AN-X-AMXCAPT
AutoMax
Capture
Module

User Manual

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

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-AMXCAPT

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AN-X-AMXCAPT Module Overview

This document is a user guide for the AN-X-AMXCAPT capture module. It connects to a computer using Ethernet and makes it possible to capture frames on an AutoMax DCS or remote I/O network.

The module passively monitors network traffic and captures all network frames, with timestamps to microsecond precision. It does not occupy a drop on the network.

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 43 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 AutoMax network
- a power connector
Package Contents

- AN-X-AMXCAPT module
- CD containing software and documentation

Other Requirements

To transfer data over Ethernet requires:

- 100 Mbit/second Ethernet network and hardware
- Ethernet network should use switches, not hubs

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.

![Power connector diagram](image)

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

Contact us if you need a suitable wall adapter.

**Cabling and Termination**

Use a standard drop cable and passive tap (M/N 57C380) to connect the module to the coaxial network cable. The drop cable is a multi-conductor cable with 9-pin D-shell connectors at each end. Connect one end to the connector on the module and the other end to the passive tap.

The passive tap has two BNC connectors for connection to the coaxial cables and terminating loads.

The network coaxial cable must be terminated with 75 ohm terminating loads attached to the taps at the physical ends of the network. There should be two and only two terminators on the network.
The cable must be RG-59/U.

**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 or switch, 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-AMXCAPT module connects a computer or other device on Ethernet to a Reliance AutoMax DCSnet or remote I/O network.

Before you can use the AN-X-AMXCAPT, you must configure its network properties on Ethernet.

No configuration is required on the AutoMax 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.

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 is 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 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**: ____________

- Obtain an IP address automatically (DHCP)
- Use the following Settings

| IP Address: | 192.168.0.9 |
| Subnet mask: | 255.255.255.0 |
| Default gateway: | 192.168.0.1 |

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.

**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 AnxAmxCapt 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 IP Address. AnxAmxCapt displays the AN-X-IP Address dialog.

![AN-X IP Address dialog]

Enter the IP address of the AN-X module that you wish to use to capture AutoMax 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.

AnxAmxCapt displays the Capture Control dialog.

![Capture Control dialog]

Type or browse in the capture file (CaptFile) name.

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, AnxAmxCapt 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 Test.1453.AmxCapt. The next file is called Test.1454.AmxCapt, 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 could be 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 it 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, AnxAmxCapt automatically executes a **Capture/Dump** command when the capture ends.

Click **Start** to begin capturing network frames.

AnxAmxCapt 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 (CRC error, abort, overrun, or noise) 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 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.

AnxAmxCapt displays the TextDump dialog.
Browse or type the capture file name into the FileName box. AnxAmxCapt appends the option file name to the name you supply, and then appends the extension “.txt”. For example, if the capture file is Test1413.AmxCapt and the option file is QTS_All.opt, the text file created is Test1413_QTS_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_All.opt option file. For detailed information on option files, refer to page 15.

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.

If you obtained the capture using the ring buffer method, NumMin determines the number of consecutive capture files from which frames are to be extracted. If the capture was obtained using the continuous file method, set NumMin to 1.

After AnxAmxCapt 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.

Description

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

Descrip=Show All Packets in Raw Format

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,
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 19.

**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

Any character after the unit is displayed. For example, hr:mn causes the time to be displayed as 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: a 0:00:002,975 255< 05^ 1- 0000 0000 0000 0000 0000 0000…
```

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:

```
TimeGap ms.us
```

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

```
2: a 0:00:002,975 g 0.001,054 255< 05^ 1- 0000 0000…
```

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

Example:

```
TimeDelta ms.us
```

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

```
2: a 0:00:002,975 d 0.002,975 g 0.001,054 255< 05^ 1- 0000 0000…
```
**TIP**

You can use the delta time to display update times for a drop. Modify the option file QTS_UpdFromDrop.opt to display the delta time and include a delta time graph, set the drop number to the drop of interest and display the selected frames.

