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Using IDENT M System T with Modbus/TCP

Introduction

The Pepperl+Fuchs IDENT M System T consists of two models <u>MTT3000-F180-B12-V45-MON</u>, which is a read only unit and the <u>MTT6000-F120-B12-V45</u> which is a read/write unit. Tags that can be used are MTO-xx which have an 8 byte read only number on them and the MTM-C2 which have an 8 byte read only number and 71 bytes of read/write data.

Mdbus/TCP

The IDENT M System T has RS232, RS485 and Ethernet TCP/IP ports. It does not however directly support Modbus/TCP. In order to talk Modbus/TCP use the converter RTS-UP-1 unit to either convert the TCP/IP or serial data to Modbus/TCP.

<u>RTS-UP-1</u> – Converts one serial and one Ethernet device to Modbus/TCP <u>RTS-UP-4</u> – Converts four serial and four Ethernet devices to Modbus/TCP

This document will show you step by step how to read and write to the MTT devices using Modbus/TCP. The serial port data will be converted to Modbus/TCP data. The Ethernet data could also be converted to Modbus/TCP data as well but that configuration isn't described here.

Wire the RTS-UP-1serial port to the MTT serial port

RTS-UP-1		MTT unit
2 Rxd	>	J42 TX, pin 1
3 Txd	>	J42 RX, pin 2
5 Txd	>	J42 GND

Make all other connections

Wire 24V to MTT reader Wire 24V to RTS-UP-1 Connect Ethernet to RTS-UP-1 Connect Ethernet to MTT reader(For configuration only)

Configure the MTT... devices

The reader can be configured from the Ethernet port or the RS232 port. This section describes how to set the IP address of the MTT... reader. If this isn't desired the reader can be connected to by RS232 at the default baud rate of 9600bps. Other serial settings are 8databits, 1 stop bit and no flow control.

Set IP Address

The first thing to do is to configure the Ethernet settings of your RFID system. This example will actually be converting the RS232 data to Modbus/TCP data and the Ethernet port can be used to configure the serial interface. Here are the default Ethernet parameters.

Default Ethernet Settings:	IP Address:	192.168.0.2
	Subnet Mask:	255.255.255.0

Put this IP address into your web browser and logon to the MTT... device. Make sure the IP address of your PC is close. For example set it to 192.168.0.1.

Authenticatio	on Required	×
?	A username and password are being requested by http://172.18.30.10. The site says: "TagMaster GEN4 Reader"	
User Name:	admin	
Password:	••••••	
	OK Cancel	
	qwerty	

Go to the Settings > System > Network tab and set the network parameters correctly as required by your network administrator.

PEPPE	RL+FUCHS
Start Information	Network Settings
Settings System	DHCP: Off 💌
Passwords Date & Time	Bonjour: Off 💌
Network	Hostname: PF-10098D
Options	DynDNS username:
Applications Clone	DynDNS password:
Web Tools	DynDNS hostname:
Log Files Reboot	Values below are used when DHCP is off or no DHCP server is available.
	IP address: 172.18.30.10
	Netmask: 255.255.0.0
	Gateway:
	Primary DNS:
	Secondary DNS:
	Note: A reboot is required for these settings to take effect
	Save Settings Factory Defaults

Network configuration screen for the MTT...

After you change the IP address reboot the hardware so the settings will take affect. Reset the IP address of your PC to reconnect to it.

Configure reader

Download the <u>Configuration and diagnostic software</u> from the web site. This software will connect to the serial or Ethernet ports so that a configuration can be made. Put your new Ethernet parameters into the Settings > Port settings menu option.

i Seti	DENT MT Setup and Test Program ings Reader Setup Help	_			_0×
	Connect				
	HEX		ASCII		Clear
		🖷 Port Settings			
		Port IP Address TCP/IP v 172.18.30.	10		
		Baud Rate Port 9600			
-					
	Modes of Operation © Standard © Track © Enhanced © Universal Input 1 Input 2	Input 1 Boot + String	Write	Enter Data /xx for Hex	Mini

Setting the Network parameters to connect to an MTT... device

Close the port settings dialog box and press connect. It should say connected at the top. Press the Boot String button at bottom to verify that you have a Pepperl+Fuchs ID system connected.

