

# Contents

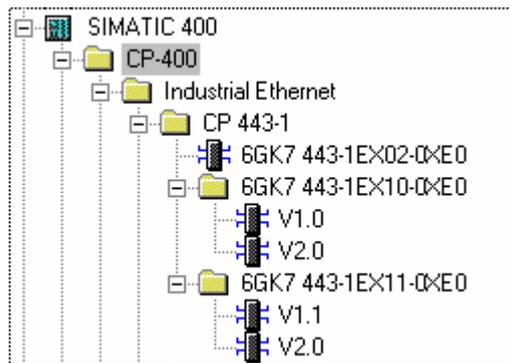
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## F650 on xx7 (TCP/IP-Modul)

# 1 Design of HW and connections

## 1.1 HW configuration

To run the F650 module on an xx7, the correct HW configuration must be loaded. The HW design must always use a CP443-1. Output status is not significant.



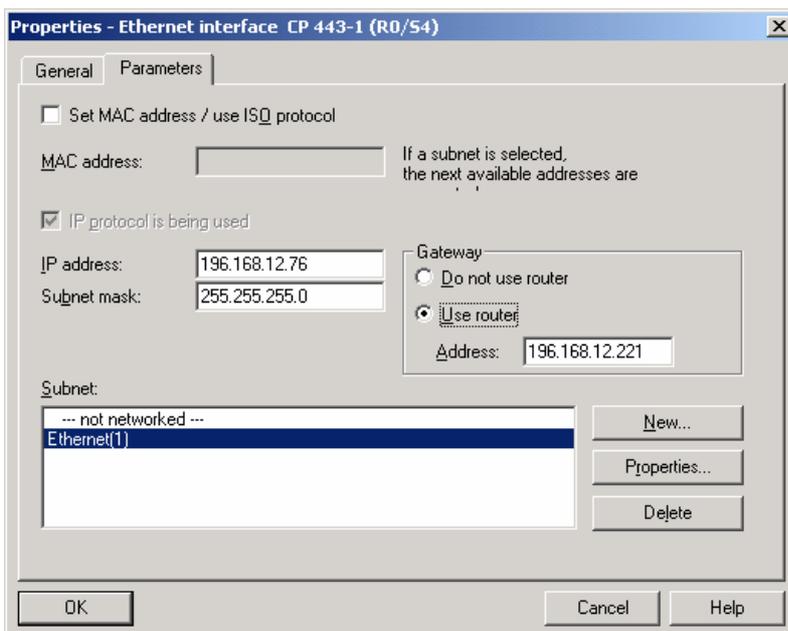
All the CPs shown in the above diagram can be used for project design. The more recent CPs also allow a parameter to be set for the Connection Timeout. A default value of 65 000 is set for the older CPs.

**Caution:** The project design **must always** use a **CP443-1**, never a CP343-1.

Depending on which CP is used in the design, different FCs (FC5,6,50,60) will be made available in the library. Unfortunately, these FCs are not mutually compatible. If the design uses a CP343-1 and works with the FC for a CP343-1, the user program will not run properly, if at all!!!!

The following parameters must be set:

- Edit → Interface Properties → General:



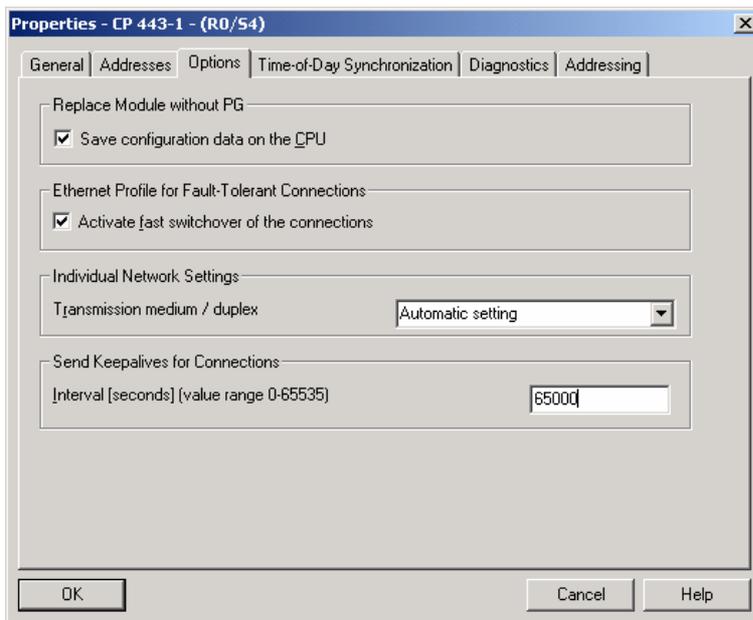
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The F650 module is supplied ready equipped with a MAC address. It is not therefore necessary to enter the MAC address here. Any MAC address that might be entered will not affect the module, as this parameter will not be evaluated.

