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SIEMENS
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Industrial Ethernet OSM/ESM

Operating Instructions

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Preface

Purpose of the Operating Instructions

These Operating Instructions provide you with support during configuration, commissioning, and troubleshooting of networks with Industrial Ethernet OSMs (Optical Switch Module) and Industrial Ethernet ESMs (Electrical Switch Module).

The Package

The OSM/ESM includes the following components:

- OSM/ESM device
- 6-pin plug-in terminal block for connection of the power supply and the signaling contact
- One or two 6-pin plug-in terminal blocks for OSMs/ESMs with digital inputs
- Kit for wall mounting or mounting in 19" cubicle
- Product information bulletin
- CD

Installing an OSM/ESM

- Follow the instructions in Chapter 5 of these operating instructions.

Validity of the Operating Instructions

These operating instructions are valid for the following devices:

- OSM ITP62
- OSM ITP62-LD
- OSM ITP53
- ESM ITP80
- OSM TP62
- ESM TP80
- OSM BC08
- OSM TP22
- ESM TP40

Further Documentation

The OSM/ESM Network Management manual /1/ describes how to operate the OSM/ESM with network management.

The "SIMATIC NET Industrial Twisted Pair and Fiber Optic Networks" manual /2/ contains further information if you want to connect the OSM/ESM to other SIMATIC NET network components (for example OLM, ELM) or if you want to connect entire network segments to an OSM/ESM.

The "Triaxial Networks for Industrial Ethernet" manual /3/ contains instructions on creating triaxial networks that you can connect via an ELM to an OSM/ESM.

Finding Information

To help you to find the information you require more quickly, the manual includes not only the table of contents but also the following sections in the Appendix:

- Glossary
- Index

Guide to the Manual

To help you to find specific information quickly, these operating instructions include the following parts:

- At the front of the operating instructions you will find a complete table of contents.
- The chapters have headings in the left margin with an overview of the contents of the paragraphs in the section.
- Following the appendix, you will find a Glossary in which the most important specialist terms used in the instructions are defined.
- At the back of the operating instructions, you will find an index with which you can find topics quickly.

Audience

These Operating Instructions are intended for staff involved in configuration, commissioning, and troubleshooting networks with Industrial Ethernet OSMs (Optical Switch Module) and Industrial Ethernet ESMs (Electrical Switch Module).

Personnel Qualification Requirements

Only qualified personnel should be allowed to install and work on this equipment. Qualified personnel as referred to in the operating instructions or in the warning notes are defined as persons who are familiar with the installation, assembly, startup and operation of this product and who possess the relevant qualifications for their work, e.g.:

- Training in or authorization for connecting up, grounding or labeling circuits and devices or systems in accordance with current standards in safety technology;
- Training in or authorization for the maintenance and use of suitable safety equipment in accordance with current standards in safety technology;
- First Aid qualification.

Standards and Approvals

The OSM /ESM meets the requirements for the CE mark. You will find detailed information on the existing approvals and certifications in the Appendix in this manual.

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Introduction 1

The switching technology of the Industrial Ethernet OSM Version 2/ESM (Optical/Electrical Switching Module) allows the structuring of Ethernet networks with large spans and large numbers of nodes. It simplifies network configuration and network expansions. The OSM Version 2/ESM are simply called OSM/ESM in the rest of this manual.

The OSMs have both electrical ports and additional FO ports via which several of these devices can be interconnected to form an optical bus or ring configuration. ESMs only have electrical ports.

DTEs, other OSMs/ESMs or complete network segments operating at 10 or 100 Mbps can be connected to the electrical autonegotiation (autosensing) ports of the OSM/ESM. The transmission rate is detected automatically.

To increase availability, ring configurations can be created with OSMs or ESMs. To do this, OSMs or ESMs are first connected together to form a bus using their ring ports. The ends of the bus are closed to form a ring by an OSM or ESM operating in the Redundancy Manager mode (RM mode).

The OSM or ESM operating in the RM mode monitors the attached bus and allows a connection through it if it detects an interruption on the attached bus; in other words, it reestablishes a function bus. Reconfiguration is completed within 0.3s. An OSM/ESM is switched over to the RM mode using a DIP switch on the device.

The redundant standby coupling allows the redundant coupling of OSM/ESM or OLM rings. To do this, two OSM/ESMs (one operating in standby mode) are connected via their standby-sync ports.

With the ITP variants of the OSM/ESM, the DTEs are connected using sub-D female connectors. This connector technology allows direct links over distances up to 100 m. With the TP variants, the DTEs are connected using RJ-45 jacks.

The Version 2 OSMs are compatible with the previous OSM variants (6GK 1105-0AA00) and ORM (6GK1105-1AA00) and can, for example, be mixed with these in an optical ring.

This manual describes the functions of the OSM/ESM available without using network management. The OSM/ESM Network Management user manual /1/ describes the additional options available if you use network management. You will find this manual on the CD accompanying every OSM/ESM or you can download the manual from the Web in Siemens Customer Support under entry number 8677203:
http://www4.ad.siemens.de/view/cs/de/8677203

1.1 Overview of the Variants of the OSM/ESM

1.1.1 OSM ITP62

Possible Attachments

The OSM ITP62 allows attachment of up to 6 DTEs or network segments using the ITP connector. By coupling an OSM via ports 7 and 8 it is possible to create optical bus and ring structures. The OSM TP62 can be coupled with other OSM TP62, OSM TP22, OSM ITP53, OSM ITP62, and OSM BC08 modules via the optical ports.

The OSM ITP62 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 1: OSM ITP62

Properties of the OSM ITP62	
Electrical ports	6 x 10/100 Mbps autonegotiation/autocrossover ports ITP connectors (sub-D 9-pin female)
Optical ports	2 x 100 Mbps FO ports (full duplex) BFOC female connectors
Maximum distance between two OSMs	3000 m (multimode graded-index fiber)
Maximum ring span with 50 OSMs	150 km
Digital Inputs	8 x DC 24V

Note

Industrial Ethernet OSM ITP62 is available in two versions:

- OSM ITP62 with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the eight device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- OSM ITP62 without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by two mode LEDs.

1.1.2 OSM ITP62-LD

Possible Attachments

The OSM ITP62-LD allows attachment of up to six DTEs or network segments using the ITP connector. By coupling an other OSM ITP62-LD modules via ports 7 and 8 it is possible to create optical bus and ring structures.

The OSM ITP62-LD also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.

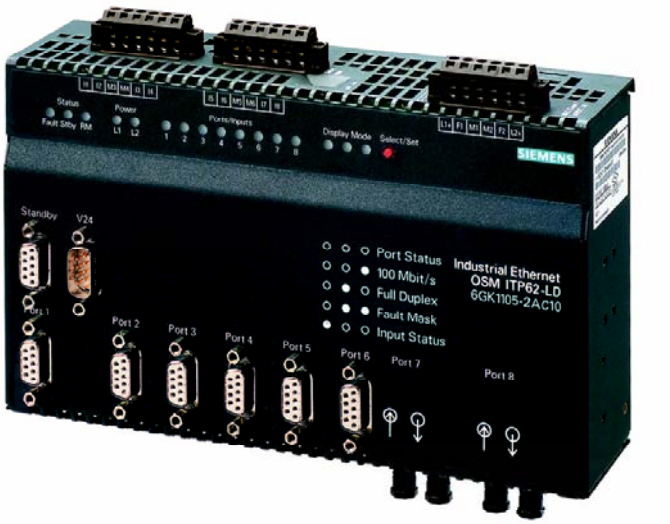


Figure 2: OSM ITP62-LD

Properties of the OSM ITP62-LD	
Electrical ports	6 x 10/100 Mbps autonegotiation/autocrossover ports ITP connectors (sub-D 9-pin female)
Optical ports	2 x 100 Mbps FO ports (full duplex) BFOC female connectors
Maximum distance between two OSMs	26 km (monomode fiber)
Maximum ring span with 50 OSM ITP62-LD	1300 km
Digital Inputs	8 x DC 24V

Note

Industrial Ethernet OSM ITP62-LD is available in two versions:

- OSM ITP62-LD with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the eight device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- OSM ITP62-LD without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by two mode LEDs.

1.1.3 OSM ITP53

Possible Attachments

The OSM ITP53 allows attachment of up to five DTEs or network segments using the ITP connector. By coupling an OSM via ports 7 and 8 it is possible to create optical bus and ring structures. The OSM TP53 can be coupled with other OSM TP53, OSM TP62, OSM ITP22, OSM ITP62, and OSM BC08 modules via the optical ports.

The additional FO port of the OSM ITP53 (port 1) also allows redundant coupling of rings via fiber-optic cable (see Section 3.3).

The OSM ITP53 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 3: OSM ITP53

Properties of the OSM ITP53	
Electrical ports	5 x 10/100 Mbps autonegotiation/autocrossover ports ITP connectors (sub-D 9-pin female)
Optical ports	3 x 100 Mbps FO ports (full duplex) BFOC female connectors
Maximum distance between two OSMs	3000 m
Maximum ring span with 50 OSMs	150 km
Digital Inputs	8 x DC 24V

Note

Industrial Ethernet OSM ITP53 is available in two versions:

- OSM ITP53 with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the eight device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- OSM ITP53 without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by two mode LEDs.

1.1.4 ESM ITP80

Possible Attachments

The ESM ITP80 allows attachment of up to eight DTEs or network segments with ITP connectors (sub-D9 female). By coupling further ESMs to ports 7 and 8 it is possible to create optical bus and ring structures.

The ESM ITP80 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the ESM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 4: ESM ITP80

Properties of the ESM ITP80	
Electrical ports	8 x 10/100 Mbps autonegotiation/autocrossover ports ITP connectors (sub-D 9-pin female)
Maximum distance between two ESMs	100 m
Maximum ring span with 50 ESMs	5 km
Digital Inputs	8 x DC 24V

Note

Industrial Ethernet OSM ITP80 is available in two versions:

- ESM ITP80 with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the eight device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- ESM ITP80 without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by two mode LEDs.

1.1.5 OSM TP62

Possible Attachments

The OSM TP62 allows attachment of up to 6 DTEs or network segments with TP connectors. By coupling an OSM via ports 7 and 8 it is possible to create optical bus and ring structures. The OSM TP62 can be linked with other OSM TP62, OSM TP22, OSM ITP53, OSM ITP62, and OSM BC08 modules via the optical ports.

The OSM TP62 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of this function is described in the OSM/ESM Network Management User Manual /1/.



Figure 5: OSM TP62

Properties of the OSM TP62	
Electrical ports	6 x 10/100 Mbps autonegotiation/autocrossover ports TP connectors (RJ-45 jacks)
Optical ports	2 x 100 Mbps FO ports (full duplex) BFOC sockets
Maximum distance between two ESMs	3000 m (multimode graded-index fiber)
Maximum ring span with 50 OSMs	150 km
Digital Inputs	8 x 24 V dc

Note

Industrial Ethernet OSM TP62 is available in two versions:

- OSM TP62 with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the 8 device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- OSM TP62 without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by 2 mode LEDs.

1.1.6 ESM TP80

Possible Attachments

The ESM TP80 allows attachment of up to 8 DTEs or network segments with TP connectors (RJ-45 jack). By linking further ESMs to ports 7 and 8 of the ESM TP80 it is possible to create bus and ring structures.

The ESM TP80 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the ESM. The use of this function is described in the OSM/ESM Network Management User Manual /1/.



Figure 6: ESM TP80

Properties of the ESM TP80	
Electrical ports	8 x 10/100 Mbps autonegotiation ports TP connectors (RJ-45 jacks)
Optical ports	none
Maximum distance between two ESM TP80 modules	100 m
Maximum ring span with 50 ESM TP80 modules	5 km
Digital Inputs	8 x DC 24V

Note

Industrial Ethernet OSM TP80 is available in two versions:

- ESM TP80 with eight digital inputs:
  The eight digital inputs are connected over two plug-in 6-pin terminal blocks on the top of the device. To display the status of these inputs using the 8 device LEDs, there is an additional display mode known as the "Input Status" that is selected using a third mode LED.
- ESM TP80 without digital inputs:
  There are no digital inputs and the "Input Status" display mode is not available. The operating states are displayed by 2 mode LEDs.

