

## MIC01-CL(R)

Multi Interface Controller

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### Features

- Stand-alone distributed data logging system with LAN or GPRS remote connection
- Simplest way to collect information from 200 points inside over 100m radius

- Proven and cost effective CAT6(5) twisted pair cabling (one pair needed)
- Full duplex 200 x 80 Bits/s data transfer rate in Linet network
- Single 24V DC power supply
- Only 12W for full 200 node system
- Ethernet connection with embedded UDP/IP and TCP/IP stacks
- Embedded Web, TFTP and Telnet servers
- ARM7TDMI, RTOS and file system
- System status LED indicators
- Real time clock with battery back-up
- Full monitoring, control and alarms with SMS (MIC01-CLR)
- GSM-data and GPRS services (MIC01-CLR)
- Datalogging interface to uSD-memory card (MIC01-CLR)
- Industrial standard DIN-rail enclosure

### Application

- Remote location data logger
- Building automation
- Light control systems
- Manufacturing automation
- Industrial automation

## ***General operation***

Using just one pair of the CAT6 twisted pair cable the MIC01 controller connects up to 200 Linet node based interface modules to operate as a widespread distributed controlling and monitoring data network. This controller provides both power and data in the same cable pair for this master/slave time division network. The controller sends and receives Linet data frames over the carrier signal so that every node gets its time slot eighty times per second. The network is both polarity and topology free needing no signal terminations at the end of cable segments. This way it is very fast and easy to install.

MIC01 controller also provides service and user interfaces as well as system interface for higher level control and monitoring applications like server computer or SC-01 system controller. MIC-controller software takes care of communication between the field appliances interfaced with our modules and higher level host application using UDP socket over Ethernet network. Note that this Ethernet communication must be isolated from public networks (internet) e.g. by firewalls. Ethernet based WEB and Telnet connections are provided for configuration and service operations. Optional (MIC01-CLR) GSM/GPRS modem provides M2M remote connection using e.g. GSM data, SMS and GPRS services.

## ***Modular system structure***

MIC- Multi Interface Controller is modular so that the user can optimise the structure of the controller needed. This leaves us also the possibility to develop suitable new interfaces according to our customer's future needs.

MIC-CPU contains the ARM7TDMI cpu, 2M bytes of flash memory, 256k bytes of internal SRAM memory where the actual program file exists, 512k bytes of external SRAM for system data and 10/100Tx Ethernet controller with RJ45 connection. The card also includes real-time clock, watch dog timer and necessary power supplies. This card is mandatory in all MIC configurations.

MIC-LIN contains the Linet network interface. This interface allows the user to connect up to 200 Linet compatible field interface modules to one MIC –controller to create easily a very comprehensive data network at very low costs.

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MIC-RIF contains GSM/GPRS 4-band radio interface. This interface uses Telit GC864 modem module. This module carries the mandatory SIM card holder and a holder for optional microSD flash memory card. User can collect information from 10 different I/O-groups to this memory card. Memory can store months of continuous data depending on the frequency and the number of information collected.

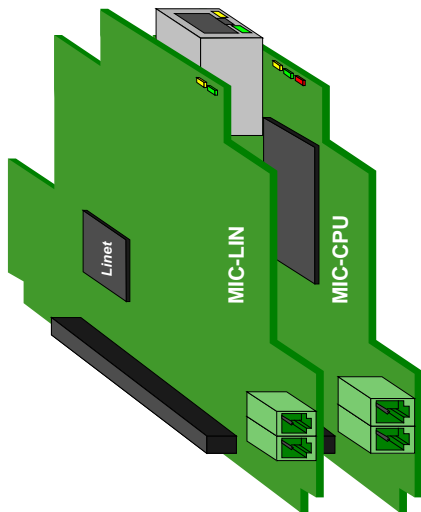


Figure1: MIC01-CL modules

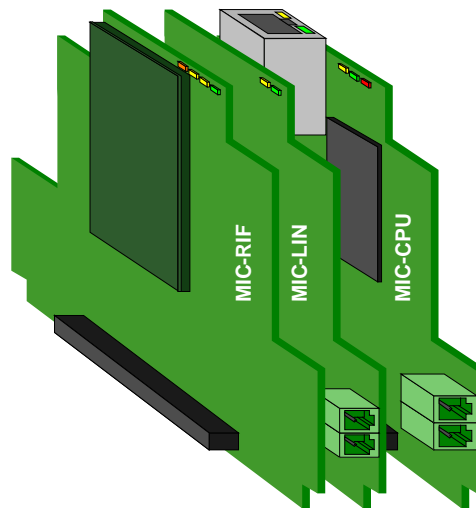


Figure2: MIC01-CLR modules

## ***Interfaces and services***

### Linnet network interface

Linnet network – consisting of CAT6 twisted pair cable and Linnet nodes attached to it – is connected directly to the polarity free Linnet connector on the MIC controller. Carrier signal is generated by the driver stage on the MIC-LIN module. The continuous monitoring of the carrier provides instant response of network over load conditions. Operation starts again automatically if the defect disappears. Linnet node count is limited to 200 and maximum CAT6 type cable length to 1000 m. Cabling topology is very free so it can be e.g. star, bus or tree topology. It is highly recommended

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to divide the cabling to several segments e.g. by using cross connection boxes available from us. Cabling recommendation can be found from other documents.

