

3720 ACM

**MPCC / MPE
Retrofit Installation
Instructions**

Danger

During normal operation of this device, hazardous voltages are present which can cause severe injury or death. These voltages are present on the terminal strips of the device and throughout the connected potential transformer (PT), current transformer (CT), status input, relay, and control power circuits. Installation and servicing should be performed only by qualified, properly trained personnel. See the *Installation and Operation Manual* for the specific device for additional warnings.

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the operator will be required to take whatever measures may be required to correct the interference.

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3720 ACM

Multi-Port Communications Card (MPCC)

Multi-Port Ethernet Communications Card (MPE)

Introduction



NOTE

For complete communications connections and operational descriptions, refer to the *3720 ACM Installation & Operation Manual*.

This document provides step-by-step instructions for installing a standard Multi-Port Communications Card (MPCC) or a Multi-Port Communications Card with Ethernet (MPE), into a 3720 ACM. Also contained in this document is a brief description of each product's operation and a section on configuring the MPE. The MPCC enables the 3720 ACM to communicate simultaneously over three communications ports (three serial ports for the MPCC, two serial and one Ethernet port for the MPE). Either type can be purchased to replace the ISOCOM2 or Multi-Port Communications Card on your 3720 ACM.



WARNING

It is important that all instructions provided in this document are performed exactly as described to avoid injury and to ensure the 3720 ACM is protected from any damage.

Installation Procedure

You will require the following tools to install the MPCC or MPE:

1. One Philips screwdriver.
2. An anti-static wrist strap or equivalent protection.

Preparing the 3720 ACM for Installation



DANGER

During normal operation of the 3720 ACM, hazardous voltages are present which can cause severe injury or death. These voltages are present on the terminal strips of the device and throughout the connected potential transformer (PT), current transformer (CT), status input, relay, and control power circuits. Installation and servicing should be performed only by qualified, properly trained personnel.



NOTE

You can also obtain the firmware version information using the front panel buttons of the 3720 ACM. Refer to Figure 3.4.6d, "Diagnostics Group", in the 3720 ACM Installation & Operation Manual.

To prepare the 3720 ACM for installation:

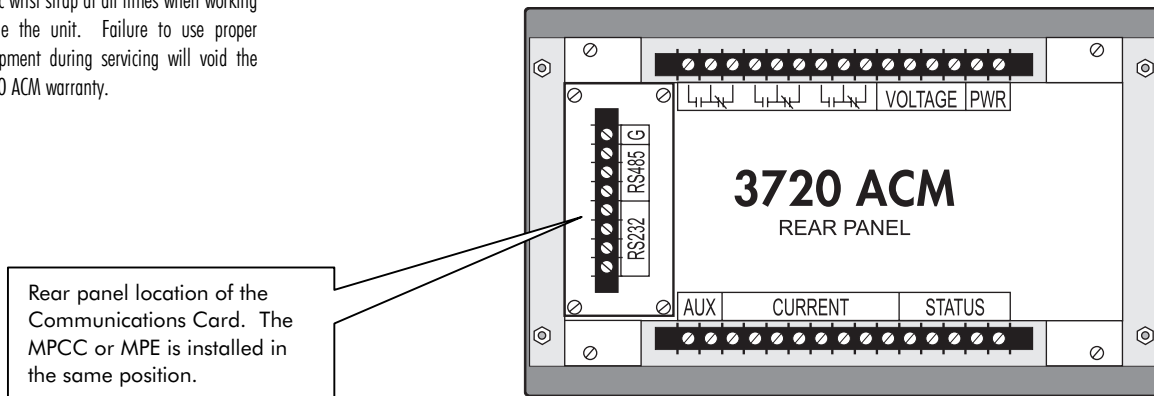
1. Verify that your 3720 ACM contains firmware version 1.5.0.0 or later (this information is available on the rear label of the unit). If it does not, contact Power Measurement Ltd. for details regarding firmware upgrades.
2. Open all PT fuses (or direct voltage input fuses) and close all CT shorting blocks.
3. Turn off all power to the 3720 ACM and disconnect the Line and Neutral (or DC power) wires from the Power inputs to the unit.
4. Disconnect all other wiring (or power off all other circuits) which may present potentially hazardous voltage levels to the unit, such as connections to the relay outputs, status inputs, etc.
5. Ensure that all cables still connected to the 3720 ACM are **NOT** live.