ngs Reader Setup Help Disconnect Connected to 172.18.30.10 Port 10000		
HEX	ASCII 1 88	
20 28 43 29 50 28 46 20 49 44 45 4E 54 2D 4D 0D 0A 4D 54 54 33 30 30 30 2D 46 31 38 30 20 42 31 32 2D 56 34 35 2D 4D 4F 4E 0A 0D 20 23 39 31 32 32 33 31 20 0A 0D 31 31 38 30 30 35 35 0D 0A 31 39 2E 30 33 2E 31 30 0D 0A 53 4D 44 65 73 6B 43 39 38 52 34 42 31 0D 0	(C)P+F IDENT-M MTT 3000-F180-B12-V45-MON #912231 I180055 130.310 SMDeskC98R4B1	

Reading the version information of an MTT... reader

Go to the Reader Setup > Configure Reader menu option. Configure the reader like I have suggested. Many other options are possible. Press "Send Setup to Reader" and

look for a 0 on the previous screen. Close the window and reconnect to the reader and verify the configuration.

IDENT MT Setup and Test Program ettings Reader Setup Help		- 🗆 >
Disconnect Connect to Comm 1 Good	Senfigure Reader	
HEX 20 28 43 29 50 2B 46 20 49 44 45 4E 54 2D 4 2D 42 31 32 2D 56 34 35 2D 4D 4F 4E 00 0A 30 35 35 0D 0A 31 39 2E 30 33 2E 31 30 0D (32 54 30 44 48 30 30 58 30 30 4D 30 0D 0A 30 30 33 31 24 24 24 24 53 4E 61 70 70 31 4	Configure Reader Mode I 13200 I	
58 30 30 4D 30 0D	Frequency Read Range Frequency hopping all sub-bands Image 4(100%) Send Setup to Reader Read Configuration,L	
Modes of Operation C Standard © Track C Enhanced C Universal	Input 2 Input 1 Boot LON F Write R4 Mr M	ini

Configuring an MTT... reader

This example will show you how to read and write two byte to and from the MTT readers.

Make the following changes

- **1.** Change mode to Track
- **2.** Change Baudrate to 19200 (Not necessarily required, but it must match the RTS-UP configuration of serial port 1)
- **3.** Term Char(Hex) = 0D, Head Char(HEX) = 00
- 4. Handshake(hex) = 00
- **5.** Tags to read for LON = Read Always
- **6.** Read Range = User specified
- **7.** Fixed string length = 2

Press the button "Send Configuration to reader" and wait for the reader to reboot.

Configure RTS-UP-... Modbus/TCP adapter

Load Modbus/TCP firmware

The RTS-UP unit comes with socket server firmware. If you want other firmware for industrial busses like Ethernet/IP, PROFINET, or Modbus/TCP then download this firmware from out web site and send the firmware to the unit using PortVision.

Download and install Portvision

You may have to reboot your PC to see the RTS unit. Click "Scan".

Scanning for RTS-UP... devices and downloading firmware

Download the Modbus/TCP firmware

If the Scan Results do not show a device with Modbus/TCP firmware; then highlight the device and go to the menu "Device > Upload Firmware" and update the RTS unit with the right firmware. When you install the Modbus/TCP firmware above the .bin file will be in the folder Comtrol > Modbus_TCP > modbustcp-x.xx.bin



Loading the Modbus/TCP firmware into the RTS-UP...

Using PortVision you can also double click on the scanned unit and configure the IP Address, subnet mask, and gateway.

ols User Guides	
	DeviceMaster UP 1-Port (5-30VDC)
	()
Detection Type : LOCAL	L _ Device Name : Device 21:02:AF MAC Address : 00:C0:4E:21:02:AF
hippy onlinged	
Undo Changes	C Disable IP
Undo Changes Reboot Device	C Disable IP C DHCP IP C Static IP IP Address : 172 . 18 . 30 . 96
Undo Changes Reboot Device Save Settings to a File	C Disable IP C DHCP IP Static IP IP Address : 172 . 18 . 30 . 96 Subnet Mask : 255 . 255 . 0 . 0
Undo Changes Reboot Device Save Settings to a File Load Settings from a File	C Disable IP C DHCP IP Static IP IP Address : 172 . 18 . 30 . 96 Subnet Mask : 255 . 255 . 0 . 0 Default Gateway : 172 . 18 . 0 . 52
Undo Changes Reboot Device Save Settings to a File Load Settings from a File Help	C Disable IP C DHCP IP Static IP IP Address : 172 . 18 . 30 . 96 Subnet Mask : 255 . 255 . 0 . 0 Default Gateway : 172 . 18 . 0 . 52

IP address configuration screen for RTS-UP...

Configure the RTS and MTT to work together

Put the IP address of the RTS-UP... unit in a web browser. You will configure the rts-up...unit here.



Go to Serial device configuration and open up port 1. Make the configuration changes you see below.