```plaintext
3: a 0.006,823 d 6.823 d............. | 255< 06^ 1- 0000
8: a 0.015,232 d 8.409 d............. | 255< 06^ 1- 0000
11: a 0.020,729 d 5.497 d............ | 255< 16^ 1- 0000
18: a 0.029,401 d 8.672 d............. | 255< 06^ 1- 0000
21: a 0.035,198 d 5.797 d............ | 255< 06^ 1- 0000
26: a 0.043,606 d 8.408 d............. | 255< 06^ 1- 0000
29: a 0.049,077 d 5.471 d............ | 255< 06^ 1- 0000
32: a 0.054,557 d 5.480 d............ | 255< 06^ 1- 0000
35: a 0.060,042 d 5.485 d............ | 255< 06^ 1- 0000
38: a 0.065,532 d 5.490 d............ | 255< 06^ 1- 0000
```

**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 20,5:

```plaintext
1: a 0:00:00.000,000 g 2,252 g.......... | 2
2: a 0:00:00.002,975 g 1,054 g.... | 2
3: a 0:00:00.009,338 g 0,184 g | 2
4: a 0:00:00.013,163 g 0,527 g.. | 2
5: a 0:00:00.015,998 g 0,182 g | 2
6: a 0:00:00.019,821 g 0,528 g.. | 2
7: a 0:00:00.020,536 g 0,181 g | 2
8: a 0:00:00.021,167 g 2,027 g........ | 2
```
If the gap time graph overflows the given scale, the beginning and end of the graph are shown as asterisks, for example,
1: a 0:00:00.000,000 g 2,252 g* *

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 5ms

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:

1: a 0:00:00.000,000 d 0,000 d |  
2: a 0:00:00.002,975 d 2,975 d...... |  
3: a 0:00:00.009,338 d 6,363 d........... |  
4: a 0:00:00.013,163 d 3,825 d....... |  
5: a 0:00:00.015,998 d 2,835 d...... |  
6: a 0:00:00.019,821 d 3,823 d....... |  
7: a 0:00:00.020,536 d 0,715 d. |  
8: a 0:00:00.021,167 d 0,631 d. |  
9: a 0:00:00.023,297 d 2,130 d.... |  
10: a 0:00:00.029,659 d 6,362 d............ |  
11: a 0:00:00.033,476 d 3,817 d....... |  
12: a 0:00:00.036,311 d 2,835 d...... |  
13: a 0:00:00.040,125 d 3,814 d....... |  
14: a 0:00:00.040,839 d 0,714 d. |  

If the delta time graph overflows the given scale, the beginning and end of the graph are shown as asterisks, for example,
3: a 0:00:00.009,338 d 6,363 d* *
Frame Data

Detailed Status

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

Immediately before the frame data are four columns, one each for CRC error, noise error, abort error and overrun error. If the column contains a period, there has been no error or the corresponding type in the frame.

Example: Frame 354 has no errors, frame 355 has CRC and abort errors, etc.

<table>
<thead>
<tr>
<th>Frame</th>
<th>Time</th>
<th>CRC</th>
<th>Noise</th>
<th>Abort</th>
<th>Overrun</th>
<th>Data</th>
<th>Checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>354</td>
<td>0:00:00.689</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,106 ....255</td>
<td>05^</td>
</tr>
<tr>
<td>355</td>
<td>0:00:00.691</td>
<td>0</td>
<td>0</td>
<td>0,206</td>
<td>0</td>
<td>2,106 c.a.255</td>
<td>05^</td>
</tr>
<tr>
<td>356</td>
<td>0:00:00.693</td>
<td>0</td>
<td>2,313</td>
<td>1,143</td>
<td>0</td>
<td>255&lt; 00^</td>
<td></td>
</tr>
<tr>
<td>357</td>
<td>0:00:00.695</td>
<td>4,246</td>
<td>1,054</td>
<td>0</td>
<td>0</td>
<td>255&lt; 05^</td>
<td></td>
</tr>
<tr>
<td>358</td>
<td>0:00:00.703</td>
<td>5,787</td>
<td>2,105</td>
<td>0</td>
<td>0</td>
<td>255&lt; 05^</td>
<td></td>
</tr>
<tr>
<td>359</td>
<td>0:00:00.707</td>
<td>3,846</td>
<td>2,096</td>
<td>0</td>
<td>0</td>
<td>255&lt; 05^</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>0:00:00.711</td>
<td>3,828</td>
<td>2,555</td>
<td>0</td>
<td>0</td>
<td>255&lt; 05^</td>
<td></td>
</tr>
</tbody>
</table>

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

Data Format

The following option lines control the display of register data for DCSNet I/O update frames (CTL = 5 or CTL = 6).

<table>
<thead>
<tr>
<th>Option line</th>
<th>Show register data as…</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowRegInt</td>
<td>integers, -32768 to 32767</td>
</tr>
<tr>
<td>ShowRegUns</td>
<td>unsigned integers, 0 to 65535</td>
</tr>
<tr>
<td>ShowRegHex</td>
<td>hexadecimal, 0000 to FFFF</td>
</tr>
<tr>
<td>ShowRegBin</td>
<td>binary, 0000 0000 0000 0000 to 1111 1111 1111</td>
</tr>
</tbody>
</table>

By default, all data is shown as bytes.

The following example shows the same in each format.

Default, bytes

<table>
<thead>
<tr>
<th>Frame</th>
<th>Time</th>
<th>Data</th>
<th>Checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.004,958</td>
<td>255&lt; 05^ 55- 12 34 ff ff 33 33...</td>
<td></td>
</tr>
</tbody>
</table>

Hexadecimal

<table>
<thead>
<tr>
<th>Frame</th>
<th>Time</th>
<th>Data</th>
<th>Checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.004,958</td>
<td>255&lt; 05^ 55- 1234 ffff 3333...</td>
<td></td>
</tr>
</tbody>
</table>
Integer
4: a 0.004,958 g....... | 255< 05^ 55- 4660 -1 13107...

Unsigned integer
4: a 0.004,958 g....... | 255< 05^ 55- 4660 65535 13107...

Binary
4: a 0.004,958 g....... | 255< 05^ 55- 00010010-00110100...

CRC

To include the frame CRC, use the ShowCrc option line.

CRCs are shown at the end of the frame, enclosed in square brackets.

Example:
6: a 0:00:00.019,821 255< 05^ 3- 00 00 00 00 00 00 00 00 [95f5]

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

(Ctl=CTL_MSG) or (Ctl=CTL_ACK)
#

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

Keywords

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

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS</td>
<td>Frame status</td>
</tr>
<tr>
<td>Len</td>
<td>Frame length (included the 3 byte header but not the CRC)</td>
</tr>
<tr>
<td>Dst</td>
<td>Frame destination</td>
</tr>
<tr>
<td>Ctl</td>
<td>Frame control</td>
</tr>
<tr>
<td>Drop</td>
<td>Frame drop</td>
</tr>
<tr>
<td>DataByte[ofs]</td>
<td>Data byte at offset ‘ofs’ into the frame data</td>
</tr>
<tr>
<td>DataWord[ofs]</td>
<td>Data word at offset ‘ofs’ into the frame data</td>
</tr>
<tr>
<td>CmdArg[num]</td>
<td>Passed parameters, see page 24</td>
</tr>
<tr>
<td>Keyword</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>GapTme</td>
<td>Gap time, see page 16</td>
</tr>
</tbody>
</table>

### Frame Status, STS

The frame status can be one of the following:

<table>
<thead>
<tr>
<th>Value</th>
<th>Symbolic name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>STSOK</td>
<td>Good status</td>
</tr>
<tr>
<td>0x01</td>
<td>STSCRC</td>
<td>CRC error</td>
</tr>
<tr>
<td>0x02</td>
<td>STSNOISE</td>
<td>Noise error</td>
</tr>
<tr>
<td>0x04</td>
<td>STSABORT</td>
<td>Status abort, frame did not complete</td>
</tr>
<tr>
<td>0x80</td>
<td>STSOVERUN</td>
<td>Overrun error, frame did not terminate properly</td>
</tr>
</tbody>
</table>

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 CRC errors.