Removing the Existing Communications Card

CAUTION

The components inside the 3720 ACM are sensitive to static-electric discharge. To prevent damage to the unit, wear an anti-static wrist strap at all times when working inside the unit. Failure to use proper equipment during servicing will void the 3720 ACM warranty.

The existing communications card (Isocom2 or MPCC) must be removed before you can install the MPCC or MPE. You can remove the communications card while the unit is still mounted in its switchgear panel (or other mounting location). The communications card is on the left of the 3720 ACM rear panel as depicted below:



1. Carefully disconnect all communication wiring from the existing card.
2. Remove the four machine screws from the rectangular communications card mounting plate with the screwdriver.
3. Pull the plate away from the rear panel to remove the communications card from the 3720 ACM.

Multi-Port Communications Card Installation

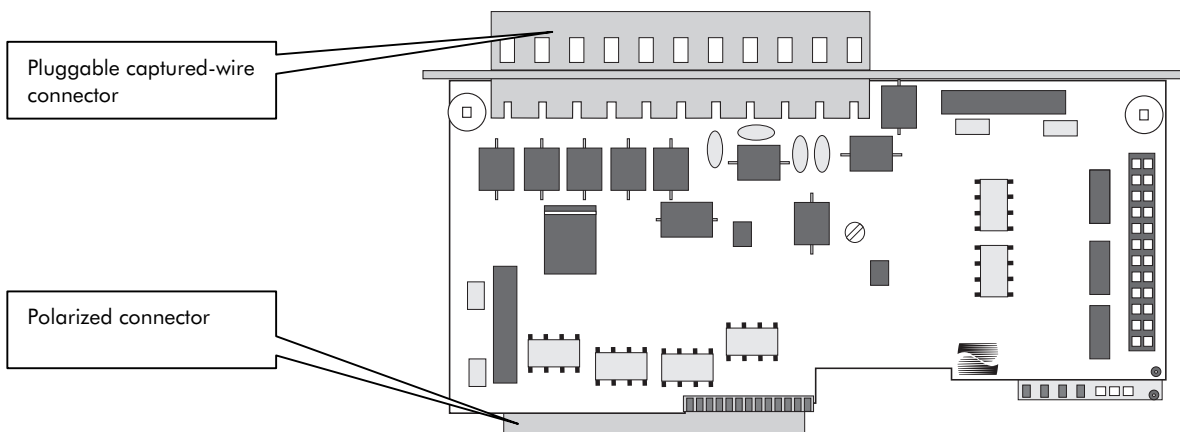
CAUTION

Touch the communications card only by the sides of the circuit board or by the metal mounting plate to prevent damage to its components.

MPCC

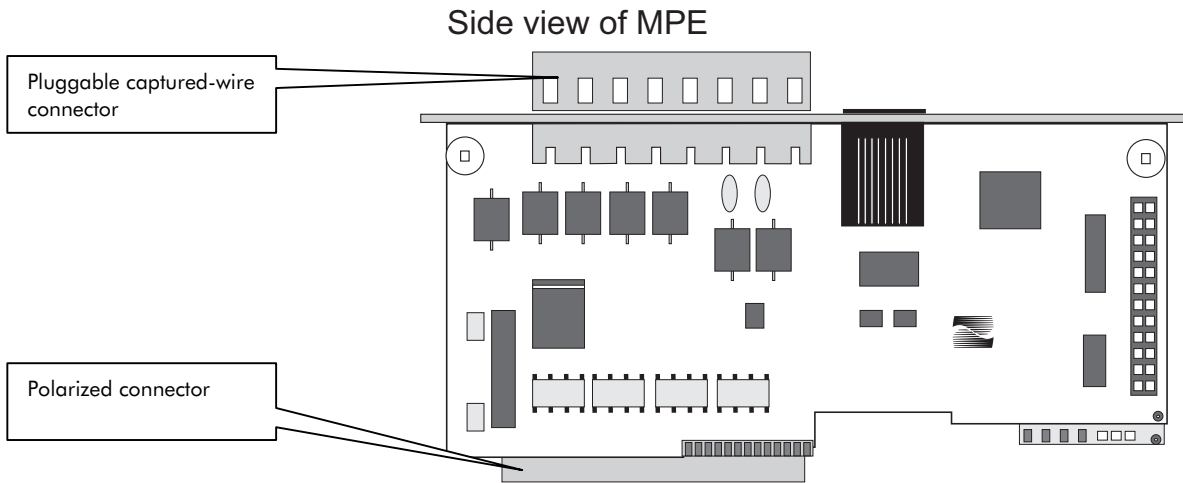
The MPCC consists of a metal mounting plate and a pluggable captured-wire connector.

