

D77D-EMA Modbus TCP Adapter to QCPort Installation Leaflet**D77D-EMA Installation**

The D77D-EMA is designed to be used in industrial applications and installed in accordance with this document. The intended use of the D77D-EMA is for use in clean, dry environments

Mount the D77D-EMA to a DIN Rail

To mount the D77D-EMA to a DIN rail the following procedure must be performed.

- Using a screwdriver or fingernail, gently pull out the locking tab located at the right side center of the D77D-EMA module.
- Insert the D77D-EMA module on to the DIN rail.
- Depress the locking tab to secure the D77D-EMA to the DIN rail.

Connect the D77D-EMA to Modbus TCP

Connect the Modbus TCP Ethernet cable to the RJ45 connector located at the top of the D77D-EMA.

- The D77D-EMA will work with any Cat5 or Cat5e or 10BT cable.
- The Modbus Serial connection on the RS485 port pins are labeled on the side label for correct pin out.

Set the Modbus TCP Address

The TCP address is default set for BootP. CHStudio has a BootP server native. Once the TCP address is set using BootP, any Modbus TCP tool can then change the address from BootP to static so that it is permanently stored in NVRAM and will be present after a power cycle.

Set the Modbus Serial Address, Baud and Mode

The Serial address is set using the front DIP switches if the adapter is used as a Modbus serial slave. When the DIP switch is to the right it is in the ON position. The address can be set from zero to 255. The mode and baud also need to be set for Modbus serial. The DIP switch designations are described on the side rating label. The mode can be set to RTU or ASCII and the baud rates supported are from 1200 to 115.2K.

The baud rate is set using the configuration switches B0, B1 and B2

B0	B1	B2	Baud
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
OFF	ON	OFF	4800
ON	ON	OFF	9600
OFF	OFF	ON	19.2K
ON	OFF	ON	38.4K
OFF	ON	ON	57.6K
ON	ON	ON	115.2K

Modbus TCP Setup and Configuration of the D77D-EMA

The D77D-EMA requires no other setup or configuration for normal operation. For more information on the Modbus TCP configuration parameters and how to modify them refer to the user manual **MN05004002E**.

Performing a Soft Auto Configuration on the D77D-EMA

The Auto Configure button is labeled A/C and is located on the left side of the RS485 connector above the A and B LED's. The Soft Auto Configure will erase the existing I/O data map to Modbus TCP and replace it with a new map that represents the devices on both QCPorts. To perform a Soft Auto Configuration, ensure that the QCPort system has been properly installed, the Group ID's have been set and that there is power applied to the QCPort system for both Channel A and Channel B (if used). All devices must be powered and operating without communication faults. Press and hold the A/C button for five seconds. When the button is first pressed, the ST, MS and NS LED's will all go ON. When the LED's go OFF, it is safe to release the button indicating that the Auto Configuration is being performed. If the Soft Auto Configuration is not successful, the MS LED will be solid RED. This is an indication to check the QCPort devices for errors, correct the errors and attempt the Auto Configuration again.

After performing a successful Soft Auto Configuration, the I/O data of the QCPort devices will be placed in the produced holding registers 40001 – 41024 (to the system controller) and consumed holding registers 41025 – 42048, (to the D77D-EMA). The first register of the consumed message will include the Control Word and the first register of the produced message will contain the Status Word. Following the Control and Status registers will be the I/O data of the QCPort devices in order of the Group ID settings on the QCPort devices from lowest to highest.

Performing a Hard Auto Configuration on the D77D-EMA

A Hard Auto Configuration is similar to the Soft Auto Configuration except the A/C button is held prior and during (for five seconds) power being applied to the QCPort system. **A Hard Configuration will reset all QCPort devices to Out of Box defaults. This resets all parameters previously set by a tool to Out of Box factory defaults.** A Hard Auto Configuration will then remap all the I/O data as described in the Soft Auto Configuration section above.

