140 NOE 511 00 / 551 00

Ethernet MMS Modules for

Modicon TSX Quantum

User Manual

840 USE 453 00

09/97

GROUPE SCHNEIDER

■ Modicon ■ Square D ■ Telemecanique

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Höhe: 230 mm

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Contents

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Terminology

☞   **Note**   This symbol emphasizes important facts.

⚠   **Caution**   **This symbol refers to a frequent source of error.**

🛑   **Warning**   **This symbol points to a source of danger that may cause financial or health damage or have other aggravating consequences.**

👨‍🎓   **Expert**   This symbol is used when more detailed information, intended exclusively for experts, is given. To understand and apply it requires special training. Skipping this information will not interfere with understanding the document, no restrict standard application of the product.

💡   **Tip**   This symbol is used for Tips & Tricks.

👣   **Path**   This symbol is a popup in the helptexts, this means you can click on it.

      In software documentation this symbol tells you how to select the described menu commands and dialog boxes. The steps are always given starting from the main menu.

      In EFB documentation (block libraries) this symbol tells you in which library and in which group you can find the described EFB.

Figures are annotated in the spelling corresponding to international practice and approved by SI (Systéme International d' Unités).
An example of this is the space following the thousands and the decimal point in the number 12 345.67.

Application Note

⚠   **Caution**   **The relevant regulations must be observed for control applicatons involving safety requirements.**
For reasons of safety and to ensure compliance with documented system data, repairs to components should be performed only by the manufacturer.

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Objectives

This documentation is the basic user guide for the Quantum MMS Ethernet option modules
140 NOE 511 00 and 140 NOE 551 00.
The focus is on installation, LED indications and Modsoft related portions of module configuring.
The option modules are shipped blank. i.e. without image loaded. Handling and operating the image is
described in the "LiveData Quantum MMS Ethernet User's Guide".

This manual will acquaint you with the MMS Ethernet modules and their parts, tell you how to install
them, describe changes you may make in configuration, review the operation of the modules and
provide maintenance procedures.

This manual is written for an Ethernet user and assumes familiarity with Ethernet networks. If you are
not familiar with Ethernet, please consult your system administrator before connecting this module to
your network.

This manual also assumes that the user is acquainted with Quantum Automation Series control
systems. For information about Quantum products, please refer to the "Quantum Automation Series
Hardware Reference Guide".

Related Documents

The following manuals may also be helpful. Be sure to order the version specified or a later version.

☐ Modicon Quantum Automation Series Hardware Reference Guide
   840 USE 100 00 Ver. 5

☐ Modicon Ladder Logic Block Library User Guide
   840 USE 101 00 Ver. 2

☐ Modsoft Programmer User Manual
   890 USE 115 00

☐ LiveData Quantum MMS Ethernet User's Guide
   840 USE LDQD 00

Validity Note

Modsoft 2.4 or higher, LiveData Quantum image 3.10, LiveData Client 3.10.

Terms and Abbrevations

CTE	Configuration Table Extension
Cycle	Cycle Software Inc.
Image	Short form for LiveData Quantum image
LiveData	Name of Cycle's product family
MAC	Medium Access Control
MMS	Manufacturing Message Specification
MMSE	Short form for MMS Ethernet
MSTR	Master Block: Modbus+ Ladder Logic communication function block
NSAP	Network Service Access Point
OSI	Open System Interconnection
PDU	Protocol Data Unit
PLC	Programmable Logic Controller

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Chapter 1
Introduction

___

☐ Introducing the MMS Ethernet modules

☐ Front panel components

☐ LiveData Quantum image diskette

1.1 Introducing the MMS Ethernet Modules

The Quantum MMS Ethernet modules make it possible for a Quantum industrial control system to communicate with MMS devices on an Ethernet network. For example, the modules can be used to link a Quantum Automation Series controller to a PC.

The MMS Ethernet network is well supported worldwide, with a wide variety of third party products and services. MMS is a standard protocol.

1.1.1 The Benefits of Quantum Design

Like all Quantum modules, the MMS Ethernet modules are easy to install.

The MMS Ethernet modules are shipped blank, i.e. the image is not yet loaded. The image is to be downloaded by the user. Modsoft 2.4 or higher is needed to download the image into the module's flash memory.

The modules may be inserted into existing Quantum systems and connected to existing Ethernet networks. They do not require proprietary cabling.

The modules may be plugged into any slot in a local Quantum backplane and may be replaced while the system is running (hot swapped).

1.1.2 Models for Fiber Optic and Twisted Pair Cable Systems

Modicon has designed two Ethernet MMS modules: one for fiber optic networks and the other for networks using twisted pair cabling. Both are covered in this manual.

Table 1   Assignment cable to Module

Type of Cable Network	Part Number
Twisted Pair	140 NOE 511 00
Fiber Optic	140 NOE 551 00

Note   The MMS Ethernet module must be routed through an Ethernet hub to function properly. Do not connect it directly to another device.

1.1.3 System Compatibility

For the MMS Ethernet module to work properly, you must have the proper version of other system components. Use the version specified in the table below or a later version.

	Quantum Executive	Modsoft	LiveData Quantum Image	LiveData Client
Version	2.11	2.4	3.10	3.10

☞ **Note**   LiveData Quantum image is the module executive. LiveData Client is the software required for configuring and monitoring the module.

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1.2 Front Panel Components

On the front panel of each MMS Ethernet module, you will find an LED display, a global address label and a cable connector.

