AN-X. You will be warned and given the opportunity to cancel the command.
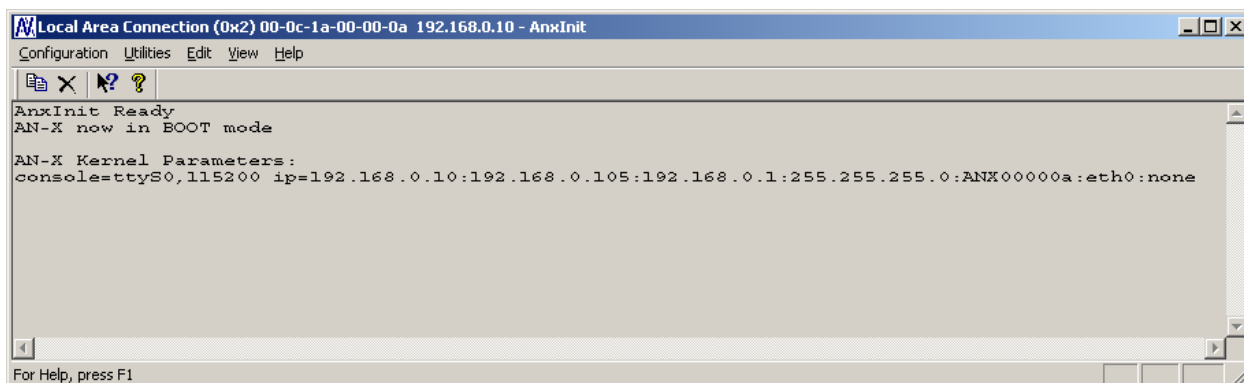
The *Utilities/Read Kernel Parameters* command leaves the AN-X running the boot code. Use the *Utilities/Restart AN-X* command to restart the AN-X in production mode.

Run Config Mode

The *Utilities/Run Config Mode* command is used to restart the currently selected AN-X in configuration mode (normally used internally for updating firmware).

This command is not used in normal operation but may be required for technical support.

The AN-X is in configuration mode when the SYS LED flashes red twice, followed by a pause.

To exit configuration mode, use the *Utilities/Restart AN-X* command to restart AN-X in production mode.

Update AN-X Flash

The *Utilities/Update AN-X Flash* command updates the low-level firmware (boot code, configuration kernel, production kernel).

Files have extension qtf.

This command resets the AN-X. You will receive a warning and be given the opportunity to Cancel the command.

If you cancel at the filename dialog, the AN-X has already been reset and is in boot mode. Use the *Utilities/Restart AN-X* command to restart it in production mode.
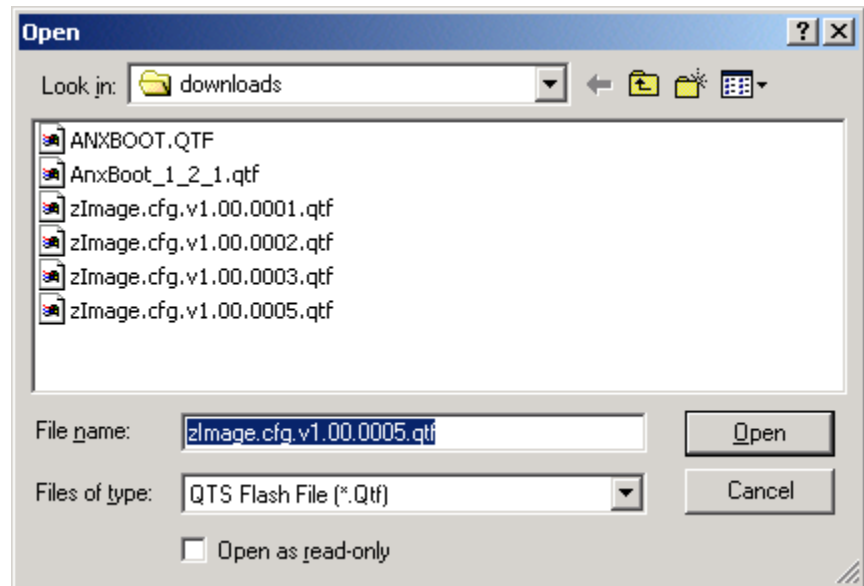
Update Firmware

There are two ways to update all the firmware in an AN-X module.

