AN-X3-PB-CAPT
Profibus Capture - FTP

User Manual

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Cautions

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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-X3-PBS.

Module Overview

The AN-X3-PB module running AN-X3-PB-CAPT firmware (referred to hereafter as AN-X) captures frames from a Profibus network and writes them to raw capture files on an external FTP server.

A capture analyzer Windows application (AnxPbcCaptAnlz.exe) reads the capture files, filters frames based on a selected option file, and creates a formatted text file.

An equation parser provides great flexibility for searching and filtering capture files.

A command line version is also provided (PbcCapt2Txt.exe) along with its c source code.

The analyzer can be downloaded from qtsusa.com/dist/AN-X3/PB/PB-CAPT/Analyze

The module connects directly to a Profibus network.

Capture Files

The AN-X closes the capture file and opens a new one every minute.

A 2-digit hour and 2-digit minute capture offset time is added at the end of the file name.

The minutes roll from 59 to 00.

The hours roll from 99 to 00.

Capture Use

The most common ways the capture is used are:

- Capture a causable event
- Capture a repeatable event
- Capture an intermittent event

Causable Event

Capturing a causable event is the easiest. Start the capture, cause the event, and then stop the capture.

If the time between starting the capture and the full effects of the event is less than one minute, analysis is only needed on that one file. In this case we will probably not be generating large numbers of files for analysis.

Repeatable Event

Repeatable events are also straightforward. Start the capture, wait for the event, then stop the capture. In these cases we may need to capture longer to make sure we have captured what caused the event.

Intermittent Event

Intermittent events are often more difficult. We start the capture, monitor the process as best we can, then stop the capture as quickly as possible after recognizing the event, hoping we've captured enough data to find what caused the event.

Events

Events can be network errors, intermittent nodes etc.

They can also be certain states of inputs and/or outputs.

Hardware Features

The module has:

- LEDs to indicate the status of the connection to the Ethernet, its own internal state, and the state of capturing frames from the Profibus network
- An Ethernet RJ45 connector
- A 9-pin D Shell connector to connect to the Profibus network
- A 3-pin Phoenix power connector
- A microSD card for storage of configuration data and firmware

Package Contents

- AN-X3-PB module
- Phoenix Power connector

Using the MicroSD Card

The AN-X3-PB microSD card stores configuration data and firmware.

There are no restrictions on the size or speed of the card.

The format must be FAT-16 or FAT-32.

The microSD card must be present while the AN-X3-PB is running.

WARNING! Do not remove the microSD card while the AN-X3-PB is powered on!

TIP The most recent firmware for the AN-X is available at qtsusa.com/dist

AN-X3 Modes of Operation

There are two AN-X3 modes of operation:

- Maintenance mode. The AN-X3 runs the maintenance firmware at startup. It performs diagnostics (memory tests, etc), copies any changes from the microSD card. If there are no errors, it starts the AN-X3 in production mode.
- Production mode. This is the normal runtime mode of operation.

WARNING! If you remove the card to edit the configuration file, push the card in straight or the card might fall inside the case and you will have to disassemble the AN-X3 to retrieve it (7/64 Allen wrench).

Installation

Prevent Electrostatic Discharge

The module is sensitive to electrostatic discharge.

WARNING!

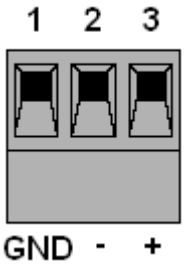
Electrostatic discharge can damage integrated circuits and semiconductors. Follow these guidelines when you handle the module:

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

Power

AN-X requires 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.



Power consumption is 160 mA @ 12VDC or 80 mA @ 24VDC.

The part number for the power connector is:

Phoenix 1757022 (Old part number: MSTB 2.5/3-ST-5.08)

Profibus Cabling and Termination

Use a cable with a standard Profibus 9-pin connector 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

The AN-X has a standard RJ45 connector for connecting to Ethernet.

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

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

IP Address Configuration

Before you can use the AN-X3, you must configure its IP address on Ethernet. For the options and best procedures to configure AN-X3 modules, see:

https://qtsusa.com/dist/AN-X3/AN-X3_ReadMe_and_QuickStart.txt

Initial IP Configuration

AN-X can be configured:

- To use a static (unchanging) IP address
- To obtain its IP address from a DHCP server
- To use the fixed link-local address 169.254.42.84

All AN-X modules are shipped with the link-local address 169.254.42.84.

Unless you have control of the DHCP server, in most applications you will assign the AN-X 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.

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 or to obtain a static IP address for AN-X.

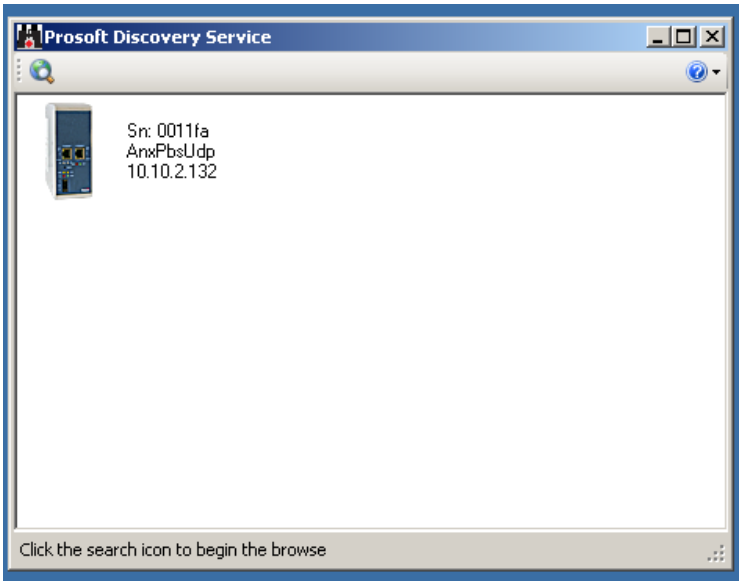
** Since link-local IP addresses are not always accessible, the recommended method to set the initial IP address is with the Prosoft Discovery Service (PDS).

Prosoft Discovery Service

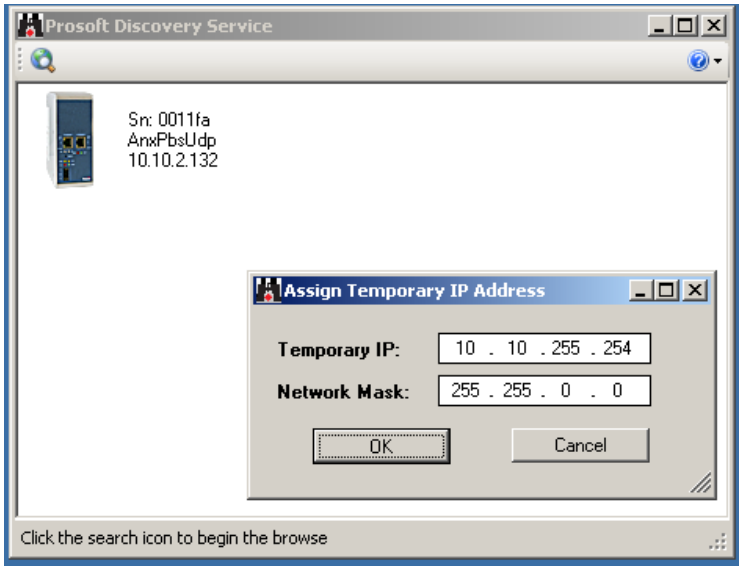
ProSoft Discovery Service (PDS) is a free application available from Prosoft's web page:

https://www.prosoft-technology.com/Products/ProSoft-Software/ProSoft-Discovery-Service

With the AN-X3 module connected to Ethernet and powered up, run PDS. It should find any AN-X modules on the network.