Side view of MPCC



MPE

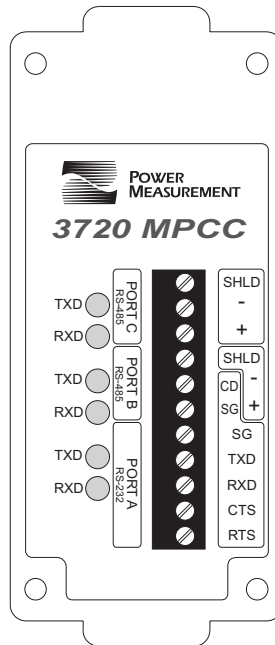
The MPE consists of a metal mounting plate, a pluggable captured-wire connector and a standard RJ-45 Ethernet jack. The mounting plate is attached to two circuit boards which have a polarized connector that plugs into the base unit.



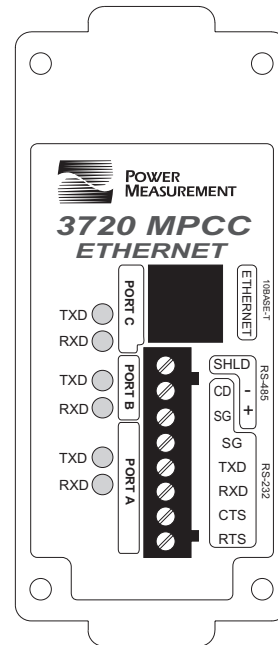
To install the Communications Card (MPCC or MPE):

1. Touch the side of the 3720 ACM chassis to dissipate any stray static charge that could damage 3720 ACM electronic components when installing the Communications Card.
2. Locate the socket where the old communications card was previously inserted.
3. Hold the Communications Card by the metal mounting plate and lower it into the base unit so that the row of LED's face the outside edge of the 3720 ACM case.
4. Line up the connector with the socket and press the Communications Card firmly into place. The socket and the connector are polarized, so the pins in the connector will not fit into the socket if the circuit board is not oriented correctly. The Communications Card will be securely inserted into the socket when the mounting plate meets the chassis of the 3720 ACM. The MPCC and MPE mounting plates are shown on the next page.

MPCC



MPE



Final Steps



NOTE

Should the MPCC or MPE upgrade fail, contact Power Measurement's Customer Service for assistance.

1. Align the holes in the metal mounting plate of the Communications Card with the mounting holes on the 3720 ACM base unit. Replace the four machine screws.
2. Reinstall the Line and Neutral (or DC power) wiring to the Power inputs of the unit.
3. Reconnect all other wiring (or re-enable all other circuits). Close the PT fuses (or direct voltage input fuses) and open the CT shorting blocks.
4. Turn on power to the 3720 ACM and verify correct operation.
5. To verify that the MPCC was installed properly, access the front panel display. Using the front panel buttons, go to programming mode, scroll and select "Communications- Yes". If the display reads "Communications Card- Multiport", then the MPCC installation was successful. If the MPCC installation failed, the display will read "Communications Card- ISOCOM". Refer to Chapter 3 of the 3720 ACM Installation & Operation Manual for more information.

Operational Details

The optional Multi-Port Communications Cards allow the 3720 ACM to communicate via three distinct ports (one RS-232 and two RS-485 for the MPCC; one RS-232, one RS-485 and one Ethernet port for the MPE) within a multi-protocol environment. Each serial RS-232 or RS-485 port can be configured to operate with any of the supported protocols (PML, Modbus, AB DF-1, Alarm Dialer). The Ethernet port supports PML protocol. All ports can communicate simultaneously. Optical coupling provides full isolation between the RS-232/RS-485 and the Ethernet port/metering equipment. In addition, protection circuitry on the RS-485 port provides a safeguard from common mode voltages that may be applied to the card due to incorrect connection of the MPCC.