1.2.1 MMS Ethernet Module For Twisted Pair Networks
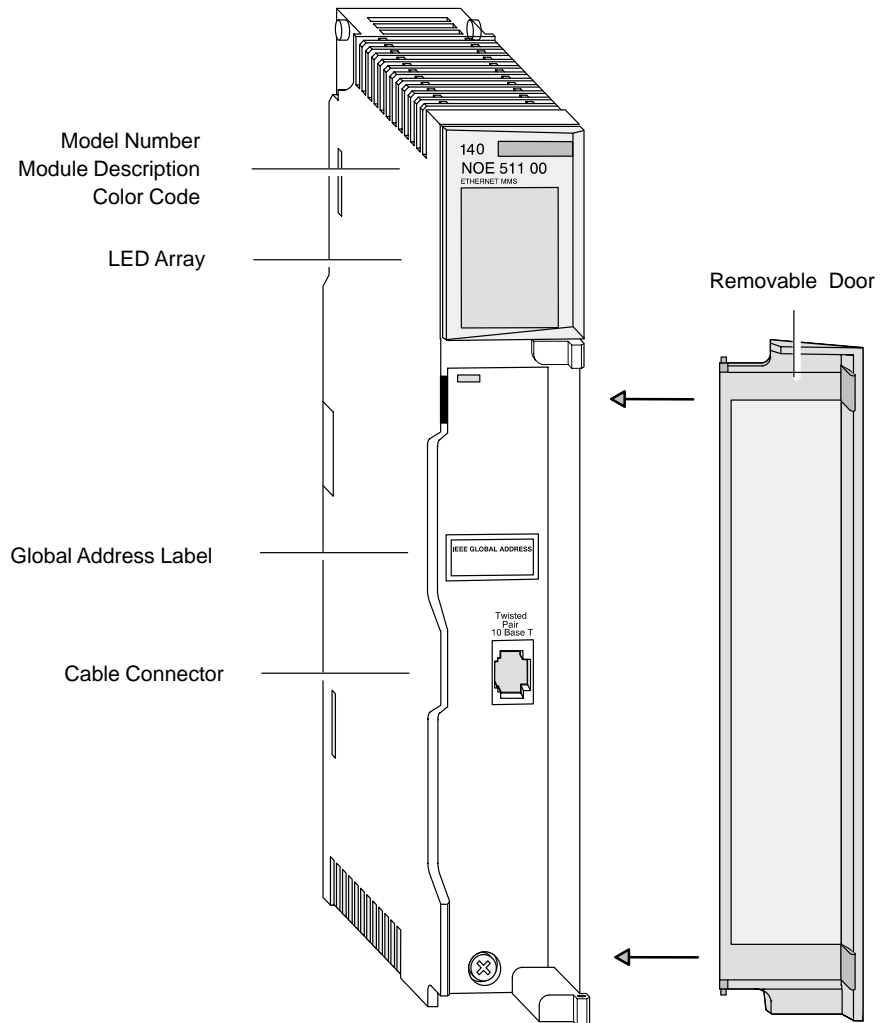
Figure 1   140 NOE 511 00 Module

1.2.2 MMS Ethernet Module for Fiber Optic Networks

Model Number
Module Description
Color Code

LED Array

Removable Door

140
NOE 551 00
ETHERNET MMS

Global Address Label

IEEE GLOBAL ADDRESS

Fiber Optic
10 Base FL

Transmit Cable Connector

Tx

Receive Cable Connector

Rx
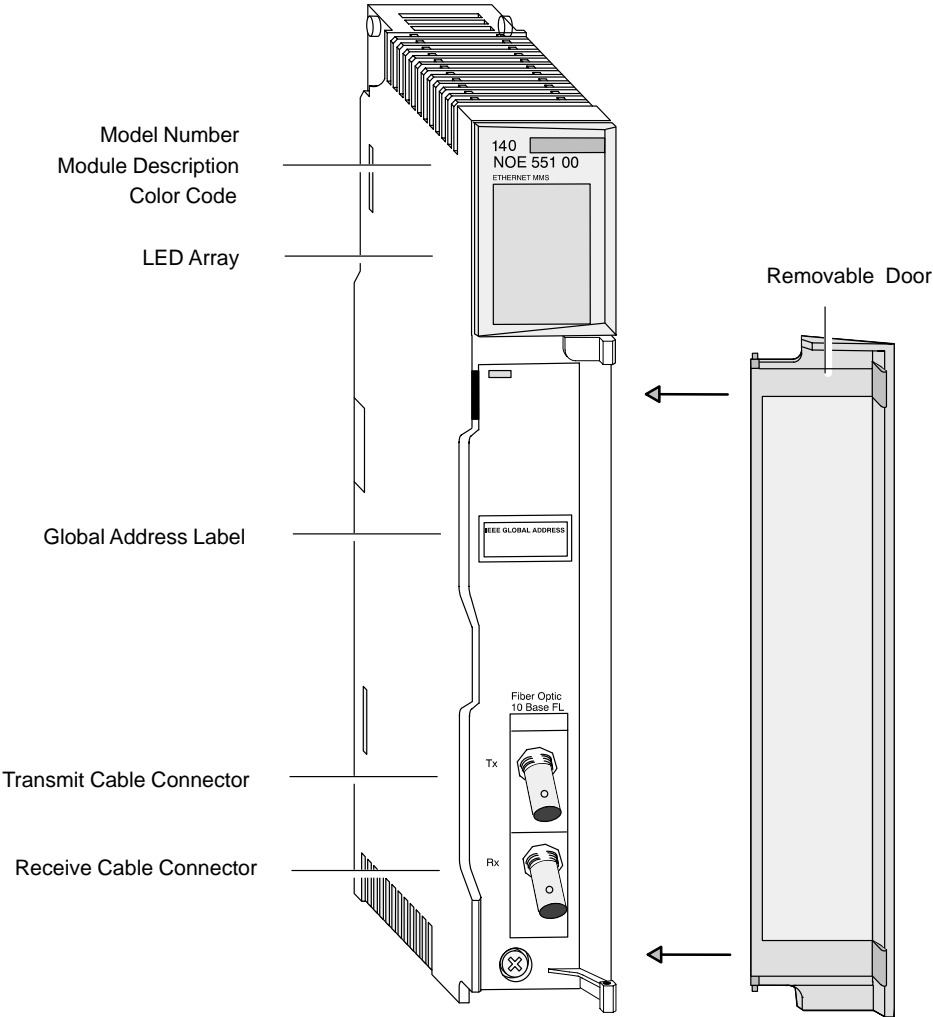
Figure 2   140 NOE 551 00 Module

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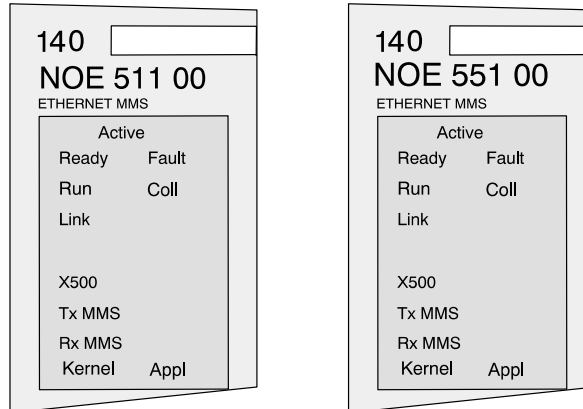
1.2.3 LED Array

Figure 3   LED Array

LED	Color	Indication When On
Active	Green	Module is communicating with backplane.
Ready	Green	Module has passed internal diagnostic tests.
Run	Green	Flashes during normal operation.
Link	Green	Ethernet link to hub is ok.
X500	Green	If steady, module is connected to X500 Server. If flashing, module is X500 Server.
TxMMS	Green	If flashing, module is sending MMS PDUs.
RxMMS	Green	If flashing, module is receiving MMS PDUs.
Kernel	Amber	If steady, module is operating in kernel mode. If flashing, module is waiting for download.
Fault	Red	An error has been detected, a download has failed or a reset is in process.
Coll	Red	If steady, cable is not connected. If flashing, Ethernet collisions are occurring.
Appl	Amber	Entry exists in crash log.

