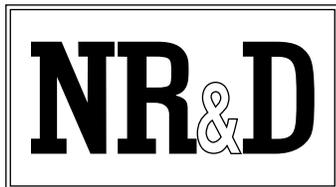# QUCM ACCU-SORT

Installation and Programming Manual

This Manual describes the QUCM application for interfacing an ACCU-SORT Barcode Scanner to a Quantum PLC.

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NR&D

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Introduction

The Niobrara QUCM is a TSX Quantum® compatible module that is capable of running multiple applications for performing communication translations between serial protocols. This document covers an application that provides PLC control of an ACCU-SORT XLT-200 Scanner. This application is written to be a direct replacement of a Modicon BASIC module with a similar application.

The QUCM simulates the old BASIC program by interfacing with the PLC through 6 INPUT and 6 OUTPUT registers on the backplane. The QUCM may be installed in the local PLC rack, RIO remote rack, or DIO rack. A Concept MDC file is included with 6 IN / 6 OUT for use with Concept. Any standard QUCM MDC may also be used as long as at least 6 words in and 6 words out are included.

The application, "app1.qcm" is compiled and loaded into Application 1 of the QUCM-L with the Auto-Start feature enabled for stand-alone operation. The application includes multiple threads for simultaneously servicing both serial ports. Port 1 of the QUCM is connected to the ACCU-SORT scanner. Port 2 may be used as a debugging terminal server port.

<div align="right">

2
Installation

</div>

QUCM Installation

1   Mount the QUCM in an available slot in the register rack. Secure the screw at the bottom of the module.

Software Installation

The application files for the QUCM are included in the ACCUSORT.ZIP file. This file must be unzipped using PKUNZIP.EXE. A copy of PKUNZIP is included on the standard NR&D software disk and is also available at www.niobrara.com. The latest version of the ACCUSORT.ZIP file is located at

> http://www.niobrara.com/ftp/qucm/accusort/accusort.zip

The latest version of this document in pdf format is located at:

> http://www.niobrara.com/ftp/qucm/accusort/qaccusort.pdf

Serial Connections to the QUCM-L

Port 1 to Scanner (RS-232)

The serial port 1 of the QUCM-L must be switched to RS-232. The handshaking lines on the Accu-Sort are not required but RTS and CTS on the QUCM must be jumpered together.
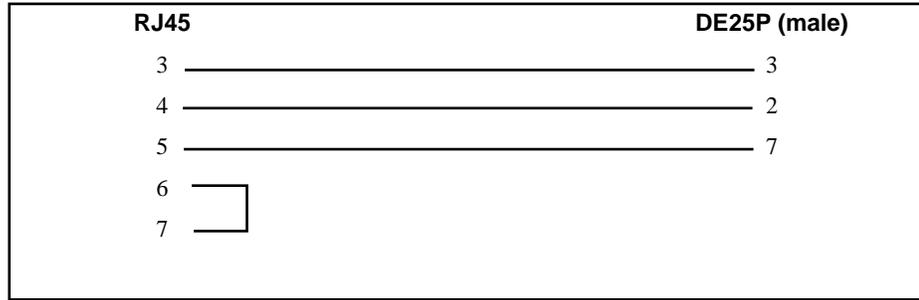
```
RJ45                                      DE25P (male)

 3  ───────────────────────────────────────  3
 4  ───────────────────────────────────────  2
 5  ───────────────────────────────────────  7
 6  ─┐
 7  ─┘
```

