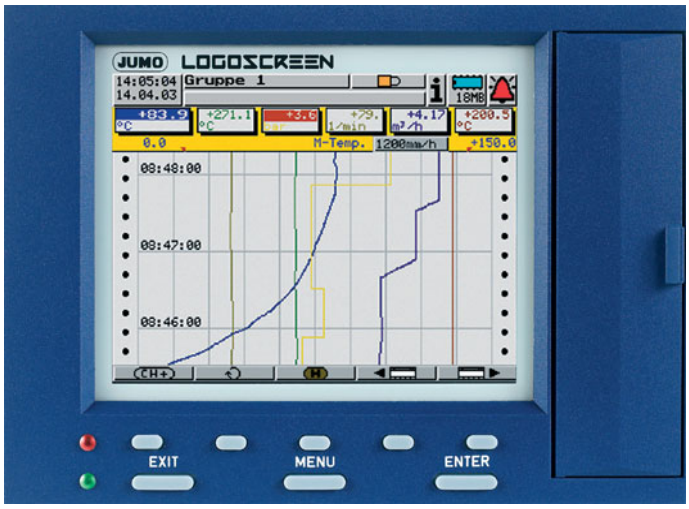


LOGOSCREEN cf

Paperless Recorder with CompactFlash card as storage medium

B 70.6570.2.1

Interface Description

LON interface

12.06/00434197

Contents

Contents

1.1 Preface

Warranty

If any problems should arise during start-up, you are asked not to carry out any manipulations on the unit. You could endanger your rights under the warranty. Please contact the nearest subsidiary or the head office in such a case.

Data backup

Back up your configuration files at regular intervals.
If you reformat the hard disk, the projects that you have created with the JUMO mTRON-iTOOL will also be deleted!

Update CD for paperless recorder

For interlinking the modules, you will need the JUMO mTRON-iTOOL project design software, which has been created especially for devices from the mTRON series.
For this reason, the driver data for the paperless recorder must be re-installed in the module library.

Operating Instructions B 70.6570.2.1

All necessary information for operating the interface is contained in these operating instructions.
Please read this manual before starting up the interface. Keep the manual in a place which is accessible to all users at all times.
Please assist us to improve this manual, where necessary.

Phone +49 661 6003-0
Fax +49 661 6003-607
email mail@jumo.net

1.2 Typographical conventions

1.2.1 Warning signs

The signs for **Danger** and **Caution** are used in this manual under the following conditions:

Danger This symbol is used when there may be **danger to personnel** if the instructions are disregarded or not followed correctly!

Caution This symbol is used when there may be **damage to equipment or data** if the instructions are disregarded or not followed correctly!

Caution This symbol is used where special care is required when handling components liable to damage through electrostatic discharge.

1.2.2 Note signs

Note This symbol is used when your attention is drawn to a **special remark.**

Reference This sign refers to further information in other handbooks, chapters or sections.

abc[1] **Footnote** Footnotes are notes which refer to certain points in the text. Footnotes consist of two parts:

Marking in the text and the footnote text.

The markings in the text are arranged as continuous superscript numbers.

The footnote text (in smaller typeface) is placed at the bottom of the text and starts with a number and a full stop.

1.2.3 Presentation

0x0010 **Hexadecimal number** A hexadecimal number is identified by being preceded by a “0x” (here: 16 decimal).

2.1 Applications

The LON interface is available for the connection of external modules of the JUMO mTRON automation system, in order to expand the functionality of the paperless recorder.

All mTRON modules can be connected.

2.2 System requirements

The following requirements have to be met for the connection of external modules to the recorder :

- Paperless recorder with LON interface
- Configured modules of the JUMO mTRON automation system

2.2.1 Configuring the mTRON modules

The mTRON modules are configured using the JUMO mTRON-iTOOL project design software. A setup interface is required for connecting mTRON modules to a PC.

The JUMO mTRON-iTOOL project design software can only be dispensed with if the mTRON modules have been configured by JUMO GmbH & Co. KG prior to delivery. In order for this to happen, the customer must have specified the required configuration in detail when ordering his measuring system.

