MNS *i*S Motor Control Center
Interface Manual Redundancy
System Release V7.0

Power and productivity
for a better world™

This document relates to the MNS *i*S System Release 7.0.

Table of content

General

Target Group

This document describes communication and control interfaces used in MNS *i*S. The manual is primarily intended for those requiring information on accessing information and data provided from MNS *i*S. Furthermore the document provides information for integration of MNS *i*S as fieldbus component into PLC or higher level Process Control Systems to control system and application engineers.

It is assumed that the reader of this manual is familiar with basic terms of fieldbus and control communication (e.g. basic knowledge about PROFIBUS, Modbus etc.).

Use of Warning, Caution, Information and Tip icon

This publication includes **Warning**, **Caution**, and **Information** icons where appropriate to point out safety related or other important information. It also includes **Tip** icons to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

The electrical warning icon indicates the presence of a hazard that could result in *electrical shock.*

The warning icon indicates the presence of a hazard that could result in *personal injury.*

The caution icon indicates important information or warnings related to the concept discussed in the text. It might indicate the presence of a hazard that could result in *corruption of software or damage to equipment/property.*

The information icon alerts the reader to pertinent facts and conditions.

The tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although **Warning** notices are related to personal injury, and **Caution** notices are associated with equipment or property damage, it should be understood that the operation of damaged equipment could, under certain operational conditions, result in impaired process performance leading to personal injury or death. It is, therefore, imperative that you comply fully with all **Warning** and **Caution** notices.

Terminology

List of the terms, acronyms, abbreviations and definitions that the document uses.

Abbreviation	Term	Description
	Aspect Object	ABB technology. An Aspect Object is a computer representation of a real object such as a pump, a valve, an order or a virtual object such as a service or an object type. An Aspect Object is described by its aspects and is organized in structures.
	Alarm	Alarm is defined as status transition from any state to abnormal state. Status transition to abnormal state can be data crossing over the pre-defined alarm limit.
	Bus Local	A Control Access term describing that the M*Control* accepts its commands from a device on the switchgear control network, e.g. the Web Interface, M*View*.
COTS	Commercial off the shelf	Commercial off the shelf product, term to describe products available on the market, ready to use
DCS	Distributed Control System	See also PCS
DTM	Device Type Manager	Software module used to manage devices via Fieldbus (e.g. PROFIBUS) using frame application environment (e.g. PactWare, ABB Fieldbus Builder etc.)
Eth.	Ethernet	Ethernet is a local area network (LAN) technology. The Ethernet standard specifies the physical medium, access control rules and the message frames.
	Event	An event is a status transition from one state to another. It can be defined as alarm, if the state is defined as abnormal or as warning as a pre-alarm state.
FD	Field Device	Term for devices connected to the Fieldbus (e.g. motor control units or circuit breaker protection)
GSD file	Geräte Stamm Datei (German abbreviation)	A hardware description file for a PROFIBUS-DP or PROFIBUS-DP/V1 slave type
GPS	Global Positioning System	System to detect local position, universal time and time zone, GPS technology provides accurate time to a system
	Hardware Local	A Control Access term describing that the M*Control* accepts its commands from the Hardwired inputs, when the respective Local control input is set to true.

Abbreviation	Term	Description
HMI	Human Machine Interface	Generic expression
LVS	Low voltage switchgear	A factory built assembly built to conform with IEC 60439-1
MCC	Motor Control Centre	Common term for switchgear used for motor control and protection.
MNS		Modular Low Voltage Switchgear family from ABB
MNS *i*S		The integrated intelligent switchgear solution from ABB
	M*Start* M*Feed* M*Control* M*Link* M*View* M*Navigate*	MNS *i*S components integrated in the switchgear, see the MNS *i*S System Guide for technical details
	MODBUS	Fieldbus communication protocol
	MODBUS RTU	Fieldbus communication protocol
	Motor Starter	Consists of motor controller and electrical components to control and protect a motor, part of Motor Control Center
NLS	Native Language Support	Providing the ability to change the language of software tools in order to support native languages (English is basis, others are optional)
OPC		OLE for Process Control, an industrial standard for exchange of information between components and process control application
PCS	Process Control System	High level process control system
PLC	Programmable Local Controller	Low level control unit
	PROFIBUS-DP	Fieldbus communication protocol with cyclic data transfer (V0).
	PROFIBUS-DP/V1	Fieldbus communication protocol, extension of PROFIBUS-DP allowing acyclic data transfer and multi master (V1).

Abbreviation	Term	Description
	PROFIBUS-DP/V2	Fieldbus communication protocol, extension of PROFIBUS-DP allowing time stamp and communication between master and slave (V2).
	PROFINET	PROFINET is an open standard for Industrial Ethernet and standardized in IEC 61158 and IEC 61784.
PNIO	PROFINET IO	PROFINET for decentralized periphery and distributed automation
RCU	Remote Control Unit	Local control unit with pushbutton and indicator to operate a device (e.g. motor) from field level.
RS232		Standard No. 232 for PC communication, established by EIA (Electronics Industries Association, USA)
RS485		Communication interface standard from EIA (Electronics Industries Association, USA), operating on voltages between 0V and +5V. RS-485 is more noise resistant than RS-232C, handles data transmission over longer distances, and can drive more receivers.
RTC	Real Time Clock	Integrated clock function in devices used to generate time and date information if a remote clock system is not present
	Software Local	A Control Access term describing that the M*Control* accepts its commands from the hardwired inputs as a result of either the DCS or M*View* passing the Control Access Authority to Soft-Local. Note: Does not require the hardwired local input to be set to true.
SNTP	Simple Network Time Protocol	a protocol used for time synchronization in Control Network through Ethernet
	Switchgear Bus Network	Term used to describe the internal switchgear communication network, between M*Link* and M*Control*.
TCP/IP	Transmission Control Protocol / Internet Protocol	TCP/IP is a high-level connection oriented , reliable, full duplex communication protocol developed for integration of the heterogenous systems.
	Trip	A consequence of an alarm activated or an external trip command from another device to stop the motor or trip the circuit breaker.

Abbreviation	Term	Description
UTC	Coordinated Universal Time	Coordinated Universal Time is the international time standard. It is the current term for what was commonly referred to as Greenwich Meridian Time (GMT). Zero (0) hours UTC is midnight in Greenwich England, which lies on the zero longitudinal meridian. Universal time is based on a 24 hour clock.
	Warning	A warning is defined as status transition from any state to pre-alarm state to inform in advance before an alarm level is reached.

Related Documentation

MNS *i*S

1TGC910211 M0203 MNS iS Interface Manual MLink, Release 7.0

1TGC910111 M0201 MNS *i*S M*Link* Upgrade Kit Manual

1TGC910223 M0201 MNS iS Interface Manual Web Interface, Release 7.6

1TGC910232 M0201 MNS iS Interface Manual OPC Server, Release 7.7

1TGC910241 M0201 MNS *i*S Interface Manual Profibus, Release 7.0

1TGC910251 M0202 MNS iS Interface Manual Modbus, Release 7.0

1TGC910292 M0201 MNS iS Interface Manual PROFINET IO, Release 7.6

1TGC910283 M0201 MNS iS MControl Interface Manual Profibus Direct, Release 7.6

1TGC910272 M0201 MNS iS M*Connect* Interface Manual, Release 7.6

1TGC910001 B0204 MNS *i*S System Guide

1TGC910201 M0201 MNS *i*S Quick Guide Installation and System Setup, Release 7.0

1TGC910090 M0210 MNavigate Help file V7.7

1TGC910018 M0208 MNS *i*S ATEX – Enhancements for Safety

PROFIBUS

[1] Profibus Specification Slave Redundancy TC4-04-0001

Related System Version

The content of this document is related to MNS *i*S System Release 7.0.