1.1.7 OSM BC08

Possible Attachments

The OSM BC08 allows you to connect up to 8 DTEs or network components over FO ports and is suitable particularly in environments in which the data lines run through areas with high levels of electromagnetic interference (for example, in the vicinity of power supply cables).

The OSM BC08 can be coupled with other OSM BC08, OSM ITP62, OSM TP62, OSM TP22, and OSM ITP53 over the optical ports 7 and 8 to form a redundant fiber-optic ring, a fiber-optic star, or a fiber-optic linear bus.

The OSM BC08 also has eight digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 7: OSM BC08

Properties of the OSM BC08	
Ports	8 x 100 Mbps FO ports (full duplex) BFOC female connectors
Maximum distance between two OSMs	3000 m (multimode graded-index fiber)
Maximum ring span with 50 OSMs	150 km
Digital Inputs	8 x DC 24V

1.1.8 OSM TP22

Possible Attachments

The OSM TP22 allows attachment of up to 2 DTEs or network segments with TP connectors. By coupling an OSM via ports 3 and 4 it is possible to create optical bus and ring structures. The OSM TP22 can be coupled with other OSM TP22, OSM TP62, OSM ITP53, OSM ITP62, and OSM BC08 modules via the optical ports.

The OSM TP22 also has four digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 8: OSM TP22

Properties of the OSM TP22	
Electrical ports	2 x 10/100 Mbps autonegotiation/autocrossover ports with TP connectors (RJ-45 jacks)
Optical ports	2 x 100 Mbps FO ports (full duplex) BFOC female connectors
Maximum distance between two OSMs	3000 m (multimode graded-index fiber)
Maximum ring span with 50 OSMs	150 km
Digital Inputs	4 x DC 24V

1.1.9 ESM TP40

Possible Attachments

The ESM TP40 allows attachment of up to 4 DTEs or network segments with TP connectors (RJ-45 jack). By coupling further ESMs via ports 3 and 4 it is possible to create bus and ring structures.

The ESM TP40 also has four digital inputs. The states of the inputs are available in a management information base (MIB) and can be read using an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the ESM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.



Figure 9: ESM TP40

Properties of the ESM TP40	
Ports	4 x 10/100 Mbps autonegotiation/autocrossover ports with TP connectors (RJ-45 jacks)
Maximum distance between two ESMs	100 m
Maximum ring span with 50 ESMs	5 km
Digital Inputs	4 x DC 24V

Functions 2

This chapter discusses the general functions of the OSM/ESM, in particular the properties of the switching technology.

Increased Network Performance

By filtering the data traffic based on the Ethernet (MAC) address of the DTEs, local data traffic remains local, only data intended for nodes in another network segment are passed on by the OSM or ESM. This reduces the data traffic in the network segments and lowers the network load in the network segments.

Simple Network Configuration and Network Expansion

OSMs and ESMs store the data received at the ports and the direct it to the destination address. The restriction of the network span resulting from collision detection (CSMA/CD) ends at the OSM/ESM port. With multimode graded-index fibers, a total network span of up to 150 km and more can be achieved without problems. With the OSM ITP62-LD, the monomode fibers allow a network span of up to 1300 km.

Limitation of Errors to the Network Segment Affected

OSMs and ESMs only pass on valid data. Invalid packets are discarded so that bad packets within a network segment have no effect on any other segment attached to the OSM/ESM.

Learning Addresses

By evaluating the source addresses in the data packets, OSMs/ESMs automatically learn the addresses of the DTEs attached via a particular port. If an OSM/ESM receives a data packet, it directs this packet only to the port via which the appropriate DTE can be obtained.

An OSM/ESM can learn up to 7000 addresses.

Deleting Addresses

An OSM/ESM monitors the age of the addresses it has learnt - address entries that exceed a certain age (aging time, default setting on the OSM/ESM 40 seconds) are deleted again by the OSM/ESM. If a packet with a source address matching the address entry is received before the aging time elapses, the address entry is retained and the age of the address is set to 0 again. When the OSM/ESM is restarted, the address entries are also deleted. If a packet is received by an OSM/ESM for which there is no address entry, the OSM/ESM distributes it to all ports.

Setting the Transmission Rate, Autonegotiation

The electrical ports of the OSM/ESM are set to autonegotiation mode as default (autosensing).

They automatically detect the transmission rate (10 or 100 Mbps) at which the attached device or attached network segment operates and set themselves to this rate. If the partner device also supports the autonegotiation mode, the devices further negotiate whether they will exchange data with each other in the half duplex or full duplex mode.

As a result of the automatic adaptation to the transmission rate of the attached DTEs, existing network segments operating at 10 or 100 Mbps can be interconnected simply using OSMs/ESMs.

Note

If the partner device connected to a port of an OSM/ESM does not support the autonegotiation mode (for example OSM Version 1), the port of the partner device must be set to half duplex mode or the port properties of the OSM/ESM must be configured.

Packets with the VLAN Priority Tag

OSMs/ESMs support frames with VLAN tags according to IEEE 802.1Q.

VLAN tags are additional information entered in the frame header. This additional information includes a priority field according to IEEE 802.1D. This field can have values from 0 through 7 and allows frames to be assigned a priority from 0 (lowest priority) through 7 (highest priority).

Frames with priority 0 through 3 are processed with low priority in the OSMs/ESMs and frames with priority 4 through 7 are processed with high priority.
Frames with a non-learned unicast destination address are an exception. These are always handled with low priority.

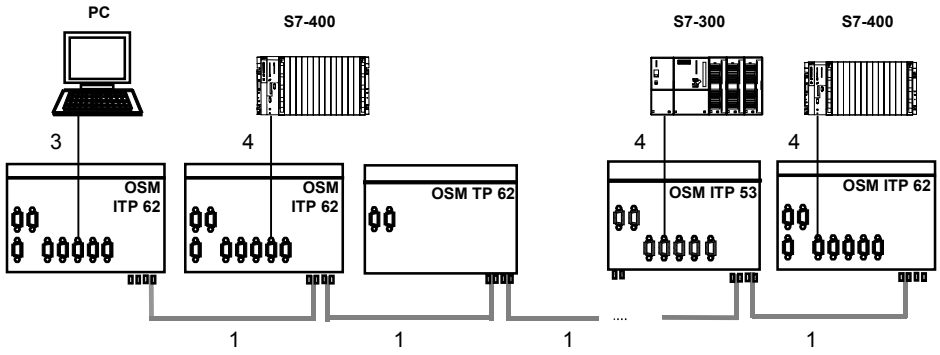
Notice

Frames with a priority higher than 3 can have a negative effect on the redundancy functions of OSMs/ESMs so that the reconfiguration time of maximum 0.3 seconds can no longer be guaranteed and higher failover times result.

Network Topologies with OSM/ESM 3

3.1 Bus Structure

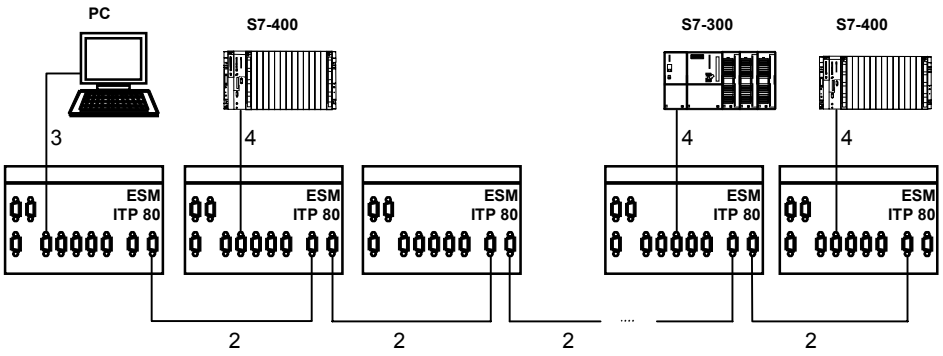
With OSMs or ESMs, bus structures can be implemented . The cascading depth and total span of a network are limited only by the monitoring times of the communication connections. These times must always be set higher than the signal delay of the transmission path.



1 Fiber-optic cable (FOC)
3 TP cord 9/RJ-45
4 ITP standard cable 9/15

Figure 10: Bus with OSM

Apart from OSM ITP62-LD modules, all listed OSM variants can be used in any combination in a bus consisting of OSMs. OSM ITP62-LD modules can only be coupled with other OSM ITP62-LD modules via the optical ports (monomode fiber).



2 ITP XP standard cable 9/9
3 TP cord 9/RJ-45
4 ITP standard cable 9/15

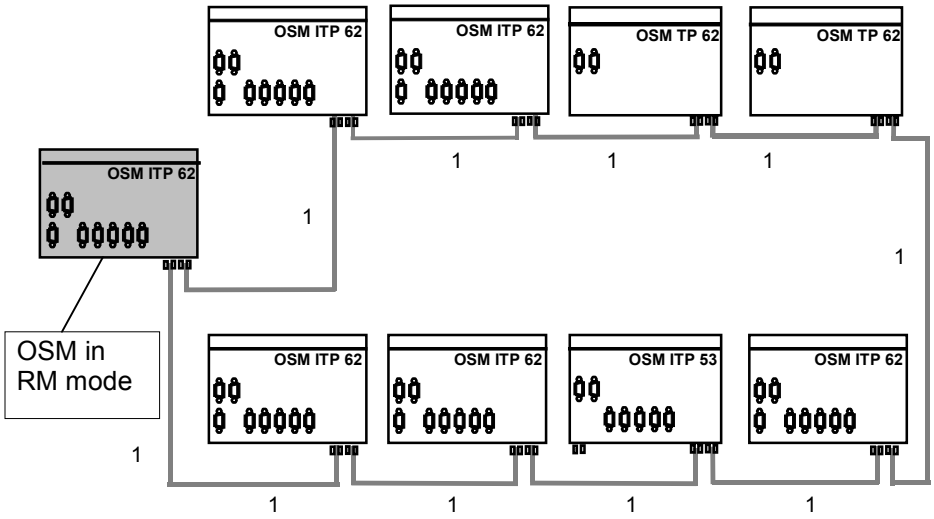
Figure 11: Bus with ESMs

In a bus consisting of ESMs, both ESM ITP80 modules and ESM TP80 modules can be used. TP and ITP variants can be connected together using the Industrial Ethernet FastConnect cabling system.

3.2 Redundant Ring Structure

With the aid of an OSM functioning as the redundancy manager (RM), both ends of an optical bus made up of OSMs can be closed to form a redundant optical ring. The OSMs are connected together using ports 7 and 8.

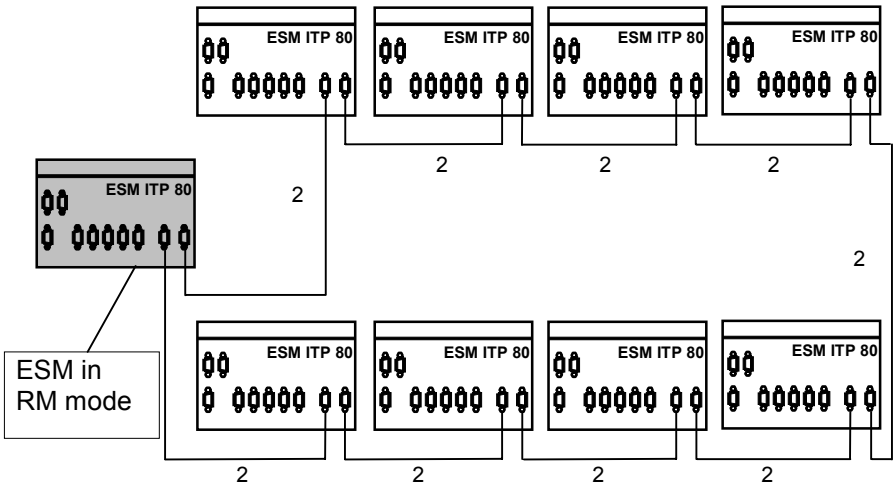
The RM monitors the OSM bus connected to it, closes the bus if it detects and interruption and therefore reestablishes a functioning bus configuration. A maximum of 50 OSMs are permitted in an optical ring. This allows reconfiguration time of less than 0.3 s to be achieved. The RM mode is activated on the OSM using a DIP switch (Section 4.2.4.1).