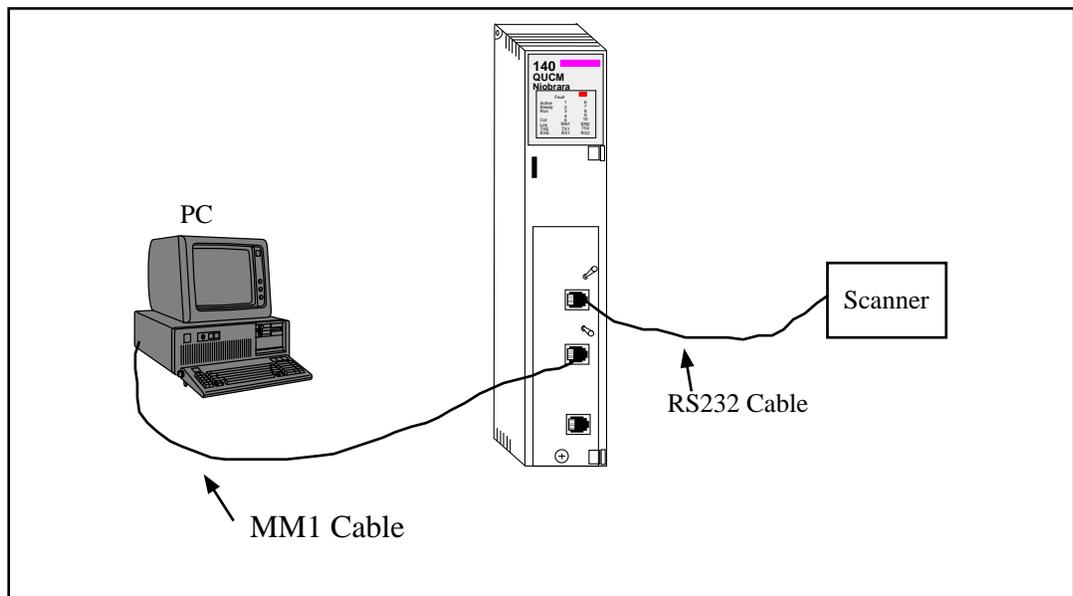**Figure 2-1 QUCM-L to RS-232 Scanner (25-pin)**

Figure 2-2   Typical system setup

Port 2 to the Personal Computer

A physical connection must be made from the personal computer to the QUCM in order to load the APP1.QCC file. This link may be a serial connection from a COM port on the personal computer to the RS-232 port on the QUCM-LE.   The Niobrara MM1 cable may be used for this connection. This cable pinout is shown in Figure 2-3.
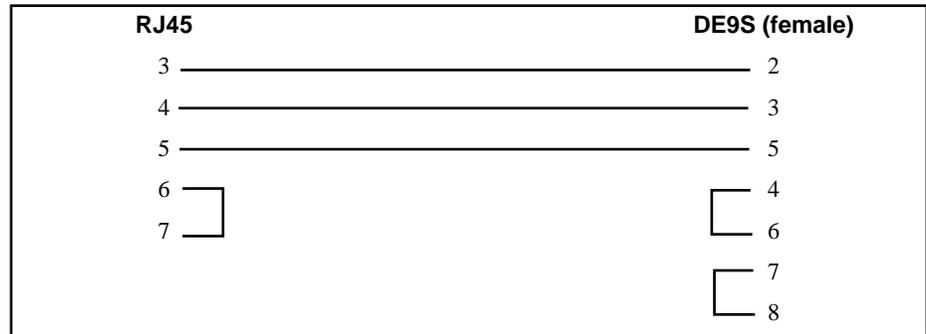
RJ45		DE9S (female)

Figure 2-3 QUCM-SE to RS-232 PC Port (9-pin) (MM1 Cable)

Loading the Applications into the QUCM

The QUCM-LE must use the qucmtcpl.fwl or qucmtcpl.qcc firmware included in the accusort.zip file. This firmware is dated 28Oct2002 or later. There are two ways to upgrade the firmware of the QUCM-LE: QLOAD and FWLOAD.