The described functions are designed but may not be fully implemented in all details. Please refer to the current system guides and release notes regarding possible restrictions.

Document Revision History

Rev.	Page	Chapter	Description of change	Date
M0201			Initial document for Release V7.0	July 2012
M0202	11,13,15, 16,30	Slave Redundancy Redundancy Requirements Redundancy Configuration LED – Status Information	Figure 1 modified Figure 2 modified Figure 3 modified Figure 4 modified Document ID changed	June 2015

Introduction

Redundancy

Redundancy in communication systems and Fieldbus technology allows data communication between a PLC or DCS master to slave devices on two independent communication links. This may be required if a higher availability of the communication link is required. The M*Link* device in MNS *i*S is a slave device on the Fieldbus to which the following types of redundancy are applicable:

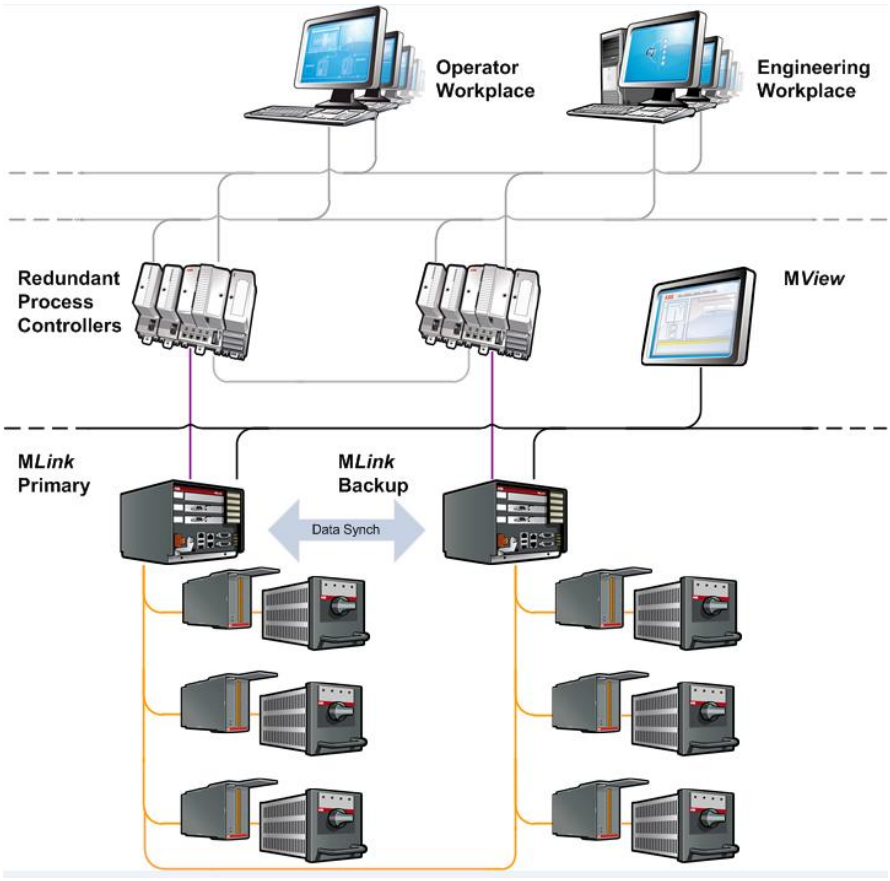
Line Redundancy

In this case, the cable connection between a Fieldbus master and slave devices is doubled. Two independent cables are used and routed through the plant on different cable ways. This redundancy requires third party hardware. No additional components and configuration is required in MNS *i*S.

Slave Redundancy

In slave redundancy, two slave devices are used on separate cable connections to the Fieldbus master. MNS *i*S allows redundancy incorporated in a Fieldbus system as Slave Redundancy by using two M*Link* modules.

Fig. 1 MNS *i*S Redundancy



Redundant OPC Servers are not supported.

MNS *i*S Hardware Requirements

The redundancy is available for M*Link* Types:

Hardware ID numbers	1TGE102019Rxxxx	1TGE120021R0x10
Hardware available for MNS iS versions	up to V6.0	from V6.1 onwards
MLink Types		
Accessories for Redundancy	---	Switchgear bus connector Redundancy 1TGE120016R0103
	Redundant link cables 2 m -> 1TGE120109R0002 3 m -> 1TGE120109R0003 5 m -> 1TGE120109R0005 10 m -> 1TGE120109R0010	
	Ferrite Core for redundant link cables 1TGB000197P0001	
MNS iS Interface Manual **MLink**	1TGC 91012x M020x	1TGC 910210 M020x

MNS iS Software Requirements

Redundancy requires MNS *iS* Release 2.0 or higher.

Basics

Redundancy Requirements

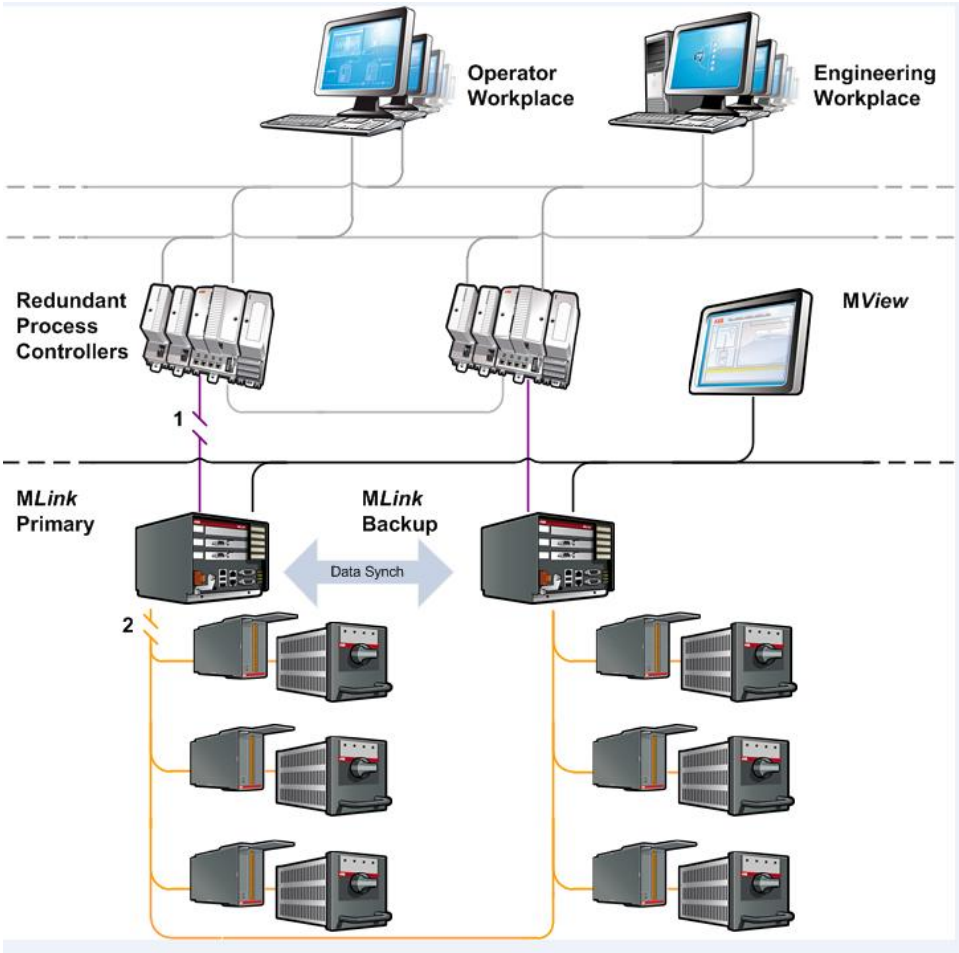
The primary M*Link* polls the M*Controls* via Switchgear Bus and is responsible for writing the switching commands, as well as reading the information fed back from the M*Controls* via the M*Link*. The Backup M*Link* reads the information only, and is inhibited from writing switching commands.