Right click on the module icon and choose 'Assign Temporary IP'.



Generally you can just use the default PDS Temporary IP.

Select '*OK*', then use the Temporary IP address in your web browser to access the module and configure a permanent IP address with the web interface (see page 12).

Link-Local IP Configuration

* Many computers do not allow access to link-local addresses by default.

If you are using link-local IP addresses to configure multiple AN-X3 modules, connect and configure one at a time, since initially they will all be set to the same link-local IP address.

Enter the AN-X3's link-local IP address (169.254.42.84) in your web browser.

TIP The AN-X3 must be on the same subnet as the computer to use the link-local IP address. It cannot be connected through a router.

If the AN-X3's web page does not load, it's likely your computer is not configured to allow access to link-local IP addresses.

You can add a link-local route to your computer or use Prosoft Discovery Service or remove the microSD and edit Config.txt.

microSD Config.txt

The microSD card contains a text configuration file named Config.txt. Config.txt contains the IP configuration and the name of the firmware file to load.

When you perform the '*Administration/AN-X IP/FW Configuration'* command from the web interface, it writes the results to config.txt.

Each line consists of a keyword followed by a colon and then a value. Example:

IP: 192.168.1.12

Anything after a semicolon on a line is treated as a comment.

Keyword	Possible Values
IP	LOCAL DHCP Static IP address
Netmask	Ethernet netmask, used only if IP is a static IP address
DefGtwy	default gateway, used only if IP is a static IP address
Hostname	Ethernet host name, from 1 to 30 characters
Firmware	Firmware file to run at startup, must be present on microSD card

If you edit the file and AN-X3 finds an error during startup, it flashes an error code on the SYS LED, see page 28.

Sample config.txt files

DHCP

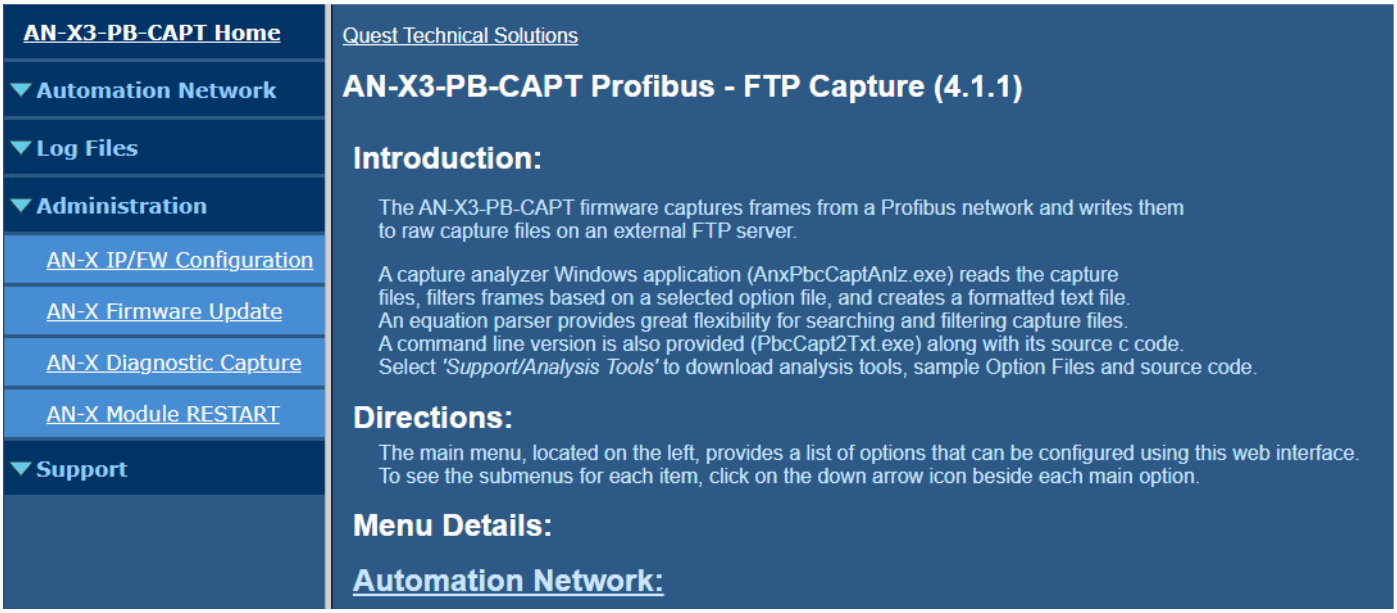
```
IP: DHCP
Hostname: AnxPbCapt
Firmware: AN-X3-PB-CAPT
```

Static IP Address

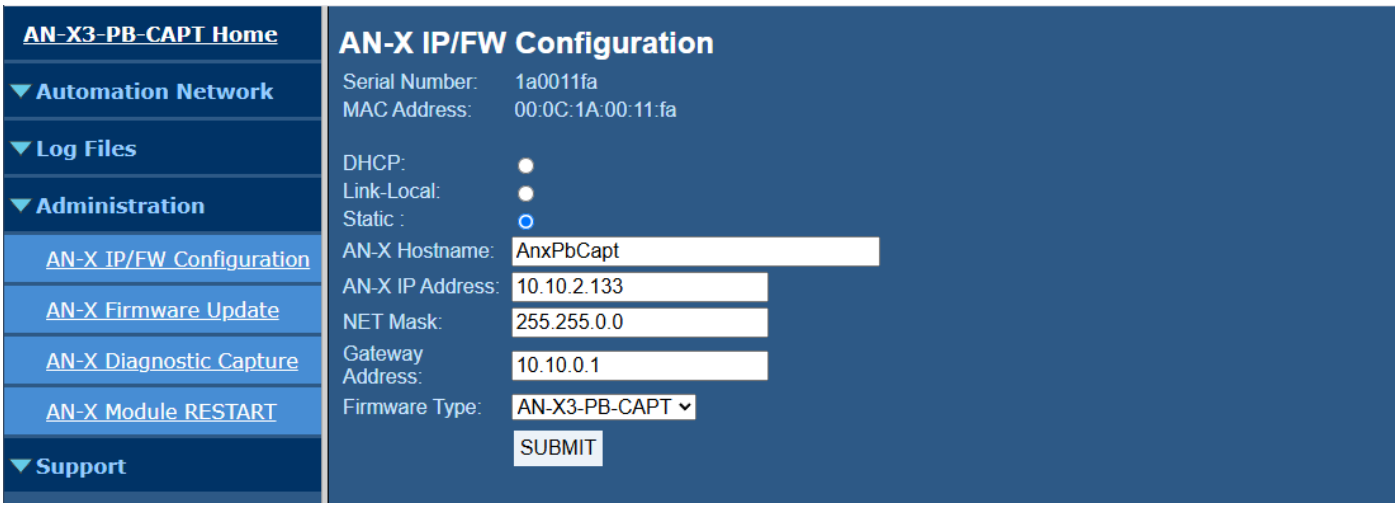
```
IP: 10.10.2.132
NetMask: 255.255.0.0
DefGtwy: 10.10.0.1
HostName: AnxPbCapt
Firmware: AN-X3-PB-CAPT
```

Web Page IP Configuration

Select *'Administration/AN-X IP/FW Configuration'*.