Environmental Ratings of the D77D-EMA

Transportation and Storage	Temperature	-50°C to 80°C (-58°F to 176°F)
	Humidity	5-95% non-condensing
Operating	Temperature	-25°C to 65°C [-13°F to 131°F]
	Humidity	5-95% non-condensing
	Altitude	Above 2000 meters (6600 feet) consult factory
	Shock IEC 68-2-27	15G any direction for 11 milliseconds
	Vibration IEC 68-2-6	5 – 150 Hz, 5G, 0.7 mm maximum peak-to-peak

Approvals/Certifications of the D77D-EMA

Electrical/EMC	
• ESD Immunity (IEC61000-4-2)	+/- 8kV air, +/- 4kV contact
• Radiated Immunity (IEC61000-4-3)	10V/m 80-1000 MHz, 80% amplitude modulation @ 1kHz
• Fast Transient (IEC61000-4-4)	+/- 2kV supply and control +/- 1kV communications
• Surge (IEC61000-4-5)	+/- 2kV line-to-ground +/- 1kV line-to-line
• RF Conducted (IEC61000-4-6)	10V, 0.15 – 80MHz
• Magnetic Field (IEC61000-4-8)	30 A/m, 50Hz
Ingress Protection Code	IP20
Radiated and Conducted Emissions	EN5011 Class A
Agency Certifications	UL 508 CUL (CSA C22.2 No. 14) CE (Low Voltage Directive) Modbus Conformance Tested

Status Register for the D77D-EMA (holding register 41025)

Bit	Low Byte	High Byte	Description
0	CHA Active	CHB Active	0 – selected channel not scanning
1	CHA Ready to Scan	CHB Ready to Scan	0 – Selected channel scan list registry requirements have been met 1 – Selected channel scan list registry requirements have not been met
2	Faulted Device CHA	Faulted Device CHB	0 – selected channel does not have any faulted or missing devices 1 – selected channel has at least one faulted or missing device
3	Reserved	Reserved	Must be 0
4	Duplicate Group ID CHA	Duplicate Group ID CHB	0 – no two devices on the selected channel have the same group ID 1 – more than one device on the selected channel has the same group ID
5	QCPort Config Corrupt CHA	QCPort Config Corrupt CHB	0 – selected channel has a valid registry 1 – selected channel has a corrupt registry
6 – 7	reserved	reserved	Must be 0

Control Register for the D77D-EMA (holding register 40001)

Bit	Low Byte	High Byte	Description
0	Activate Scan CHA	Activate Scan CHB	0 – IO scan will not occur on the selected channel. All devices at this time on the QCPort channel will be in their "safe state" and offline. 1 – IO scan will occur on the selected channel. All devices will be online and operating in an online state.
1 – 7	reserved	reserved	Must be 0

Module Current Draw for the D77D-EMA

Modbus TCP	N/A
Channel A QCPort	50 mA
Channel B QCPort	15 mA
Modbus Serial	20 mA

Communication Specifications for the D77D-EMA

IO Modbus TCP Size Max	1023 16bit registers input 1023 16bit registers output
Modbus TCP Baud Rates	10Meg
Modbus Serial Baud Rate	1200 – 115.2K (19.2K Default)
Modbus Serial Mode	RTU (default) or ASCII
QCPort Channels	Channel A and Channel B (independent from each other)
Max QCPort Devices	63 CH A 63 CH B

Sample Modbus TCP Input/Output Assembly for the D77D-EMA.

Input Holding Registers		Output Holding Registers	
Reg.	Data	Reg.	Data
40001	D77D-EMA Status	41025	D77D-EMA Control
40002	First Parameter of First Device	41026	First Parameter of First Device
40003	Second Parameter of First Device	41027	Second Parameter of First Device
40004	Third Parameter of First Device	41028	Third Parameter of First Device
...		...	
n	Last Parameter of Last Device	n	Last Parameter of Last Device