The "IP protocol used" function must be selected.

An IP address and subnet mask must be entered, which will enable the module to be accessed later on. If routers are used in a subsequent Ethernet network, it is also necessary to enter the router address.

- Features→Addresses: The address entered here will later be used to actuate the module from the Step7 program. (Adopt default value.)
- Features→Options: The F650 module's Keep-Alive parameter has a different meaning than with Siemens. This parameter corresponds to the F650 module's connection timeout. If no parameters are received across a port before the connection timeout lapses, the F650 module will assume that the remote station is no longer on the network and will close the connection. Subsequently, the module will try to establish a new connection. The remaining parameters on this page are ignored.



- The settings for Time-of-Day synchronization, diagnostics and addressing do not affect the F650 module.

### 1.2 Configuration of connections

The following connections can currently be designed for:

- UDP connection
- TCP connection (active/passive)
- ISO-on-TCP connections (active/passive).

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### 1.2.1 Configuration of UDP connection

The following parameters must be set for UDP connections:

- Under Include new connection → Connection partner: a connection partner must be selected from the list.
- Under Features → UDP connection → General → Connection end point: the local ID must be selected (default value). This number is required again in the S7 program.
- Under Features → UDP connection → Addresses: the local port address and the port address of the partner station must be entered.
- The remaining parameters do not affect connections.

The following parameters must be set for UDP broadcast connections:

- Under Include new connection → Connection partner: "All broadcast stations" must be selected.
- Under Features → UDP connection → General → Connection end point: the local ID must be selected (default value). This number is required again in the S7 program.
- Under Features → UDP connection → Addresses: the local port address and the port address of the partner station must be entered.
- The remaining parameters do not affect connections.

The connection mode "All multicast" stations is not supported.

### 1.2.2 Configuration of TCP connection

The following parameters must be set for TCP connections:

- Under Include new connection → Connection partner: a connection partner must be selected from the list.
- Under Features → TCP connection → General → Connection end point: the local ID must be selected (default value). This number is required again in the S7 program.
- Under Features → TCP connection → Addresses: the local port address and the port address of the partner station must be entered.
- The remaining parameters do not affect connections.

### 1.2.3 Configuration of ISO-on-TCP connection

The following parameters must be set for ISO-on-TCP connections:

- Under Include new connection → Connection partner: a connection partner must be selected from the list.
- Under features → ISO-on-TCP connection → General → Connection end point: the local ID must be selected (default value). This number is required again in the S7 program.

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- Under features → ISO-on-TCP connection → Addresses: the local and partner TSAP address must be entered.
- The remaining parameters do not affect connections.

## 2 Programming connections

Any exchange of data between AGs must be programmed accordingly in the S7 program with FC5/6, FC50/60.

**Caution:** Since the F650 module transfers new data to the PCD, a cyclical call of FC6 or FC60 is necessary for all connections when receipt has been acknowledged of the last item of data. If data has not been fetched from a projected connection all communications will be blocked!!

## 3 Features of UDP and TCP connections

### 3.1 Difference between the xx7 PCD Types on Ethernet TCP/IP level

PCD Type	Maximum possible simultaneous Ethernet TCP/IP connections to/from one PCD (for each PCD)
PCD2.M157 (PCD7.F650 on socket B1)	9
PCD2.M177/M487/Smart7 (PCD7.F650 on socket B2)	64

### 3.2 UDP Connections

UDP telegrams are not fragmented. With UDP, therefore, the received packet is always transferred to FC6/60, regardless of buffer size. If the buffer size of the Rec parameter is smaller than the telegram received, the FC6/60 block gives an error message. If the buffer size is greater than the telegram received, the telegram will be copied to user memory and Len will indicate the actual telegram length.