W Comtrol Corporation - DeviceMaster UP Modbus/TCP 5.07 - File Edit View History Bookmarks Tools <u>H</u> elp	Mozilla Firetox
Comtrol Corporation - DeviceMaste × 🗗 Ethernet DeviceServe	rr RTS-UP-1 💦 🗌 tdoct1402a_eng.pdf (application/p 🗙 💭 Comtrol Corporation - DeviceMaste 🗙 🕇
(172.18.30.96 /editPort.asp?portNum=0	☆ マ C 5 - Bing
Most Visited 15 Search Pepperl+Fuc W Getting Started Search Search Pepperl+Fuc	Latest Headlines
Modbus Slave and Raw-Data Device Settings	_
Response Timeout: Raw-Data Only Raw-Data Message Transfer Mode: Cmd/Resp Age Time, Discard Responses After: Cmd/Resp Expected Responses Per Command: Cmd/Resp Mode Response To Modbus/TCP Based On:	250 (ms) Data-Stream I0 (sec) 1 IP-Address V
Serial Port Packet ID Settings (Raw-Data Only) STX (Start of Transmission) Rx Detect: ETX (End of Transmission) Rx Detect: PLC Specific Settings	none Byte 1: Byte 2: (dec) Serial data must end with one byte Byte 1:13 Byte 2: (dec) a carriage return
STX (Start of Transmission) Tx Append: ETX (End of Transmission) Tx Append: Strip Rx STX/ETX: Application Specific Settings	none Byte Pute 2: (dec) A carriage return is appended to all PLC strings one byte Byte 1:13 Byte 2: (dec) strings
STX (Start of Transmission) Tx Append: ETX (End of Transmission) Tx Append: Strip Rx STX/ETX:	none Byte 17 Byte 2: (dec) none Byte 1: Byte 2: (dec) Byte 1: Byte 2: (dec) Carriage return does not appear in PLC
Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only) Rx (To PLC) Transfer Mode: Tx (From PLC) Transfer Mode: Maximum Rx Data Packet Size: Oversized Rx Packet Handling:	Slave (PLC Polls) Read from 41001 to read serial Slave (PLC Writes) Raddata. To write command send data to 41301 Truncate
TX MS Byte First: Tx MS Byte First: Disable Non-Filtered To PLC Rx Queue (Data-Stream only): Disable Tx Sequence Number Check: Madhur /TCB Mactar Pu/Tu Sattings (Paus Data calu)	Most significant byte is the first byte in/out of serial port
PLC IP Address: PLC Device ID: Note: Use gateway's IP Address to access local Modbus Slaves.	0.0.0. 1 (1-255, 0=broadcast)
Master Rx Mode Only PLC Rx Data Address: Maximum PLC Update Rate: Use Maximum Sized Modbus Messanos:	1 (Base 1) 40 (msec)
Master Tx Mode Only PLC Tx Data Address: PLC Tx Poll Rate:	1 (Base 1) 100 (msec)
PLC Tx Poll Message Length: Tx Sequence Number Syncing Enable: PLC Tx Consumed Sequence Number Address:	0 (bytes) 1 (Base 1)
Filtering/Data Extraction Configuration (Raw-Data Only) To PLC Filter Mode: To PLC Filter Options (RFID Only):	Off Antenna 🗖 Filter Value 🗌 Serial Number

RTS-UP-1 serial port 1 configuration

Setup the PLC to talk to the RTS-UP... unit.

Configure the PLC to read data from 41001. The length can be longer than required. I suggest a length of 50 even though it is way more than you need. The unit identifier(Slave address) must be 255 to read data from a serial port. Read address 41001, Length 50

Write address 41301, Length 50 Device ID = 255

	File Connecti	2 - ModScal on Setup View	Window H	elp				×
	ModSca1							
	Address:	1001	Devi MOD	ce Id: 255 BUS Point Tyr		Number of Poll	s: 77	
	Length:	50	03: HOLD	ING REGISTE	R 🔹	lalia Slave Re	Beset Ctr	
Rx Counter Length Data start	41001: 41002: 41003: 41004: 41005: 41006: 41007: 41010: 41011: 41013: 41014: 41014: 41015: 41016: 41016: 41017: 41018: 41019:	<00059H> <0002H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H>	41020: 41021: 41022: 41023: 41024: 41025: 41026: 41027: 41028: 41029: 41030: 41031: 41032: 41033: 41034: 41034: 41035: 41036: 41037: 41038:	<0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H>	41039: 41040: 41041: 41042: 41043: 41044: 41045: 41046: 41047: 41048: 41049: 41050:	<0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H> <0000H>		
	For Help, press	F1				Po	ılls: 77	Resps: 44

Read serial data for MTT reader

How will you know it is working?