1 Fiber-optic cable (FOC)

Figure 12: Redundant Ring Structure with OSMs

A redundant electrical ring can be established using ESMs in the same way. To achieve this the ESMs must be connected together using ports 7 and 8. One device must be switched to the redundancy manager mode. With ESMs and a maximum of 50 devices in the ring, a reconfiguration time of less than 0.3 s can also be achieved.



2 ITP XP standard cable 9/9

Figure 13: Redundant Ring Structure with ESMs

Notes

- The reconfiguration time of less than 0.3 s can only be achieved when no components other than OSMs and ESMs (for example switches) are used in the redundant ring.
- In a ring, one device and one device only must operate in the redundancy manager mode.
- DTEs or complete network segments can be connected to ports 1 – 6 (OSM/ESM with 8 ports) or ports 1 and 2 (OSM/ESM with 4 ports) of an OSM/ESM operating in the RM mode.

3.3 Redundant Coupling of Network Segments

The standby-sync port of an OSM/ESM with 8 ports allows the connection of two Industrial Ethernet OSMs or ESMs with one operating as standby master (DIP switch "Stby off") and the other as standby slave (DIP switch "Stby on"). With this mode, pairs of OSMs/ESMs can be used for redundant coupling of OSM/ESM or OLM rings.

With network management, the OSM/ESM can also be configured so that several rings or networks can be interconnected at the same time with two OSMs/ESMs (see OSM/ESM Network Management, User Manual /1/).

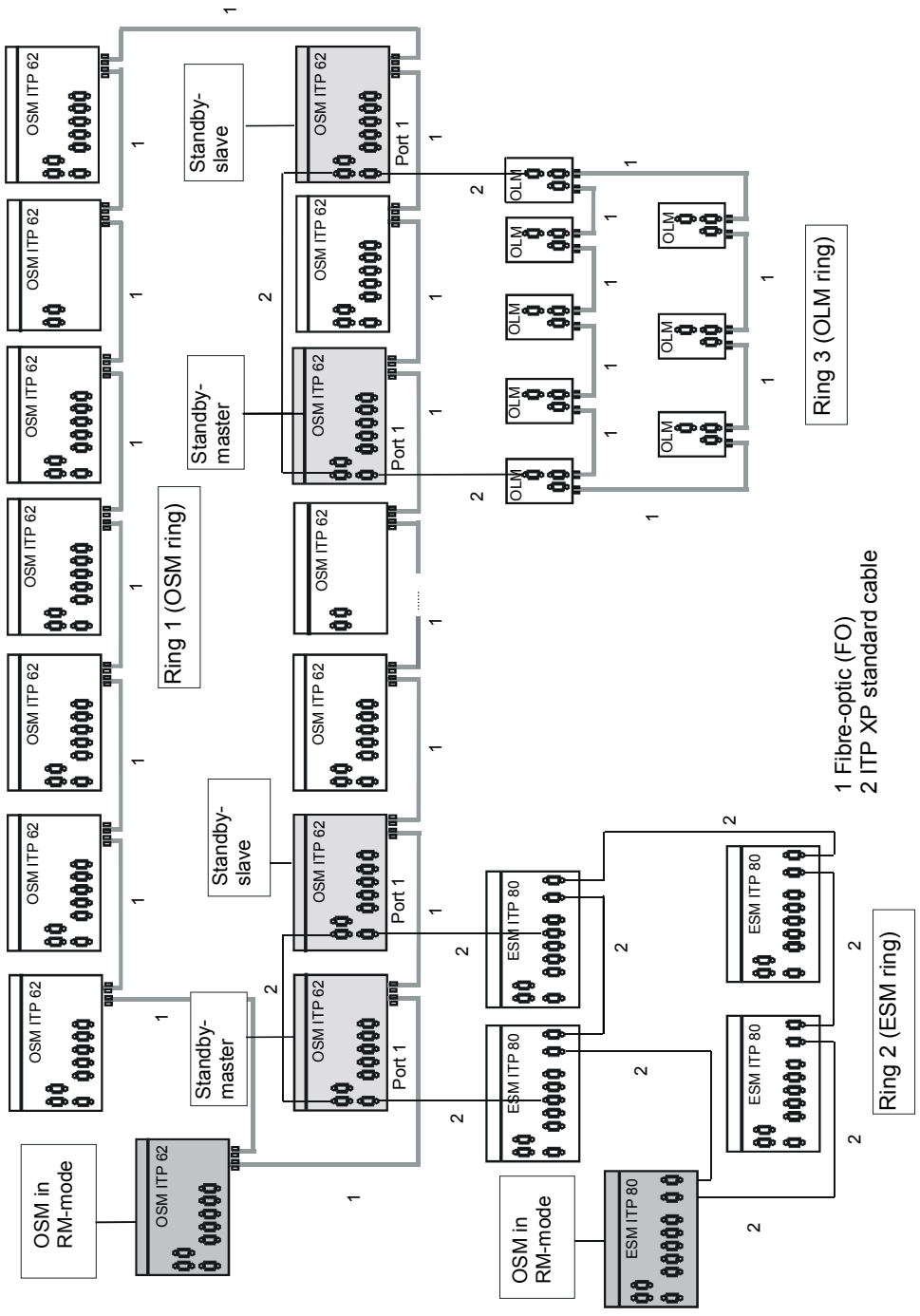


Figure 14: Redundant Coupling of Network Segments

The connection between two network segments is on two separate paths. Two of the OSMs/ESMs in a ring are connected together via a connecting cable (ITP-XP standard cable 9/9 with a maximum length of 40 m) and inform each other of their operating states. One of these OSMs/ESMs is assigned the redundant function using the DIP switch setting "Stby on" (standby slave). The other OSM takes over the function of the standby master (DIP switch setting "Stby off").

Immediately following the failure of the main transmission path, the standby slave enables the redundant path. If the main path is OK again, the standby master informs the standby slave. The main path is enabled and the redundant path disabled again. The reconfiguration time of the redundant ring coupling is less than 0.3 s.

Port Assignment in the Standby Mode

On the standby master and standby slave **only port 1** (standby port) can be used for the coupling to the neighboring ring. Ports 2 - 6 can be used just as normal OSM ports.

With network management, it is also possible to configure ports other than port 1 as standby ports (see also OSM/ESM Network Management User Manual /1/).

Simultaneous Standby and Redundancy Manager Operation

A standby master or standby slave can adopt the function of a redundancy manager at the same time.

Replacing the Standby Master During Operation

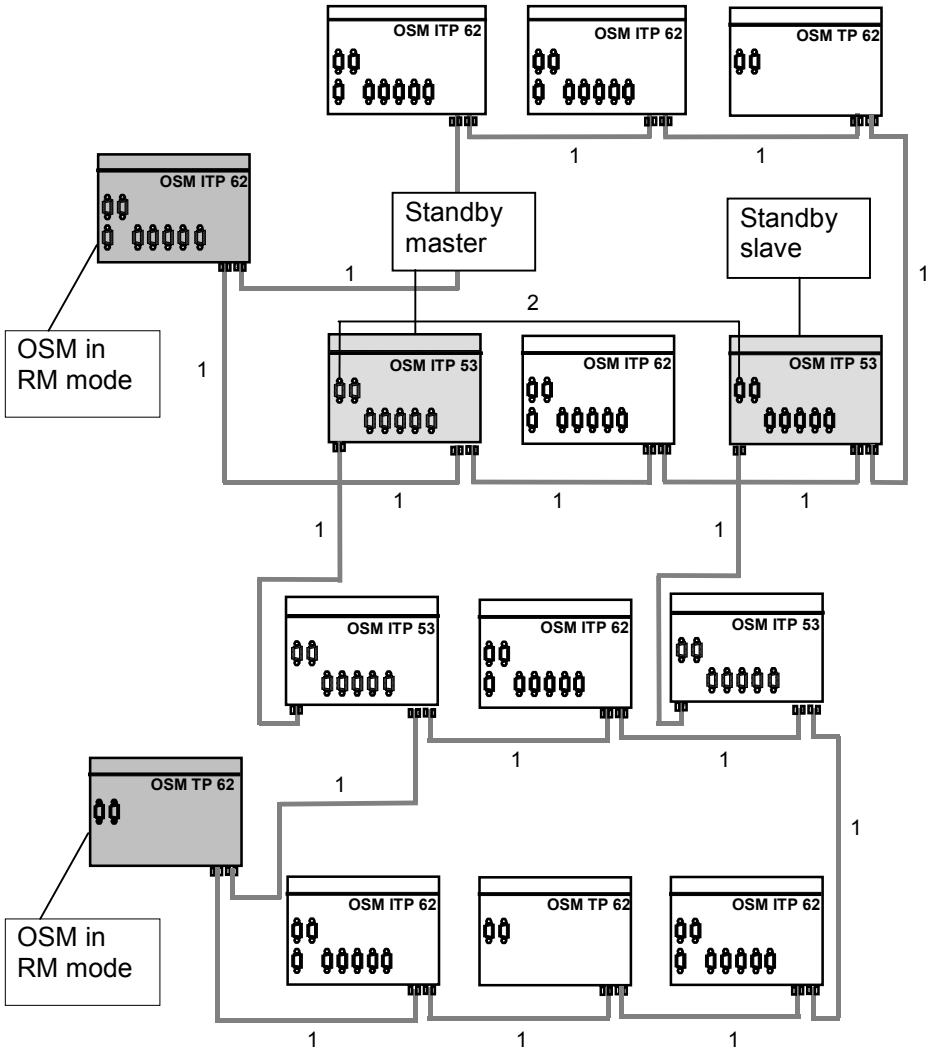
When replacing a standby master during operation, the following order is necessary to prevent an interruption on the network:

1. Remove the terminal block for the power supply on the standby master
2. Remove the signal lines and the standby connecting cable from the standby master.
3. Connect the signal lines to the standby connecting cable on the replacement device.
4. Plug in the terminal block for the power supply on the replacement device.

When replacing a standby slave, no special measures are necessary. You must simply make sure that the standby master is active.

Redundant Coupling of Rings over Fiber Optic Cable with the OSM ITP53

The OSM ITP53 allows a redundant coupling of rings with FO transmission paths. This allows rings far apart from each to be connected.