Since the mailbox on the F650 module is limited to 744 bytes (with no possibility at present of sending/receiving larger telegrams via the mailbox) the maximum packet size for UDP is restricted to 744 bytes. (Siemens 2048 bytes)

### Caution!

**Any attempt to transmit UDP packets larger than 744 bytes will result in error message 8184: "Invalid data type for Send parameter".**

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### 3.2.1 Broadcast connections

If a connection has been designed as a broadcast connection and a (broadcast) telegram is received via this port, the job header will be copied before the useful data.

The following diagram shows the structure of the job buffer, with the meaning and positioning of parameters in the job header.

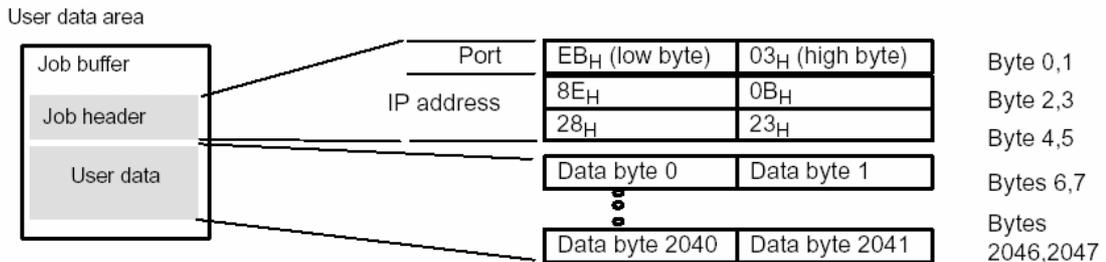


Figure showing reception via a broadcast UDP connection per program

This illustration (entries are in hexadecimal) starts from the following IP address as an example: 142.11.40.35;

Entries for port address 1003 should be, e.g.: Low Byte: EB<sub>H</sub>; High Byte: 03<sub>H</sub>.

The user data range can include up to 2048 bytes. Up to 2042 bytes of useful data can be transferred. 6 bytes are reserved for the job header. (**Caution:** In the current FW version of the F650 module only 744 bytes are possible.)

Please note that the data length indicated when the block is called (parameter LEN) must include both header and useful data!

If a broadcast telegram is sent to a normal port, the recipient will not see that he has received a broadcast telegram, nor from which station the telegram was sent.

### 3.3 TCP connections

TCP telegrams can be fragmented. A transmitted packet can therefore arrive at the receiving station as several partial packets; or several transmitted packets can arrive at the receiving station as a single packet. For this reason, when TCP packets are received the number of bytes transferred is always the same as the size of the receive buffer (FC6/60). (In contrast to UDP).

Broadcast and multicast connections are not possible with TCP.

### 3.4 ISO-on-TCP connections

Since ISO-on-TCP telegrams are normal TCP telegrams, they can also be fragmented. A transmitted packet can therefore arrive at the receiving station as several partial packets; or several transmitted packets can arrive at the receiving station as a single packet. In the data part of the TCP telegram an additional ISO header is inserted. This contains, among other things, an entry for the transmitted data length.

On receipt, the complete data packet/received packet is always transferred to FC6/60, regardless of buffer size. If the buffer size of the Rec parameter is smaller than the telegram received, the

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FC6/60 block gives an error message while the ISO connection is closed and then re-established, to allow the transmitter to identify the error. If the buffer size is larger than the telegram received, the telegram is copied to user memory and Len will indicate the effective telegram length.

Broadcast and multicast connections are not possible with ISO-on-TCP.

## 4 Connections with OPC server (OP communication)

If a server supports ISO-on-TCP connections, data can be written to or read from PLCs via such connections, without having to execute a special program on the PLC.