The AN-X IP/FW Configuration page appears.



The serial number and MAC address of the AN-X being configured are shown.

Check either DHCP or Static. If Static, fill in the required fields.

DHCP

If the AN-X3 finds a DHCP server on the network, it obtains an IP address and other network parameters (netmask and default gateway) from the DHCP server.

To find the address assigned, you have to look at the DHCP server log.

When you submit the changes, if the AN-X3 does not find a DHCP server, it reverts to the default link local address 169.254.42.84 and repeatedly flashes the SYS LED 3 times red followed by a pause (see page 28).

Static IP Address

If you select static IP address, enter:

- The IP address for the AN-X.
- The netmask 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.

Hostname

Enter a Hostname for the AN-X3. 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 30 characters long.

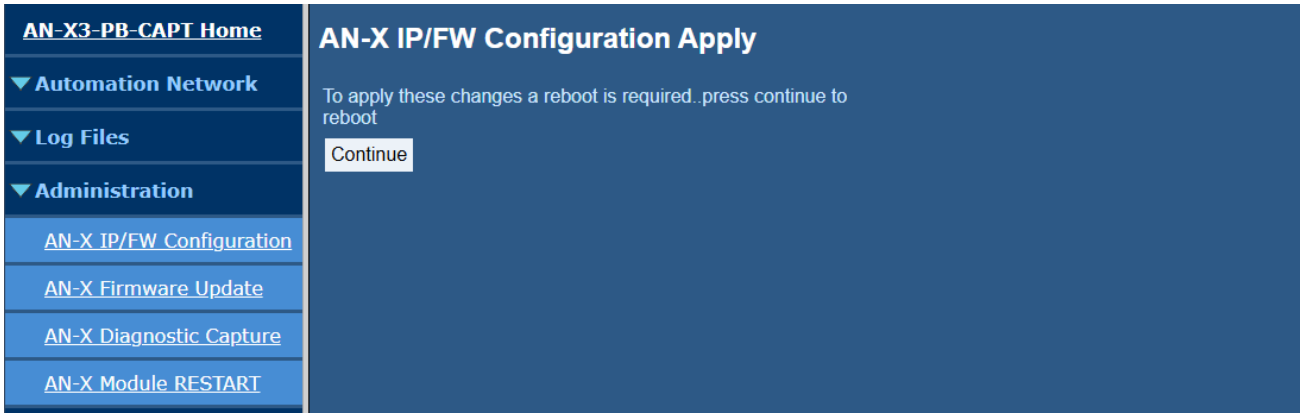
Firmware

Select the firmware the AN-X is to load from the list provided. AN-X builds the list from the firmware files on the microSD card that are compatible with the AN-X hardware.

Submitting the Configuration

Once you have entered all required parameters, click SUBMIT to write the configuration to the file config.txt on the microSD card. The changes do not take effect until the AN-X restarts.

The following page appears when you click SUBMIT.



Click Continue to restart the AN-X3, then wait until the AN-X has completely restarted before continuing.

If you have changed the IP address, you will need to enter the new IP address in the browser's address field.

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 or the IP address is unknown.

In most cases, the Prosoft Discovery Service will be able to find the AN-X3 module, even if its IP address is not accessible on the computer's subnet.

If not, remove the microSD card and edit the Config.txt file (see page 11).

Non-Booting AN-X3 or Factory Reinitialize

If the AN-X3 microSD becomes corrupted and the AN-X3 will no longer boot, or if you want to reinitialize the AN-X3 to factory state:

- Download the appropriate factory image file from the QTS website.

  qtsusa.com/dist/AN-X3 (AN-X3-PBS-uSD.v4.01.01.img.zip for example).

WARNING: This process will erase all AN-X3 configuration files.

If possible, make copies of any configuration files on the microSD you need to preserve before initializing it.

There are many ways to Flash .img.zip files to the microSD. We recommend Balena Etcher. It's free and seems to work very well.

https://www.balena.io/etcher

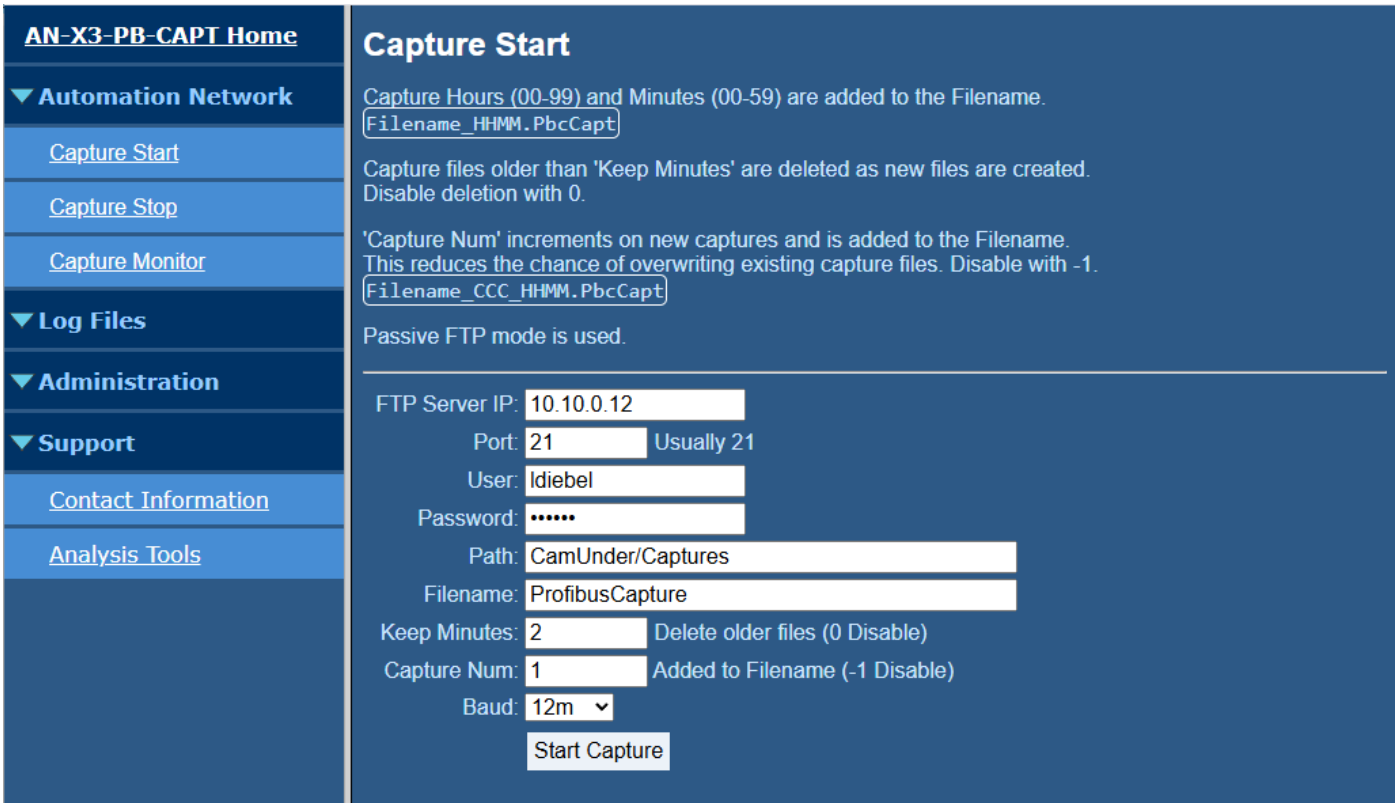
This factory image will have the LOCAL IP address.