A redundant system does not tolerate single failure. Following theoretical failure situations are covered by a redundant MNS *i*S system.

On an active communication link:

1. Failure in a PLC Fieldbus master or
   failure in a Fieldbus cable connection between one master and slave
2. Failure in a M*Link or* failure at the switchgear bus connection to a single M*Link.*

Fig. 2 Theoretical failure situations in a redundant MNS *i*S system



If a failure is detected, from one of the 2 cases detailed above an integrated system mechanism in MNS *i*S ensures a bumpless changeover from the 'Primary' M*Link* to the 'Backup' M*Link*. All process data, alarms and events and the system status information is then available from the 'Backup' M*Link*.

Figures 2 show representations only of both the Switchgear Bus and Fieldbus connections to M*Link*. For more details on the Switchgear Bus please refer to the section later in this manual. For more details about M*Link* Fieldbus interfaces ref. to the respective Interface Manuals.

Fault detection and change over

If the Fieldbus communication between Primary M*Link* and Process Controller fails and Fieldbus connection between the Backup M*Link* and Process Controller is healthy, then the Primary M*Link* and the Backup M*Link* execute a 'bumpless' changeover.

The primary M*Link* polls the M*Controls* via Switchgear Bus and is responsible for writing the switching commands, as well as reading the information fed back from the M*Controls* via the M*Link*. The Backup M*Link* continuously reads the information only, and is inhibited from writing switching commands.
If we take Fig. 2 as an example, and the communication is lost between the 'Master A' controller and the 'M*Link* Primary', (case 1), and the communication between the 'Master B' controller and the 'M*Link* Backup' is healthy. Then the system will initialize the changeover, resulting in Process Controller 'Master B' now having read / write access.

What was the 'M*Link* Backup' now becomes the active M*Link*, responsible for sending Control commands towards the connected M*Controls*.

Fault indication that there is a redundancy problem, is then given by the serial link, to the 'Master B' controller, it is also displayed via the Web Interface, and LED indication is given by the Backup M*Link*.

The same handling also applies for case 2 previously detailed.

The Fieldbus data values sent from the Backup M*Link* are frozen at the time of the changeover. This is to ensure that the Fieldbus communication is available at any time for another changeover.

When the communication is then restored between 'Master A' and the Primary M*Link*, the redundancy fault indication will be cleared. The system is then again running in the redundant mode, with the 'Master B' Process Controller having read / write access, and 'Master A' having read access only. There is no automatic switch back to previous communication channels.

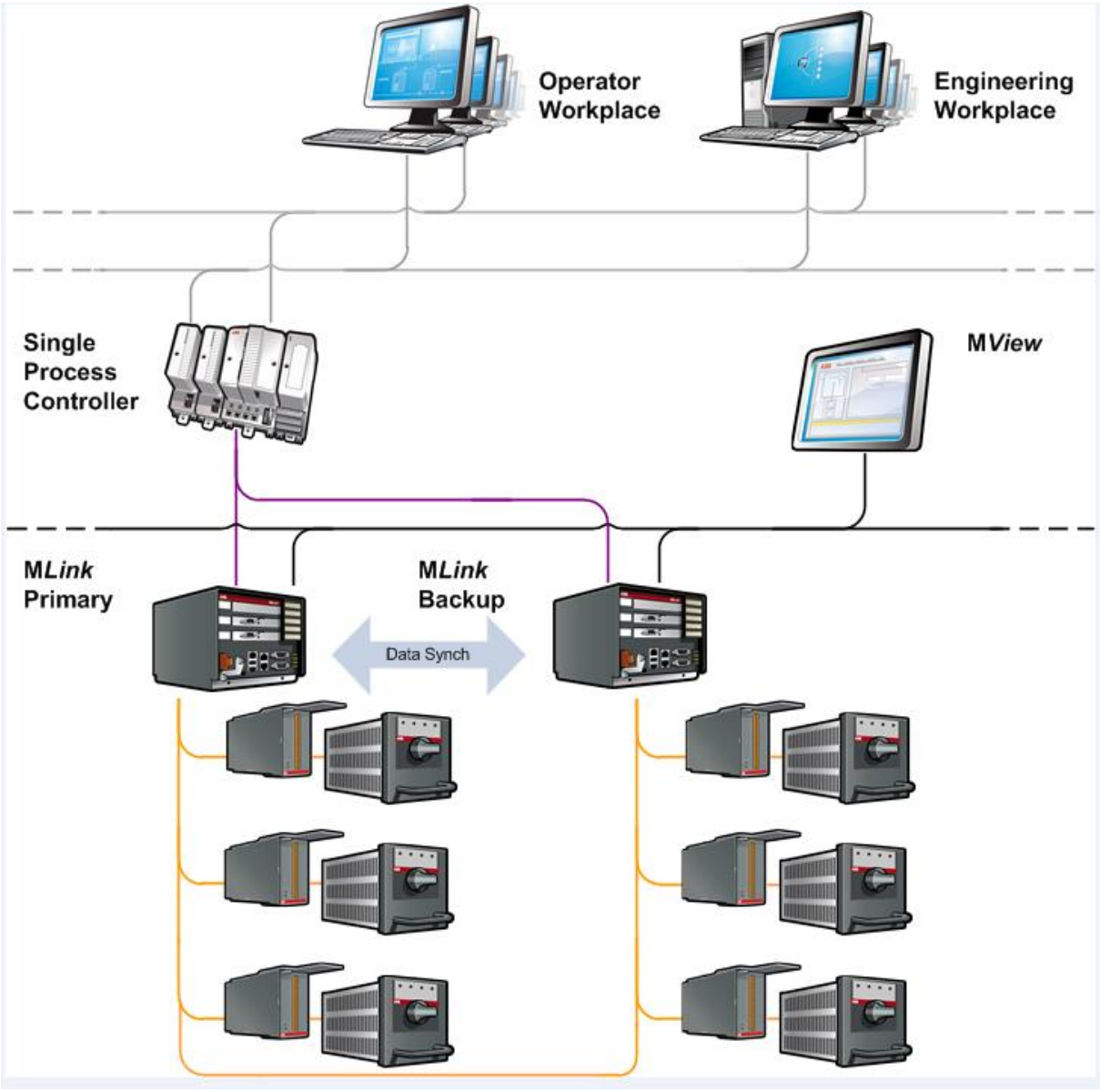
It is possible to initiate a changeover of the Master Controllers, providing all communication links are healthy. For more details please refer to the respective Fieldbus Interface Manuals.