1.2.4 Module Addresses

Each Quantum MMS Ethernet module is unambiguously identified on the network by two addresses: the Ethernet or MAC address and the OSI network address (NSAP). Both addresses must be unique on the whole network.

1.2.4.1 Ethernet Address Label

The Ethernet address or MAC address is assigned at the factory and is recorded on a label on the front panel, above the cable connector. This is a unique 48–bit global assigned address. It is set in PROM. The Ethernet address is recorded on the label in hexadecimal, in the form 00.00.54.xx.xx.xx.

```
┌─────────────────────────────────┐
│                                 │
│       IEEE GLOBAL ADDRESS       │
│                                 │
│          000054xxxxxx           │
│                                 │
└─────────────────────────────────┘
```

Figure 4   Global Address Label

1.2.4.2 OSI Network Address (NSAP)

You can use the default NSAP address, which is provided in the image. Or you can configure a unique address via Modsoft. Throughout this book, these alternatives will be referred to as the default NSAP network address and a user–configured address.

The default NSAP network address has the form 49 00<CYCLE–ID>01, where each figure is a hexadecimal number. The NSAP address is minimum 6 byte and maximum 20 byte long. <CYCLE–ID> denotes a field holding the Cycle–ID, which is unique for each module.

If you will be operating on an open network, you should opt for a user–configured address. Obtain a valid address from your network administrator.

If you will be operating on a local network, you may use the default NSAP network address. However, you should check with your network administrator first to ensure that this address is not already in use.

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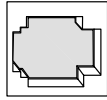
1.2.5 Twisted Pair Connector

Figure 5   NOE 511 Connector

For the NOE 511, Modicon recommends that you use Category 5 UTP cabling, which is rated to 100 MHz, with an RJ–45 connector. You may also use Category 3 UTP cabling, which is rated to 16 MHz.

The RJ–45 pinout used by this module is:

☐ Receive Data (+)   3

☐ Receive Data (–)   6

☐ Transmit Data (+)   1

☐ Transmit Data (–)   2

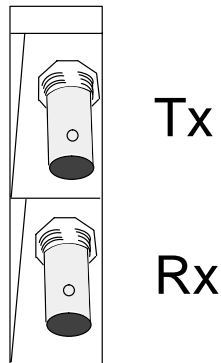### 1.2.6 Fiber Optic Connectors

Tx

Rx

Figure 6   NOE 551 Connectors

For the NOE 551, you need 62.5/125 micron fiber optic cable with ST–style connectors. Modicon offers a 3 m cable with connectors (990 XCA 656 09).

This module comes with two fiber cable clasps, tubular plastic tools for installing the cable.

1.3   LiveData Quantum Image Diskette

The MMS Ethernet modules are shipped blank, i.e. without image loaded. To operate the modules you need a licensed LiveData Quantum image which is not part of the module or manual but must be purchased separatly.
The image is provided on a diskette. Moreover, the diskette contains an utility for the Ethernet module, the ERRLOG utility.

1.3.1   ERRLOG

This utility allows you to read and clear the crash log from an IBM compatible PC communicating with the local Quantum controller via Modbus Plus.

The PC must be equiped with an SA85 Modbus Plus card and software driver. ERRLOG may be run in a native DOS environment or in a DOS box under Windows 3.1 or Windows 95.

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Chapter 2
Using Your Ethernet Module

☐ Before you begin...

☐ Installing the module

☐ Changing the default configuration

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2.1 Before You Begin . . .

The MMS Ethernet module is shipped blank, i.e. without the image loaded. Before you can operate the module on your network you must download the image. The image already includes default configuration data. But before you install your module, you must verify that:

☐ the LiveData Quantum image with the proper Cycle–ID is available

☐ the default configuration is appropriate for your network

☐ your Ethernet network is properly constructed

⚠ **Caution   The default configuration includes the OSI network address (NSAP). Do not connect this module to your network until you have ensured that its NSAP address will be unique on the network.**

2.1.1   Verifying the Default Configuration

You should verify the default configuration before installing the module:

☐ if the module will be communicating on an open network

☐ if the module's default OSI network address (NSAP) is already in use on your network

Consult your network administrator to see if any of these conditions apply. If they do, follow the directions on p.17 for changing the default configuration.

☞ **Note**   If you will be changing the default configuration, you should stop the controller, then install the module, then change the configuration before starting the controller again.

The MMS Ethernet module only reads its CTE configuration data at power–up and when it is reset. Whenever the CTE configuration data is changed, the module must be reset. This can be done by hot swapping or through a command to the MSTR block or by using LiveData Client software.
Once the MMS Ethernet module is installed, stopping / restarting the controller or program downloading will not reset it.

It is also possible to change the default configuration with help of the LiveData Client software. Configuring and resetting of the MMS Ethernet module can be done under direct control of this software.

2.1.2 Verifying that the Network Has Been Constructed Properly

You should not connect an Ethernet module directly to another device with a length of cable. For the network to operate properly, you must route the cable for each device through an Ethernet hub. Hubs are widely available and can be purchased from many suppliers.
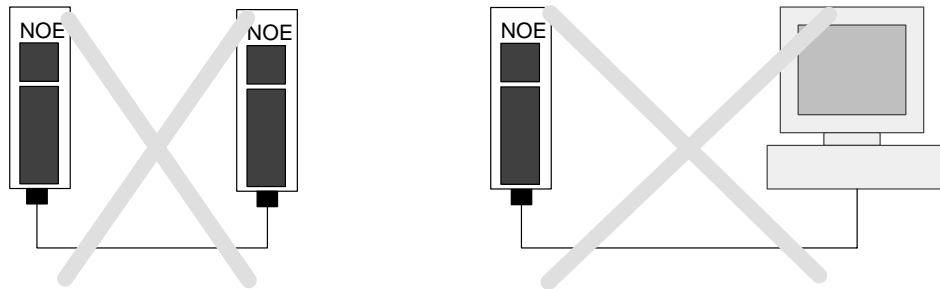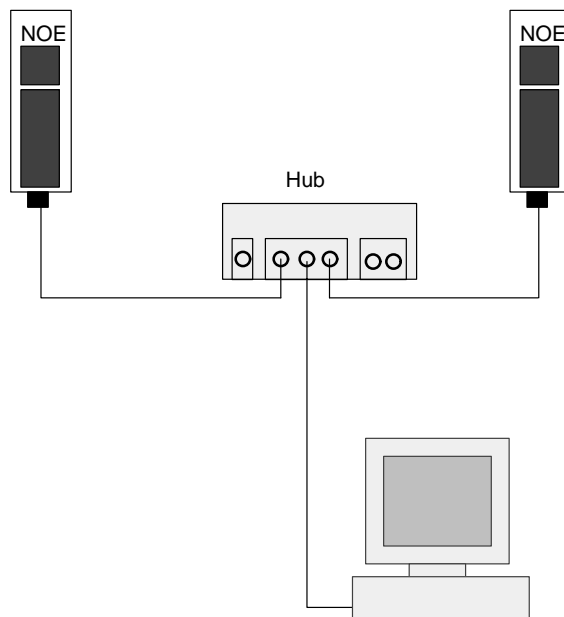

Figure 7 Improper Network Topologies

Figure 8 Proper Network Topology

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2.2   Installing the Module

The MMS Ethernet module comes blank, i.e. without image loaded. Installation consists of mounting the module on the backplane, connecting the cable and downloading the image.