The individual microSD files are available on qtsusa.com/dist/AN-X3 in the appropriate uSD_Files directory.

Profibus Capture

Capture Start

Select *'Automation Network/Capture Start'*.



This page is used to specify Profibus, FTP and other parameters, as well as to start a capture.

Capture Hours (00-99) and Minutes (00-59) are added to the Filename.

`Filename_HHMM.PbcCapt`

Capture files older than 'Keep Minutes' are deleted as new files are created.

Disable deletion with 0.

'Capture Num' increments on new captures and is added to the Filename.

This reduces the chance of overwriting existing capture files. Disable with -1.

`Filename_CCC_HHMM.PbcCapt`

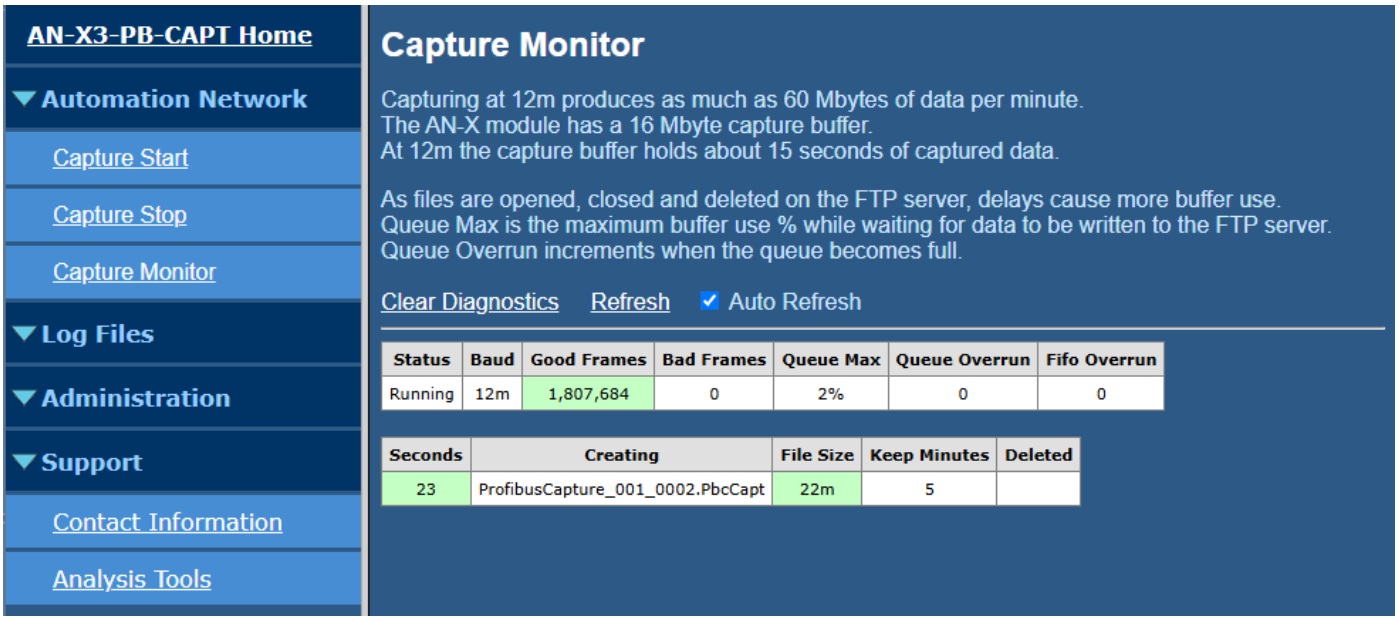
Passive FTP mode is used.

Capture Stop

Select *'Automation Network/Capture Stop'* to stop a running capture.

Capture Monitor

To monitor a Profibus capture, select '*Automation Network/Capture Monitor'*.



Status	Description
Idle	Not capturing
Open	Opening FTP Control Connection
Welcome	Expect FTP Welcome Response
User	Expect FTP Username Response
Pass	Expect FTP Password Response
ChDir	Expect FTP Change Directory Response
Type	Expect FTP Binary Type Response
Pasv	Expect FTP Passive Mode Response
Data	Opening FTP Data Connection
Store	Expect FTP Store File Response
New	New File, Closing FTP Data Connection
Del	Expect FTP Delete File response
Running	Capture running
Error	Error Condition – See Capture Log

Capturing at 12m produces as much as 60 Mbytes of data per minute.

The AN-X module has a 16 Mbyte capture buffer. At 12m the capture buffer holds about 15 seconds of captured data.

As files are opened, closed and deleted on the FTP server, delays cause more buffer use.

Queue Max is the maximum buffer use % while waiting for data to be written to the FTP server.

Queue Overrun increments when the queue becomes full.

