

## **Application example:**

### **Profibus connection to a MX2-inverter with Gateway PRT1-SCU11**

#### **Introduction**

The OMRON gateway between Profibus and serial connections does not work only with temperature controllers but since version 2 also with inverters. With the inverter MX2 it is possible to access control and status bits over modbus hold registers (1F01).

#### **Hardware needed**

- PLC with Profibus-Master e.g. CJ1M-CPU11 with CJ1W-PRM21
- Gateway PRT1-SCU11
- Inverter MX2

#### **Cable connections**

|                  |     |
|------------------|-----|
| PRT1-SCU (RS485) | MX2 |
| R+               | SP  |
| R-               | SN  |

#### **PRT1-SCU11 setup**

In the manual W01E-EN-02 from chapter 2-1-3 on, the setup of the gateway is described.

Set the Node address (Profibus address) to 02, (= 0 x10, 2 x1)

Set the DIP-switch 3 to ON, all others to OFF (9600 Baud , Modbus).

Set the switch 1 and 2 to ON (RS485, with termination)

#### **MX2 – inverter setup**

In the manual I114-EN-01 appendix B or I570 chapter 6-3 the necessary settings are described.

Following settings fit to the above given PRT1-SCU settings:

|       |    |                    |
|-------|----|--------------------|
| A001: | 3  | Frequency source   |
| A002: | 3  | Run command source |
| C071: | 05 | 9600 bps           |
| C072: | 1  | Modbus address     |
| C074: | 01 | Even parity        |
| C075: | 1  | stop bits          |

After changing the settings, reset the MX2 or recycle power.

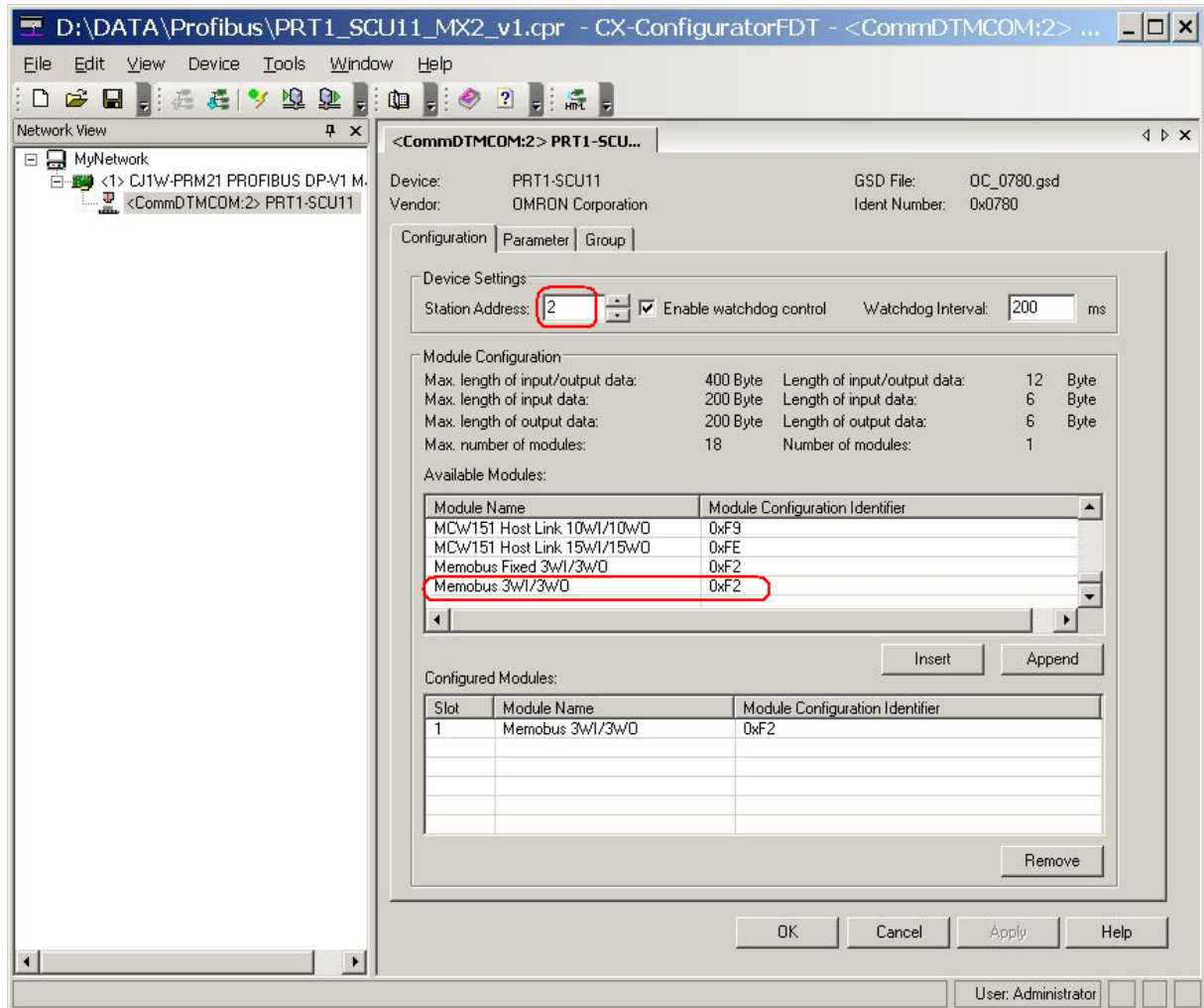
#### **Configuration of the Profibus-Master**