1. The *Configuration/Firmware Update* command starts the firmware update wizard, which takes you step by step through the firmware update process.

2. The *Utilities/Update Firmware* command updates all the firmware on an AN-X you have selected using the *Utilities/Select An AN-X* command.

Firmware files have extension *bin*.

Firmware Update Wizard

Select the *Configuration/Firmware Update* command to start the firmware update wizard.

Step 1:

In step 1, you identify the AN-X you are configuring.

1. Select the Ethernet adapter that's connected to the AN-X. In most cases there will be just one Ethernet adapter in the computer. The AN-X must be on the same subnet as the computer.

2. Enter the MAC address of the AN-X you are updating. This is printed on the AN-X label. It consists of six pairs of hexadecimal digits, separated by hyphens. In the example above, it's 00-0c-1a-00-00-09.

If the AN-X is already online, you can obtain its MAC address using the *Utilities/Locate All AN-X Modules* command.

3. Enter the IP address of the AN-X you want to update

Step 2

In step 2, you choose a method of restarting AN-X to put it in config mode.
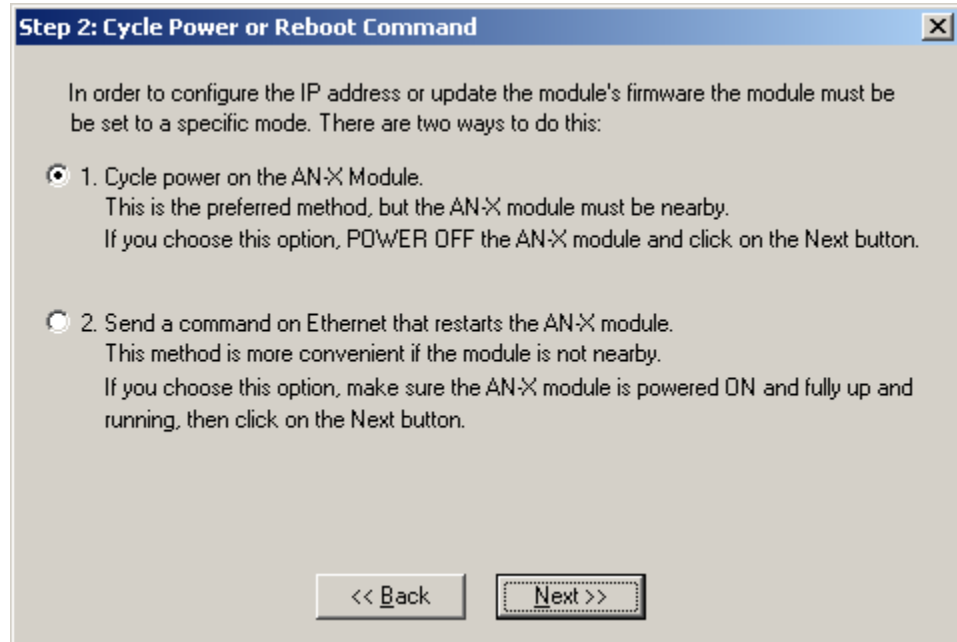
The preferred method is to cycle power on the AN-X. Select the first option on the screen and click the *Next >>* button.