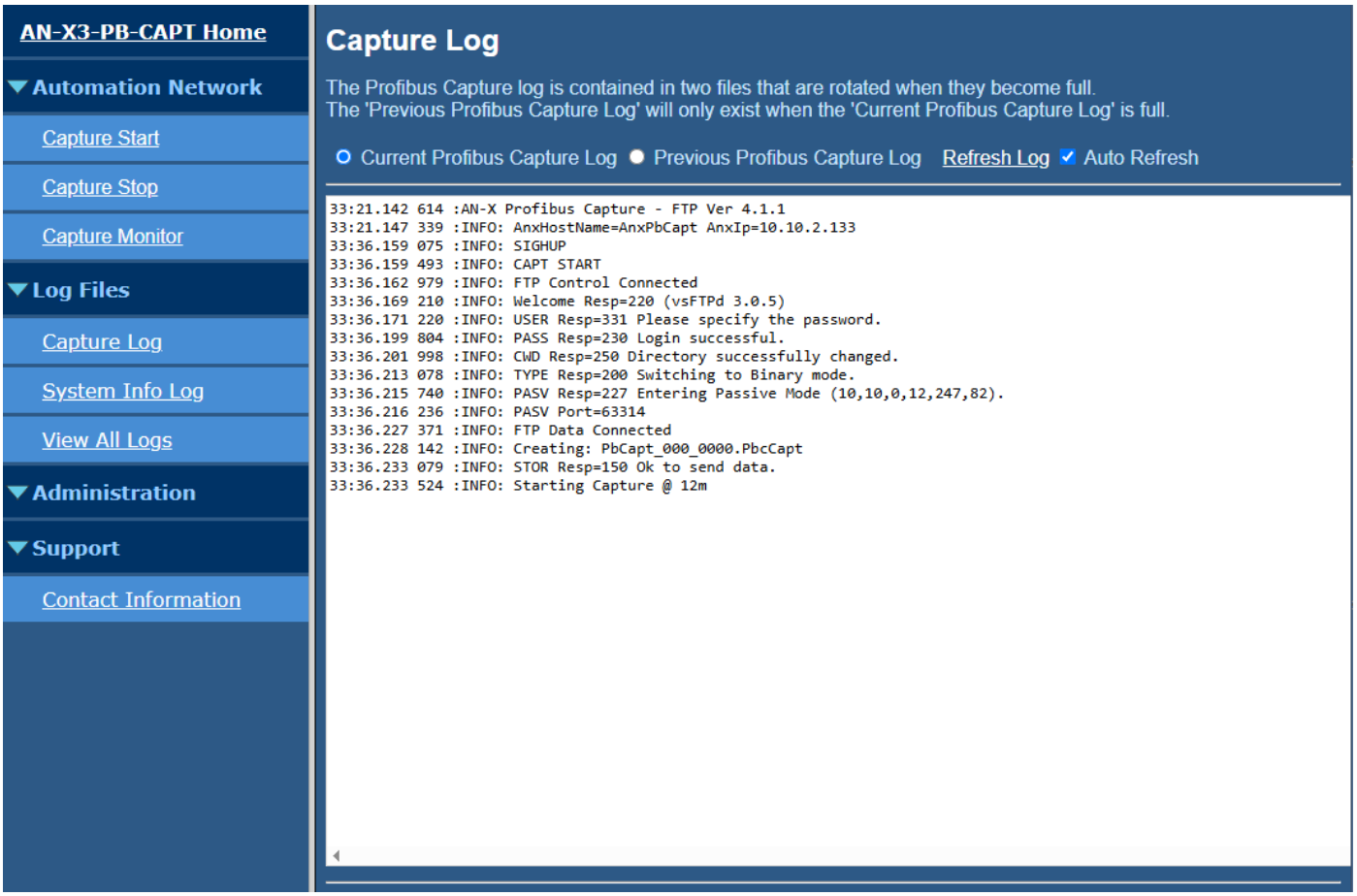
Log Files

Capture Log

The Capture log shows events related to starting captures, FTP file transfer & deletion and stopping captures.

This is especially useful for troubleshooting FTP connection issues.

The Log is contained in two files that are rotated when they become full.



System Info Log

The *System Info Log* records informational messages during AN-X startup and normal operation. This is mostly used by technical support and does not contain information useful to the end user.

View All Logs

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

Capture Analysis

Tools

A capture analyzer Windows application (AnxPbcCaptAnlz.exe) reads the capture files, filters frames based on a selected option file, and creates a formatted text file.

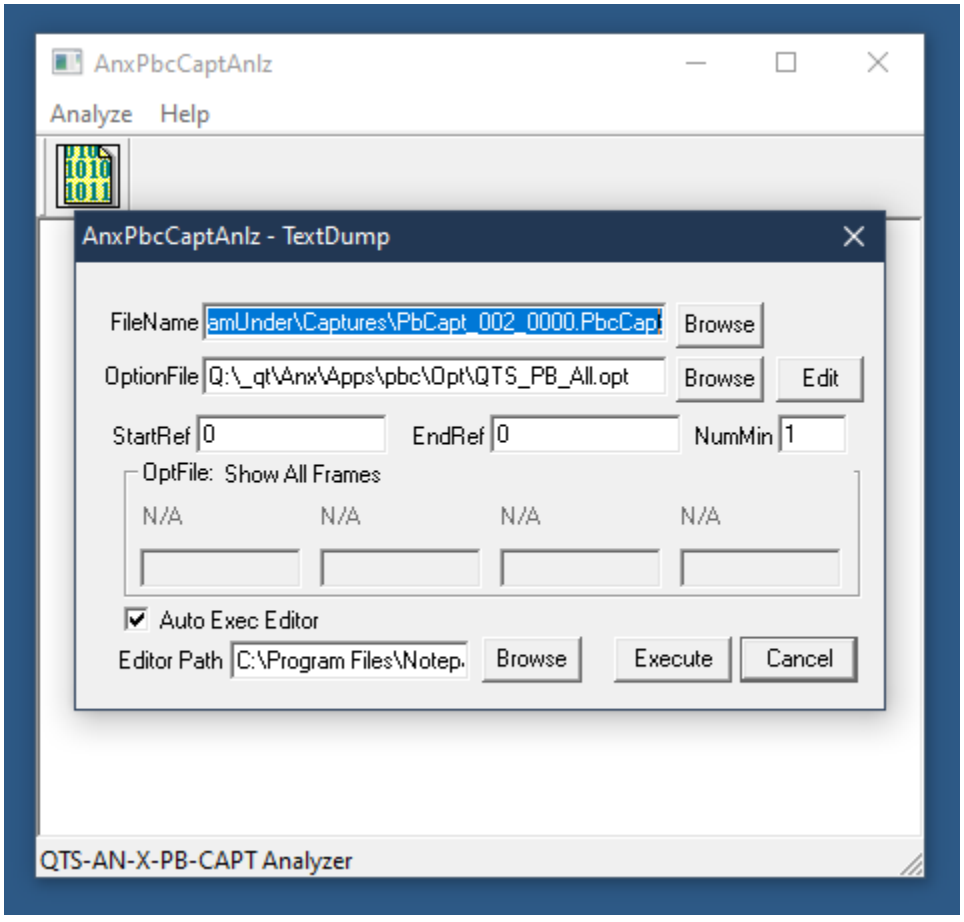
An equation parser provides great flexibility for searching and filtering capture files.

A command line version is also provided (PbcCapt2Txt.exe) along with its c source code.

The analysis tools, sample option files and source code can be downloaded from:

qtsusa.com/dist/AN-X3/PB/PB-CAPT/Analyze

'Support/Analysis Tools' provides a link to this page.



Option Files

Option files specify format and filtering options for the generated text file.