Redundancy Configuration

There are three options available to connect DCS or PLC to both M*Link*

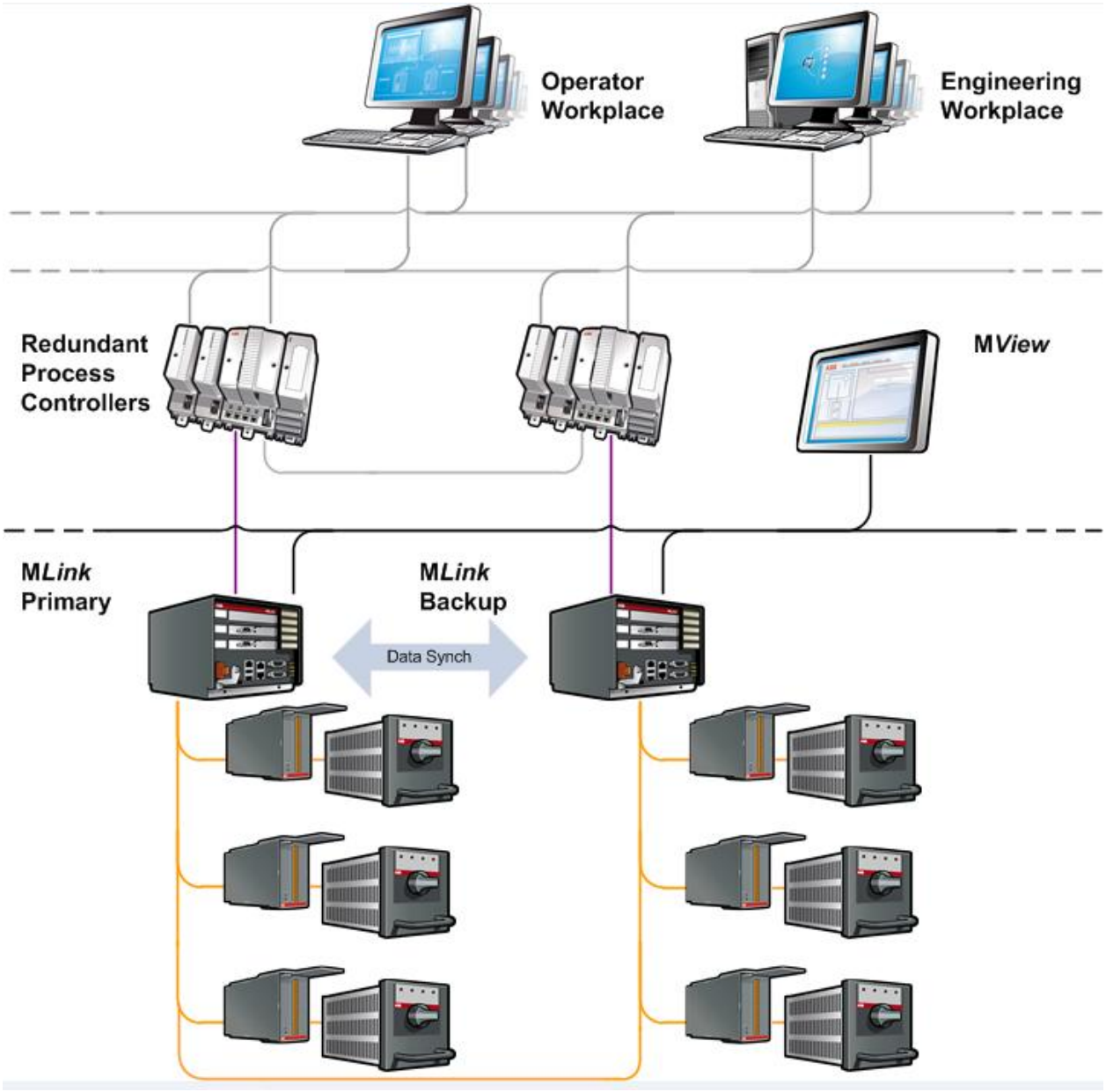
- One DCS / PLC connected to both M*Link*, as described in [1]
- One DCS / PLV with at least redundant (two) master interfaces
- Redundant (two) DCS / PLC (redundancy handled in DCS or PLC only)

Fig. 3 One DCS / PLC is connected to both M*Links*



This redundancy is described in [1]. The DCS / PLC master device is capable to communicate to two redundant slave devices with different Fieldbus addresses.

Fig. 4 Two DCS - each is connected to one M*Link*


Operator Workplace
Engineering Workplace
Redundant Process Controllers
MView
MLink Primary
MLink Backup
Data Synch

Primary and Backup MLink

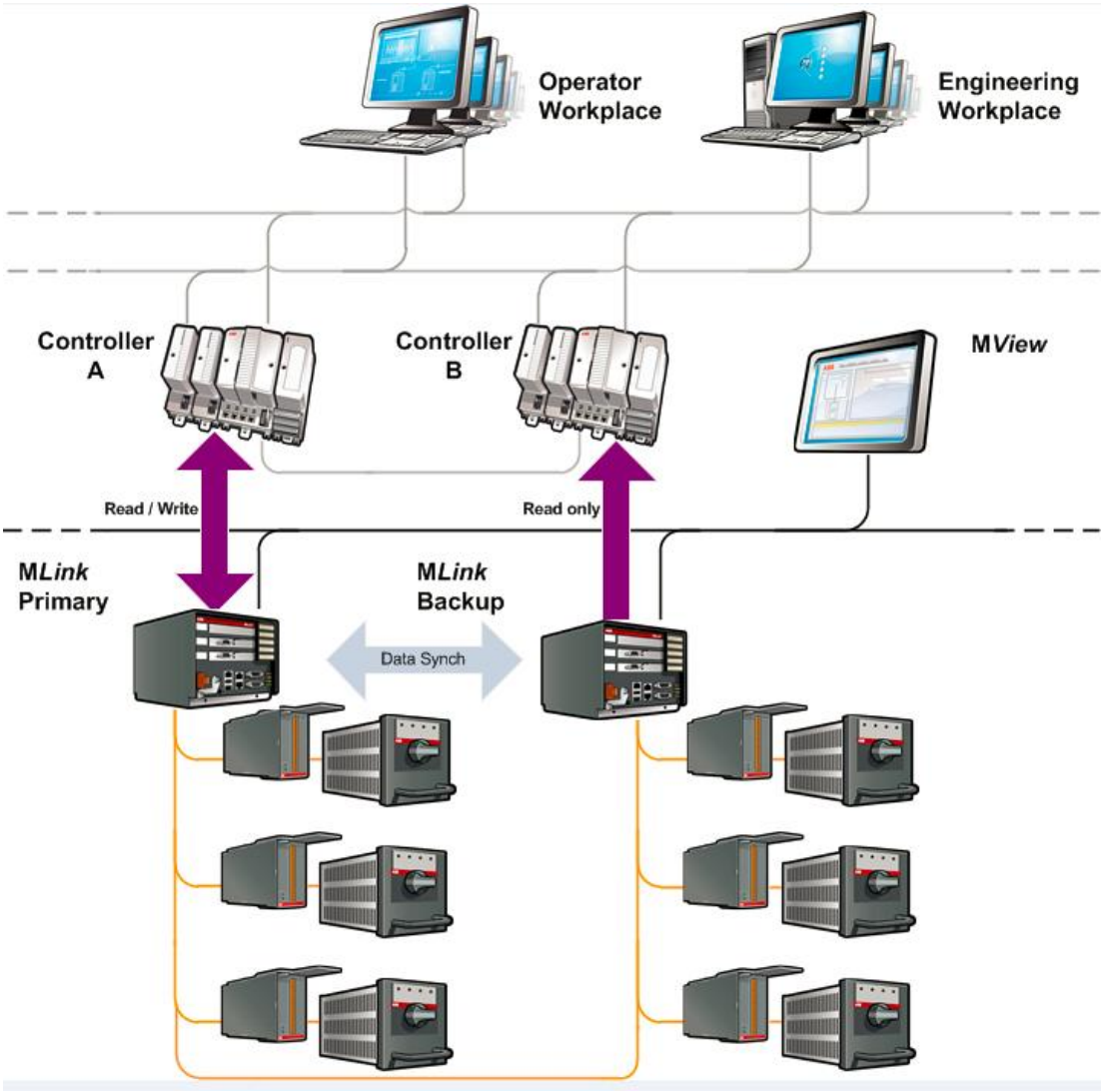
Redundancy is provided by using two M*Links* connected as shown below in figure 6. These are configured as Primary and Backup in the M*Navigate* parameterisation software (refer to the section 'Redundancy Setup' for more information). The Primary and Backup M*Links* are connected together within the switchgear by a data synchronisation link, and also by the Switchgear Bus.