The second method, useful if the AN-X in not easily accessible, is to send it a command over Ethernet. The AN-X must be powered on and completely running for this method to work. For example, if this is the first time you are configuring a new AN-X, allow sufficient time for it to acquire an IP address from a DHCP server or to time out and use its default IP address (about 3 minutes). Select the second option on the screen and click the *Next >>* button.
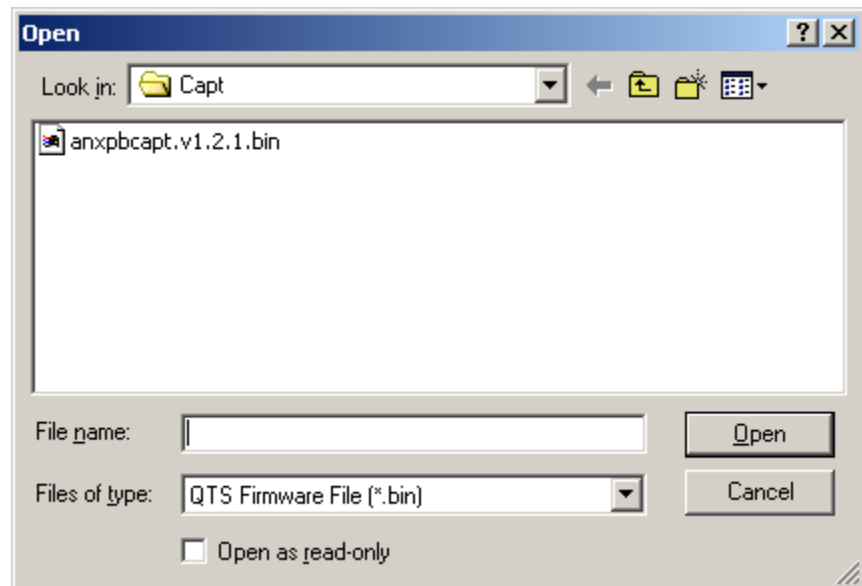
Step 3:

Wait for AN-X to enter config mode. While AnxInit is waiting, the *Next>>* button will be disabled. When AN-X is in boot mode, the *Next>>* button will be enabled.
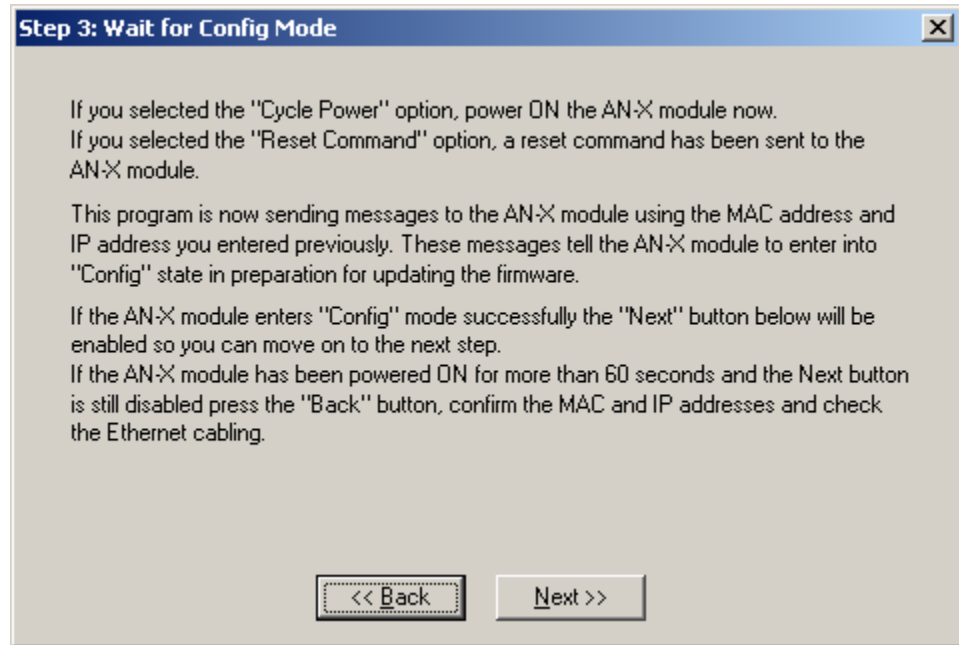
If the AN-X does not enter config mode within about 60 seconds, return to the previous screens and check the entries.

Click the *Next>>* button, and select the firmware file you want to download and click *Open*.