The configuration of the OMRON Profibus master CJ1W-PRM21 is also described in the PRT1-SCU manual chapter 2-6-2.

In the enclosed example projects the PRM21 has unit number 4 and profibus address 1 and the PRT1-SCU has profibus slave address 2.

The document consists of settings and screen shots for the CX-Configurators-FDT on the following pages.

Add the master and the slave into the configuration.  
Do the configuration of the slave.  
Define the slave address as 2.  
Append the module „Memobus 3WI/3WO“.



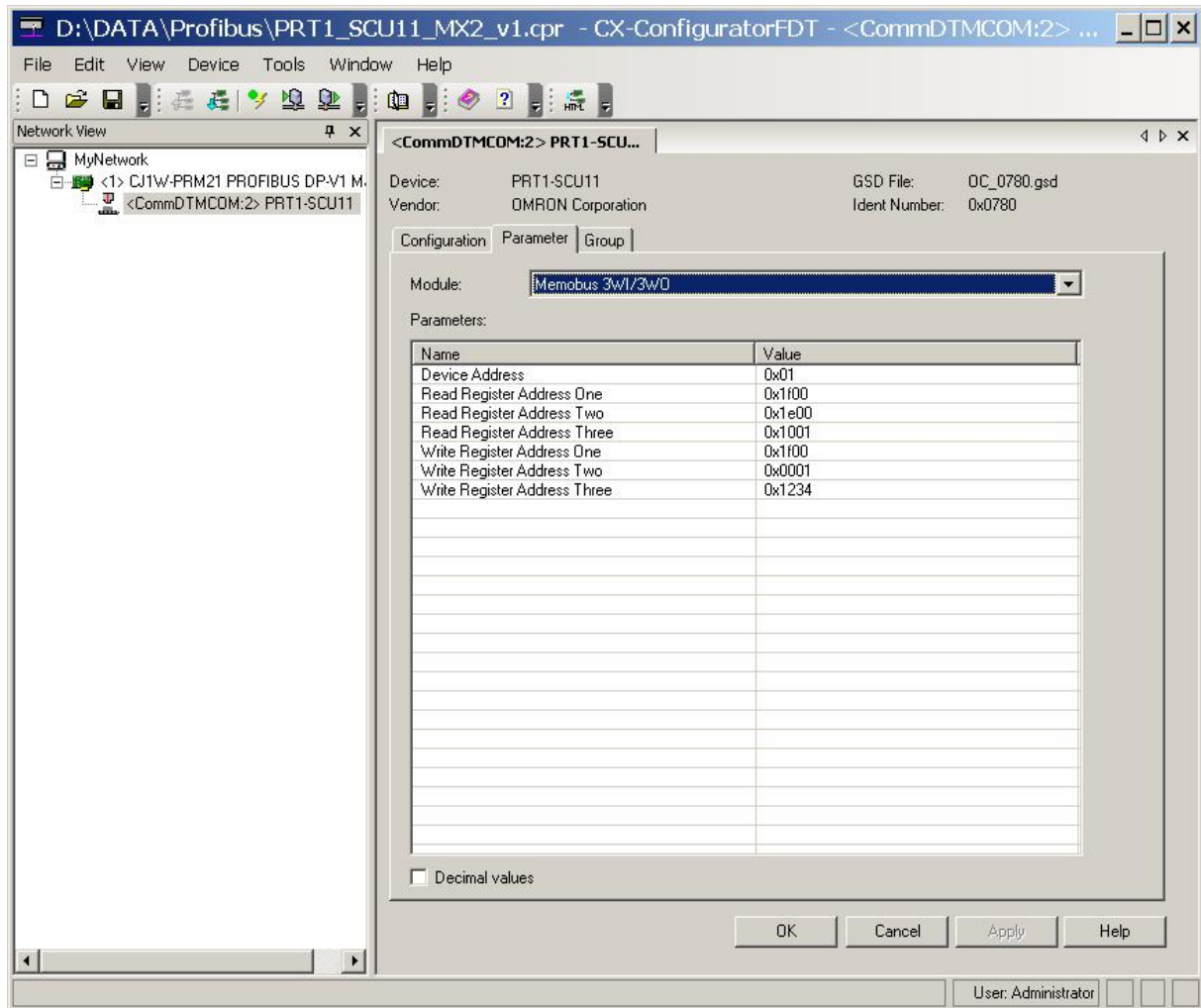
Don't forget to press the „Apply“ button and save the configuration.

Click the „Parameter“-tab of the slave.