Communication Ports



NOTE

Port A has signaling options. It supports RTS (Request to Send) and CTS (Clear to Send) handshaking.



NOTE

Certain timing considerations apply when using Power measurement COM32 and COM128 RS232/485 converters with Allen Bradley DF-1 and Modicon Modbus protocols. Contact Customer Service for more information.

MPCC

	Standard	Baud Rates	Protection	Fully isolated
Port A	RS-232, half duplex	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.	Withstand ANSI C37.90.1 fast transient.	From Port C.
Port B	RS-485, half duplex	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.	Withstand ANSI C37.90.1 fast transient, withstand 120V AC/DC applied to Data- and/or Data+.	From Port C.
Port C	RS-485, half duplex	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.	Withstand ANSI C37.90.1 fast transient, withstand 120V AC/DC applied to Data- and/or Data+.	From Port A and B.

MPE

	Standard	Baud Rates	Protection	Fully isolated
Port A	RS-232, half duplex	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.	Withstand ANSI C37.90.1 fast transient.	From Port C.
Port B	RS-485, half duplex	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.	Withstand ANSI C37.90.1 fast transient, withstand 120V AC/DC applied to Data- and/or Data+.	From Port C.
Port C	Ethernet, IEEE 802.3 (10Base-T)	10 Megabits per second		From Port A and B.

Terminal Block and LEDs

The MPCC provides a captured-wire connector strip. Terminal functions include:

SHLD	RS-485 shield for Port C (electrically connected to chassis ground)
-	RS-485 Data Minus for Port C
+	RS-485 Data Plus for Port C
SHLD	Port B (chassis ground)
CD/ -	Carrier Detect or RS-485 Data Minus for Port B. (See below)
SG/ +	Signal Ground for CD or RS-485 Data Minus for Port B
SG	Standard RS-232 Signal Ground
TXD	RS-232 Transmit Data (data out)
RXD	RS-232 Receive Data (data in)
CTS	RS-232 Clear to Send
RTS	RS-232 Request to Send. (See below)

Terminal functions for the MPE is identical to the MPCC, except the “SHLD”, “-” and “+” connections at Port C are replaced by the Ethernet jack.

Two LED indicators per port, TXD and RXD, show activity on ports A, B and C, and can be used to verify correct communications operation. The TXD indicator flashes when data is being sent out by the device. The RXD indicator flashes when data is being received by the device.

RS-232 Connection



NOTE

For information on remote connections via modem (telephone, fiber optic, radio etc.) contact POWER MEASUREMENT for a detailed application note.

Using RTS Lines

The RTS line for the Isocom2, MPCC and MPE functions identically. If CTS is not required, short the RTS and CTS lines together with a jumper wire between the two connectors.

The RS-232 port RTS line is operational for the ISOCOM2 card, MPCC or MPE, and can be used, if required, with any hardware device connected to the 3720 ACM. POWER MEASUREMENT's SCADA systems do not require the use of the RTS line for direct RS-232 connections; however, some types of modems (e.g. radio modems) may require its operation.

The RTS signal is asserted before the beginning of a transmission and remains asserted throughout the transmission. The time delay between the assertion of the RTS and the start of the transmission is controlled by the TRANSMIT DELAY parameter, which can be set from the front panel. The range is 0 to 999 ms. (with a default of 20 ms). Transmission will begin after the transmit delay time has expired and the CTS signal has been asserted.

The programmable RTS ACTIVE LVL parameter selects whether the RTS line is asserted HIGH or LOW during transmission.

CTS must be asserted before port A can transmit. If CTS is de-asserted, transmit will wait for 1.5 seconds, after which time it will abort the transmission.

Carrier Detect



NOTE

The use of the CD option will disable Port B for use as an RS-485 port.

Carrier Detect is designed for applications where a modem is in use. With CD enabled, transmit will not occur until CD is asserted by a modem.

To use Carrier Detect, a jumper wire must be connected between the Carrier Detect Signal Ground (SG) and the adjacent PORT A RS-232 standard Signal Ground (SG).



NOTE

The COM128 is recommended for modem communications (the COM32 is not suitable for this application).