A sample option file is show below:

```
 ;Copyright (c) 2003 Quest Technical Solutions Inc.
;Capture Frame Text Dump Utility
;
;Possible Options:
;NoRef       don't show reference numbers
;NoDelim     don't show start & end delimiter
;NoDst       don't show destination node
;NoSrc       don't show source node
;NoFc        don't show frame control info
;NoDstSap    don't show destination SAP
;NoSrcSap    don't show source SAP
;NoData      don't show frame data
;NoBad       don't show bad frames

;DataSgn     show frame data in Signed   Decimal Format (rather than hex)
;DataUns     show frame data in Unsigned Decimal Format (rather than hex)
;Data16      show frame data as 16 bit words (frame length must be even)

;DetailSts   show detailed frame status info
;ShowFcbTyp  show frame count bits for request, Stn-Type for response
;ShowFcs     show frame check sum
;ShowFileOfs show capture file offsets for each frame (debugging)

;TmeAbs    <fmt> show absolute time stamp
;TmeGap    <fmt> show gap time
;TmeDelta  <fmt> show frame delta time
;   <fmt> - example "hr:mn:sc.ms,us,ns"
;         - hr-hour, mn-minute, sc-second, ms-millisecond, us-microsecond, ns-nanosecond
;         - character following unit is displayed after the value

;GrphGap   <wdth> <maxscale> show frame gap graph
;GrphDelta <wdth> <maxscale> show frame delta graph
;   <wdth> - width of graph in characters
;   <max>  - full scale value
;          - example: 100us
;          - hr-hour, mn-minute, sc-second, ms-millisecond, us-microsecond, ns-nanosecond

;ShowOnly   the next lines define a logic equation that controls
;           which frames will be displayed, ends with '#'
;   Key Words are as follows:
;   STS         - Frame Status
;     STSOK     = 0x00
;     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
;   Len         - Length of Data portion of Frame
;   SD          - StartDelimiter
;     SD1       = 0x10 (Fixed Length, No Data)
;     SD2       = 0x68 (Var Length, With Data)
;     SD3       = 0xa2 (Fixed Length, With Data)
;     SD4       = 0xdc (Token Pass)
;     SC        = 0xe5 (Single Char, Short Ack)
;   DA          - Destination Address (Node)
;   SA          - Source Address (Node)
;     SAPEXT    = 0x80  - SAP Extension Used
;   FC          - Frame Control
;     TYPMSK    = 0xcf
;       MTM1    = 0x40  - Cmd: Station Management Time 1
;       MTM2    = 0xc0  - Cmd: Station Management Time 2
;       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
;       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)
;   DSAP        - Destination SAP
;   SSAP        - Source SAP
;   DataByte[ofs] - Data Byte (Ofs in bytes)
;   DataWord[ofs] - Data Word (Ofs in bytes)
;   CmdArg[num]   - Command Line Argument <num>
;   GapTme        - Gap time between frame and previous (in uSec)
; Operators
;   <>   NOTEQUAL
;   !=   NOTEQUAL
;   <=   LESSEQUAL
;   >=   GREATEREQUAL
;   ==   EQUAL
;   =    EQUAL
;   &&   AND
;   AND  AND
;   ||   OR
;   OR   OR
;   &    BITWISEAND
;   |    BITWISEOR
;   ^    BITWISEXOR
;   *    MULT
;   /    DIV
;   %    MOD
;   +    ADD
;   -    SUB
;   <    LESS
;   >    GREATER
;   !    NOT
;   ~    COMPL
;   (    LPAREN
;   )    RPAREN

; Descrip       - Options File Description (displayed in dump dialog box)
; ArgName<0-3>  - Name of arguments passed into ShowOnly equation CmdArg[0-3] (displayed in dump dialog box)

; NOTE: a ';' in front of option makes it a comment.

Descrip=Diagnostic Status Read for a Specific Node
ArgName0=Node

;NoRef
;NoDelim
;NoDst
;NoSrc
;NoFc
;NoDstSap
;NoSrcSap
;NoData
;DetailSts
;ShowFcbTyp
;ShowFcs

TmeAbs   sc.ms,us,ns
;TmeGap ms,us
```

```
TmeDelta sc.ms,us

;GrphGap   20 10us
;GrphDelta 20 100us

showonly
((SA=CmdArg[0]) OR (DA=CmdArg[0]))
AND
(((SSAP=60) AND (DSAP=62))
OR
((SSAP=62) AND (DSAP=60)))
#
```

Sample Capture Text File

```
        File      : \\qtbkup1\ldiebel\CamUnder\Captures\ProfibusCapture_003_0000.PbcCapt
AN-X Name : AnxPbcCapt
AN-X IP   : 10.10.2.133
Baud      : 12M
Opt File  : Q:\_qt\Anx\Apps\pbc\Opt\QTS_PB_All.opt
Show Only :

        1: a 0.000,018,187 ........  1<9   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        2: a 0.000,062,125 ........ 11<1   SRDH       17 00 17 80 18 00 18 80
        3: a 0.000,079,770 ........  1<11  DL         00 00 00 00 00 00 00 00
        4: a 0.000,116,541 ........ 12<1   SRDH       19 00 19 80 00 00 00 00 00 00 00 00
        5: a 0.000,137,854 ........  1<12  DL         00 00 00 00 00 00 00 00 00 00 00 00
        6: a 0.000,178,125 ........ 13<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        7: a 0.000,203,104 ........  1<13  DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        8: a 0.000,247,041 ........122<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
        9: a 0.000,275,687 ........  1<122 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       10: a 0.000,323,291 ........125<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       11: a 0.000,557,270 ........  1<125 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       12: a 0.000,810,291 ........  2<1   SRDH       d0 07 01 00 02 00 03 00 04 00 05 00 06 00 07 00 08...
       13: a 0.001,044,270 ........  1<2   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       14: a 0.001,297,208 ........  6<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       15: a 0.001,329,520 ........  1<6   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       16: a 0.001,380,791 ........ 10<1   SRDH       16 00 16 80
       17: a 0.001,394,770 ........  1<10  DL         00 00 00 00
       18: a 0.001,427,708 ........123<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       19: a 0.001,460,020 ........  1<123 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       20: a 0.001,511,291 ........124<1   SRDH       00 00 00 00 00 00 00 00 39 00 39 80 40 00 40 80 41...
       21: a 0.001,745,270 ........  1<124 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       22: a 0.001,998,604 ........  3<1   SRDH       22 01 23 01 24 01 25 01 26 01 27 01 28 01 29 01 00...
       23: a 0.002,120,791 ........  1<3   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       24: a 0.002,258,770 ........  1<1
       25: a 0.002,279,520 ........  1<1
       26: a 0.002,300,354 ........  0<1   RFDL
       27: a 0.002,381,854 ........  1<1
       28: a 0.002,403,604 ........  4<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       29: a 0.002,468,958 ........  1<4   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       30: a 0.002,553,270 ........  5<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       31: a 0.002,585,625 ........  1<5   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       32: a 0.002,636,854 ........  7<1   SRDH       45 03 45 83 01 00 01 80 00 00 00 00 00 00 00 00 00...
       33: a 0.002,669,208 ........  1<7   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       34: a 0.002,720,437 ........  8<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       35: a 0.002,752,791 ........  1<8   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       36: a 0.002,804,020 ........  9<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
       37: a 0.002,829,041 ........  1<9   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
       38: a 0.002,872,937 ........ 11<1   SRDH       17 00 17 80 18 00 18 80
       39: a 0.002,890,625 ........  1<11  DL         00 00 00 00 00 00 00 00
       40: a 0.002,927,187 ........ 12<1   SRDH       19 00 19 80 00 00 00 00 00 00 00 00
       41: a 0.002,948,541 ........  1<12  DL         00 00 00 00 00 00 00 00 00 00 00 00
       42: a 0.002,988,937 ........ 13<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
       43: a 0.003,013,958 ........  1<13  DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
       44: a 0.003,057,937 ........122<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       45: a 0.003,086,625 ........  1<122 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       46: a 0.003,134,354 ........125<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       47: a 0.003,368,375 ........  1<125 DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       48: a 0.003,621,270 ........  2<1   SRDH       d0 07 01 00 02 00 03 00 04 00 05 00 06 00 07 00 08...
       49: a 0.003,855,208 ........  1<2   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       50: a 0.004,108,187 ........  6<1   SRDH       00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
       51: a 0.004,140,458 ........  1<6   DL         00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00...
```

Administration

The *Administration* menu contains items used to configure, control and update the AN-X.

AN-X IP/FW Configuration

See page 12 for details on setting the IP address.