The primary M*Link* polls the M*Controls* via Switchgear Bus and is responsible for writing the switching commands, as well as reading the information fed back from the M*Controls* via the M*Link*. The Backup M*Link* reads the information only, and is inhibited from writing switching commands.

The M*Links* synchronize information about:

- Status of PLC or DCS connection
- M*Link*
- Configuration settings for redundancy in M*Link*.

Fig. 5 M*Link* Primary and Backup data and information flow



Interfaces

M*Link* connectors

Refer to the M*Link* Interface Manuals for details.

Hardware ID numbers	1TGE102019Rxxxx	1TGE120021R0x10
Hardware available for MNS iS versions	up to V6.0	from V6.1 onwards
MLink Types		

Redundancy M*Link* connection

Both M*Link* must be connected together to enable data synchronization and device supervision via a RS232 Null Modem cable from serial port 1 to serial port 1 to ensure correct operation. ABB part numbers for these cables and the associated ferrite core are given in the section 'MNS *iS* Hardware Requirements'.

Fig. 6 Serial 1 to serial 1 Redundant link connections with ferrite core

The length of this cable should not exceed 10 meters

Switchgear Bus connection

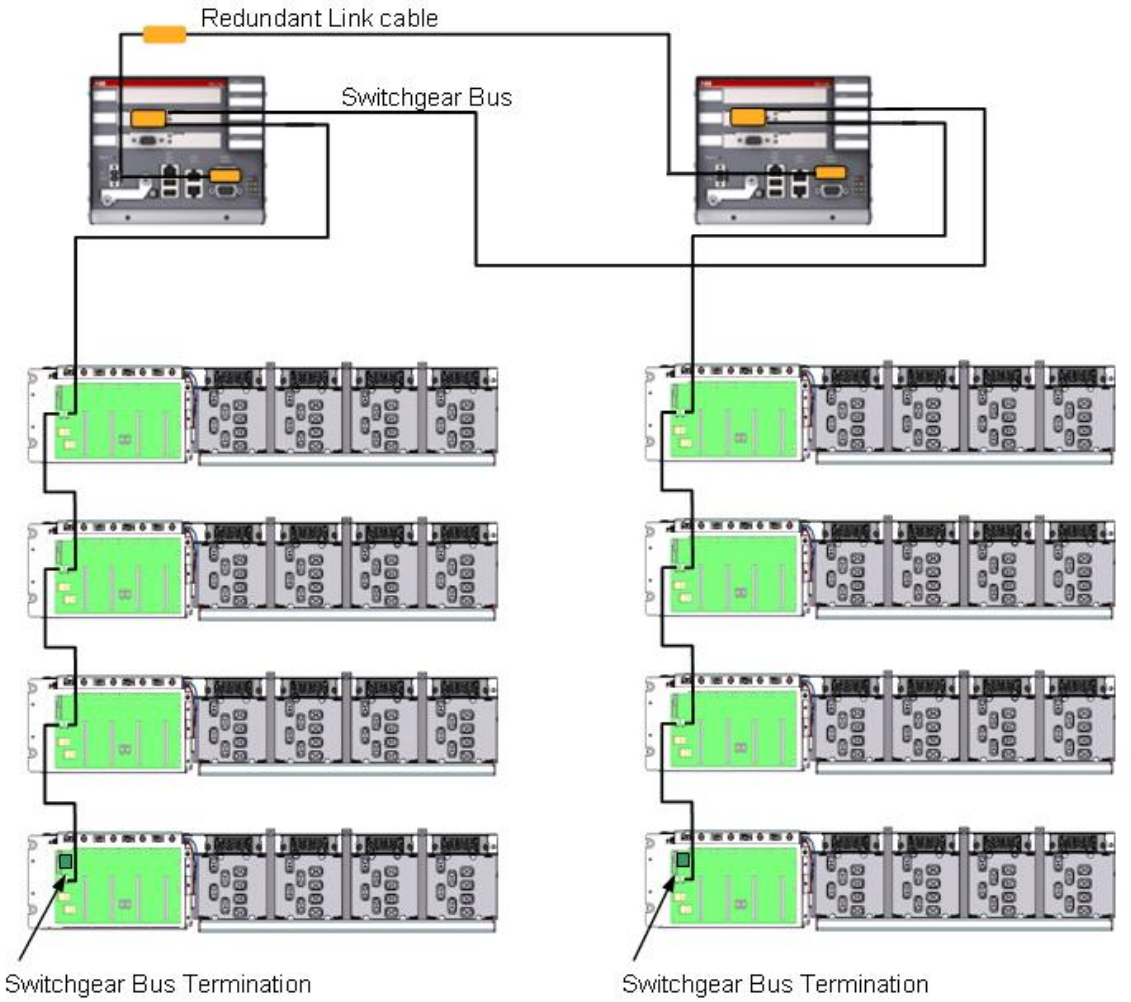
In a dual redundant configuration both M*Link* are connected to the Switchgear Bus for communication to M*Control* devices. The maximum numbers of M*Control* connected to both M*Link* is 60, the maximum allowable number of panels is 7, and the maximum switchgear bus cable length is 30m, not including backplanes.

The Switchgear Bus must be terminated at both ends of the line with the active bus termination. This differs from non-redundant systems where only one bus termination is required.

M*Link* with Modbus RTU in redundant configuration does not reply to Modbus requests (except FC08) if switchgear bus is not connected properly. Thus the DCS can easily detect a communication problem and use the redundant communication line.