2.2.1   Are You Really Ready to Install?

Check, that:

☐ the MMS Ethernet module and LiveData Quantum image are available,
☐ the default configuration is unique.

If you are planning to change the default configuration, stop the controller before installing the Ethernet module.

Modicon also recommends that you test to be sure your Ethernet cabling is working properly before connecting it to the Ethernet module. Some suppliers of testing equipment are listed in Appendix B.

2.2.2   Mounting the Module on the Backplane

Mount the module at an angle onto the two hooks located near the top of the backplane. Swing the module down to make an electrical connection with the backplane I/O bus connector.
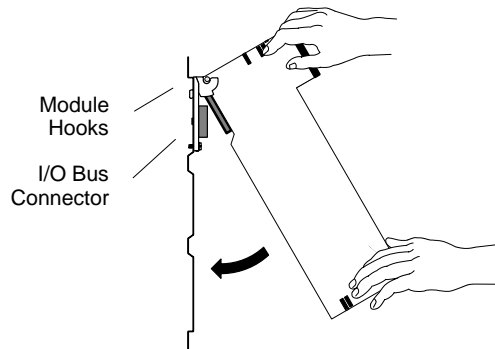

Figure 9   Mounting an Ethernet Module on the Backplane

Tighten the screw at the bottom of the module to fasten it to the backplane. The maximum tightening torque for this screw is 2–4 in–lbs.

2.2.3 Connecting the Cable

If you are using twisted pair cable, Modicon recommends Category 5, which is rated to 100 MHz. Use RJ–45 connectors. Slip the connector into the port. It should snap into place.

2.2.3.1 Connecting Fiber Optic Cable

Use 62.5/125 fiber optic cable with ST–style connectors. Modicon sells a 3 m cable with connectors (990 XCA 656 09).

Remove the protective plastic coverings from the cable ports and the tips of the cable. Snap one of the fiber cable clasps onto the cable, carefully pressing the cable through the slot so that the wider end of the clasp is closest to the boot.
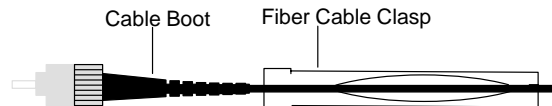
Cable Boot   Fiber Cable Clasp

Figure 10   Attaching the Fiber Cable Clasp to the Cable

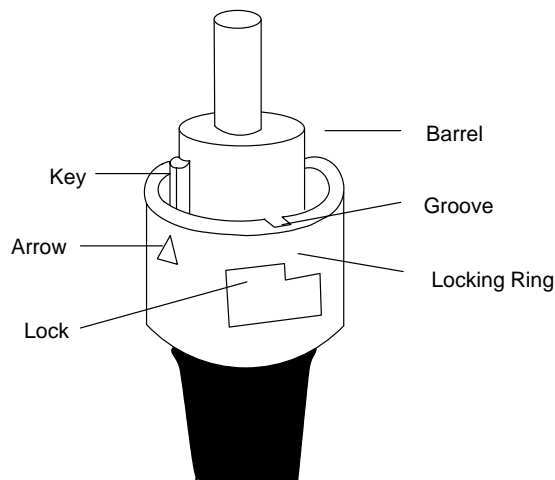The key to installing the cable is to align the barrel, the locking ring and the connector.

Barrel

Key

Groove

Arrow

Locking Ring

Lock

Figure 11   Aligning the Key and Locking Ring

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Turn the locking ring to align an arrow with the key. Then align the key with the keyway. As a result, the locking tab, groove and lock should also be aligned.

Slide the clasp up to the locking ring. Gripping the cable with the clasp, plug the cable into the lower (receive) cable connector. If it does not connect easily, realign the key with the arrow and try again.
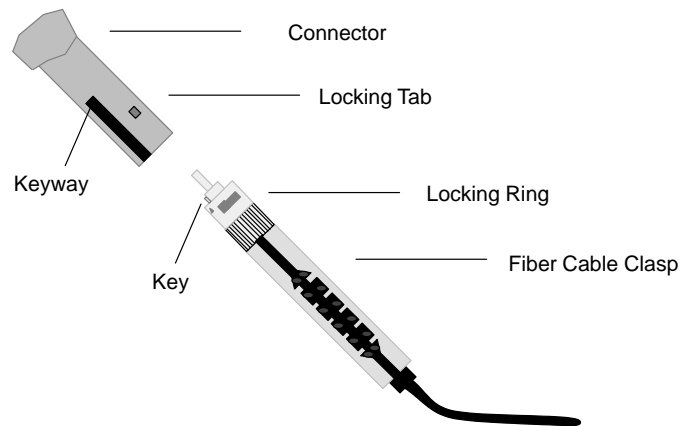

Figure 12   Attaching the Cable

Turn the cable to the right, so that the tab locks securely. You may leave the fiber cable clasp on the cable for future use, but slide it off the boot of the cable to allow the module door to close.

Repeat this process with the remaining strand of cable and the upper (transmit) cable connector.

When connecting the cable to the hub, make sure that the strands are crossed. The transmit port of one device should be linked to the receive port of the other.

2.2.4   Downloading the Image

The downloading procedure for the LiveData Quantum image is decribed in chapter 3.3. Moreover, you will find a description in the "LiveData Quantum MMS Ethernet User's Guide".

2.3   Changing the Default Configuration

Configuring of the MMS Ethernet will be done with help of the Modsoft CTE screen for MMS Ethernet. The following steps are to be performed:

☐ Stop the controller.

☐ Install the module.

☐ Change the default configuration (CTE screen) offline.

☐ Execute ”FILE TO PLC”.

☐ Reset the module.

☐ Start the controller.