QLOAD QUCM Firmware Update

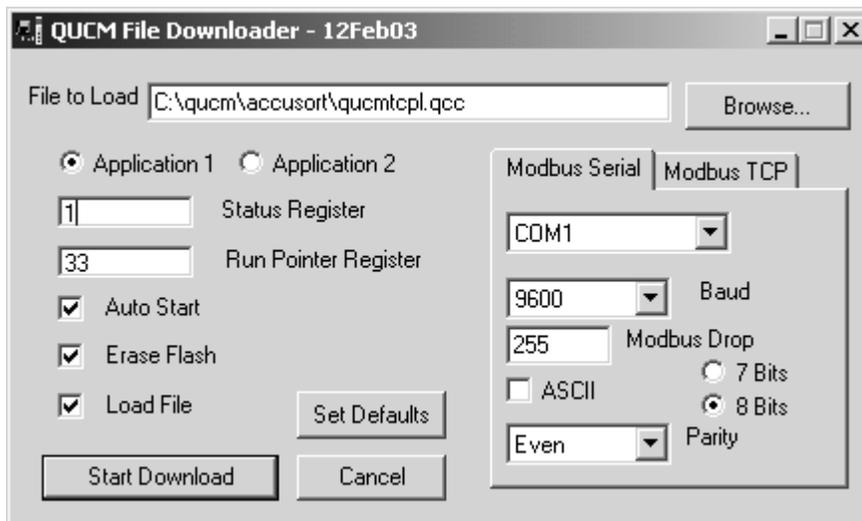**Figure 2-4   QLOAD of Firmware**

QLOAD is a convenient method for upgrading the firmware of a QUCM.

1   Connect the PC to QUCM port 2 (or port 1) in RS232 with an MM1 Cable.

2   Application 1 and 2 Switches must be in HALT.

3   Start QLOAD.EXE

4   Click on the Browse button and select the file qucmtcpl.qcc.

5   Select the Application 1 Radio Button.

6   Verify the following:

a. Status Register = 1.

b. Run Pointer Register = 33.

   c. Auto Start is checked.

   d. Erase Flash is checked.

   e. Load File is checked.

   f. The Modbus Serial is selected.

      (1) The PC COM port is selected.

      (2) The Baud is set to 9600.

      (3) The Modbus Drop is set to 255.

      (4) The 8 bits radio button is selected.

      (5) ASCII is NOT checked.

      (6) Parity is set to EVEN.

7   Press the Start Download button. QLOAD will open a progress window to show the status of the download.

8   After the download is finished. Move switch 1 to RUN. There should be a flurry of light activity at the top of the module. The upgrade process will take approximately 20 seconds. When the process is finished, the QUCM will automatically reboot.

FWLOAD QUCM Firmware Update.

If the QUCM has corrupt firmware or completely non-responsive then the old method of using FWLOAD may be required.

Firmware upload is as follows:

1   Remove the module form the rack.

2   Move the RUN/LOAD switch on the back of the module to LOAD.

3   Replace the module in the rack and apply power.

4   Only the 3 light should be on. (The Link and RX E-net lights may be on if the E-net port is connected and there is traffic.)

5   Connect the PC to QUCM Port 1 with a MM1 cable.. Make sure that Port 1 is set to RS232 mode with the slide switch below the port.

6   From the command line enter
         > fwload qucmtcp.fwl com1:
    Be sure to have the colon after the PC's com port name. The download will only take a few minutes and will inform when finished.

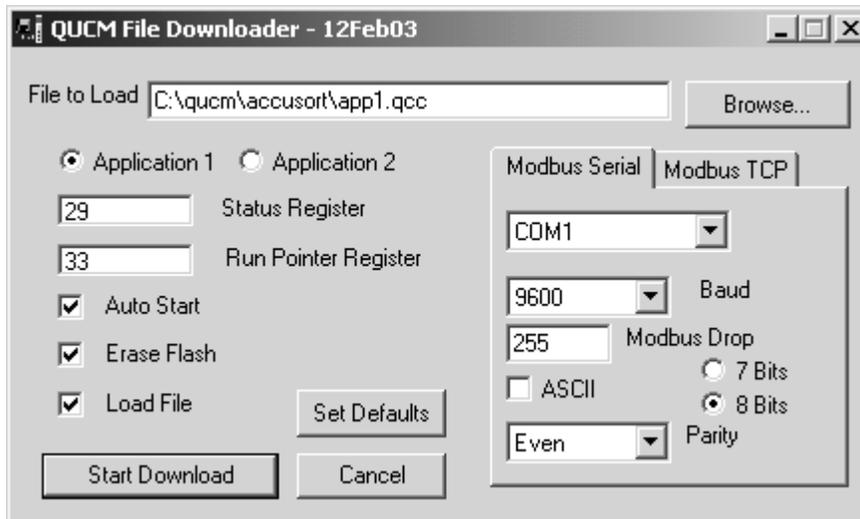7   Remove the module from the rack and change the switch back to RUN.