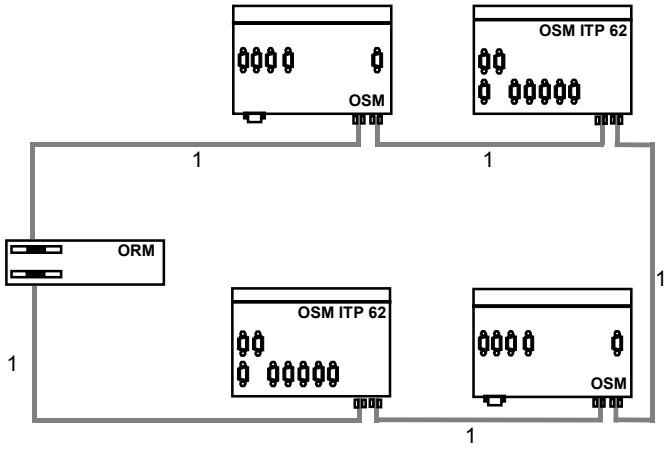
1 Fiber-optic cable (FOC)
2 ITP XP standard cable 9/9

Figure 15: Redundant Coupling of Rings with OSM ITP 53

3.4 Compatibility of OSM Version 2/ESM with OSM/ORM Version 1

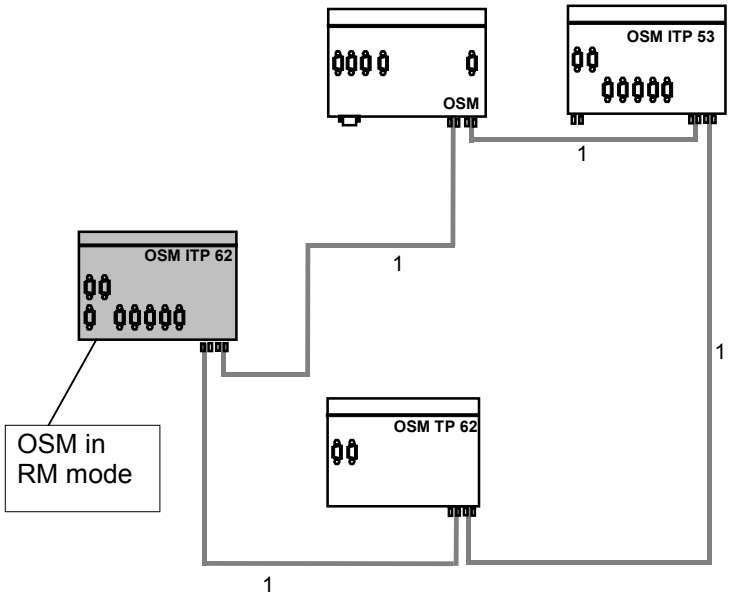
Compatibility

Version 2 OSMs can be operated at the same time in the ring with the OSM (6GK 1105-0AA00) and ORM (6GK 1105-1AA00) here called OSM/ORM Version 1. Make sure that only one device can adopt the redundancy manager function in the ring; in other words, only one ORM or only one OSM Version 2 operating in the RM mode.



1 Fiber-optic cable (FOC)

Figure 16: Ring with ORM as Redundancy Manager

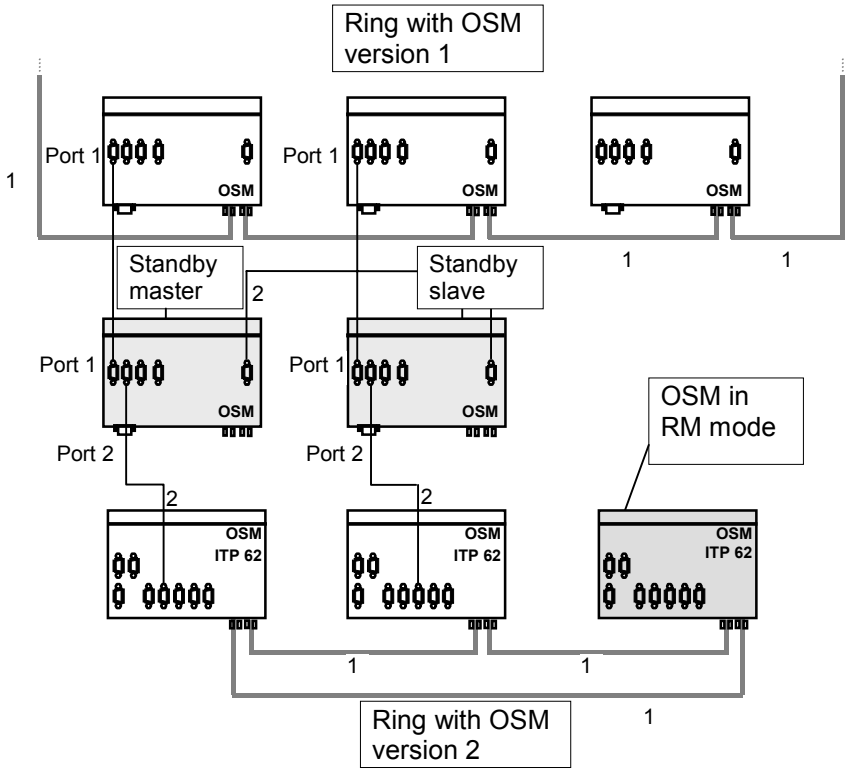


1 Fiber-optic cable (FOC)

Figure 17: Ring with OSM Version 2 as Redundancy Manager

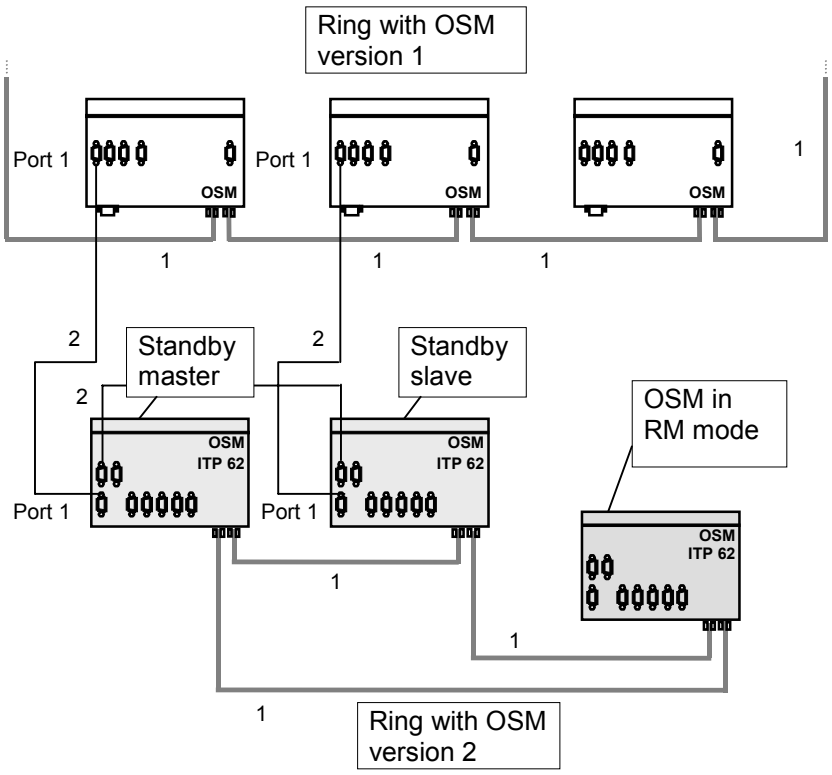
Redundant Coupling of Rings

In a redundant coupling of rings, make sure that the standby master and standby slave are either both of the type OSM Version 1 or both of the type OSM Version 2.



1 Fiber-optic cable (FOC)
2 ITP XP standard cable 9/9

Figure 18: Redundant Ring Coupling with OSM V1 as Standby Master/Standby Slave



1 Fiber-optic cable (FOC)
2 ITP XP standard cable 9/9

Figure 19: Redundant Ring Coupling with OSM V2 as Standby Master/Standby Slave

Figure 16 also shows how an existing ring with Version 1 OSMs can be connected to a ring with Version 2 OSMs.

3.5 Coupling Network Segments

A network segment can be connected to each of the ports of an OSM/ESM.

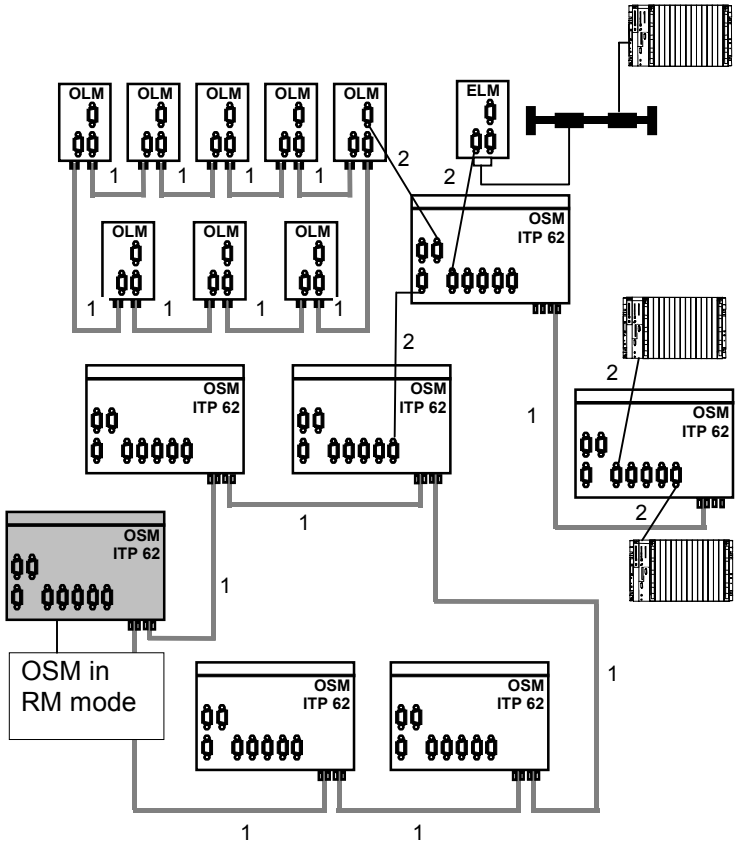
The Ethernet Planning Rules:

- Sum of the delay equivalents and cable lengths in the worst-case path shorter than 4520 m
- Sum of the variability values in the worst-case path less than 50 bit times

need only be maintained as previously in each individual segment (see also "SIMATIC NET Industrial Twisted Pair and Fiber Optic Networks" manual).

The coupling of network segments via OSM has further advantages:

- The collision domain ends at the OSM ports and the network segments attached to them, the permitted total network span increases.
- Only valid data packets are passed on via OSM ports. Network segments with problems cannot influence other network segments.
- Data packets are only passed on to the ports to which the DTE with the destination address is connected. The available transmission capacity increases since the local data traffic of a network segment no longer puts load on another network segment.



1 Fiber-optic cable (FOC)
2 ITP XP standard cable 9/9

Figure 20: Coupling Network Segments

Interfaces, Displays and Operator Controls 4

4.1 ITP/TP Ports

This chapter describes the properties of ITP and the TP ports.

4.1.1 ITP Ports

In the ITP variant of the OSM/ESM, the DTEs are attached via sub-D female connectors. The casings of the connectors are electrically connected to the casing of the OSM. A screw locking mechanism holds the connectors firmly in place.

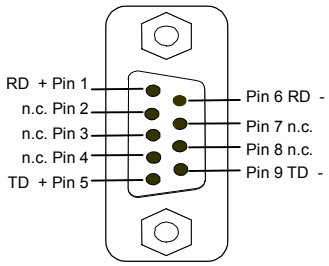


Figure 21: Pinout

4.1.2 TP Ports

With OSM TP62, OSM TP22, ESM TP40, and ESM TP80 modules, the DTEs are connected via RJ-45 jacks with MDI-X assignment (Medium Dependent Interface Crossover).

4.1.3 Properties of the TP/ITP Ports

Link Control

OSMs/ESMs monitor the connected TP/ITP cable segments for short-circuits or wire breaks using regular link test pulses complying with the 100BASE-TX standard. OSMs/ESMs do not send data to a segment from which they are not receiving link test pulses. An unused interface is taken to be a wire break since the device without power cannot send link test pulses.

Auto Polarity Exchange

If the receive cable pair is incorrectly connected (RD+ and RD- swapped over), the polarity is automatically reversed.

Autonegotiation Mode

The TP/ITP ports of OSM/ESM are set to the autonegotiation mode.

They automatically detect the transmission rate (10 or 100 Mbps) at which the attached device or attached network segment operates and set themselves to this rate. If the partner device also supports the autonegotiation mode, the devices further negotiate whether they will exchange data with each other in the half duplex or full duplex mode.