2.3.1   The Configuration Table Extension Screen

				modsoft					▼	▲

Hex   Dec   Bin   Goto   Quit
  F1————————F2————————F3————————F4————————F5————————F6————————F7— Lev 8 F8— OFF— F9———
                      Quantum MMS Ethernet (MMSE) CFG. (1st OPTIONMOD.)   Screen 1 / 12

    Quantum Backplane Slot: 0   DEC   Note: slot=0, deletes option
    Use defaults at Power On Reset: NO
    NSAP:
      (B5): | 00 | 00 | 00 | 00 | HEX   Note: B5, B4, B3, B2, B1 represents the full
      (B4): | 00 | 00 | 00 | 00 | HEX   potential 20 bytes
      (B3): | 00 | 00 | 00 | 00 | HEX   NSAP address which is di-
      (B2): | 00 | 00 | 00 | 00 | HEX   vided 4 bytes in each line
      (B1): | 00 | 00 | 00 | 00 | HEX

    NSAP Length in bytes (0,6 – 20): 0   DEC

                              PgDn/Up to next/prev Screen

◄   ►

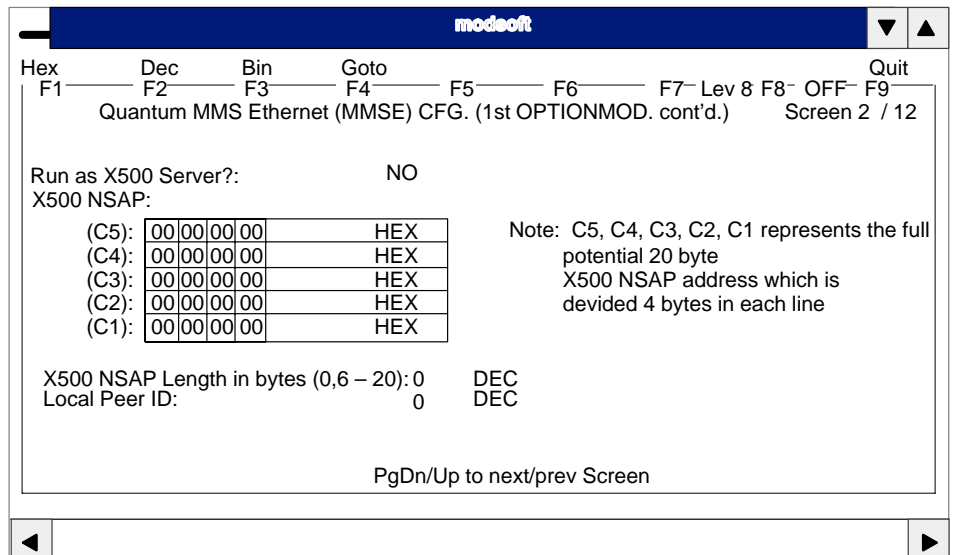**Figure 13   Configuration Extension Screen (screen 1)**

Figure 14   Configuration Extension Screen (screen 2)

From the Modsoft configuration overview screen, select the "Cfg Ext" pulldown menu. From the options, select "MMS ENET" Setup. You will reach the Ethernet configuration extension screen.

The first MMS Ethernet module requires 100 words of CTE memory. Each additional MMSE module will add 95 words to the CTE size.

2.3.2   Assigning a Slot Number

To activate the configuration extension screen, you must enter the backplane slot number in the first entry field. This is the slot where you have mounted or intend to mount the Ethernet module. The slots are numbered from left to right, from one to sixteen.

☞ **Note**   If you do not enter the slot number, the system will ignore any other data you enter on this screen.

2.3.3   Adjusting "Use Defaults" Parameter

Normally the MMS Ethernet module needs configuration data that is downloaded within configuration files to the module over the network (as to the configuration files description confer "LiveData Quantum MMS Ethernet User's Guide"). Upon option module reset the configuration data files are interpreted by

the module. The "Use Defaults" parameter can be used to force the module not to begin interpretation, but to ignore the configuration files and start with a clean configuration. This option should only be used as an emergency means, when some problems during the interpretation phase occur.

In this case the "Use Defaults" parameter should be set to "YES" (i.e. ignore configuration files and start with clean configuration). If your system operates without any problems, the "Use Defaults" parameter should be set to "NO" (i. e. use configuration files).

2.3.4 Assigning the OSI Network Address

The OSI network address (NSAP) is used to unambiguously identify a station within the whole network. Its size, which is displayed in the NSAP Length parameter, can range from 6 bytes to 20 bytes. In Modsoft an NSAP is input in 5 rows, each of which may contain 4 bytes. The NSAP field always shows 20 bytes, but the NSAP length parameter defines, how many of these bytes are actually used.

If the "NSAP Lengths" field is set to 0, which means that there is no explicit network address, the option module comes up with the default NSAP, which is derived from a unique ID stamped into the module's image.

☞ **Note** Make sure that all network addresses within your network are unique.

2.3.5 Defining the X500 Server Location

The X500 server acts as a kind of central registry, where all applications supporting the X500 protocol can register. The X500 server may be located on a PC within the network or on one of your MMS Ethernet modules. If you decide to put the X500 server on one of your MMS Ethernet modules, the "Run As X500 server" field corresponding to this module must be set to "YES". Otherwise it must be set to "NO".

2.3.6 Inputting the X500 Server Network Address

When you have fixed the location of the X500 server, you need to make the OSI network address of the station on which the X500 server is located known to all other stations, so that they are able to register. The X500 NSAP is inputted in the same way as the station's own NSAP.

If the "X500 NSAP Length" field is set to 0, which means that there is no explicit X500 network server address, the option module comes up with a predefined default NSAP, whose value is "49 00 00 00 00 00 00".

☞ **Note** Even on the station, where the X500 server is actually running you need to fill in the entry "X500 NSAP". In this case the value of the X500 NSAP equals the value of the station's own NSAP.

2.3.7 Assigning a Local Peer ID

In the simplified MMS communication mode, in which a simple Read and Write Register functionality might be used without any MMS configuration, the Peer ID is used within the MSTR function to identify the partner station. This is analogous to the Peer ID in the MB+ solution. Since a station's Peer ID is not determined by hardware jumpers as in the MB+ case , the "Local Peer ID" field assigns such a value to the local station.

If the value of the "Local Peer ID" field equals 0, no Peer ID is assigned to the local station. This option is normally utilized, if more sophisticated MMS communication is required.

☞ **Note** If the "Local Peer ID" field is used (i.e not equal zero), its value is part of the application name, under which the station registers to the X500 server. You can verify that in your LiveNet Directory.

2.3.8 Resetting the Module

If you change the default configuration after installing the module, you must reset the module for your changes to take effect. The module may be reset through a command to the MSTR block in Modsoft, by cycling power or by lifting the module off the backplane and then setting it back in its slot.

Resetting of the MMS Ethernet module can also be done under control of the LiveData Client software.