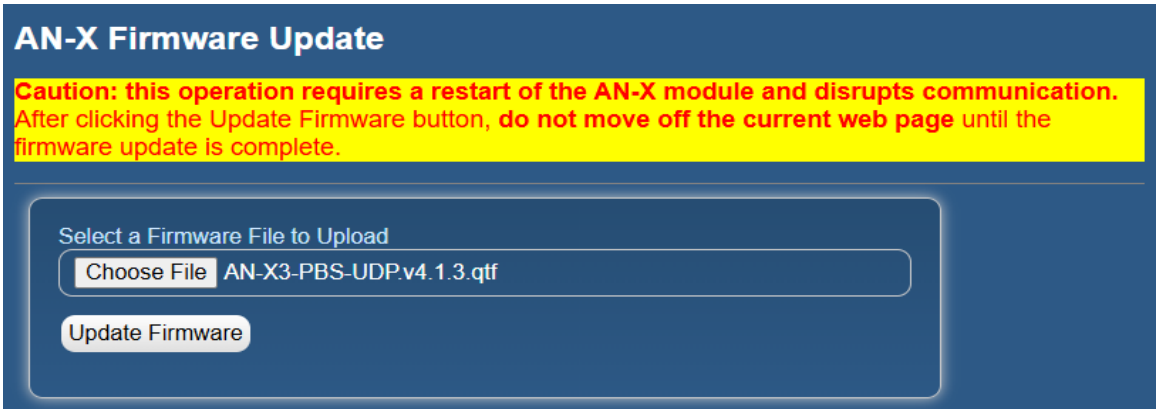
If other firmware images are available and on the microSD card, you can select this firmware with the '*Firmware Type*' Drop Down box.

AN-X Firmware Update

Use AN-X Firmware Update to transfer a firmware file to the microSD card on the AN X. Firmware files for the AN-X3 have names that begin with AN-X3 and have extension *.qtf.

TIP The most recent firmware for the AN-X is available at qtsusa.com/dist

WARNING! Do not update firmware in the AN-X while applications that use the AN-X are running.



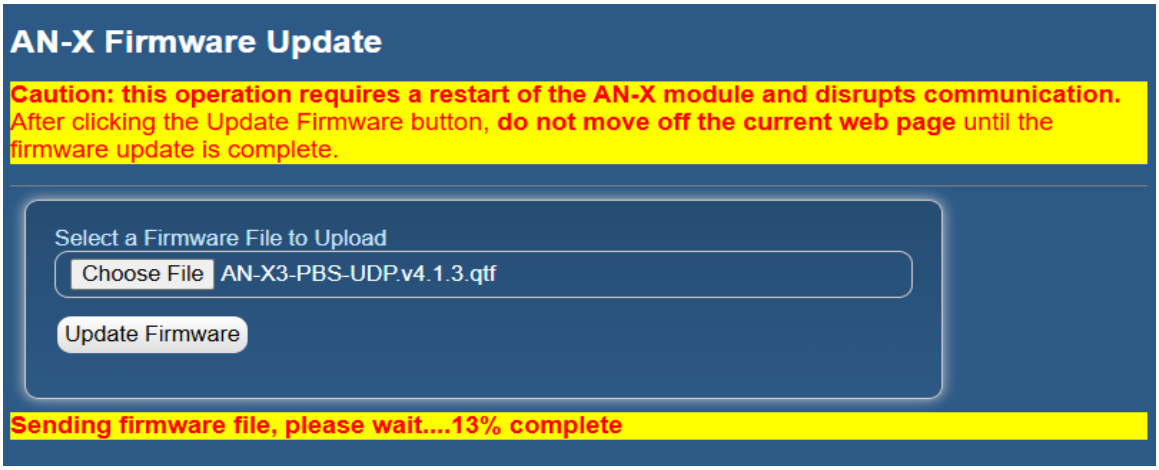
Browse to select the file, then click the '*Update Firmware*' button to transfer the file.

WARNING!

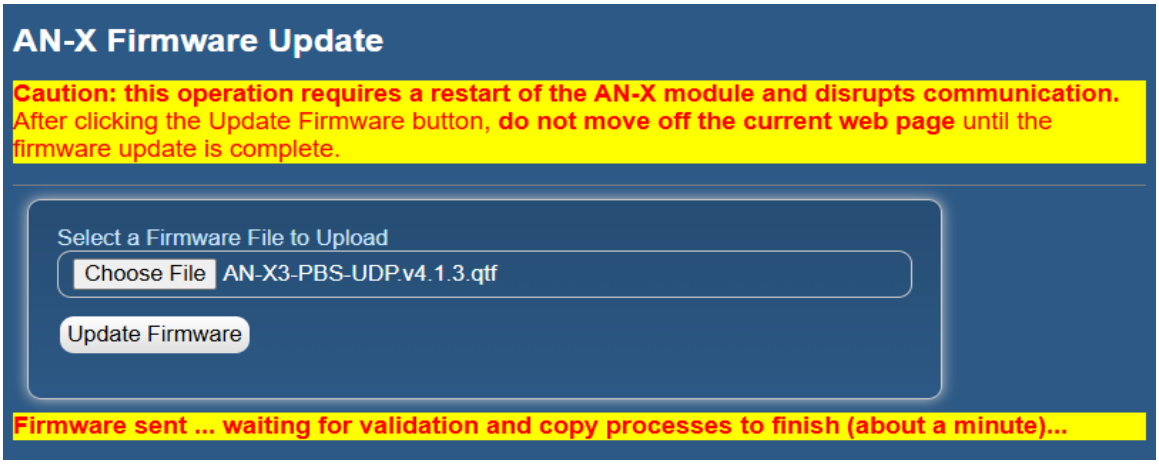
It is essential that you do not disrupt power while updating firmware, especially maintenance firmware, to the AN-X3 or while the AN-X3 is restarting following a firmware update.

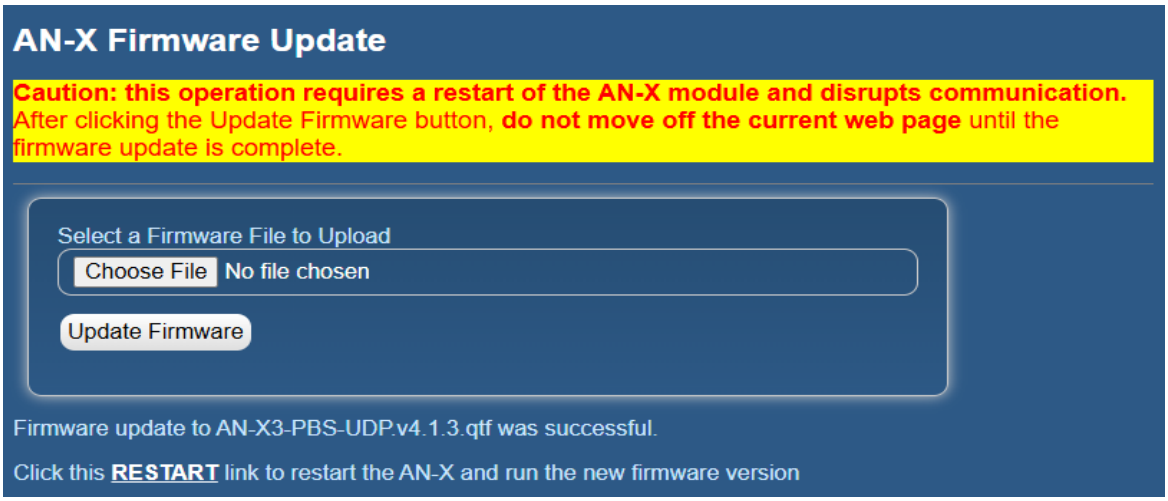
Interrupting power at some points in the update process could render the AN-X inoperative and it will have to be returned to the factory for re-initialization.

AN-X displays progress and status information as the firmware is updated.



When the update is complete, AN-X displays a message that indicates the success or failure of the update.