Note

If the partner device connected to a port of an OSM/ESM does not support the autonegotiation mode (for example OSM Version 1), the port of the partner device must be set to half duplex mode.

Autocrossover Function

OSMs/ESMs with digital inputs are capable of switching over their TP/ITP ports automatically between MDI and MDI-X pinning; in other words, they can cross over the send and receive data internally, when necessary.
This means that regardless of the port type of the device you are connecting and the type of Ethernet cable, a connection can be established. Crossover cables are not necessary.

Note

The autocrossover function of a TP/ITP port of the OSM/ESM is active only when it is set to the autonegotiation mode.

If this is not the case, it may be necessary to replace a straight-through cable with a crossover cable.

Please remember that even when using straight-through cables, an illegal loop can occur in the Ethernet network, caused, for example, by connecting two ports on an OSM/ESM. Such a loop can lead to network overload and network failure.

4.1.4 FO Ports

The FO ports have BFOC/2.5(ST) female connectors. They monitor the connected cable for wire breaks complying with the IEEE 802.3 100 Base-FX standard. A break on the FO cable is always signaled by the port status display of the two attached OSMs (status LED of the port goes off).

Note

The FO ports operate at the fixed transmission rate of 100 Mbps. And optical link, for example, to OLM (10 Mbps) is not possible.

4.1.5 Standby-Sync Port

A 9-pin female connector is used on the OSMs/ESMs with 8 ports to connect the ITP XP standard cable 9/9 for the redundant standby coupling. The casing of the connector is electrically connected to the casing of the OSM/ESM.
The OSM TP22 and ESM TP40 do not have a standby-sync port.

A screw locking mechanism holds the connectors firmly in place.

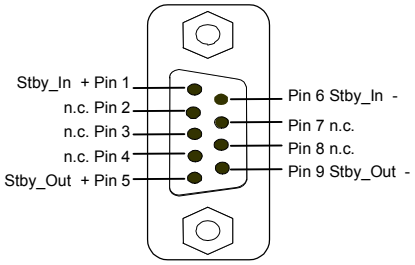


Figure 22: Pinout

4.1.6 Serial Interface

OSM/ESM modules have an RS-232 interface. This is used for the following purposes:

- Firmware Updates
- Management with the aid of the command line interpreter (CLI) including setting the IP address information (see /1/).

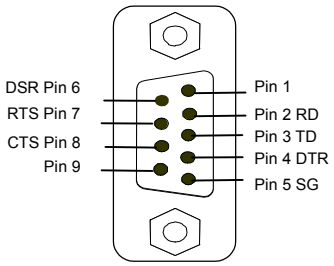


Figure 23: Pinout

4.1.7 Signaling Contact/Terminal Block for Attaching the Power Supply

The attachment of the power supply and the signaling contact is made using a 6-pin plug-in terminal block with a screw locking mechanism.

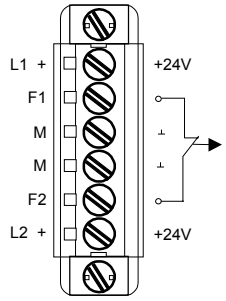


Figure 24: Terminal Block for the Power Supply and Signaling Contact

Warning

Industrial Ethernet OSMs/ESMs are designed for operation with safety extra-low voltage. This means that only safety extra-low voltages (SELV) complying with IEC950/EN60950/ VDE0805 can be connected to the power supply terminals and the signaling contact.

The power supply unit to supply the OSM/ESM must comply with NEC Class 2 (voltage range 18 - 32 V, current requirement 1 A)

The signaling contact can carry a load of maximum 100 mA (safety extra-low voltage (SELV), DC 24V).

Exceptions:

- **Supply by PELV (corresponding to VDE 0100-410) is also permitted if the generated nominal voltage does not exceed the voltage limits 25 V a.c. or 60 V d.c.**
- **Supply by a SELV current source (corresponding to IEC 60950) or PELV current source (corresponding to VDE 0100-410) power limitation is also permitted as long as suitable fire protection measures are taken as follows:**
  - Installation in a cubicle
  - Installation in a suitable enclosure
  - Installation in a suitably equipped room.

Power Supply

The power supply can be connected redundantly. Both inputs are isolated. There is no load distribution. With redundant power supply, the power supply unit with the higher output voltage supplies the OSM/ESM alone.

Signaling Contact

The following is signaled via a floating signaling contact (relay contact) when contact is broken:

- The failure of a monitored power supply. Which power supply is monitored is specified in the fault mask (see Section 4.2.3).
- The incorrect link status of a monitored port (in other words, the port is not correctly attached or there are no link test pulses coming from the partner device). The ports to be monitored are selected using the fault mask.
- When at least one port is segmented.
- If the DIP switch setting was changed during operation.
  (Inconsistency between the switch setting and the actual operating state because the switch setting is adopted only after a restart)

In the RM Mode (additional)

- The incorrect link status of port 7 or port 8 of the OSM ITP62, OSM ITP53, ESM ITP80, OSM TP62, ESM TP80, and OSM BC08 or of port 3 or port 4 of the OSM TP22 and ESM TP40, regardless of the status of the fault mask.
- When a second OSM is switched to the RM mode in the same ring.

OSM/ESM in Normal Mode and ITP XP Standard Cable 9/9 Plugged into the Standby-Sync Port:

- Short-circuited ITP XP Standard Cable 9/9
- Bad standby configuration: The partner device connected via the ITP XP Standard Cable 9/9 is not switched to standby.
- If there is an incorrect link status on a standby port.

OSM/ESM in the Standby Mode:

- ITP XP Standard Cable 9/9 not plugged in, short-circuited or broken
- Bad standby configuration: The partner device connected via the ITP XP Standard Cable 9/9 is switched to standby.
- If there is an incorrect link status on a standby port.

4.1.8 Digital Inputs

In the case of the OSMs/ESMs with digital inputs, the states of these inputs are available in a management information base (MIB) and can be read with an SNMP get request. Depending on the configuration of the device, changes at these inputs can also trigger the sending of E-mails, SNMP traps and/or entries in the log of the OSM/ESM. The use of these functions is described in the OSM/ESM Network Management User Manual /1/.

The digital inputs are attached using six-pin plug-in terminal blocks with screw locking mechanisms.

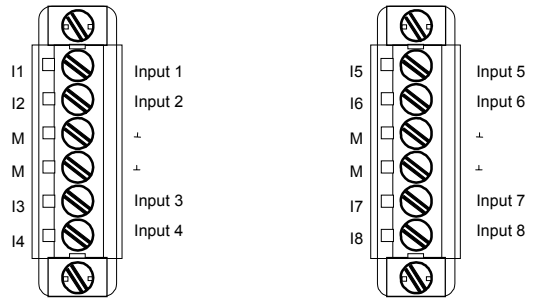


Figure 25: Terminal Block for Digital Inputs

Warning
The input voltage must not exceed +30V DC or fall below -30V DC.

4.2 Displays and Operator Controls

The OSM/ESM has the following LED displays:

4.2.1 LED Display "Status"

The status display indicates the operating mode of an OSM/ESM:

Fault (red LED):

Status	Meaning
Lit	The OSM/ESM has detected an error. The signaling contact opens at the same time. The signaled errors are described in Chapter 4.1.7.
Not lit	No errors detected by the OSM/ESM.

Stby – Standby (green LED):

This LED does not exist on the OSM TP22 and ESM TP40.

Status	Meaning
Lit	The standby function is activated, the OSM/ESM is in the standby passive mode.
Not lit	The standby function is deactivated.
Flashes	The standby function is activated, OSM/ESM is in the standby active mode; in other words, the master OSM/ESM has failed and the standby OSM/ESM takes over data traffic.

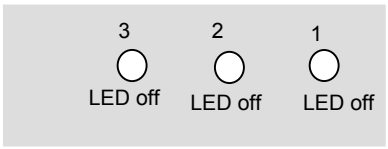
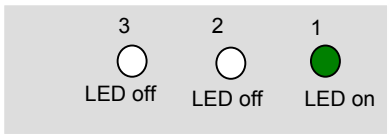
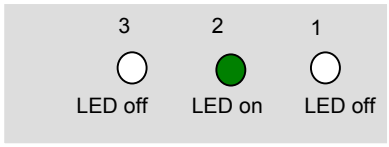
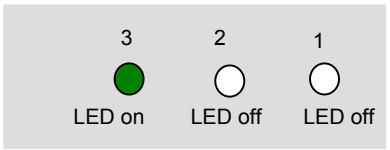
RM – Redundancy Manager (green LED)

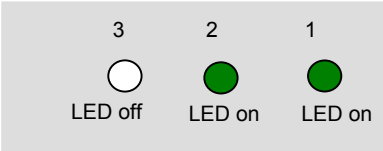
Status	Meaning
Lit	The OSM/ESM is operating in the redundancy manager mode. The ring is operating free of errors in other words the redundancy manager does not allow traffic through but monitors the ring. Note: One OSM must operate in the redundancy manager mode (and one only) in each OSM/ESM ring.
Not lit	The OSM/ESM is not in the redundancy manager mode.
Flashes	The OSM/ESM is in the redundancy manager mode and has detected a break on the ring. The OSM/ESM makes the connection between its two ring ports so that a functional bus configuration is reestablished.

4.2.2 LED "Power"

The display mode of the "Power" LED can be switched over by briefly pressing the "Select/Set" button on the front panel of the OSM/ESM. The valid display mode is indicated by the display mode LEDs on the OSM/ESM.

Depending on the status of the display mode LEDs, the "Power" LED has the two following display modes:

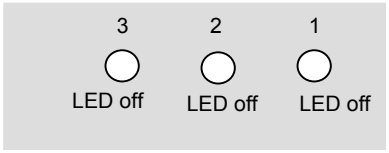
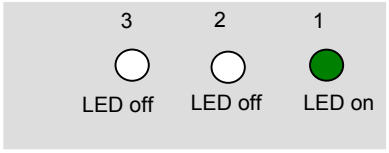
Display mode	Meaning
Status of the power supplies In the following states of the **display mode LEDs**, the **Power LEDs** indicate the current status of the two voltages of the OSM/ESM: Display Mode     Note LED 3 exists only on devices with digital inputs.	**Power LED L1 or L2** - Lit green; in other words, power supply 1 or 2 (line 1 or line 2) is applied. - Not lit; in other words power supply 1 or 2 (line 1 or line 2) is less than 14 V.

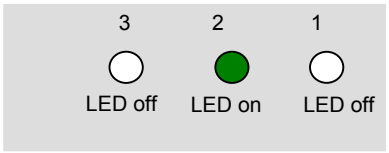
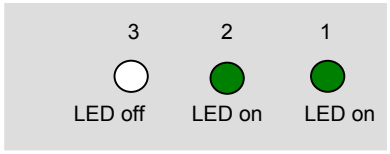
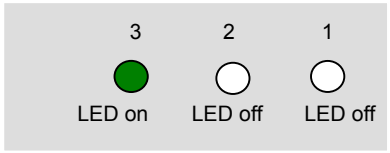
Fault Mask Display Mode  Note LED 3 exists only on devices with digital inputs.	With the line 1 or 2 LEDs, the fault mask indicates whether the power supplies are monitored with the signaling contact. **L1 or L2 LED** - Lit green; in other words the corresponding power supply (line 1 or line 2) is monitored. If the power supply falls below 14 V, the signaling contact responds. - Not lit, in other words the corresponding power supply (line 1 or line 2) in not monitored. If the power supply falls below 14 V this does not trigger the signaling contact. The fault mask can be set again with the button on the front panel of the OSM/ESM (see 4.2.4.2)

The "Select/Set" button on the front panel of the OSM/ESM changes the display mode of the display mode LEDs. Using this button, a new status can be programmed for the fault mask (see 4.2.4.2)

4.2.3 Port LEDs

The port LEDs indicate the operating states of the individual ports of the OSM/ESM. On the OSM/ESM variants with digital inputs, the state of the inputs is also indicated by the port LEDs. To allow this, the OSMs/ESMs have an additional display mode. The display mode of the port LEDs can be changed using the Select/Set button on the front panel of the OSM/ESM allowing all operating states to be displayed. The current display mode is signaled by the display mode LEDs.