### 10/100TX Ethernet interface

Ethetnet interface provides the path to configure, monitor and directly control the services built in the MIC controller. These services include Linet network services, GSM/GPRS set-ups, TCP/IP set-ups etc. Set-up data is stored in text format to non-volatile memory on the controller. This information can be read over Ethernet/internet e.g. for backup to remote computer or for editing or for downloading to other MIC controller to make a very easy controller replacement. User and maintenance interface can be accessed through Ethernet or through remote access using GSM data connection.

In addition to Telnet terminal and WEB server, also file transfer service on TFTP protocol is provided which makes software updates and file loading very simple and fast operation. GSM data connection provides terminal session to the MIC controller.

Control and monitor communication takes place over the local Ethernet using UDP packets. This interface provides path for higher level applications to communicate with services on the MIC controller. This interface can be used e.g. setting and monitoring states of the Linet groups. One UDP packet carries a snapshot of the whole Linet network i.e. group states/values that can be used exchanging information between upper layer application and Linet nodes behind the MIC controller. The packet exchange rate can be adjusted according to the application needs and Linet network limits. Control and monitor interface can also be used for sending SMS and EMAIL messages.

### Remote connections (MIC01-CLR)

The services provided by the GSM/GPRS modem on the MID-RIF module make the remote connections possible wherever GSM field is available. The built in GSM network scanner service capable of measuring the GSM field strengths can be used for selecting the operator candidates by their performance at the installation location. Note that this can be done without SIM card.

GSM data service can be used implementing a password protected terminal session directly to the maintenance and user interface. This session can be implemented easily e.g. using a laptop PC with an ordinary GSM phone as a modem behind IR or RS-323 link.

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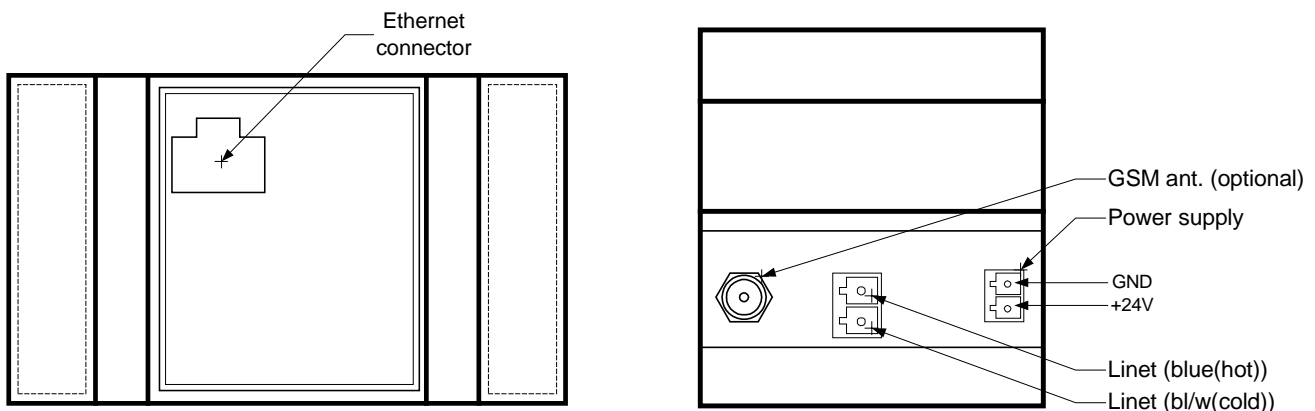
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The states of Linet groups can set and taken using SMS messages. Note that only messages from the pre-defined numbers are taken into execution, if the user has limited the number space. Linet groups are also capable of generating SMS alarms on user defined conditions.

Besides the FTP and EMAIL services, GPRS services can be used for building remote connection to the maintenance and user interface. MIC controller with host rights initiates GPRS/TCP communication with Internet server in order to establish remote connection. Thereafter, host MIC controller takes care of routing the UDP request packets to the client MIC controllers under same Ethernet segment as well as its own control and monitoring interface. Host MIC controller takes also care of GPRS encapsulation of the answered UDP packets from the client Linet servers and routing them back to the requesting Internet server.