```
showonly (STS & STSCRC = STSCRC)
```

Example: The following equation selects all frames with errors.

```
showonly STS <> 0
```

### Frame Length, Len

The frame length includes the three byte header but does not include the CRC bytes.

Example: The following equation selects frames with only a header.

```
showonly Len <= 3
```

### Frame Destination, Dst

The first byte of the frame is the destination.
For I/O updates the destination is 255 (broadcast) since all drops see updates to and from all other drops.

Example: The following equation selects frames with destination 255.

```
showonly
Dst = 255
#
```

**Frame Control, Ctl**

The second byte of the frame is the frame control, Ctl, which identifies the type of frame. Possible values are:

<table>
<thead>
<tr>
<th>Value</th>
<th>Symbolic name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CTL_INIT_REQ</td>
<td>Init request</td>
</tr>
<tr>
<td>1</td>
<td>CTL_INIT_RSP</td>
<td>Init response</td>
</tr>
<tr>
<td>2</td>
<td>CTL_TOKPASS</td>
<td>Token pass</td>
</tr>
<tr>
<td>3</td>
<td>CTL_ACK</td>
<td>Acknowledge</td>
</tr>
<tr>
<td>4</td>
<td>CTL_TOKRET</td>
<td>Token return</td>
</tr>
<tr>
<td>5</td>
<td>CTL_UPDTOSLV</td>
<td>I/O update to slave drop</td>
</tr>
<tr>
<td>6</td>
<td>CTL_UPDTOMAS</td>
<td>I/O update to master</td>
</tr>
<tr>
<td>7</td>
<td>CTL_MSG</td>
<td>Directed message</td>
</tr>
</tbody>
</table>

The symbolic names can be used in the equation.

Mask off the upper bits of the CTL byte before using them in comparisons.

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