Display mode	Meaning
Port Status Display  Note LED 3 exists only on devices with digital inputs.	**Port LED** - Not lit: No valid connection to the port (for example station turned off or cable not connected) - Lit green: Valid connection - Flashes green (once per period): Port switched to standby - Flashes green (twice per period): Port is segmented - Flashes green (three times per period): Port is turned off - Flashes green (four times per period): Port is mirrored - Flashes/lit yellow: Data reception on this port
100 Mbps Display  Note LED 3 exists only on devices with digital inputs.	**Port LED** - Lit green: Port operating at 100 Mbps - Not lit: Port operating at 10 Mbps

Full duplex Display  Note LED 3 exists only on devices with digital inputs.	**Port LED** - Lit green: Port operating in full duplex mode - Not lit: Port operating in half duplex mode
Fault mask Display  Note LED 3 exists only on devices with digital inputs.	The fault mask indicates whether the ports and the power supplies are monitored with the signaling contact. **Port LED** - Lit green: Port is monitored; in other words, if the port does not have a valid connection (for example cable not plugged in or attached device turned off), the signaling contact is triggered. - Not lit: The port is not monitored; in other words, an invalid or valid connection at the port does not trigger the signaling contact. The fault mask can be set again with the button on the front panel of the OSM (see 4.2.4.2)
Digital inputs Display  Note LED 3 exists only on devices with digital inputs.	**Port LED** - Lit green: The logical state "1" is applied to the corresponding digital input. This requires an input voltage of + 13 V DC to + 30 V DC. - Not lit: The logical state "0" is applied to the corresponding digital input. This requires an input voltage of + –30 V DC to + 3 V DC.

The basic status "Port Status" of the display is adopted automatically after turning on the device. The device also switches automatically to this display status when the "Select/Set" button is pressed for more than a minute.

4.2.4 Operator Controls

4.2.4.1 Two-Pin DIP Switch

With the two-pin DIP switches on the upper casing of the OSM/ESM you can do the following:

- With the **Stby** button, you can toggle the standby function on and off. This switch has no function on the OSM TP22 and ESM TP40.
- With the **RM** switch, you can activate the redundancy manager function.

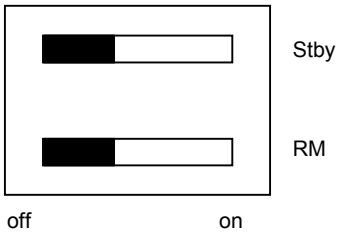


Figure 26: DIP Switches

Note

Please restart the device after changing DIP switch settings. The switch setting is adopted only when the device starts up.

4.2.4.2 "Select/Set" Button

The "Select/Set" button on the front panel of the OSM/ESM has the following functions:

- Pressing the button briefly moves on the display of the port LEDs (display mode). The current display mode is indicated by the display mode LEDs.
- If the display is in the port status (all display mode LEDs off) and if the button is pressed for three seconds, the display mode LEDs begin to flash. If you then continue to press the button for a further two seconds, the OSM/ESM is reset.

When it is reset, all the settings of the OSM/ESM are set to their defaults (as set in the factory). This allows you to cancel settings made, for example, with Web-Based Management (WBM) (see also OSM/ESM Network Management, User Manual).

- If the display is in the fault mask status and you press the button for two seconds, the display LEDs start to flash. If you then press the button for a further two seconds, the current status of the ports and the supply voltages are entered in the fault mask. This means, if, for example, the ports 1, 5, 6 had a valid connection (in other words the port status displays of these ports are lit green or yellow) and if power supply 1 was active at the point when the values were entered in the fault mask, ports 1, 5, 6 and power supply 1 will then be monitored.

Note

If the "Select/Set" button is pressed while the device is starting up (takes approximately 20 seconds) after turning on the OSM/ESM, the OSM/ESM changes to the load firmware status (all display mode LEDs flash simultaneously). This status is exited by pressing the button again. For further information on loading the firmware, refer to Chapter 6.

Installation, Commissioning, Cleaning and Maintenance 5

5.1 Unpacking, Checking the Consignment

1. Check that the consignment includes the following components:
   - OSM/ESM device
   - Mounting brackets, screws and terminal block
   - One or two extra terminal blocks for OSMs/ESMs with digital inputs
   - CD (includes the manuals) and product information bulletin
2. Check each component for any damage.



Warning
Do not install damaged components!

5.2 Installation

OSMs/ESMs can be installed in several ways:

- Installation on a 35 mm standard rail
- Installation on a SIMATIC S7-300 rail
- Installation in pairs in a 19" cubicle
- Wall mounted

Note

Remember that the OSM/ESM must only be installed horizontally (ventilation slits top/bottom see Figure 25). To ensure adequate convection, there must be a clearance of at least 5 cm above and below the ventilation slits. You should also make sure that the permitted ambient temperature is not exceeded.

Preparations

1. Before installing, check whether the switch setting of the DIP switches is correct for your application. (see Section 4.2.4.1)
2. Remove the terminal block for power supply and signaling contact from the OSM and wire up the power supply and signal lines as described in Section 4.1.7.
3. Only for OSMs/ESMs with digital inputs:
   When necessary, remove the terminal blocks for the digital inputs from the OSM/ESM and wire the input signals as described in Section 4.1.8.

Standard Rail Mounting

1. Install the OSM/ESM on a 35 mm standard rail complying with DIN EN 50022.
2. Fit the OSM/ESM on to the rail from above and press in the bottom of the device until the catch engages.
3. Fit the electrical and optical connecting cables, the terminal block for the power supply and, if necessary, the standard cable 9/9 to the standby-sync port.



Figure 27: Installing the OSM on a DIN Standard Rail

Removing from a Standard Rail

1. To remove the OSM/ESM from the standard rail, pull the device down and then pull the bottom away from the standard rail.

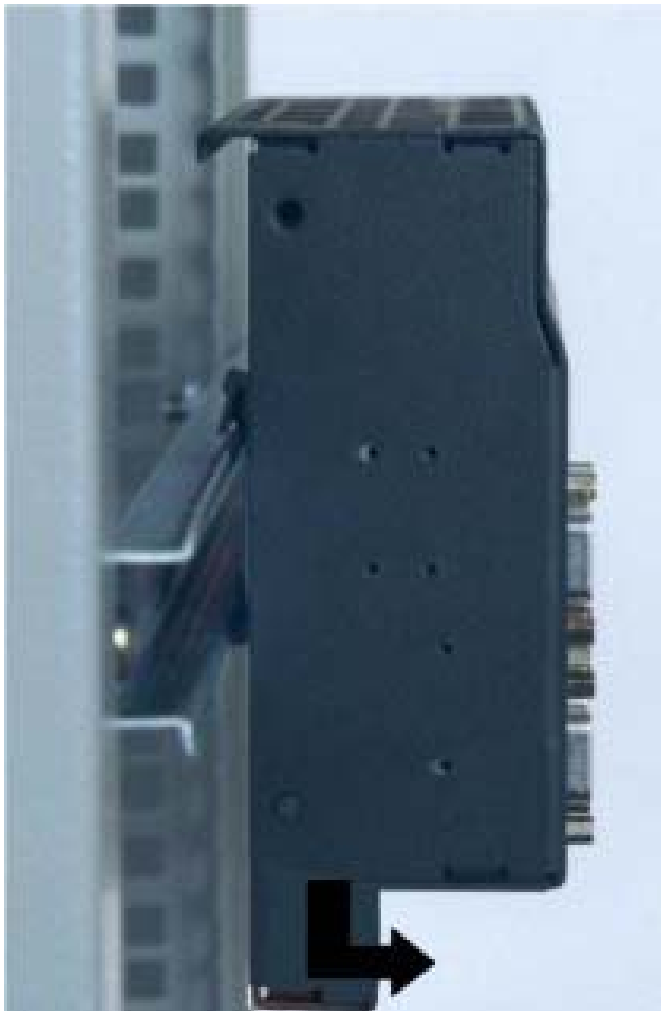


Figure 28. Removing from the Standard Rail

Installation on a SIMATIC S7-300 Rail

1. First secure the two supplied brackets on both sides of the OSM/ESM.

2. Fit the guide on the top of the OSM casing into the S7 rail.

3. Secure the OSM/ESM with the supplied screws to the lower part of the rail.



Figure 29: Installation on the S7-300 Rail

Installation in Pairs in the 19" Cubicle

To install in pairs in the 19" cubicle, you require the two securing brackets supplied.

1. First screw the two OSMs/ESMs together using the supplied holding plate on the rear.

2. Fit two of the supplied brackets to the sides

3. Secure the two devices using the brackets in the 19" cubicle. Please note that the OSM/ESM must be grounded with a low resistance via the two holding brackets.



Figure 30: Installation in the 19" Cubicle

Wall Mounting

To install an OSM/ESM on a wall, follow the steps below:

1. Fit the supplied mounting brackets on the sides.

2. Secure the device to the wall using the brackets.

3. Connect the device to protective earth with a low-resistance connection via one of the brackets.



Figure 31: Wall Mounting

The following table shows how to mount the device on different types of walls:

Wall	Mounting
Concrete wall	Use four wall plugs 6 mm in diameter and 30 mm long. (drill hole 6 mm in diameter, 45 mm deep). Use screws 4.5 mm in diameter and 40 mm long.
Metal wall (min. 2 mm thick)	Use screws 4 mm in diameter and at least 15 mm long.
Sandwich type plaster wall (min. 15 mm thick)	Use an anchoring plug with at least 4 mm diameter.

Note

The module must be secured to the wall so that the mounting can carry at least four times the weight of the module.

5.3 Cleaning

If you need to clean the OSM/ESM, use a dry cloth only.

5.4 Maintenance

If a fault develops, please send the module to your SIEMENS service department for repair. The devices are not designed for repair on site.

Firmware Update

6

With the OSM/ESM it is possible to update the firmware via the serial port.

You can obtain information on the firmware updates for OSM/ESM on the Internet at http://www.siemens.de/automation/service&support specifying the keyword "OSM Firmware".

To download the firmware you require a PC with Windows 95/98/NT and the Hyperterminal program available under Accessories. The download is explained below based on the dialogs displayed in Hyperterminal.

Preparations

Connect the serial port of your PC and the OSM/ESM with a normal null modem cable . Depending on the port of your PC that you select, you use a cable with a 9-pin or 25-pin sub-D female connector at the PC end and a 9-pin female connector at the OSM/ESM end.