### Connectors



### Technical specifications

PARAMETER	MIC01-CL	MIC01-CLR	UNIT
<b>Power supply</b>			
Supply voltage	+24 (+/-5%)	+24 (+/-5%)	VDC
Max supply current	0.5	1	ADC
Supply connector	Phoenix MC-1,5/2-ST-3,81	Phoenix MC-1,5/2-ST-3,81	
<b>Linnet Network interface</b>			
Supply voltage	40	40	V <sub>pp</sub>
Max supply current	0.7	0.7	A (peak)
Max power consumption	12	12	W
Buss frequency, sine wave	20	20	kHz
Max number of nodes	200	200	pcs
Max length of CAT6 network cable	1000	1000	m
Polarity and termination free	Yes	Yes	
Network connector	Phoenix MC1,5/2-ST-5,08	Phoenix MC1,5/2-ST-5,08	
<b>Ethernet interface</b>			
Network interface	10/100Base-T	10/100Base-T	
Network connector	RJ-45	RJ-45	
Services:			
Telnet configuration/user interface	Yes	Yes	
TFTP File transfer	Yes	Yes	
UDP/IP control and monitoring	Yes	Yes	
<b>Serial interface (optional)</b>			
Interface	RS-232	RS-232	
Standard speed, data, stop, parity	19200, 8,N,1	19200, 8,N,1	Bits/s
Isolation	no	no	
Standard connector	Pinstrip 3	Pinstrip 3	
Services:			
Alternate config/user interface	Yes	Yes	
<b>JTAG service interface</b>			
Interface type	ARM7TDMI	ARM7TDMI	
Interface connector	Molex 6 pin	Molex 6 pin	

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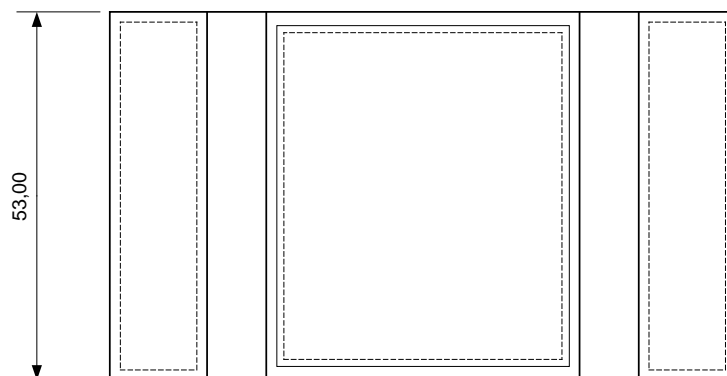
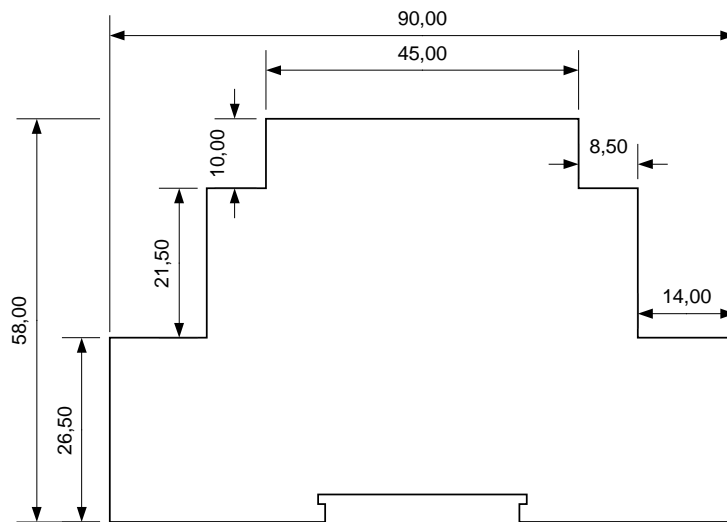
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<b>Internal memory</b>			
Volatile SRAM memory	768	768	kB
Non-volatile FLASH memory	2	2	MB
<b>Real time clock</b>			
Data format	yy.mm.dd.hh.ss	yy.mm.dd.hh.ss	
<b>GSM/GPRS-modem</b>			
GSM	No	Quad band	
GPRS	No	Class 10	
Services:			
GSM-data connection to user interface	No	Yes	
SMS message executor and alarm generators	No	Yes	
GPRS-connection to remote server (options)	No	Yes	
Jam detect, FTP- and SMTP-clients (options)	No	Yes	
Connector	No	SMA	
For more information, look for: <b>Telit GC864</b> data sheets			
<b>Temperature sensor and control</b>			
Measure range	No	-65/+127	°C
Accuracy	No	+/-5	°C
<b>MMC-card interface (option)</b>			
MMC-card type	No	uSD / FAT16	
<b>Operating environment</b>			
Temperature	from 0 to +60	from 0 to +50	°C
Humidity	non condensing	non condensing	

### Dimensions (mm)



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### *Ordering product codes*

<b>Product code:</b>	<b>Description:</b>
MIC01-CL	Controller with Ethernet and Linet interfaces
MIC01-CLR	Controller with Ethernet, Linet and GSM/GPRS interf.

### *Contact information*

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