The recorder can also operate without internal (built-in) analog channels. In this case, the measurements are obtained exclusively from the mTRON modules.

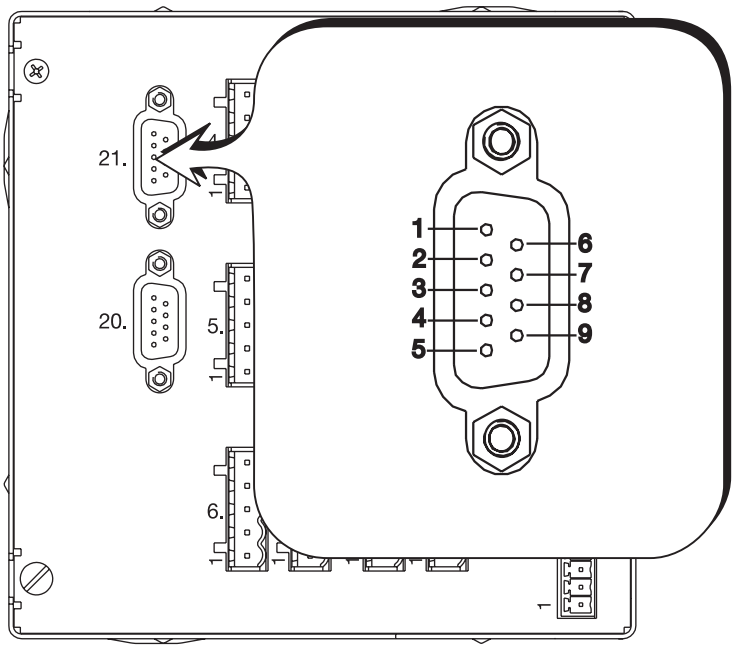
2.3 Identifying the interface

The LON interface is available as an extra. The contents of the menu *Device info* ➔ *Interface* show whether it is implemented in the system.

If the entry *Device info* ➔ *Interface 21* is set to “ExtExpansion”, the LON interface is available.

3.1 Connection diagram

Rear view of the paperless recorder

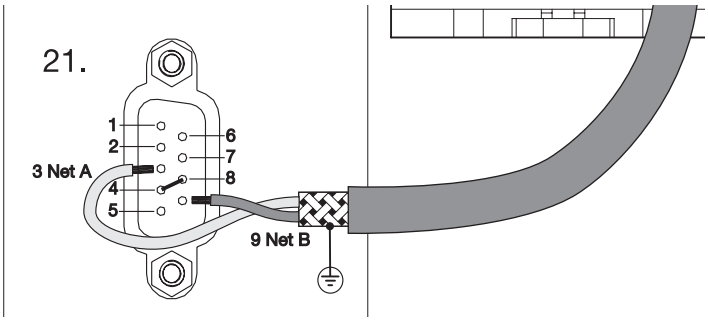


Connector 21

Interface

LON

Connection diagram



The recorder is connected to the modules of the “JUMO mTRON automation system” series using the connections Net_A and Net_B. The technical details are described in the corresponding installation instructions for the mTRON modules. Further information on bus termination can be taken from Chapter 3.2 “Connecting configured mTRON modules”.