Manual Firmware Update

AN-X Firmware qtf files can be copied and updated on the microSD manually.

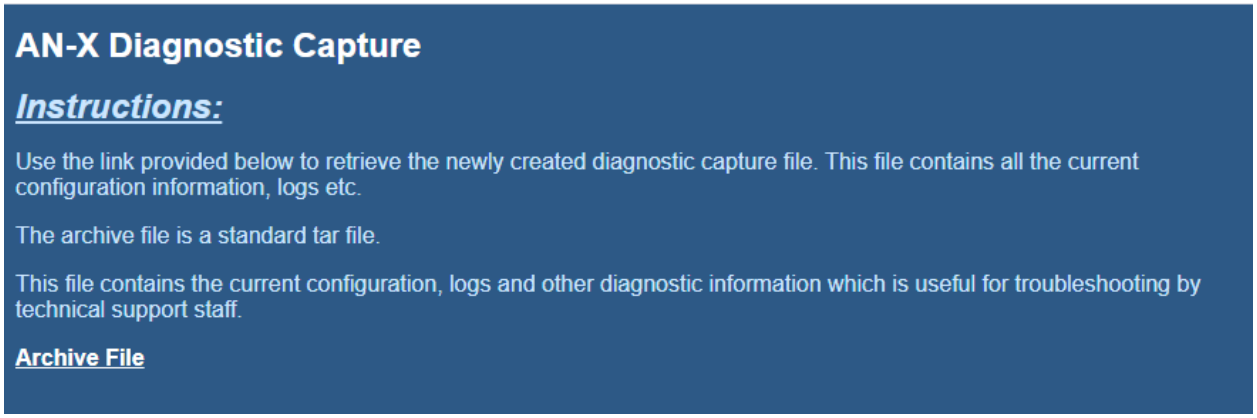
- Remove the microSD and insert it into your computer. You should see the current qtf file (AN-X3-PBS-DRV.v4.1.1.qtf for example).
- Delete or change the name of the current qtf file (zzAN-X3-PBS-DRV.v4.1.1.qtf for example). Renaming may be useful in case we need to revert back to the previous version.
- Copy the new qtf file to the microSD.
- Remove the microSD from your computer and insert it back into the AN-X. Be careful not to insert it above the connector (see page 7).

TIP The most recent firmware for the AN-X is available at qtsusa.com/dist

IMPORTANT! Make sure there is only one qtf filename that starts with the '*Firmware Type:*' specified. If not, the AN-X may use the wrong one.

Diagnostic Capture

Use '*Administration/AN-X Diagnostic Capture*' to create an archive tar file that contains the current AN-X configuration and logs for use by technical support. There may be a slight delay while AN-X builds the archive file.

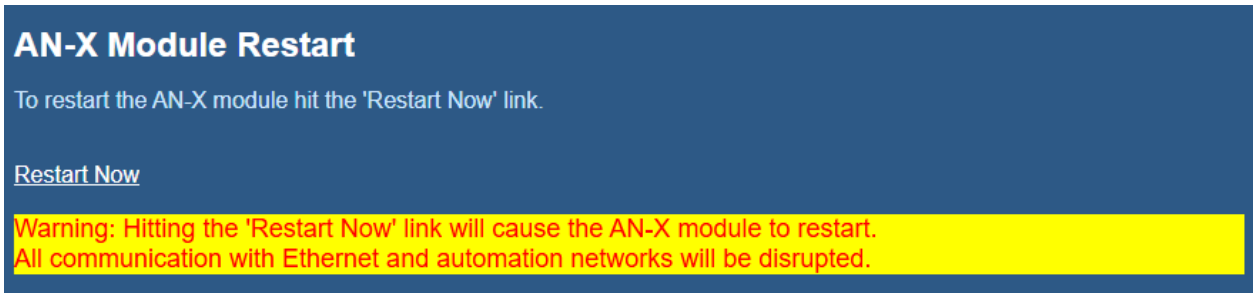


Click the Archive File link.

Select the destination where the file will be stored and save the file.

AN-X Module RESTART

Use the '*AN-X Module RESTART*' page to restart the AN-X module.



Support Menu

Contact Information

The Support contains contact information and links if you need help with the AN-X.

Analysis Tools

Provides a link to:

qtsusa.com/dist/AN-X3/PB/PB-CAPT/Analyze

Troubleshooting

LEDs

The AN-X3-PB has LEDs that indicate the state of the Ethernet connection, the overall module state and the connection to the Profibus network.

Ethernet LEDs

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

The upper, yellow LED, labeled 100, is on if the link is running at 100 Mbits/second and is off otherwise.

The lower 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 300 ms intervals and continues blinking as long as activity is present.

If the AN-X3 is not connected to Ethernet, the 10/100 LED is on.

SYS LED

The SYS is used by the AN-X operating system and software to indicate the state of operations and errors. Errors or status indication in boot mode cause the LED to flash yellow. Otherwise, the LED flashes red.

The SYS 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.

Powerup/Reboot

SYS LED	Meaning
Red 3	DHCP configuration failed
Yellow 2	microSD card not present
Yellow 3	AN-X3 Maintenance firmware file not found on microSD card
Yellow 4	config.txt file not found on microSD card or error parsing file
Yellow 5	Production firmware filename was not specified in config.txt
Yellow 6	AN-X3 production firmware file not found on microSD card
Yellow 7	Production firmware file invalid or error programming to flash
Yellow 8	Daughterboard mismatch
Yellow 9	Error processing option file or file not found
Yellow 10	Option file mismatch

‘Railroading’ – SYS and NET LEDs

AN-X3 alternates (railroads) flashing the SYS and NET LEDs to indicate its state.

It railroads the LEDs red while it is copying new maintenance firmware files from the microSD card to flash memory.
* Make sure power is not removed while railroading red.

It railroads the LEDs yellow while it is copying new production firmware files from the microSD card to flash memory.

It railroads the LEDs green for 15 to 20 seconds as it starts normal production mode.

SYS and NET LEDs: Runtime

SYS – AN-X Status

The SYS is used by the AN-X operating system and software to indicate the state of configuration and Ethernet communication.

SYS LED	Meaning
Yellow	Capture is idle or starting
Green	Capture is running
Flashing red/off	Capture has failed

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

NET LED – Network Status

The NET LED indicates the status of capturing frames the Profibus Network.

NET LED	Meaning
Green	No frame error within the last 500 ms
Red	Frame error(s) within the last 500 ms
Yellow	No frames received within the last 500 ms

Specifications

Parameter	Specification
Function	Profibus Frame Capture to FTP
Maximum Power Consumption	160 mA at 12 VDC, 80 mA at 24 VDC
Maximum Power Dissipation	2 Watts
Operational Temperature	0-50°C (32-122°F)
Storage Temperature	–40 to 85°C (–40 to 185°F)
Relative Humidity	5-85% without condensation

Support

How to Contact Us: Sales and Support

Sales and Technical Support for this product are provided by ProSoft Technology. Contact our worldwide Sales or Technical Support teams directly by phone or email:

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All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products that have been modified or repaired without Quest Technical Solutions approval or that have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables nor to any damage resulting from battery leakage.

In all cases, Quest Technical Solutions' responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this Warranty provision and compliance with such instructions shall be a condition of this warranty.

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Revisions

Version	Date	Changes
1.1	Augf 28/25	Initial Release