2.3.9 Configuring More Than One Ethernet Module

You may configure from two to six Ethernet modules in a single controller, depending on the CPU model. A 140 CPU 113 or 213 will accept a total of two network option modules, including NOE, NOM, NOP and CRP modules. A 140 CPU 424 will accept six modules.

The modules may be placed in any slot in the backplane. They do not have to be placed next to each other.

To configure the modules, simply page down to an unused configuration extension screen. Enter the backplane slot number to activate the screen.

2.3.10 CTE Configuration Example

Figure 15   Configuration Extension Screen (screen 1)

Figure 16   Configuration Extension Screen (screen 2)

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Höhe: 230 mm

From the configuration example you can derive the following information on the module you have configured:

☐ "Quantum Backplane Slot: 5"
   The module is assigned to backplane slot 5 of the Quantum rack.

☐ "Use defaults at Power on Reset: NO"
   The module is forced to use configuration data provided in the configuration files (see LiveData Quantum MMS Ethernet User's Guide).

☐ "NSAP: 49 00 00 00 14 60"
   The OSI network address (NSAP) of the module is 49 00 00 00 14 60 (user defined NSAP).

☞ **Note**   When entering the NSAP start with the left most field of the first row. If an NSAP address does not occupy full rows the rest of the last significant row must be set to zero.

☞ **Note**   If you enter a NSAP not equal to zero then the default NSAP(general format CY_<Cycle–ID>_01) is overridden.

☐ "Run as X500 server: YES"
   The X500 server of the MMSE network is located on this module.

☐ "X500 NSAP: 49 00 00 00 14 60"
   The NSAP of the module where the X500 server is located is 49 00 00 00 14 60.

☞ **Note**   If you enter a X500 NSAP then the default X500 NSAP(49 00 00 00 00 00) is overridden.

☐ "X500 NSAP Length: 6"
   The length of the X500 NSAP is 6 bytes.

☐ "Local PEER ID: 60"
   The identifier of the remote peer to communicate with is 60.

Chapter 3
Maintenance

☐ Responding to errors

☐ Hot swapping an Ethernet module

☐ Downloading a new image

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3.1 Responding to Errors

3.1.1 Detecting Errors

When faults occur, the LED display can help you determine what went wrong. During normal operation, the LEDs should display the following pattern:
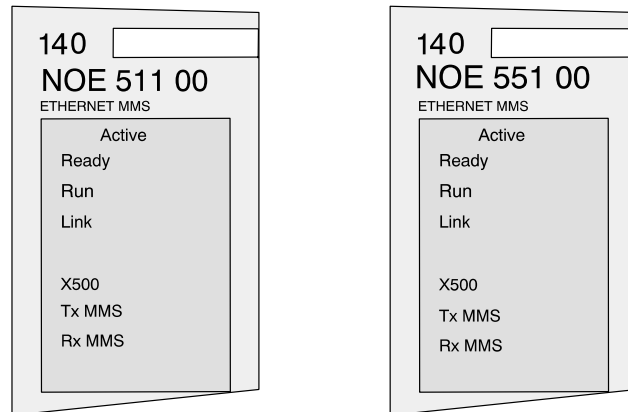

Figure 17 LED Display During Normal Operation

The **Run** indicator will flash. The **Coll** LED also may flash, indicating that collisions are occurring on the Ethernet network. Such collisions are normal.

If a fault has occurred, the normal LEDs may be extinguished or other indicators may light. This section will discuss errors reported by the **Active, Ready, Coll, Link, Kernel, Appl, Fault, X500, TxMMS and RxMMS** indicators.

For each type of error, try the suggested remedies in the order given. If no remedy suggested here overcomes the error, call your local service representative or call Modicon customer service for further directions.

Certain error codes are recorded in the MSTR block. For instructions on how to read and interpret those codes through Modsoft, please refer to the "Ladder Logic Block Library User Guide" or the Modsoft online help.

3.1.2 Active LED

If the Active LED fails to light, the module is not communicating with the backplane.

Troubleshooting

1. Make sure the Ethernet module and the controller are installed properly. Verify that the controller is functioning.

    If the controller is not functioning, replace it. If neither the new controller nor the Ethernet module will function, replace the backplane.

2. Make sure that no more than two network option modules — including NOE, NOM, MMS, NOP and CRP modules — have been installed in the backplane with a 140 CPU 113 or 213; no more than six network option modules with a 140 CPU 424.

3. Check the version of the controller executive. You must have version 2.1 or greater to support the Ethernet module. Earlier versions do not recognize the module.

4. Replace and return the faulty Ethernet module.

3.1.3 Ready LED

If the Ready LED fails to light, the module has failed internal diagnostic tests.

Troubleshooting

1. Make sure that power has been applied to the backplane.

2. Replace and return the faulty Ethernet module.

3.1.4 Link LED

If the Link LED fails to light, the module is not communicating with the Ethernet hub.

Troubleshooting

1. Make sure that the cable has been installed correctly and the module is functioning properly.

2. Verify that the hub is working properly.

3.1.5   X500 LED

If the X500 LED is steady, the module is connected to the X500 server.
If the X500 LED is flashing, the module itself is X500 server.
If the X500 LED is off the module is neither connected to the X500 server nor
X500 server itself.

Troubleshooting

1.   Check that an X500 server is correctly installed on the network.

2.   Check X500 NSAP address of faulty station.

3.1.6   Tx MMS LED

If the TxMMS LED is flashing, the module is sending MMS messages.
If the TxMMS LED fails to light, no MMS messages are sent.

Troubleshooting

1.   Check MSTR configuration.

2.   Check configuration files.

3.1.7   Rx MMS LED

If the RxMMS LED is flashing, the module is receiving MMS messages.
If the RxMMS LED fails to light, no MMS messages are received.

Troubleshooting

1.   Check MSTR configuration.

2.   Check configuration files.

3.1.8   Kernel LED

If the Ready LED is on and the Kernel LED is flashing, the module has detected an invalid image. If the Ready LED is on and the Kernel LED is shining steadily, an attempt to download an image has failed and the module is in kernel mode.

In either case, download a new LiveData Quantum image, using the procedure on page 33.
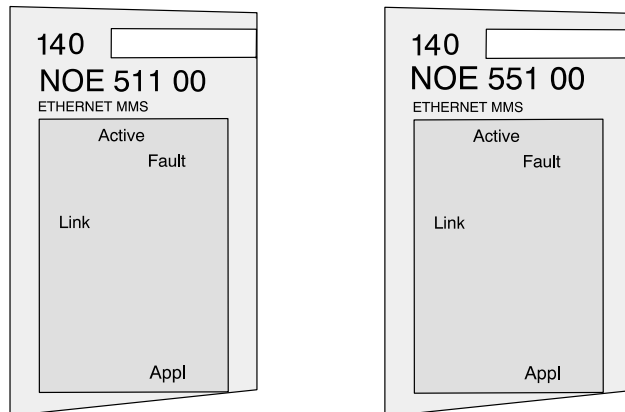
3.1.9   Fault LED

Figure 18   LED Display When the Error Log is Full

The Fault LED will flash briefly following an error as the module attempts to recover. The Fault indicator will remain on only when the error log is full (the error log has space for 1023 entries). In that case, the module will be unable to recover. Use the ERRLOG utility to clear the error log.