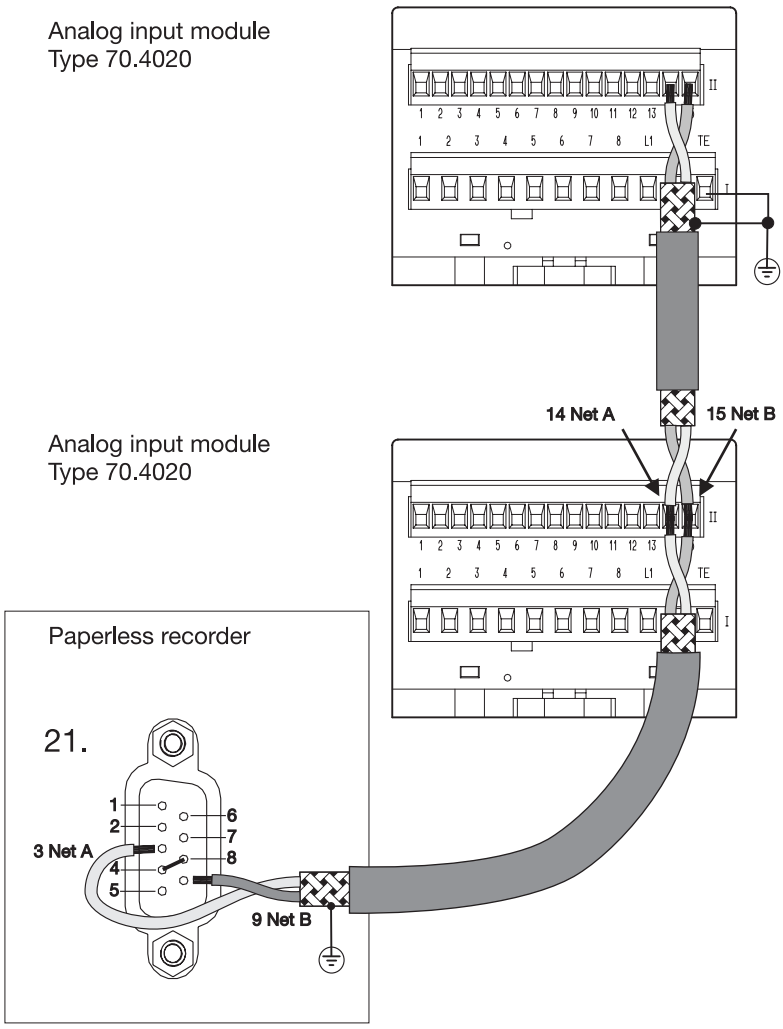
☞ When connecting the LON interface, care must be taken not to mix up connectors 20 and 21. Connector 20 is reserved for the serial interface. Measurements, as well as device and process data, can be read out from the recorder with the aid of the serial interface. The connection and functionality of the serial interface are explained in detail in the Interface Description B 70.6570.2.0.

3 Connecting the interface

3.2 Connecting configured mTRON modules

The mTRON modules are connected to the recorder using a screened twisted pair. The pre-configured mTRON modules are labelled according to customer specification.

Example: 1 paperless recorder and 2 analog input modules



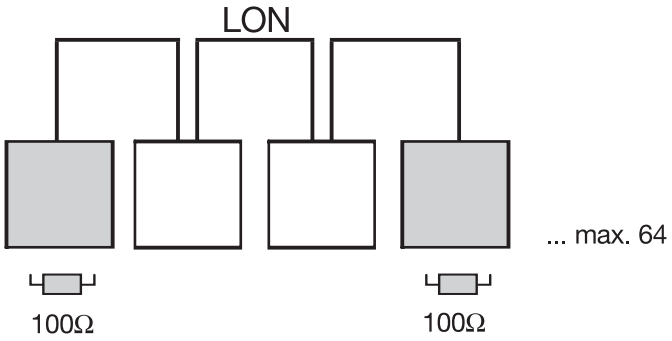
In the example shown, two analog input modules are connected to the recorder in the “line structure” type of connection. The physical ends (recorder and module 2) must be fitted with a termination resistor.

The bus termination resistor (50Ω) of the recorder is activated through a wire link between pin 4 and pin 8 (see Chapter 3.1 “Connection diagram”).

Further details on the bus termination of the analog input modules can be obtained from the installation instructions for the modules.

A screened twisted pair is used as a transmission line. The connection can be made as a line, ring, star or mixed structure (free topology).