QLOAD APP1

Figure 2-5   QLOAD of APP1

1   Connect the PC to QUCM port 2 (or port 1) in RS232 with an MM1 Cable.

2   Application 1 and 2 Switches must be in HALT.

3   Start QLOAD.EXE

4   Click on the Browse button and select the file qucmtcpl.qcc.

5   Select the Application 1 Radio Button.

6   Verify the following:

   a. Status Register = 29.

   b. Run Pointer Register = 33.

   c. Auto Start is checked.

   d. Erase Flash is checked.

   e. Load File is checked.

   f. The Modbus Serial is selected.

      (1) The PC COM port is selected.

      (2) The Baud is set to 9600.

      (3) The Modbus Drop is set to 255.

      (4) The 8 bits radio button is selected.

      (5) ASCII is NOT checked.

      (6) Parity is set to EVEN.

7   Press the Start Download button. QLOAD will open a progress window to show the status of the download.

8   When the download is complete, move Switch 1 to RUN. The RN1 light should come on.

9   Connect the scanner to QUCM port 1.

3
Operation

QUCM Operation with DEBUG messages

DEBUG mode is engaged when Switch 2 is set to MEM PROT. Connect an MM1 cable from QUCM Port 2 to a PC and run a terminal emulator such as Hyperterminal. The emulator should be set to 9600 baud, NONE parity, 8 data bits, 1 stop bit, no handshaking.

- When APP1 starts, the QUCM zeroes the first 6 PLC INPUTs (3x)
  DEBUG: "Waiting for PLC to initiate bar code read cycle..."

- The QUCM examines the first 4x OUTPUT from the PLC. When this register is set to the value 2, the QUCM sets light 1 ON and INPUT[5] bit 1 ON.
  DEBUG: "PLC has initiated read cycle..."

- The QUCM then flushes the port 1 input buffer and transmits the character "S" our pot 1.
  DEBUG: "Input buffer cleared. ''Start of Cart' Sent..."

- If the transmit went ok then the QUCM waits for STX from the scanner.
  DEBUG: "Waiting for 'STX' response from scanner..."

- After the QUCM receives the STX, it turns on light 2 and INPUT[5] bit 2. It then receives the next 6 characters from the scanner. If the receive is good the QUCM turns on light 3 and INPUT[5] bit 3 and then the QUCM packs the data into INPUT[2] through INPUT[4] in packed ASCII.
  DEBUG: "Received 'actual data' response from scanner... Copying data to PLC INPUTs..."
  After the data is copied, light 3 is turned on as well as INPUT[5] bit 3. The contents of OUTPUT[1] are copied to INPUT[1].
  DEBUG: "Waiting for PLC to zero the Command..."

- The QUCM then waits for the PLC to zero OUTPUT[1]. When OUTPUT{1] is changed from 2 to 0, the QUCM zeros the INPUT registers, turns off the lights, and sends an "E" to the scanner.