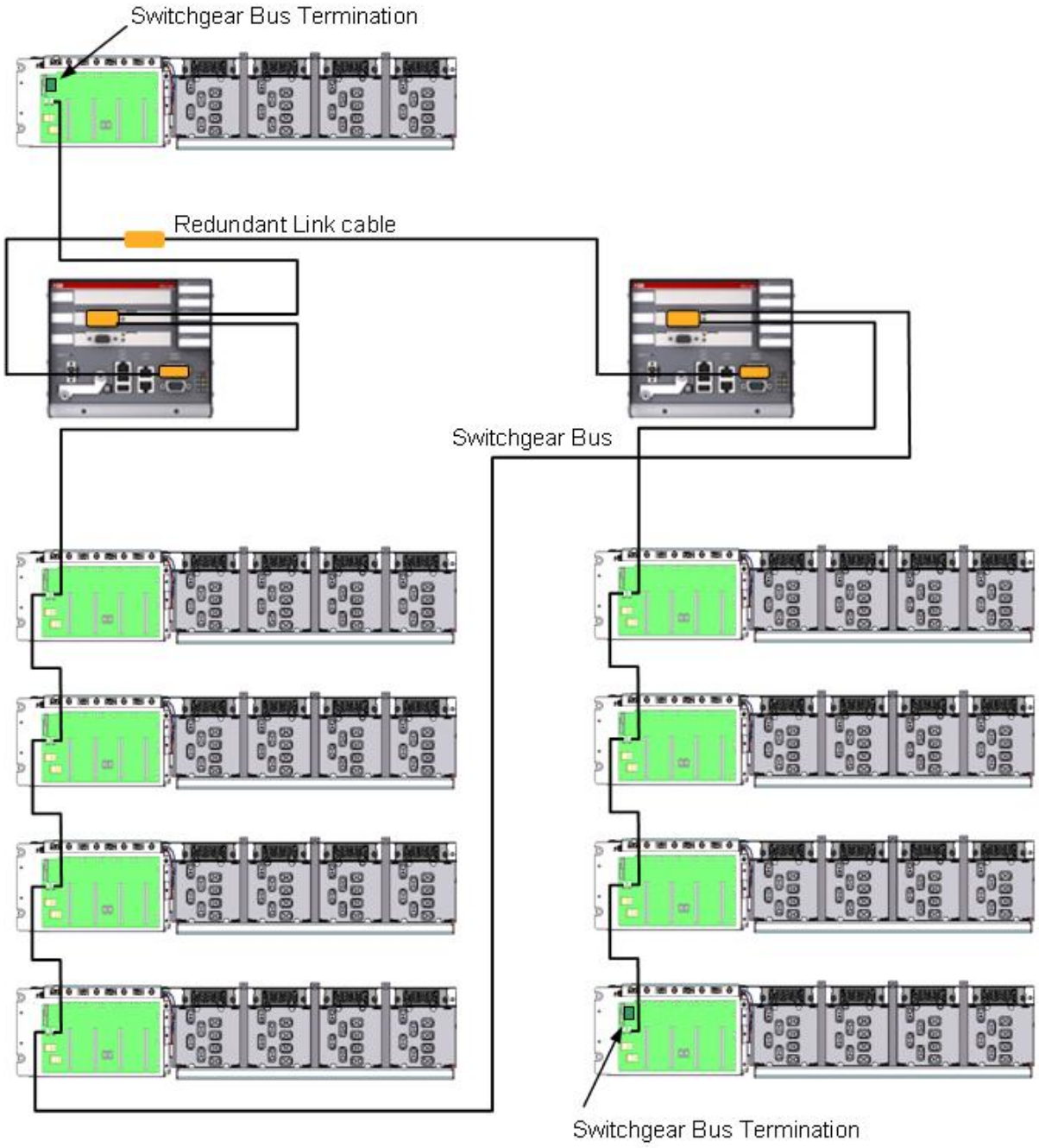
Approved redundant topologies

Fig. 7 Redundant M*Link* topology - Example 1



Note: Redundant Bus topology requires two Bus termination resistors, one at each end of the bus.

Fig. 8 Redundant M*Link* topology - Example 2



Note: Redundant Bus topology requires two Bus termination resistors, one at each end of the bus.

The two M*Link* can be installed at any point on the Switchgear Bus network between the control condaptors fitted with the Switchgear Bus termination.

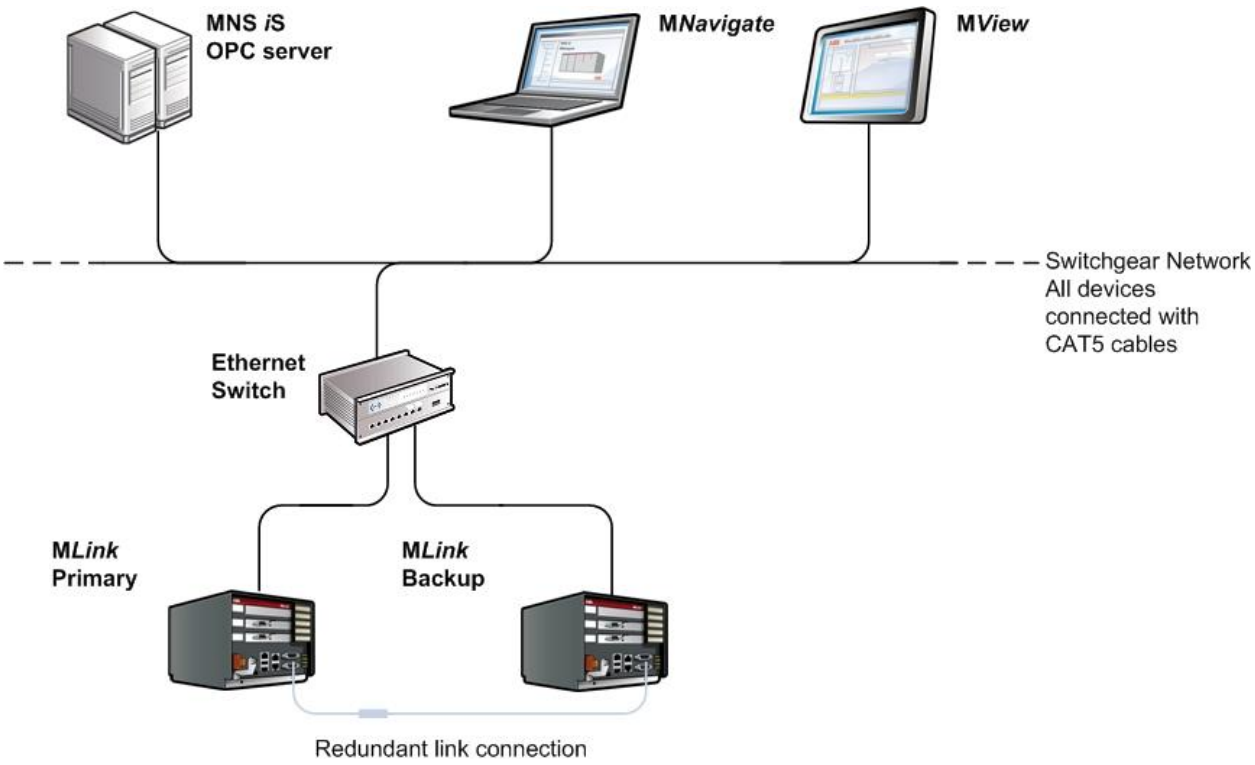
Note: The Switchgear Bus connectors for redundant and non-redundant configurations are different. That needs to be considered during installation as a wrong connector type might lead to an instable communication !

Ethernet network connections

The Ethernet network used in MNS *i*S (Switchgear Control Network) connects all M*Link* to M*View* and M*Navigate* and the OPC Server. It is connected to LAN2 port on the M*Link*.

In a redundant configuration the pair of Primary and Backup M*Link* must be connected to the same network (via managed switches) to ensure correct redundancy handling in the M*View* devices and to be able to download settings from M*Navigate* parametrization tool !

Fig. 9 Switchgear Control Network



Switchgear Control Network Restrictions

In order to achieve maximum performance from the interfaces on the Ethernet Switchgear Control Network it is not recommended to exceed the following connections to one pair of redundant M*Link* :

2 x Web Interfaces (M*View*)

2 x OPC Server

Redundancy Setup

MNS *iS* dual redundancy requires following hardware setup and configuration parameters.