```
showonly
((CTL&0x0F)=CTL_UPDTOSLV) OR ((CTL&0x0F)=CTL_UPDTOMAS)
#
```

**Frame Drop**

On I/O updates to or from the master, the third byte in the message is the frame drop. On updates from the master, the frame drop is the drop being updated with output data. On updates to the master, the frame drop is the drop sending the input data.

Example: The following equation selects frames that are I/O updates from drop 2 to the master
showonly
((CTL&0x0F)= CTL_UPDTOMAS) AND (drop = 2)
#

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

Offsets start from 0 and begin immediately after the three-byte frame header.

In the following frame, DataByte[0] is 12 hexadecimal (or 0x12), DataByte[1] is 34 hexadecimal (or 0x34), and so on.

4: a 0.004,958 g........ | 255< 05^ 55 12 34 ff ff...

In the following frame, DataWord[0] is 1234 hexadecimal or 0x1234, DataWord[1] is FFFF hexadecimal or 0xFFFF.

4: a 0.004,958 g........ | 255< 05^ 55 1234 ffff

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_UpdFromDrop.opt, selects frames that are updates to the master and that have a drop matching the value passed in as the first parameter.

showonly

((Ctl&0xf)=CTL_UPDTOMAS) &&
(Drop=CmdArg[0])
#
See page 24 for information on how to pass in parameters.

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 10 milliseconds (10000 microseconds)

showonly

GapTme > 10000
#

Constants

Constants can be entered in the following formats:
<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed integer</td>
<td>-32768 to 32767</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>0x0000 to 0xFFFF</td>
</tr>
</tbody>
</table>

**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=From Drop

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

**Operators**

You can use the following operators to define the equation.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;&gt;</td>
<td>not equal</td>
</tr>
<tr>
<td>!=</td>
<td>not equal</td>
</tr>
<tr>
<td>&lt;=</td>
<td>less than or equal</td>
</tr>
<tr>
<td>=&gt;</td>
<td>greater than or equal</td>
</tr>
<tr>
<td>==</td>
<td>equal</td>
</tr>
<tr>
<td>=</td>
<td>equal</td>
</tr>
</tbody>
</table>
### Sample Option Files

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

<table>
<thead>
<tr>
<th>Option File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTS_All.opt</td>
<td>Selects all frames</td>
</tr>
<tr>
<td>QTS_UpdTodrop.opt</td>
<td>Selects I/O updates to a specific slave drop</td>
</tr>
<tr>
<td>QTS_UpdFromDrop.opt</td>
<td>Selects I/O updates from a specific slave drop</td>
</tr>
<tr>
<td>QTS_Messages.opt</td>
<td>Selects directed messages</td>
</tr>
</tbody>
</table>

Typically you would 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 from DCSNet, selected using the sample option file QTS_All.opt. Lines have been truncated for clarity. The network consists of a DCS master and a single slave drop 55.