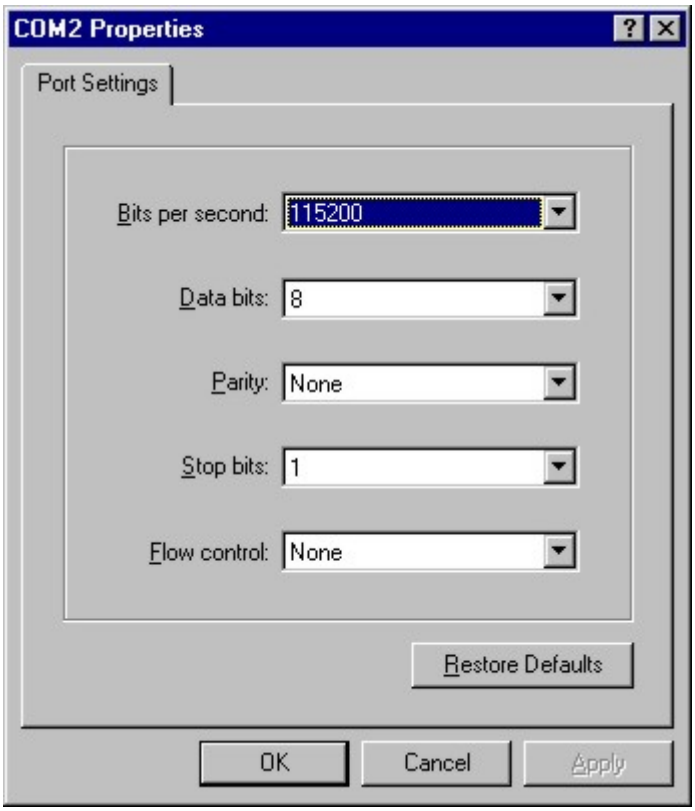
The following table shows the pinning and the connections for both types of cable:

PC port	25-pin Female	9-pin Female	connected to	OSM port 9-pin Female	
Signal Name	Pin	Pin		Pin	Signal name
TD (Transmit Data)	2	3		2	RD
RD (Receive Data)	3	2		3	TD
RTS (Request To Send)	4	7		8	CTS
CTS (Clear To Send)	5	8		7	RTS
SG (Signal Ground)	7	5		5	SG
DSR (Data Set Ready)	6	6		4	DTR
DTR (Data Terminal Ready)	20	4		6	DSR

Follow the steps outlined below in Hyperterminal:

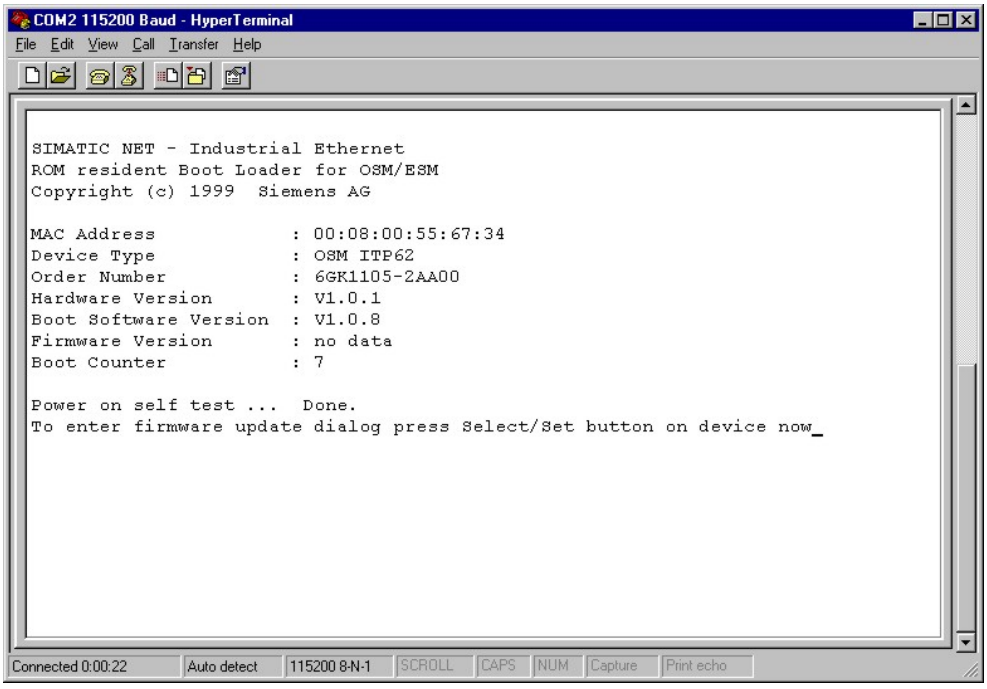
1. Set up a new connection (for example with File -> New).

2. Set the following properties for the connection as shown in the dialog below:



3. Reset the OSM/ESM. Press the Select/Set button during operation, if necessary several times until the display mode LEDs indicate the port status (all display mode LEDs off). Then press the Select/Set button for at least 6 seconds. The display mode LEDs begin to flash after approximately 3 seconds, 2 seconds later the OSM/ESM is reset. (All LEDs go on briefly and then off again).

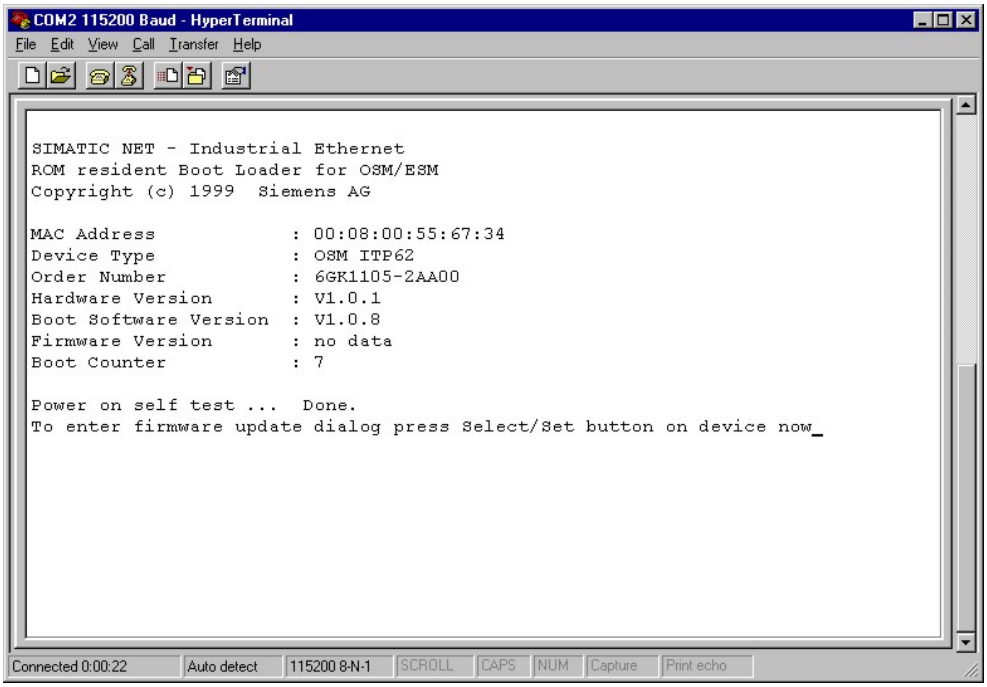
The following message then appears in the Hyperterminal window:



4. Press the "Select/Set" button again briefly

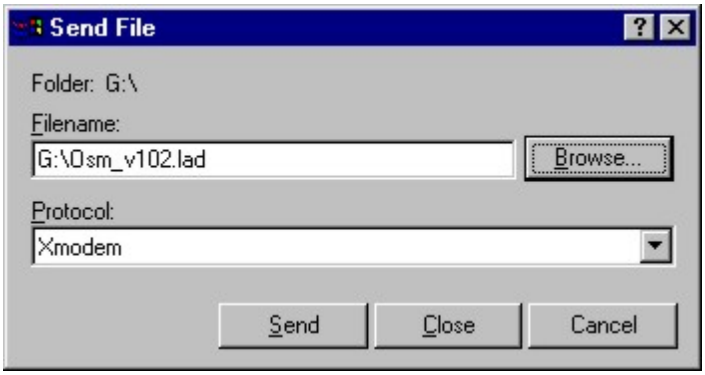
5. Then confirm the prompt: "Do you really want to update your firmware? Y/N" with Y.

The following message is then displayed.

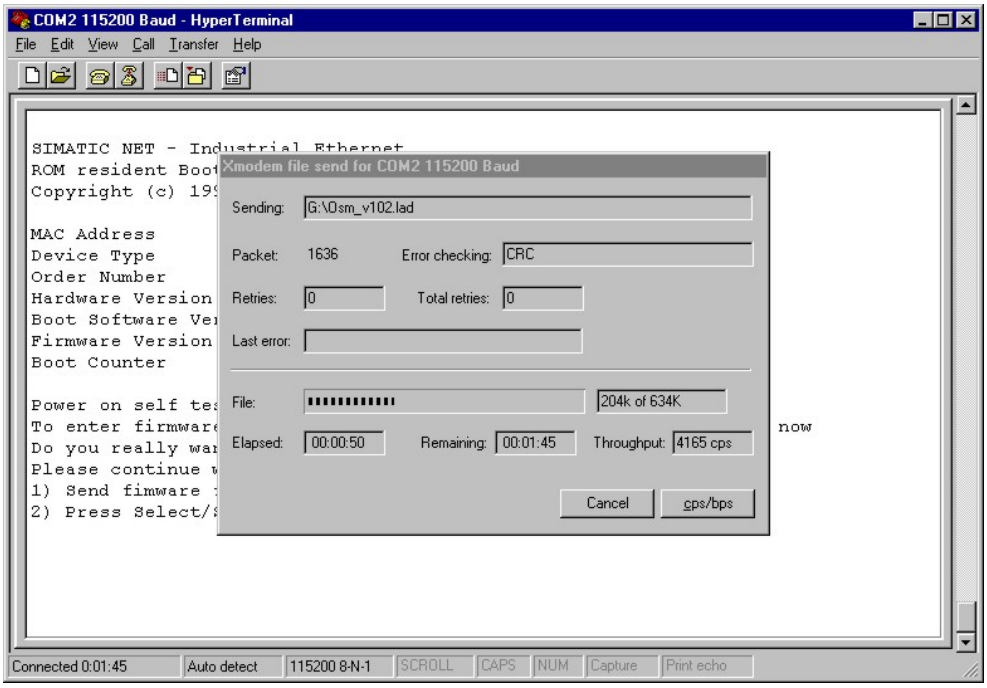


6. In the Hyperterminal window select Transfer -> Send File.

7. In the next dialog window, enter the file to be downloaded and select "Xmodem" as the protocol. Start the transfer of the firmware with the "Send" button.



The following dialog then appears displaying the progress of the download.



Start the download by pressing the "Set/Select" button again.

Downloading can take up to 10 minutes. After you have downloaded the firmware successfully, the device is automatically started with the new firmware. Please note the version of the new firmware on a label on the side labeling panel of the OSM/ESM.

Note

During the download, do not interrupt the connection between the PC and OSM/ESM or turn off the power supply to the OSM/ESM. If the firmware could not be downloaded completely to the OSM due to a power failure, the message "Firmware in flash is faulty" appears after the device starts up. This means that the firmware must be downloaded again.

Technical Specifications 7

Ports	
Attachment of DTEs or network segments twisted pair/Industrial Twisted Pair	6 x 9-pin sub-D female connectors for OSM ITP62, OSM ITP62-LD 5 x 9-pin sub-D female connectors for OSM ITP53 8 x 9-pin sub-D female connectors for ESM ITP80 2 x RJ-45 jacks for OSM TP22 4 x RJ-45 jacks for ESM TP40 6 x RJ-45 jacks for OSM TP62 8 x RJ-45 jacks for ESM TP80 All electrical ports support 10/100 Mbps autonegotiation OSMs/ESMs with digital inputs: The electrical ports support autocrossover.
Standby-sync port for redundant coupling of rings	1 x 9-pin sub-D female connector (not OSM TP22, ESM TP40)
Attachment of further OSMs and DTEs via FO	2 x 2 BFOC sockets for OSM ITP 62, OSM ITP62-LD, OSM TP62, OSM TP22 3 x 2 BFOC sockets for OSM ITP 53 8 x 2 BFOC sockets for OSM BC08 (100 Mbps, 100BaseFX, full duplex)
Connector for power supply and signaling contact	1 x 6-pin plug-in terminal block
Power supply (redundant inputs decoupled)	2 sources of DC 24V (DC 18 to 32V) safety extra-low voltage (SELV) Power supply connected over high resistance to casing (not electrically isolated). Tested in compliance with IEC 6100-4-5, 1995 "Surge Immunity Test" using the DEHN Blitzductor VT AD 24V, Type No. 918 402 lightning protection device

Ports	
Power loss at 24 V DC	20 W
Load on the signaling contact	DC 24 V / max. 100 mA safety extra-low voltage (SELV)
Current consumption at rated voltage	1000 mA
Overcurrent protection at input	Non-replaceable fuse (1.6 A / 250 V / slow)
Digital Inputs	Input voltage: • Rated voltage DC 24 V safety extra-low voltage (SELV) • For state "1": +13 ...+30V • For state "0": –30 ... +3V Max. input current: 8 mA Max. cable length: 30 m Inputs electrically isolated from electronics.