Hardware Setup

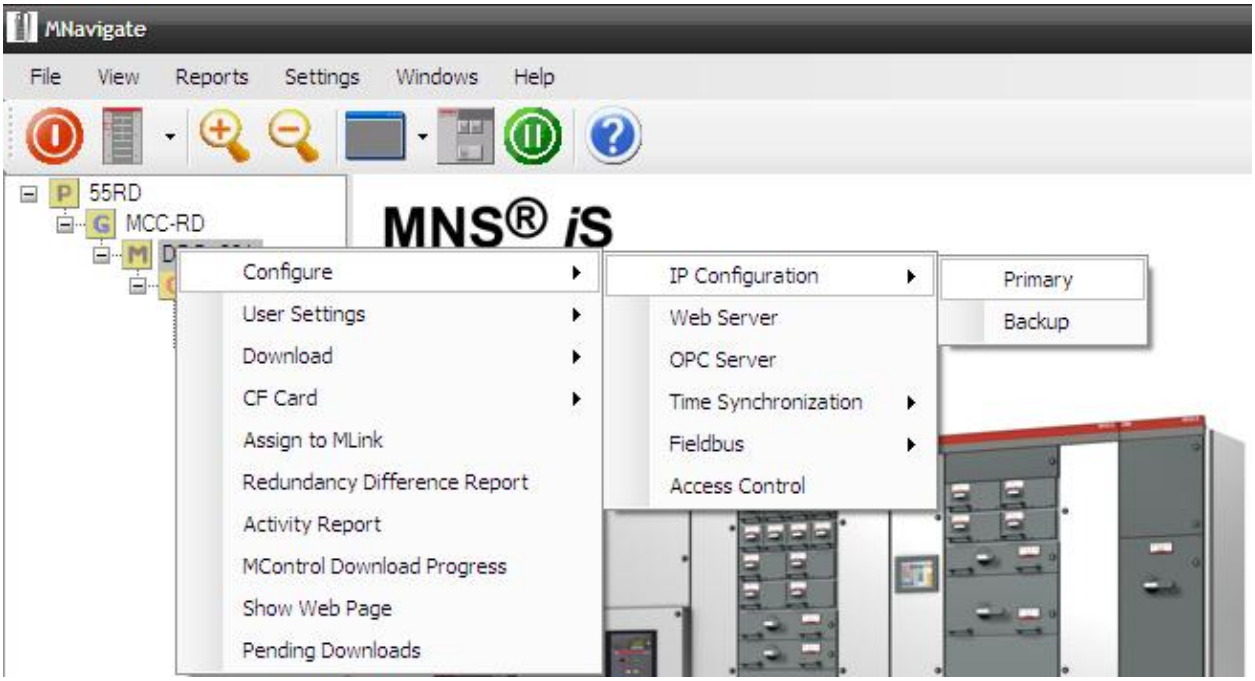
1. Connect both M*Link* by redundant link cable (RS232 Null Modem cable).
2. Connect Switchgear Bus to both M*Link*, all Control Condapter and terminate Switchgear Bus at both end of the line.
3. Connect M*View* and M*Navigate* via Ethernet using network switches.
4. Connect PLC or DCS as required in the project.

Parameter Setup

Configuration of parameters is handled via M*Navigate*. These parameters must then be downloaded to both Primary and Backup M*Link* to take effect. The majority of these parameters for the M*Link* are identical; address settings could differ depending on project requirements.

1. Set the Ethernet IP address of LAN1 (in case of Ethernet based fieldbus like ModbusTCP / Profinet is used) and LAN2 for Primary and Backup M*Link*.

Fig. 10 IP address setting of Primary and Backup M*Link*



It is essential that the IP address setting for LAN 2 of Primary and Backup M*Link* is different. The same subnet mask is used because both Ethernet ports are connected to the same Ethernet network for M*View* and M*Navigate* communication. Refer to Fig 13 for more information.

2. Set the slave address for the selected Fieldbus / Field network interface (required in case ModbusRTU or Profibus interface is used).

Fig. 11 Configure field bus address of Primary and Backup

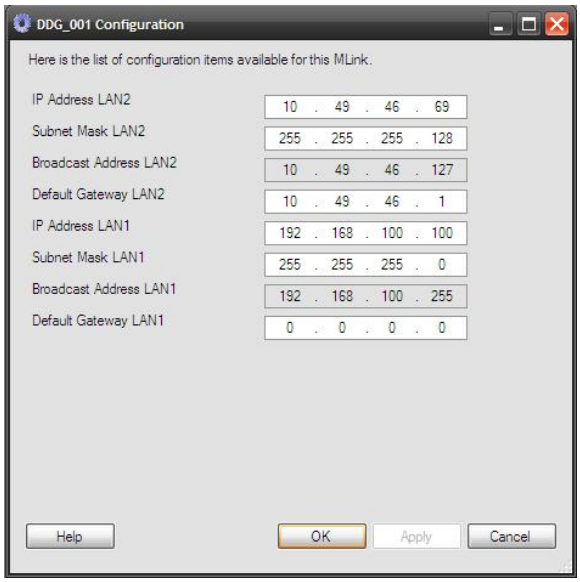
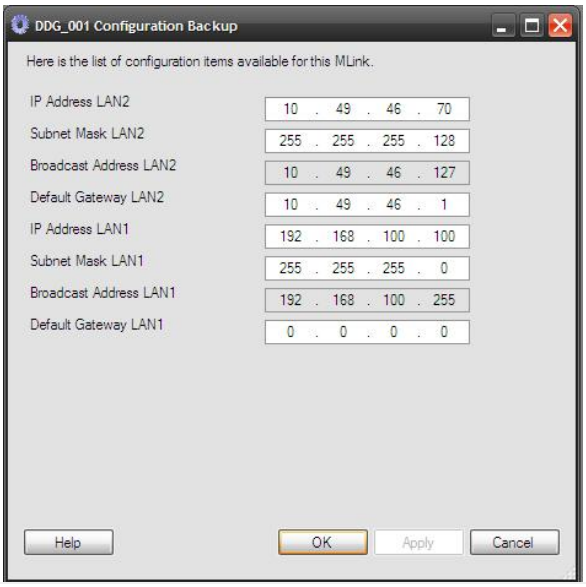
Initial Values

Table 1 Initial values (Fieldbus addresses are applicable for the selected protocol only)

Variable Name	Default Parameter	Remarks
IP Address (LAN 2)	192.168.200.100	Primary – Switchgear Control Network
IP Address (LAN 2)	192.168.200.101	Backup– Switchgear Control Network
IP Address (LAN 1)	192.168.100.100	Primary – ModbusTCP / Profinet
IP Address (LAN 1)	192.168.100.100	Backup– ModbusTCP / Profinet
MODBUS RTU / TCP Slave address	247	Primary and Backup
PROFIBUS Slave address	126	Primary and Backup

LAN 1 & LAN 2 Subnet settings must be different.

Fig. 12 M*Link* IP Address Settings

Primary	Backup
	

Network addresses for LAN2 must be set for both Primary and Backup M*Link*. Please Note these addresses must be different as shown in the example above.

Redundancy Functions

Handling of redundancy faults

Both M*Link* supervise at all times the redundancy conditions, detecting faults and problems according following table.

Table 2 Redundancy handling of faults

Event	Action
PLC or DCS connection interrupted for more than 1 second to Primary M*Link* Note : For Profibus the additional time of Profibus watchdog is set by the DCS	Redundancy change over if backup M*Link* has an active PLC or DCS connection
Power loss or internal error of Primary M*Link*	Redundancy change over, Redundancy error indicated
Power loss of backup M*Link*	No change over, Redundancy error indicated
Redundancy link cable broken	Redundancy error indicated
Problems in redundancy setup	No change over possible, Redundancy error indicated
Switchgear Bus at Primary M*Link* disconnected	Redundancy change over

A change over from Primary to Backup M*Link* will only be performed if there is no redundancy error.

Failsafe

The M*Controls* can be configured to switch into a safe state (failsafe parameter) if both PLC / DCS connections are disturbed longer than the parameterized "*PLC Timeout*" in M*Link* fieldbus setting.