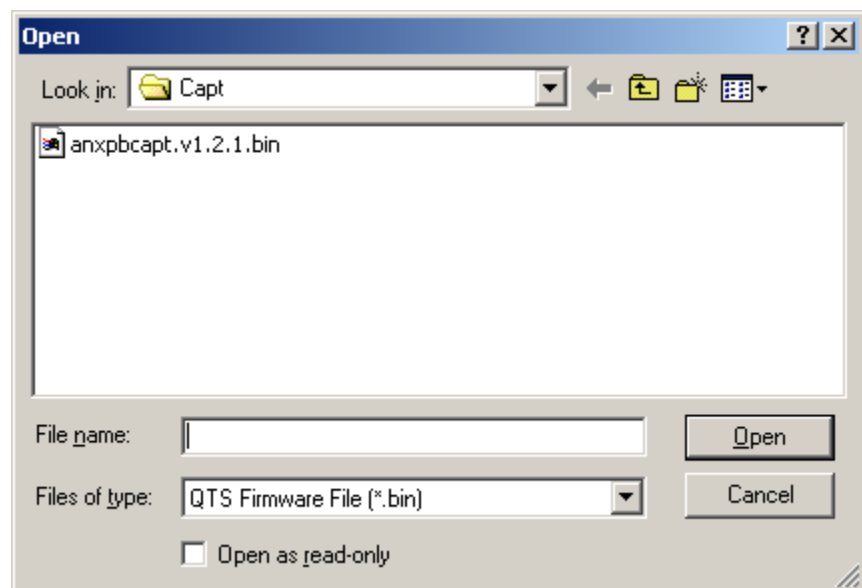AnxInit transfers the firmware file and restarts the AN-X.

Update Firmware Command

The *Utilities/Update Firmware* command updates all the firmware on an AN-X you have previously selected using the *Utilities/Select An AN-X* command.

This command resets the AN-X. You will receive a warning and be given the opportunity to Cancel the command.

If you cancel at the filename dialog, the AN-X has already been reset and is in configuration mode. Use the *Utilities/Restart AN-X* command to restart it in production mode.

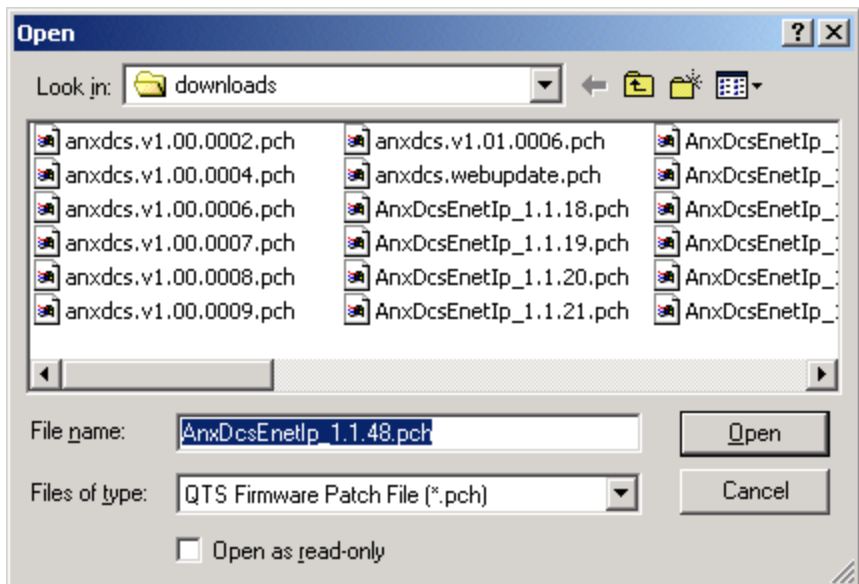Click the *Next>>* button, and select the firmware file you want to download and click *Open*.

AnxInit transfers the firmware file and restarts the AN-X.

Patch Firmware

The *Utilities/Patch Firmware* command applies small patches to the firmware running on the AN-X.

These patch files files have extension *pch*.

This command resets the AN-X. You will receive a warning and be given the opportunity to Cancel the command.

You do not have to reconfigure the AN-X after applying a patch. All configuration information will be left intact.

When the patch has been applied, AnxInit restarts the AN-X in production mode.

If you cancel at the filename dialog, the AN-X has already been reset and is in configuration mode. Use the *Utilities/Restart AN-X* command to restart it in production mode.

Using the Web Interface

The AN-X module contains a webserver capable of communicating with standard web browsers such as Internet Explorer or Netscape.

The web interface is used for viewing AN-X logs.

To use the web interface, you need to know the IP address of the AN-X. Run AnxInit and use the *Utilities/Locate All AN-X Devices* command to find all AN-X devices on the Ethernet network.