Permitted Cable Lengths	
FO cable length between two OSMs	For OSM ITP62, OSM ITP53, OSM TP62, OSM TP22: 0-3000 m (62.5/125 µm glass fiber; 1 dB/km at 1300 nm; 600 MHz*km; 6 dB max. permitted FO cable attenuation at 3 dB link power margin) 0-3000 m (50/125 µm glass fiber; 1 dB/km at 1300 nm; 600 MHz*km; 6 dB max. permitted FO cable attenuation at 3 dB link power margin) For OSM ITP62-LD: 0-26000 m (10/125 µm single mode fiber; 0,5 dB/km at 1300 nm; 13 dB max. permitted FO cable attenuation at 2 dB link power margin)
ITP cable length	0-100 m
TP cable length	0-10 m with TP cord up to 100 m total length when using the FastConnect cabling system
Length of the ITP XP Standard Cable 9/9 at standby-sync port	0-40 m

Cascading Depth	
Bus/star structure	Any (only depending on signal propagation time)
Redundant ring	50 (for reconfiguration time < 0.3 s)

Switching Properties of OSM/ESM	
Number of learnable addresses	Up to 7000
Aging time	40s (default)
Latency	4 µs (measured at 75% load between two ports operating at 100 Mbps)
Switching procedure	Store and forward

Permitted Ambient Conditions/EMC	
Operating temperature	0°C to +60°C
Storage/transport temperature	-40°C to +80°C
Relative humidity in operation	‹ 95% (no condensation)
Operating altitude	Max. 2000 m
Noise emission	EN 55081 Class A
Noise immunity	EN 50082-2
Laser protection	Class 1 complying with IEC 60825 -1

Mechanical Design	
Dimensions (W x H x D) in mm	217 x161 x 69
Weight in g	1400
Installation options	Standard rail S7-300 rail Wall mounted Installation in 19" cubicle **Only horizontal installation permitted** **(ventilation slits top/bottom)**
Degree of protection	IP 20

Consignment / Order Numbers	
Consignment	- SIMATIC NET Industrial Ethernet OSM/ESM - Fittings for 19" cubicle installation/wall mounting - 6-pin plug-in terminal block for power supply and signaling contact - One to two 6-pin plug-in terminal blocks for OSMs/ESMs with digital inputs - Documentation on the CD - Product information bulletin
Order number:	
Industrial Ethernet OSM ITP62 with digital inputs	6GK1105-2AA10
Industrial Ethernet OSM ITP62 without digital inputs	6GK1105-2AA00
Industrial Ethernet OSM ITP62-LD with digital inputs	6GK1105-2AC10
Industrial Ethernet OSM ITP62-LD without digital inputs	6GK1105-2AC00
Industrial Ethernet OSM ITP53 with digital inputs	6GK1105-2AD10
Industrial Ethernet OSM ITP53 without digital inputs	6GK1105-2AD00
Industrial Ethernet OSM ITP80 with digital inputs	6GK1105-3AA10
Industrial Ethernet OSM ITP80 without digital inputs	6GK1105-3AA00
Industrial Ethernet OSM TP62 with digital inputs	6GK1105-2AB10
Industrial Ethernet OSM TP62 without digital inputs	6GK1105-2AB00
Industrial Ethernet OSM TP80 with digital inputs	6GK1105-3AB10
Industrial Ethernet OSM TP80 without digital inputs	6GK1105-3AB00
Industrial Ethernet OSM TP22 with digital inputs	6GK1105-2AE00
Industrial Ethernet OSM TP40 with digital inputs	6GK1105-3AC00
Industrial Ethernet OSM BC08 with digital inputs	6GK1105-4AA00

Accessories	
Industrial Twisted Pair and Fiber Optic Networks Manual	6GK1970-1BA10-0AA1
Triaxial networks for Industrial Ethernet manual	6GK1970-1AA20-0AA0

Standards and Approvals

8

Product name:

The OSM/ESM products listed below, comply with the following standards and directives if they have the corresponding symbols on the type plate:

Industrial Ethernet OSM ITP62 with digital inputs	6GK1105-2AA10
Industrial Ethernet OSM ITP62 without digital inputs	6GK1105-2AA00
Industrial Ethernet OSM ITP62-LD with digital inputs	6GK1105-2AC10
Industrial Ethernet OSM ITP62-LD without digital inputs	6GK1105-2AC00
Industrial Ethernet OSM ITP53 with digital inputs	6GK1105-2AD10
Industrial Ethernet OSM ITP53 without digital inputs	6GK1105-2AD00
Industrial Ethernet OSM ITP80 with digital inputs	6GK1105-3AA10
Industrial Ethernet OSM ITP80 without digital inputs	6GK1105-3AA00
Industrial Ethernet OSM TP62 with digital inputs	6GK1105-2AB10
Industrial Ethernet OSM TP62 without digital inputs	6GK1105-2AB00
Industrial Ethernet OSM TP80 with digital inputs	6GK1105-3AB10
Industrial Ethernet OSM TP80 without digital inputs	6GK1105-3AB00
Industrial Ethernet OSM TP22 with digital inputs	6GK1105-2AE00
Industrial Ethernet OSM TP40 with digital inputs	6GK1105-3AC00
Industrial Ethernet OSM BC08 with digital inputs	6GK1105-4AA00

CE Mark

SIMATIC NET OSMs/ESMs meet the requirements of the following EU directives:

Directive 89/336/EEC “Electromagnetic Compatibility" (EMC directive)

Directive 73/23/EEC "Electrical Equipment Designed For Use Within Certain Voltage Limits" (Low Voltage Directive)

The EU declaration of conformity is available for the responsible authorities according to the above-mentioned EU directive at the following address:

Siemens Aktiengesellschaft
Bereich Automatisierungs- und Antriebstechnik
Industrielle Kommunikation (A&D PT2)
Postfach 4848

D-90327 Nürnberg
Germany

Area of Application

The products are designed for use in an industrial environment:

Area of Application	Requirements	
	Emitted Noise	**Noise immunity**
Industry	EN 50081-2 : 1993	EN 50082-2 : 1995

Notes for the Manufacturers of Machines

This product is not a machine in the sense of the EU directive on machines. There is therefore no declaration of conformity for the EU directive on machines 89/392/EEC.

If the product is part of the equipment of a machine, it must be included in the procedure for obtaining the declaration of conformity by the manufacture of the machine.

Approval for Australia

C-Tick Mark, AS/NZS 2064 (Class A)

UL Approval

UL-Recognition Mark

Underwriters Laboratories UL 1950 / UL 60950 (Information Technology Equipment)

CSA Certification

CSA Certification Mark

Canadian Standard Association CSA C22.2 No. 60950-00

FM Approval

FM Hazardous (Classified) Location Electrical Equipment:
Non Incendive / Class I / Division 2 / Groups A,B,C,D / T* and
Non Incendive / Class I / Zone 2 / Group IIC / T4

*) Temperature Class T4 or T4A, depending on model



Warning

In hazardous areas liable to explosion, injury to persons and damage to property can occur if you close or open an electric circuit while an OSM/ESM is in operation.

Do not close or open live electrical circuits unless sure that there is no risk of explosion.

Adherence to Installation Instructions

The products meet the requirements if you adhere to the installation and safety instructions contained in these Operating Instructions for SIMATIC NET Industrial Ethernet OSM/ESM and in the following documentation during installation and operation:

- SIMATIC NET Industrial Twisted Pair and Fiber Optic Networks Manual /2/
- SINEC H1 Manual for Triaxial Networks /3/

Glossary

9

Autocrossover
Mechanism with which a TP port is automatically switched over between MDI and MDI-X pinning to establish a connection regardless of the port pinning of the device being connected. This makes the use of crossover cables unnecessary.
The autocrossover function is available only when the port is set to autonegotiation mode.

Autonegotiation
Procedure standardized by IEEE 802.3 in which the transmission parameters (for example 10/100 Mbps, full/half duplex) are negotiated automatically between the devices.

Auto Polarity Exchange
Procedure in which the module automatically detects incorrect attachment of a cable to the electrical OSM/ESM port (RD+ and RD- swapped over). The OSM then reverses the polarity automatically.

Autosensing
See Autonegotiation

Backbone
In conjunction with the OSM/ESM, this means a bus or ring structure made up of interconnected OSM or ESM modules that form the backbone of an industrial LAN.

Display Mode
The display mode LEDs indicate the display mode in which the port and power LEDs and the attached input signals (OSMs/ESMs with digital inputs only) of the OSM/ESM are currently working. The display mode can be changed with the button on the front panel of the OSM/ESM.

ESM
Electrical Switching Module. SIMATIC NET Ethernet switch with electrical ports

Fault Mask
The fault mask specifies which ports (ports 1 - 8) and power supply terminals (line 1/2) are monitored by the signaling contact. The fault mask can be set again with the button on the front panel of the OSM/ESM.

Filtering
OSMs/ESMs learn the addresses of the devices that can be accessed via a port. They redirect the packets intended for this device only via this port.

ITP Port
Port with Industrial Twisted Pair (ITP) connector (sub D 9-pin female)

Latency The latency specifies the taken for packets to pass through the OSM/ESM. It is assumed that a received packet can be sent on immediately. The latency does not include the time necessary for the OSM/ESM to receive a packet.

Link Control OSMs/ESMs monitor the connected TP/ITP cable segments for short-circuits or wire breaks using regular link test pulses complying with the 100BASE-TX standard. OSMs/ESMs do not send data to a segment from which they are not receiving link test pulses. An unused interface is taken to be a wire break since the device without power cannot send link test pulses.

MDI-X Medium Dependent Interface Crossover
RJ-45 jack with pinning of a network component

OSM Optical Switching Module. SIMATIC NET Ethernet switch with optical and electrical ports

Reconfiguration Time Time required by the OSM/ESM operating in the redundancy manager (RM) or standby mode to reestablish a functioning configuration if a device fails or the cable is interrupted.

Redundancy Manager (RM) Mode of an OSM or ESM for forming a redundant ring structure. The RM monitors the OSM or ESM bus connected to it, closes the bus if it detects and interruption. This reestablishes a functioning bus configuration.

One and only one device can operate in the RM mode in every OSM or ESM ring.

Signaling Contact Floating relay contact via which the error states detected by the OSM/ESM can be signaled.

Standby-sync port Port of an OSM/ESM via which two OSMs or ESMs are interconnected in a redundant ring link allowing them to inform each other of their operating states (not available with the OSM TP22 and ESM TP40).

Store and forward In this switching method used on the OSM/ESM, the complete packet is read in before it is passed on by the switch. A packet is only passed on if it is error-free.

TP Port Port with a TP connector (RJ-45 jack)

References 11

/1/ SIMATIC NET Industrial Ethernet OSM/ESM Network Management,
Release 08/2001
supplied with every device on CD and available at
http://www4.ad.siemens.de/view/cs/de/8677203
on the Web.

/2/ SIMATIC NET Industrial Twisted Pair and Fiber-Optic Networks, Release 07/2002
Order numbers:
6GK1970-1BA10-0AA0 German
6GK1970-1BA10-0AA1 English
6GK1970-1BA10-0AA2 French
6GK1970-1BA10-0AA4 Italian

/3/ SINEC H1 Manual for Triaxial Networks, Release 04
Order number 6GK1970-1AA20-0AA0 (German/English)

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