```
10: a 0.017,109 g.... | 255< 00^  53-
11: a 0.018,323 g........ | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
12: a 0.021,285 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
13: a 0.022,563 g.... | 255< 00^  54-
14: a 0.023,779 g.------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
15: a 0.026,741 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
16: a 0.028,020 g.... | 255< 00^  1-
17: a 0.029,235 g-------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
18: a 0.032,197 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
19: a 0.033,477 g.... | 255< 00^  2-
20: a 0.034,692 g-------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
21: a 0.037,651 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
22: a 0.038,933 g.... | 255< 00^  3-
23: a 0.040,148 g------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
24: a 0.043,107 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
25: a 0.044,387 g.... | 255< 00^  4-
26: a 0.045,600 g------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
27: a 0.048,560 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
28: a 0.049,840 g.... | 255< 00^  5-
29: a 0.051,054 g-------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
30: a 0.054,015 g.. | 255< 26^  55- 00 00 00 00 00 00 00 00 00 00 00 00
31: a 0.055,302 g.... | 255< 00^  6-
32: a 0.056,517 g------- | 255< 05^  55- 11 11 22 22 33 33 44 44 55 55 66 66
```

Each line starts with a reference number. For example, the first line shown has a reference number of 10.

Next is the frame timestamp. The first frame has a timestamp of 0.015245 seconds.

This is followed by a graph of the gap time.

The next three bytes are the frame header.

The first byte of the header is the destination, 255 for all frames shown in this example. This indicates a broadcast frame. All DCS frames are broadcast, since all drops must monitor I/O updates to all other drops.

The second byte of the header is the Ctl byte. It indicates the frame type.

The third byte of the header is the drop. On I/O updates from the master, the drop is the drop number receiving the data. On I/O updates to the master, the drop is the drop sending the data.
After the header is the frame I/O data. On updates from the master, the first data on every update is the global broadcast data, in this case 11 11 22 22 33 33…), followed by the register data to the drop.
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.
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:

<table>
<thead>
<tr>
<th>AN-X Info</th>
<th>Ethernet MAC address</th>
</tr>
</thead>
<tbody>
<tr>
<td>SerNum</td>
<td>Serial number</td>
</tr>
<tr>
<td>DaughterID</td>
<td>Daughterboard ID, 3 for AN-X-AMXCAPT</td>
</tr>
<tr>
<td>BootRev</td>
<td>Boot code version</td>
</tr>
<tr>
<td>ConfigRev</td>
<td>Configuration kernel version</td>
</tr>
<tr>
<td>ProdRev</td>
<td>Production kernel version</td>
</tr>
<tr>
<td>HwRev</td>
<td>Hardware version</td>
</tr>
<tr>
<td>FirmwRev</td>
<td>Firmware release version (depends on current operating mode)</td>
</tr>
<tr>
<td>Status</td>
<td>see below</td>
</tr>
<tr>
<td>VendorId</td>
<td>Vendor ID</td>
</tr>
<tr>
<td>ProdId</td>
<td>Product ID</td>
</tr>
<tr>
<td>IpAddrStr</td>
<td>IP address assigned using Utilities/AN-X IP Configuration</td>
</tr>
<tr>
<td>HostName</td>
<td>name assigned using Utilities/AN-X IP Configuration</td>
</tr>
</tbody>
</table>

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

Possible status values are:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boot mode</td>
</tr>
<tr>
<td>2</td>
<td>Configuration mode</td>
</tr>
<tr>
<td>4</td>
<td>Production mode</td>
</tr>
</tbody>
</table>
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.
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.

**Update Firmware**

**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 is 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.*

![Open dialog](image)

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-AMXCAPT 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.

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

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 AutoMax network. It operates only while the capture is running. When no capture is running, the NET LED is off.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Have received a good frame within the last 3 ms</td>
</tr>
<tr>
<td>Yellow</td>
<td>Have not received a frame in the last 3 ms</td>
</tr>
<tr>
<td>Red</td>
<td>Have received a frame with bad status. Stays on for about 1 second</td>
</tr>
</tbody>
</table>
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 AutoMax remote I/O communication, scheduled communication with ControlLogix and unscheduled messaging

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 33 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 34 for details.

Occasionally individual patch files are released. They have extension pch and are downloaded using the Utilities/Patch Firmware command in AnxInit. Refer to page 38 for details.

Reading Version Numbers

To read the version numbers of the various software components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot code</td>
<td>AnxInit – AN-X Info</td>
</tr>
<tr>
<td>Configuration kernel</td>
<td>AnxInit – AN-X Info</td>
</tr>
<tr>
<td>Production kernel</td>
<td>AnxInit – AN-X Info</td>
</tr>
<tr>
<td>Firmware</td>
<td>AnxInit – AN-X Info (version depends on current mode, boot, configuration or production)</td>
</tr>
</tbody>
</table>
# Specifications

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

Asia Pacific
Languages Spoken: Chinese, English
+603.7724.2080, support.AP@prosoft-technology.com

Europe – Middle East – Africa
Languages Spoken: French, English
+33 (0) 5.34.36.87.20, support.EMEA@prosoft-technology.com

North America
Languages Spoken: English, Spanish
+1.661.716.5100, support@prosoft-technology.com

Latin America (Brazil)
Languages Spoken: Portuguese, English
+55.11.5083.3776, dalarcon@prosoft-technology.com

Latin America (Spanish Speaking Countries)
Languages Spoken: Spanish, English
+52.222.399.6565, victor@prosoft-technology.com
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