DEBUG: "Clearing Interface Registers..."
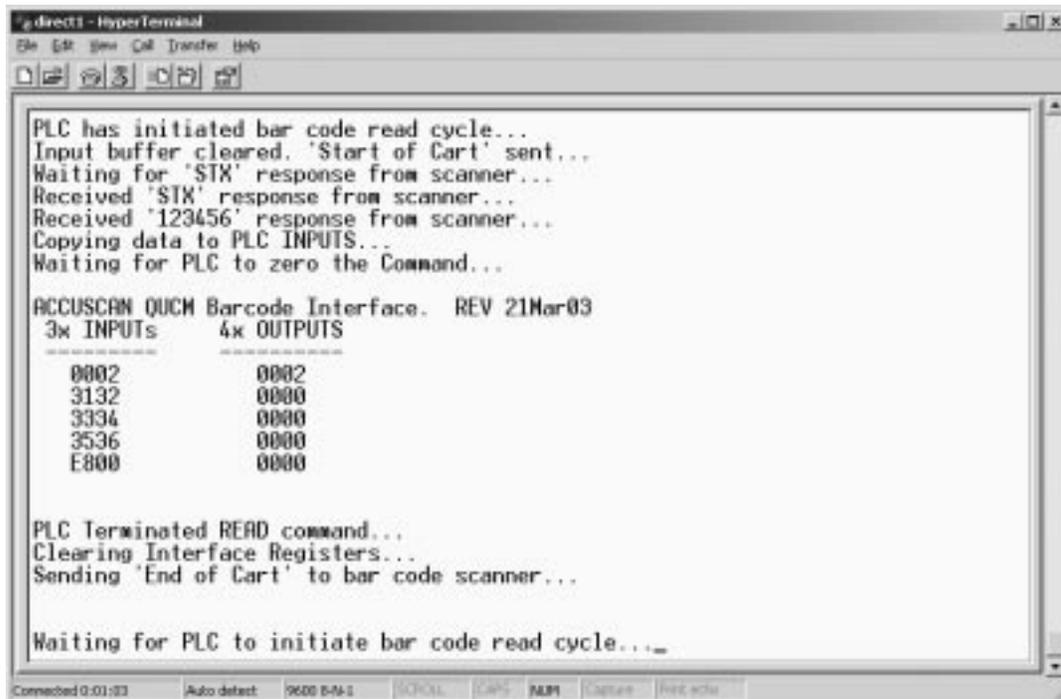"Sending 'End of Cart' to scanner..."

If the QUCM cannot transmit messages to the scanner from Port 1 because CTS is always low, it will turn on light 4 and set INPUT[5] bit 4 to indicate a CTS failure. Check the cable on port 1.
DEBUG: "Port 1 CTS failed! Check serial cable."

If at any time, the PLC may reset the system by zeroing OUTPUT[1]. The QUCM will zero the INPUTs and send the "E" to the scanner.
DEBUG: "PLC terminated READ command..."

Pressing any key on the terminal emulator will cause the debug server to display the first 6 INPUTs and OUTPUTs.

Figure 3-1   Hyperterm DEBUG Example

4

Troubleshooting

Module Lights

The QUCM-L has several lights that indicate the status of the module. Table 4-1 shows the meanings of these lights.

Table 4-1   Module Lights

Light	Meaning
Fault	The module has a catastrophic fault.. Call the factory.
Active	This light will be on if the module is in a traffic copped slot in a Quantum PLC system and the PLC is in RUN.
Ready	This light should always be on (as long as it isn't in firmware load).
Run	This light will be on if the module is in a traffic copped slot in a Quantum PLC system and the PLC is in RUN.
Col	Comes on when an Ethernet collision occurs.
Lnk	Is on when LINK is established on the 10BaseT port.
TXE	Comes on when the module is transmitting on the Ethernet port.
RXE	Comes on when the module is receiving on the Ethernet port.
RN1	This light should be on to indicate app1 is running.
TX1	Comes on when the module is transmitting on serial port 1.
RX2	Comes on when the module is receiving on serial port 1.
RN2	This light should not come on since there is no app2 loaded.
TX1	Comes on when the module is transmitting on serial port 1.
RX2	Comes on when the module is receiving on serial port 1.

User Lights

The QUCM-LE has 10 application driven lights numbered 1-10. The meaning of these lights while the APP1 program is running is shown in Table 4-2.

Table 4-2   QUCM User Light Definitions

Light	Meaning
1	PLC started READ cycle by setting OUTPUT[1] = 2
2	QUCM received STX from scanner
3	QUCM received data from scanner and copied to PLC backplane
4	QUCM port 1 failed CTS. Check cable.
5	QUCM Port 2 in DEBUG mode because switch 2 is in MEM PROT.
6	Not used.
7	Not used.
8	Not used.
9	Not used.
10	Not used.