Choose the module you just inserted: „Memobus 3WI/3WO“

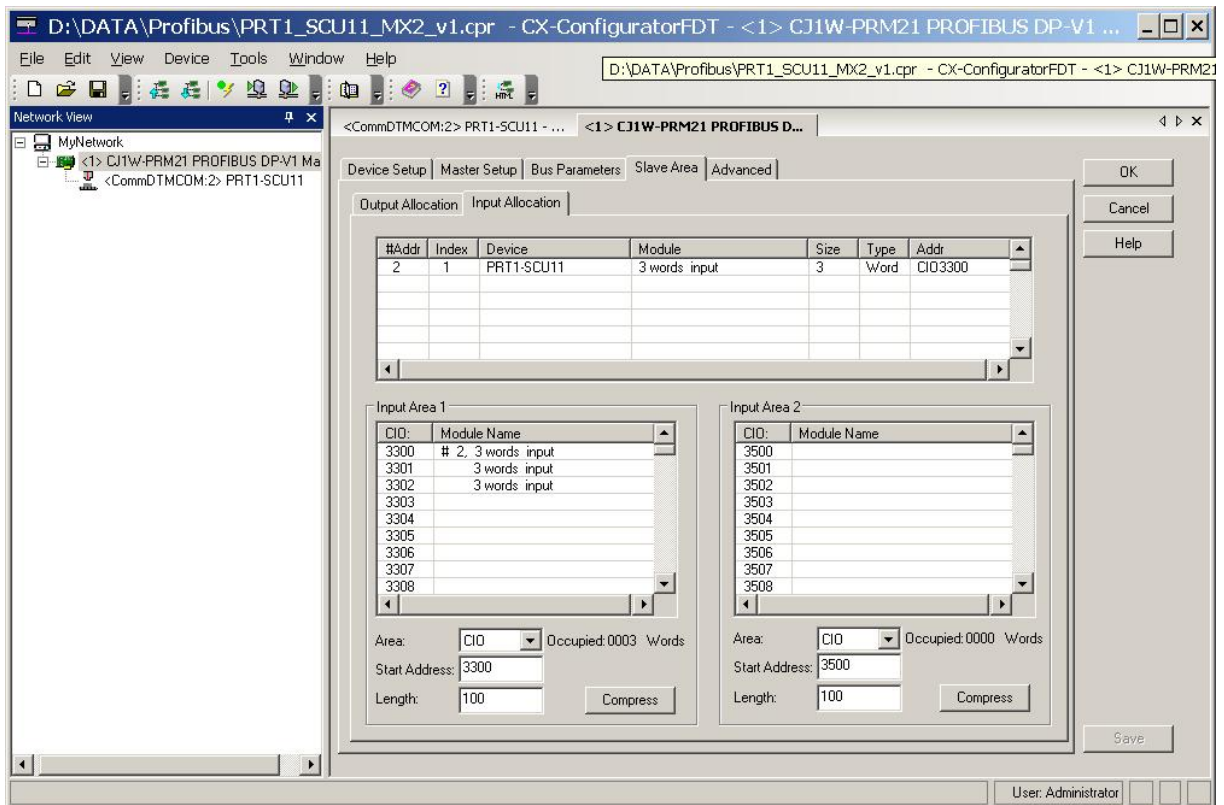