3.1.10   Collision LED

If the twisted pair cable has not been connected properly, the Coll LED will shine steadily and the Link LED will be extinguished. (This condition does not occur with fiber optic modules.)
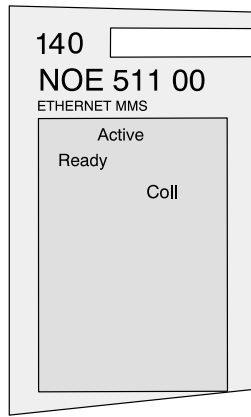
Breite: 185 mm
Höhe: 230 mm

Figure 19   LED Display for Improperly Connected Twisted Pair Cable

Troubleshooting

1.   Make sure the cable has been installed properly and is working properly.

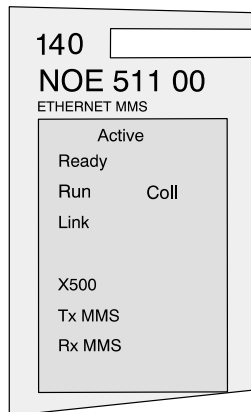**2.**   Verify that the Ethernet hub is functioning properly.

Figure 20   LED Display When Ethernet Collisions Are Occurring

If the Coll LED is flashing, the module is reporting collisions on the Ethernet network. While such collisions are normal, the frequency of the flashes is an indication of the volume of traffic on the network. The flashes may be so frequent that the LED appears to be shining steadily. Heavy traffic will slow communications. If response time is important to your application, you should consider segmenting your network to reduce the frequency of collisions.

3.1.11   Application LED

If the module crashes, it will note the reason in a log. If the module is able to recover, the Appl LED will light, indicating that an entry has been made in the error log. To learn how to read and clear the error log, refer to the section below.

3.1.12   Reading and Clearing the Error Log

If the Appl indicator is lit, entries have been made in the error log. The log may hold up to 1023 entries. If the error log is full, the Fault indicator will remain on and the module will be unable to recover until the log is cleared.

You may read the error log while the controller is running or stopped, using the ERRLOG utility. However, if you plan to clear the error log, you must stop the controller first. During the program, ERRLOG will ask you whether you want to stop the controller. If you respond yes, it will stop and restart the controller for you.

To read the error log, at the DOS prompt in the appropriate directory, type:

> ERRLOG <routing path> <slot> [/d] [/sxx] [/ny]

where <routing path> is the Modbus Plus address of the Quantum PLC

> <slot> is the slot number of the Ethernet option module

> [/d] is optional, to enable debug messages. Default is no debug.

> [/sxx] is optional and specifies the software interrupt to use, xx in hexadecimal. The default is 5c.

> [/ny] is optional and specifies the Modbus Plus adapter number to use, y. The default is 0.

Example 1.   ERRLOG 49 1

This is the minimum command. It will display the error log of the Ethernet module in slot 1 of the controller at Modbus Plus address 49.

Example 2.   ERRLOG 49.50 4 /d /s5d /n1 > TRACE.OUT

This will display the error log of the Ethernet module in slot 4 of the controller at Modbus Plus address 49.50. It will display debug information, use software interrupt 5d and use Modbus Plus adapter number 1. The output will be redirected to a file named TRACE.OUT.

If you have entered a viable command, ERRLOG will respond:

     Path DM. x. 0. 0. 0. 0 was opened

where x is the Modbus Plus address of the Quantum controller.

Next, it will list the number and date of the Quantum Ethernet image version.

Then, for each entry in the error log, ERRLOG will display the following information:

     Error log entry number.

     File name: Line: error code:

     The ten registers of the microprocessor in hexadecimal (EAX, EDX, ECX, EBX, EBP, ESI, EDI, ESP, EFLAGS, EIP).

For hardware exceptions, the file name and line number will be replaced by the hardware exception vector number in decimal.

If you have requested debug messages, ERRLOG will also display the Modbus messages and responses between the controller and the PC.

Sample error Log

     Path DM. 24. 0. 0. 0. 0 was opened.

     Quantum Ethernet image Ver. 1.00   07/15/96 09:31:35

     Error Log Entry Number: 1

     File name: user_lgc.cpp, Line: 200, error code: 0x0101
     EAX=00000001 EDX=00000001 ECX=00300101 EBX=00000000
     EBP=00012efc ESI=00000000 EDI=00000000 ESP=00012edc
     EFLAGS=00000046 EIP=03f0e0f4

Record the information in the entry and report it to Modicon customer service at 1–800–468–5342 or contact your local service representative.

After displaying all entries, ERRLOG will prompt:

     Clear the Error Log? (N)

If you do not want to clear the log, enter the default N. If you want to clear the log, type Y. If you enter Y, ERRLOG will ask:

Do you wish to stop the PLC? (N)

Again, enter Y or N. Remember that the controller must be stopped before you can clear the log.

If you enter Y, ERRLOG will stop the controller and clear the log. Then it will prompt:

Do you wish to re–start it? (N)

To restart the controller, type Y.

Breite: 185 mm
Höhe: 230 mm

3.2 Hot Swapping an Ethernet Module

You may replace your MMS Ethernet module while the controller is running.

The new Ethernet module will inherit any CTE configuration changes you had made. If the original Ethernet module was given a user–configured address (i.e. NSAP entry in CTE is not equal zero), the new module will assume that address. If you will be using the default address (NSAP), check with your system administrator to ensure that this address is not already in use on your network.

After replacing an MMS Ethernet module it must be reconfigured with help of the previously used configuration files.

To hot swap the module, simply disconnect the cable and remove the old module from the backplane. Then insert the new module in the slot and reconnect the cable.

If you are replacing the module because it failed, be aware that you may have lost several transactions. These transactions are not captured in memory and cannot be recovered by the new module.

3.3   Downloading a New Image

From time to time, improved versions of the LiveData Quantum image may be released. These new images may be downloaded through Modsoft using the following procedure.

3.3.1   Procedure: Downloading a New Image

Step 1   Stop the PLC.