To access the web interface, start your web browser and type the AN-X IP address where you normally enter web addresses in the browser.

Log Files

AN-X maintains various logs to record diagnostic and error messages. Use the Utilities menu in the web interface to view these logs.

System Error Log

The System Error log records errors that occur during AN-X operation. This log is normally empty.

System Info Log

The System Info Log records informational messages during startup and normal operation.

View All Logs

Use View All Logs to list and view all the AN-X logs. To view a log file, double click on the file name.

Administration Menu

The Administration Menu is used to view and edit files on AN-X. It is password protected and is used only for AN-X technical support.

Troubleshooting

LEDs

The AN-X-PBCAPT has LEDs that indicate the state of the Ethernet connection, the overall module state, and the network state

Ethernet LEDs

There are two LEDs that indicate the state of the Ethernet connection.

The orange LED, labelled 100, is on if the link is running at 100 Mbits/second and is off otherwise.

The green Link/Act LED is off if the link is inactive and is on if the link is active. If activity is detected, the link blinks at 30 ms intervals and continues blinking as long as activity is present.

SYS LED

The SYS LED is used by the AN-X operating system and software to indicate the state of operations and errors.

It should be used in conjunction with the logs to locate the cause of problems.

In the following, red 3 means three red flashes followed by a pause, and so on.

SYS LED State	Possible cause
Red 2	AN-X is in config mode
Red 3	DHCP configuration failed
Red 4	Fatal application error, check logs for cause
Red 5	Application memory access violation, check logs
Red 6	Application failed, illegal instruction, check logs
Red 7	Application crashed, unknown cause, check logs
Fast red flash	Reconfiguration
Slow red flash	script or application problem during startup

At startup, the SYS LED sequence is:

- boot code starts – fast flashing red

- boot code loads a kernel – solid red

- if the configuration kernel is loaded, 2 red flashes followed by a pause

• if the production kernel loads with no errors, solid green

NET LED – Network Status

The NET LED indicates the status of the Profibus network. It operates only while the capture is running. When no capture is running, the NET LED is off.

Colour	Meaning
Off	Capture not running
Green	Capture is enabled and AN-X is receiving good frames
Yellow	Capture is enabled but no frames are being received
Red	Capture is enabled and bad frames are being received

Updating the Firmware

The AN-X operating software consists of several parts:

- boot code, runs at startup

- configuration kernel, runs when you update firmware

- production kernel, runs in normal operation

- application software, for network capture

The boot code and kernels are supplied in file with extension *qtf* and are updated using the AnxInit utility. Run the command *Utilities/Update AN-X Flash* and select the file you wish to download. Refer to page 44 for details.

Firmware files contain the application programs for AN-X and have extension *bin.* They are downloaded using the command *Configuration/Firmware Update* or *Utilities/Update Firmware* in AnxInit. Refer to page 45 for details.

Occasionally individual patch files are released. They have extension *pch* and are downloaded using the Utilities/Patch Firmware in AnxInit. Refer to page 49 for details.

Reading Version Numbers

To read the version numbers of the various software components:

Boot code	AnxInit – AN-X Info
Configuration kernel	AnxInit – AN-X Info
Production kernel	AnxInit – AN-X Info
Firmware	AnxInit – AN-X Info (version depends on current mode, boot, configuration or production)

Obtaining the Latest Software

Version numbers and software for the most recent AN-X releases are available from the QTS website, www.qtsusa.com

Specifications

Parameter	Specification
Function	Captures frames from Profibus network
Description	Processor: 100MHz IDT MIPS
	FLASH memory: 64M
	RAM: 64M
Typical Power Consumption	300 mA @ 12 VDC or 150 mA @ 24 VDC
Maximum Power dissipation	3.6W
Environmental Conditions:	
Operational Temperature	0-50°C (32-122°F)
Storage Temperature	–40 to 85°C (–40 to 185°F)
Relative Humidity	5-95% without condensation

Support

Technical support is available from Quest Technical Solutions.

Quest Technical Solutions

4110 Mourning Dove Court
Melbourne FL 32934
321 757-8483

website: www.qtsusa.com

email: support@qtsusa.com

If you need to make a return, contact QTS to obtain a return authorization number.