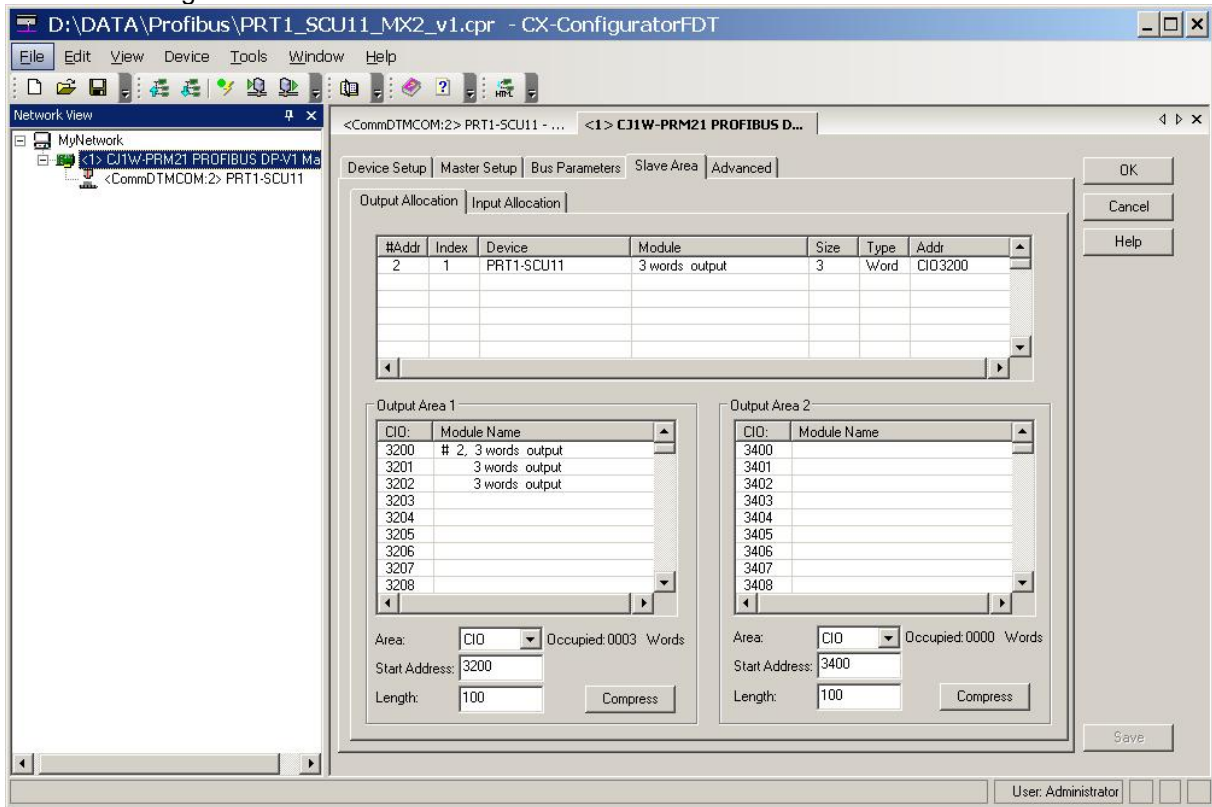
Change the values according following list:

|                |        |                                                            |
|----------------|--------|------------------------------------------------------------|
| Device Address | 0x01   | Modbus address of the inverter                             |
| Read Reg 1     | 0x1f00 | Hold register 1F01, Command bits/ Status bits coil 01...0F |
| Read Reg 2     | 0x1e00 | Hold register 1E01, Status bits coil 10...1F               |
| Read Reg 3     | 0x1001 | Hold register 1002, actual frequency                       |
| Write Reg 1    | 0x1f00 | Hold register 1F01, Command bits/ Status bits coil 01...0F |
| Write Reg 2    | 0x0001 | Hold register 0002, Set frequency                          |
| Write Reg 3    | 0x1234 | Hold register 1235, Fixed frequency number 15              |



Don't forget to press the „Apply“ button and save the configuration.

Check the assigned PLC addresses in the master:



Configure the PLC and the programming connection and save all. Load the configuration into the master unit. The master transmits the parameters during start up onto the gateway. The gateway then starts the modbus communication to the inverters.

### Address assignment in the PLC:

Please have also a look into the CX-Programmer example project.

The bits and words have following addresses in the PLC:

|     |      |                                                                                                                                                        |
|-----|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Out | 3200 | Hold register 1F01, Command bits/Status bits coil 01...0F                                                                                              |
| Out | 3201 | Hold register 0002, Set frequency                                                                                                                      |
| Out | 3202 | Hold register 1235, Fixed frequency number 15 (This register is „useless“<br>It is only given as a “dummy” because 3 register addresses had to be set) |
| In  | 3300 | Hold register 1F01, Command bits/ Status bits coil 01...0F                                                                                             |
| In  | 3301 | Hold register 1E01, Status bits coil 10...1F                                                                                                           |
| In  | 3302 | Hold register 1002, actual frequency                                                                                                                   |

#### Command bits:

| PLC-Addr. | Coil | Function                   |
|-----------|------|----------------------------|
| 3200.01   | 01   | RUN Command                |
| 3200.02   | 02   | Rotation Direction Command |
| 3200.03   | 03   | External Trip (EXT)        |
| 3200.04   | 04   | Trip Reset (RS)            |

#### Status bits:

| PLC-Addr. | Coil | Function                         |
|-----------|------|----------------------------------|
| 3300.15   | 0F   | Operation Status (01: RUN )      |
| 3301.00   | 10   | RUN Direction                    |
| 3301.01   | 11   | Inverter Ready                   |
| 3301.04   | 14   | FA1 (constant speed reached)     |
| 3301.05   | 15   | FA2 (set frequency min. reached) |
| 3301.06   | 16   | OL (overload warning)            |
| 3301.07   | 17   | OD (PID excessive deviation)     |
| 3301.08   | 18   | FEHLER-Bit = AL (alarm output)   |
| 3301.09   | 19   | FA3                              |
| 3301.10   | 1A   | OTQ (overtorque/undertorque)     |
| 3301.12   | 1C   | UV (signal during undervoltage)  |
| 3301.13   | 1D   | TRQ (during torque limit)        |
| 3301.14   | 1E   | RNT (RUN time over)              |
| 3301.15   | 1F   | ONT (Power ON time over)         |