Further details about Failsafe can be found in the MNS *i*S Interface Manuals and in the M*Navigate* Help file.

PLC / DCS Data Communication

Both Primary and Backup M*Link* are communicating to the PLC or DCS. The Primary M*Link* sends and receives data (commands) from PLC / DCS while the Backup M*Link* sends only data to the PLC / DCS. The PLC / DCS must interpret the data registers to detect which is the Primary and which is the Backup M*Link*.

MODBUS RTU and TCP

Default data mapping uses following registers:
Register Number: 12001 – If register is set M*Link* is Primary
Register Number: 12002 – If register is set M*Link* has Redundancy Error

PROFIBUS DP and DP-V1

Default data image uses the following bytes/bits:
Byte number 243, Bit 0: If bit is set M*Link* is Primary
Byte number 243, Bit 1: If bit is set M*Link* has Redundancy Error

Further details can be found in respective MNS *i*S Interface Manuals.

If user data mapping is used instead of default mapping, it is a basic requirement that this data is configured in the user mapping for redundancy handling in PLC / DCS.

PLC / DCS Handling of Redundant Configurations

The PLC or DCS must interpret the M*Link* redundancy status registers to determine which M*Link* is the Primary M*Link*, and in the event of a changeover being initiated by the M*Links* the PLC or DCS should react accordingly.

PLC / DCS Command for MLink change over

The PLC application can also force the Primary M*Link* in a redundant system to change over to act as Backup M*Link*.

MODBUS RTU and TCP

Default data mapping uses following registers:
Register Number: 44001 - Changeover command from PLC / DCS
A value 0x0001 must be send to that register to force the PLC / DCS MODBUS master to change over to the slave in order to communicate with the 'new' Primary M*Link*.

PROFIBUS DP and DP-V1

Default data image uses following bytes/bits to change over:
Byte 124, Bit 0 – Setting to 1 initiates a redundancy change over

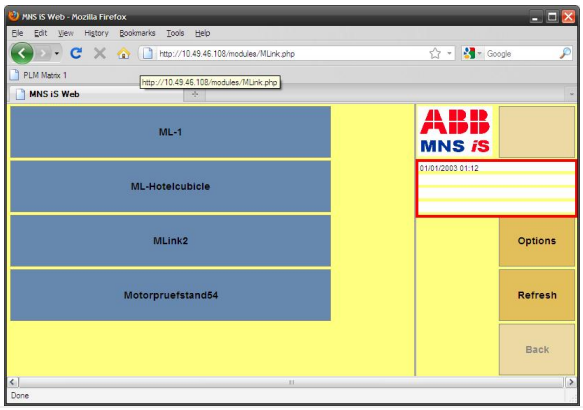
If user data mapping is used, it is a basic requirement that this data is provided therein.

M*View* / Web Interface

In a dual redundant configuration the M*View* is connected via the same Ethernet network to both Primary and Backup M*Link.* (See Fig. 9 Switchgear Control Network).

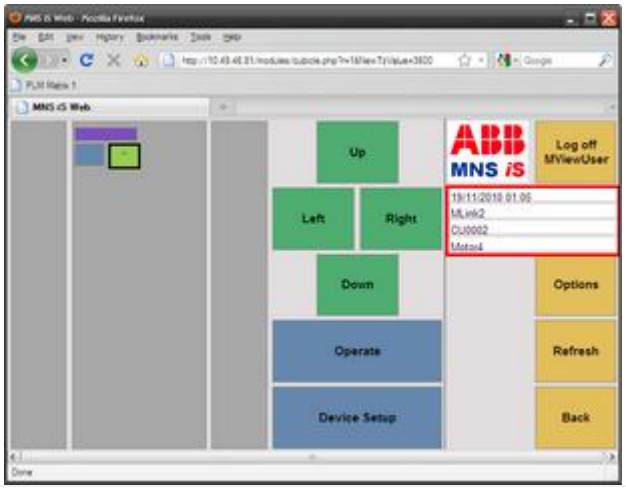
If a change over takes place, the M*View* is automatically redirected to the Primary M*Link* without user interaction. Prior to the re-direction the background in M*View* changes to yellow, this indicates that current Web Interface is connected to the Backup M*Link*. One it has redirected to the Primary the background returns to its usual colour as below.

Fig. 13 M*View* redirecting to new primary M*Link* after redundancy switchover



It is not recommended to use more than two M*View* or web interfaces per redundant pair of M*Link*, as this may affect the performance on the Switchgear control network.

Fig. 14 Redundancy Error shown in M*View* by a red square



If the Backup M*Link* fails, a change over to the other MLink would not be possible in case of an redundancy failure and the M*View* shows a red square on the text window to indicate such a Redundancy Error.

For more details please refer to the MNS *i*S Web Interface Manual.

.

Troubleshooting

M*View* or M*Navigate* cannot communicate with both M*Link*:

- Check Ethernet cabling, IP address settings and network switch functionality.

Redundancy Difference Report

In case of a Redundancy Error (also indicated by red LED on M*Link* front) the “Redundancy Difference Report” function inside M*Navigate* can be used to check if there is any difference in configuration settings between the Primary and Backup M*Link*.

If there are any differences indicated in the report those have to be rectified before the Redundancy Error is cleared (if there are no other issues pending) and MLink redundancy is functioning again !

M*View Redundancy Status*

It is possible to further check the redundancy status in M*View* (refer to the MNS *i*S Web Interface Manual for details).

Fig. 15 Redundancy status displayed in M*View*

This information needs to be send to ABB Service for help with troubleshooting.

LED - Status Information

The M*Link* redundancy is indicated by status LEDs at M*Link* front.

For more detailed information on LED status please refer to the MNS *i*S Interface Manual M*Link* or MNavigate Help file.

Trouble Shooting examples :

Hardware ID numbers	**1TGE102019Rxxxx**	**1TGE120021R0110**
MLink Types		
LED indication	LED7 and LED11	LED2 and LED7
Recommended actions	Check the redundancy report in M*Navigate* and the following. In case no issue is indicated or all indicated issues have been resolved and Redundancy Error persists check : • Both M*Links* are powered on and running. • Null Modem cable connection - redundancy link between both M*Links.* • Switchgear Bus connectors and cables are properly attached in to both M*Links.*	
	After a re-boot of M*Link* it can take up to 5 minutes depending on numbers of connected M*Control* and size of user data mapping table until the M*Link* PLC / DCS communication is re-established and red LED is off.	

Hardware ID numbers	**1TGE102019Rxxxx**	**1TGE120021R0110**
MLink Types		
LED indication	LED8 blinking	
Recommended actions	• LED8 is indicating which of the M*Link* is the current active Primary one. • The M*Link*s are continuously monitoring the M*Control* connection. If no M*Control* is connected to the M*Link*, a changeover between both M*Link* is executed every 2 seconds, because neither M*Link* receives responses from a single M*Control*. In this case check Switchgear Bus connections and termination. • This indication also occurs if only one M*Control* is connected on the Switchgear Bus and this M*Control* is rebooting after an Application Download. The switchover is stopped after M*Control* reboot is finished. • This indication also occurs if multiple M*Control* are connected on the Switchgear Bus and after an Application Group download all M*Control* are in reboot state. The switchover is stopped after first M*Control* has finished its reboot.	

Contact us

ABB Low Voltage Systems
Publication Editor:
ABB Automation Products GmbH
Ladenburg, Germany

Publication No.
1TGC910261M0202

Local Contacts on
www.abb.com/mns

Power and productivity
for a better world™