Carrier Detect (CD) is available only with the MPCC or the MPE. CD is specifically designed for use when a DCE device (e.g., modem) is connected. With CD enabled, transmit will not occur until CD is asserted by a modem. To enable the CD function, the 3720 ACM must be programmed so that CARRIER DETECT = YES. For the MPE or MPCC, CARRIER DETECT replaces the COMM MODE parameter in programming mode. Refer to 3720 ACM Manual, Figure 3.4.6c, Communications Group.

RS-485 Connection



NOTE

In some cases, e.g., higher baud rates, the MPCC and MPE might respond faster than the master station can handle. Factory default setting for the transmit delay parameter has been set to 20 ms to prevent this type of communications problems.

MPCC and MPE

The RS-485 ports functions in an identical manner for the MPCC/MPE as for the ISOCOM2.

For further details on communications connections and operational descriptions for the MPCC/MPE, refer to the *3720 ACM Installation and Operation Manual*.

MPE Configuration

Ethernet Connection

Ethernet Connector

The MPE is equipped with an RJ-45 jack for direct Ethernet connections. A UTP(unshielded twisted pair) 10Base-T cable connects the MPE to your local area network (LAN).

Ethernet Configuration

CAUTION

To ensure proper integration with your existing LAN/WAN, it is highly recommended that your Network Administrator actively participates in configuring your MPE.

Communications Protocol

The MPE communicates on an Ethernet network through TCP/IP. This protocol suite is an open standard and is used by the Internet.

Network Parameters

Required network parameter for proper operation is a unique IP address for the device (3720 ACM). This IP address is typically assigned by your Network Administrator. Optional parameters include:

- Network subnet mask (required if subnetting is applicable)
- Default gateway address (required if communication between networks is applicable)

Basic Configuration

Using the front panel switches of the 3720 ACM, scroll and select the following:

- “Communications” menu
- “Port C”
- “Ethernet” protocol

Program the MPE’s unique IP address (assigned by your Network Administrator) into the meter. The IP address consists of four blocks of numbers separated by periods. Enter each block of numbers in sequence.

For example, if the address is “192.168.2.150” (address shown here is for illustration purposes only; this address will not work on your network), you would enter this information as follows:

- IPaddr1 = 192
- IPaddr2 = 168
- IPaddr3 = 2
- IPaddr4 = 150

The remaining configuration steps can be performed via Telnet, as described in the following section:

CAUTION

The IP address for the 3720 ACM must be set correctly before connecting the meter to the network. Failure to do so may result in network problems.

Telnet Configuration

Using Telnet, connect to the IP address associated with the 3720 ACM. Log into the MPE as follows:

1. At the user name prompt, enter “pml”.
2. At the password prompt, enter your 3720 ACM meter password.

A menu containing available options can be displayed by typing “?”. To change the IP address, subnet mask or gateway address, type in the appropriate menu number and enter the information at the prompts.

Other configurable parameters are listed below (note that these only affect protocols being used on the Ethernet port):

- PML protocol password protect: Entering a value here specifies whether or not a password will be required to program the 3720 ACM, when it uses PML 3720 protocol over TCP/IP. This parameter can also be configured using the front panel buttons of the 3720 ACM.
- Modbus protocol password protect: Same as above, except for when it uses Modbus protocol over TCP/IP.
- Modbus register size: Select either 16 or 32 bit registers.
- Enabling or disabling possible Ethernet connections to the MPE: If either or both serial connections are set to “None”, additional Ethernet connections can be made (a total of three connections can be made through the 10BaseT port). If required, these additional connections may be explicitly disabled as well (disabling the additional Ethernet connections does not affect the use of the serial ports). Note that a Telnet connection cannot be locked out; if all three Ethernet connections are in use, one will be disrupted when an additional Telnet connection is initiated.

The MPE can also be completely configured via serial ports A or B. Contact Power Measurement for details.



NOTE

Modbus will be supported in future firmware releases of the MPE.

Supported protocols over TCP/IP

Currently, the MPE supports the PML protocol.

Future Firmware Upgrades

For ease of upgrading firmware, PML recommends that unused RS-232 or RS-485 ports be pre-wired to allow for firmware upgrades through the serial communication ports. Upgrading through the Ethernet port is not supported.



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