Step 2   From the main Modsoft menu, select **Transfer.** From the Transfer pulldown menu, select **Download Exec**.
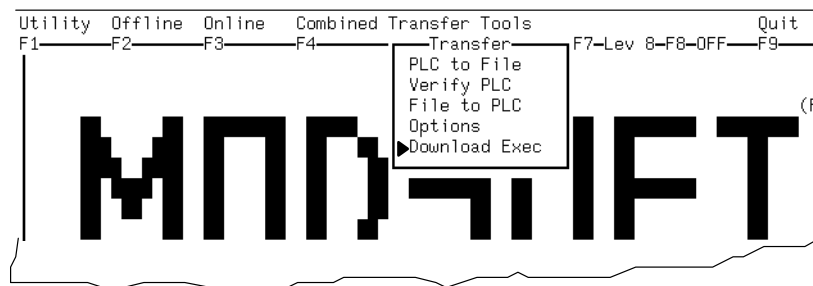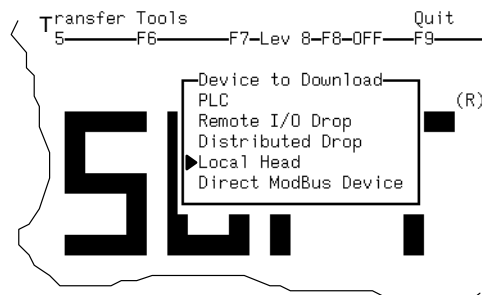

Figure 21   Main Menu Transfer Options

Figure 22   Download Device Options

r   **Step 1**   From the Device to Download menu, select **Local Head**. Now you must specify which PLC is controlling the Ethernet module and the backplane slot (head) number for the Ethernet module.

Breite: 185 mm
Höhe: 230 mm

Step 2 Modsoft will prompt you for the filename of the executive. It is referring to the new image. Load the diskette with the file in the floppy drive and type the drive designation and filename in the space provided, separated by a colon, i.e. a:filename.ext.
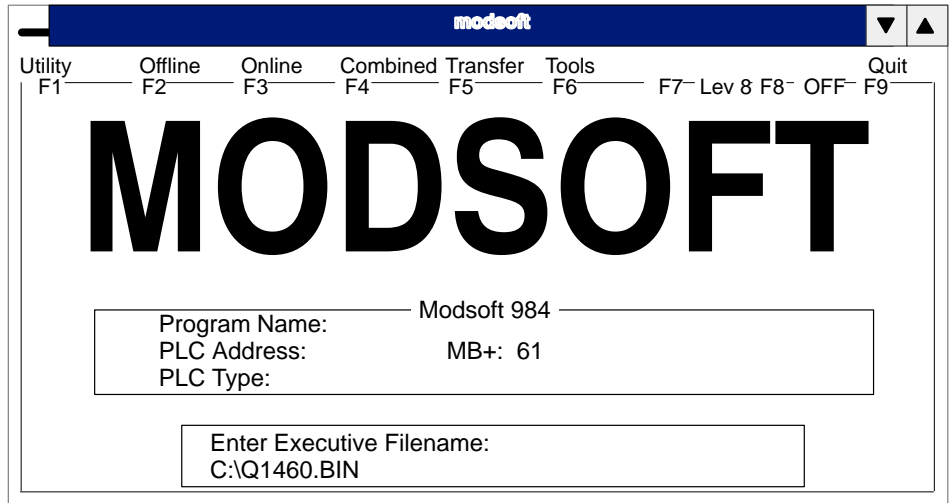

Figure 23 Location of Image

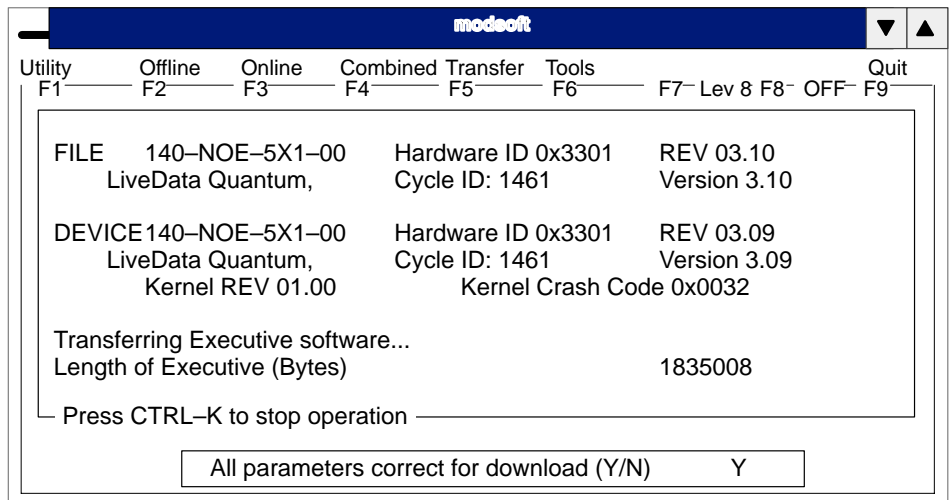**Step 3** Execute download operation with "Y"

Figure 24 Module and Image Versions

Note FILE refers to the new LiveData Quantum image to be downloaded. DEVICE refers to the LiveData Quantum image already loaded.

These screens provide information on the versions of MMS Ethernet module hardware and the LiveData Quantum image.

Caution   Make sure that a particular LiveData Quantum image, which is unambiguously identified by its Cycle–ID, is not downloaded onto more than one MMS Ethernet module on the same network. Otherwise your network will not work.

Step 4   Start PLC.

Breite: 185 mm
Höhe: 230 mm

Appendix A
Specifications

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A.1 Technical Specifications

Communication Ports	
Ethernet ports transmit and receive MMS messages:	
NOE 511 00	1 10BASE–T Ethernet network (RJ–45) port
NOE 551 00	1 10BASE–FL Ethernet network (ST–style) port
Power Dissipation	5 W
Bus Current Required	1 A
Operating Conditions	
Temperature	0 to 60°C
Humidity	0 to 95% Rh noncondensing @ 60°C
Altitude	15,000 ft (4,500 m)
Vibration	10–57 Hz @ 0.0075 mm d.a. 57–150 Hz @ 1 g
Storage Conditions	
Temperature	−40 to +85°C
Humidity	0 to 95% Rh noncondensing @ 60°C
Free Fall	1 m unpackaged
Shock	3 shocks / axis, 15 g, 11 ms

000000.20

Appendix B
Suppliers

Breite: 185 mm
Höhe: 230 mm

B.1 Equipment suppliers

A variety of Ethernet installation tools, cable diagnostic tools, cables, connectors and other related equipment is readily available from mail order suppliers or at your local computer supply store.

Cable testing equipment is available from:

☐ Datacom Technologies   1–800–468–5557

☐ Microtest, Inc.   1–800–526–9675

☐ Scope Communications, Inc.   1–508–393–1236

☐ Wavetek, Inc.   1–800–854–2708

Modicon has not qualified and does not endorse any of these products.

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