When you read address 41001 from the MTT RFID reader than you should get no slave exception error. Also when you put a tag in front of the reader the "Rx Counter" will increase by 1. The RTS-UP unit should be polled at regular intervals. If you are polling the RTS-up unit. These messages can be seen under PLC Interface Diagnostics" on the RTS-UP web page.



PLC Interface Diagnostics

Home	Serial Interface Configuration	on Ethernet Device Configuration
Display Serial Logs	Display Ethemet Device Log	<u>Alias Modbus Device ID Config/Status</u>
Communication Statistics	PLC Interface Diagnostics	Display All Modbus Slave Devices
Modbus/TCP and Serial Mo	dbus Master Statistics	Reset Statistics
Modbus/TCP Slave Mode S	pecific Statistics	
Messages Received From	PLC:	37 PLC polls
Responses Sent To PLC:		37
Raw Serial Port Data Me	ssages Received From PLC <mark>::</mark>	37
Raw Socket Port Data M	essages Received From PLC: (0
Modbus RTU/ASCII Mess	ages Received From PLC: 0	0
Modbus RTU/ASCII Broa	dcasts Received From PLC: 0	0
Invalid Command Length	s: (0
Invalid Message Data En	ors:	0
Unknown Request Destin	ation IDs:	0
Invalid Request Protocol	Types:	0
Unsupported Modbus Fun	ction Codes: (0
Modbus/TCP Master Mode	Specific Statistics	
Messages Sent To PLC:	(0
Responses Received From	n PLC: (0
Invalid Response Data E	rors: (0
Error Responses:	(0
Unexpected Response Fu	nction Codes: (0
Unknown Response Dest	ination IDs:	0
Invalid Response Protoco	ol Types: (0
Failed Modbus/TCP Conn	ection Attempts: (0
Modbus/TCP Connection	Problems: (0
No Available Modbus/TCI	P Connection Errors: (0
Non-Mode Specific Statisti	cs/Diagnostics	
Oversized Received Data	Packet Errors: (0
Improper Configuration I	Errors:	0
System Resource Errors:	(0
Writes To Offline Ethern	et Device on Socket 1: 👘 🛛	0
First Error Description:	1	No Error Detected
Last Error Description:		

Reboot

PLC polls as seen on the diagnostic interface

The serial logs will also help you figure out if the serial cable is wired from the MTT unit to the RTS unit properly. All serial strings are logged here. If the serial string does not have the proper terminator then the data will be followed by the words "DROPPED". This probably means the MTT... has the wrong termination configured.



Serial port logs

Writing to tags

Reading the tags is automatic. If you want to send a command to the MTT unit or write data with the MTT6000-F120-B12-V45 unit, data must be written to Modbus port 41301.

A command to write two bytes of data to the MTM-C2 tag from the MTT6000 reader has this format. R4 is used here for the tag format. For other options see the MTT reader manual. The RTS-UP-1 has also been configured to append a carriage return(13d) to the end of the 8 byte string.

Command: w002/00/02R4<CR> Response: 0<CR> good or 5<CR> no tag

ModScan32 - ModSca1 File Connection Setup View Wir	ndow Help	×
Address: 1001 Length: 50 03	Device Id: 255 MODBUS Point Type HOLDING REGISTER	Number of Polls: 1465 /alid Slave Responses: 1432 Reset Ctrs
16: PRES 41001: <0063H 41002: <0002H 41003: <0002H 41004: <0000H 41005: <0000H 41006: <0000H 41007: <0000H 41009: <0000H 41010: <0000H 41012: <0000H 41013: <0000H 41014: <0000H 41015: <0000H 41016: <0000H 41017: <0000H 41018: <0000H 41019: <0000H	ET MULTIPLE REGISTERS Address: 1301 Length: 0050 1301: 000A (HEX) 1302: 0008 (HEX) 1303: 7730 (HEX) 1304: 3032 (HEX) 1305: 0003 (HEX) 1306: 5234 (HEX) 1307: 0000 (HEX) 1308: 0000 (HEX) Update Cancel 038: <00000H>	To File Counter, to send string change value Length of bytes to send Start of command, w002 2 byte tag data Tag format R4
For Help, press F1		Polls: 1412 Resps: 1379 //

Writing command to serial Port 1

Tag writing can take up to 15 seconds. Only the MTT6000 can perform the write. The write range is only .25m and the tag should be away from the front of the reader by 50mm. Only one tag is allowed in the read range during the write process.