Equally, a Siemens S7 controller using S7 connections (via ISO-on-TCP connections) with SFB14 GET and SFB15 PUT can write data to or read it from the xx7, without having to run any special program on the xx7.

For this to be possible requires a valid configuration of the F650 module loaded in the xx7.

## 5 Programming via TCP/IP (Only M487)

Using the PCD2.M487 programming and controlling/monitoring is also possible via TCP/IP. But first the F650 module has to be configured in the right way. See therefore Chapter 1.1.

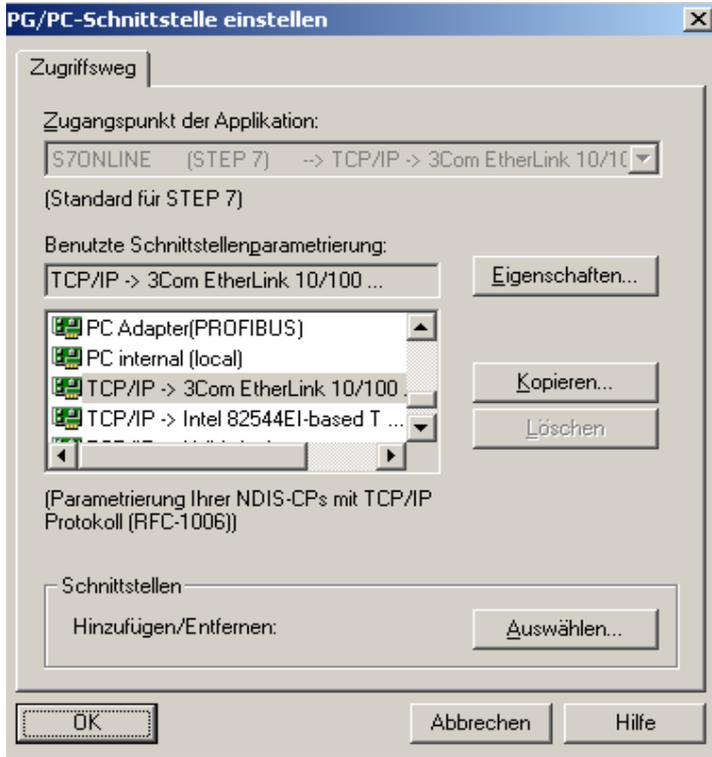
After that the Simatic Manager PG/PC interface on the TCP/IP (RFC1006) protocol settings have to be done in the following way:

1. Open the settings of the PG/PC interface:



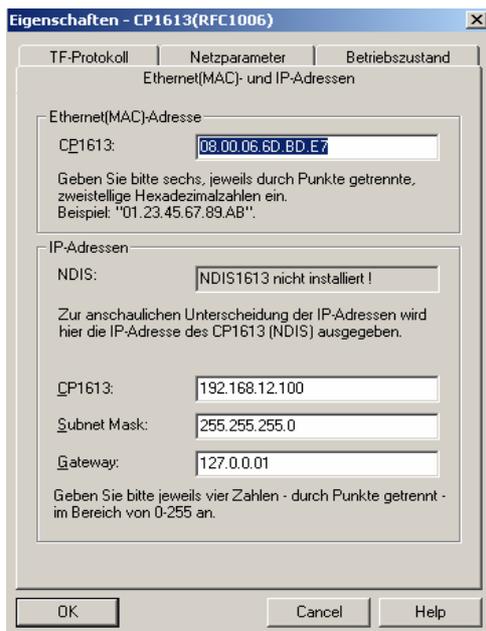
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2. Chose a interface, which supports the TCP/IP protocol (RFC-1006).



Attention: This can only be done when first the Software Simatic NetPG has been installed previously.

3. Configure the IP- properties of the PG.



Attention: Depending on the used TCP/IP card the properties window shown above could be shown different.

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4. Confirm with OK.

## 6 Further documents

See official Siemens documentation for a more detailed description of configuration and programming.

In any instances where the Siemens description deviates from the present document, the description given in the present document will always apply.

**Manual:**

- SIMATIC NET, NCM S7 for Industrial Ethernet, 12/2001 C79000–G8900–C129 Edition 05.