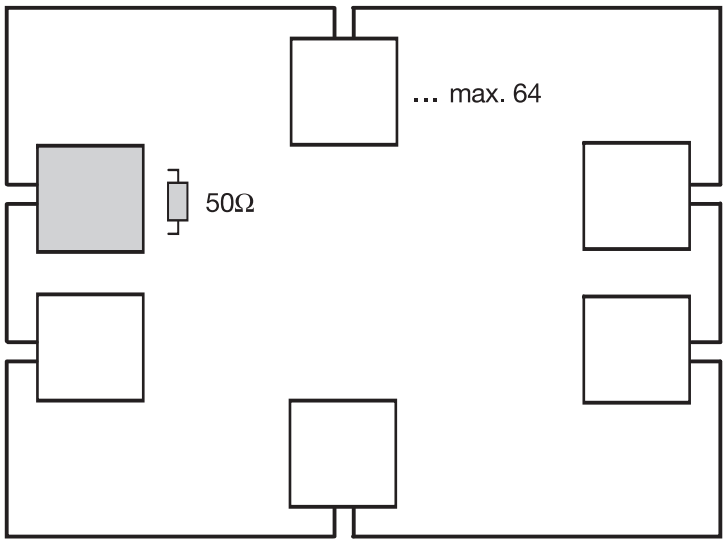
Line structure



Each physical end is provided with a termination resistance of 100Ω, which is activated by a switch on the module.

Chapter 3.3 “Setting the LON termination resistance”

Ring structure

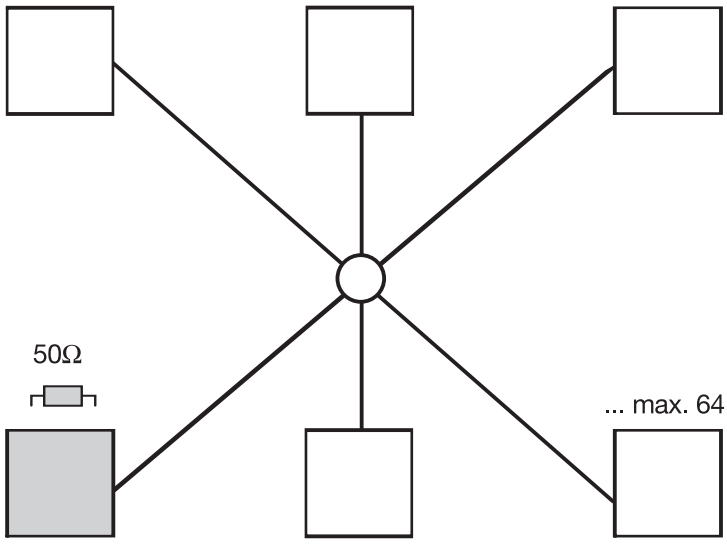


In this wiring arrangement, the network remains functional even when there is an interruption. The termination resistance of any module in the ring must be set to 50Ω.

Chapter 3.3 “Setting the LON termination resistance”

3 Connecting the interface

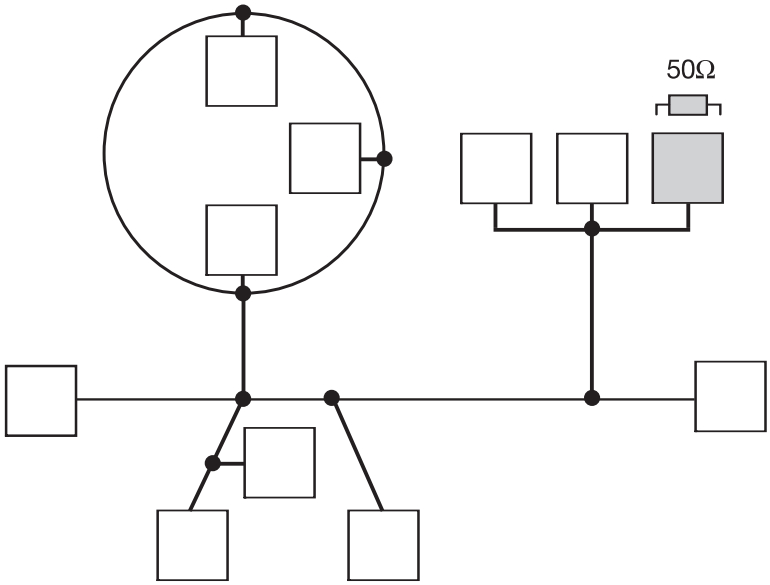
Star structure



The termination resistance of any module in the star must be set to 50Ω.

Chapter 3.3 “Setting the LON termination resistance”

Mixed structure

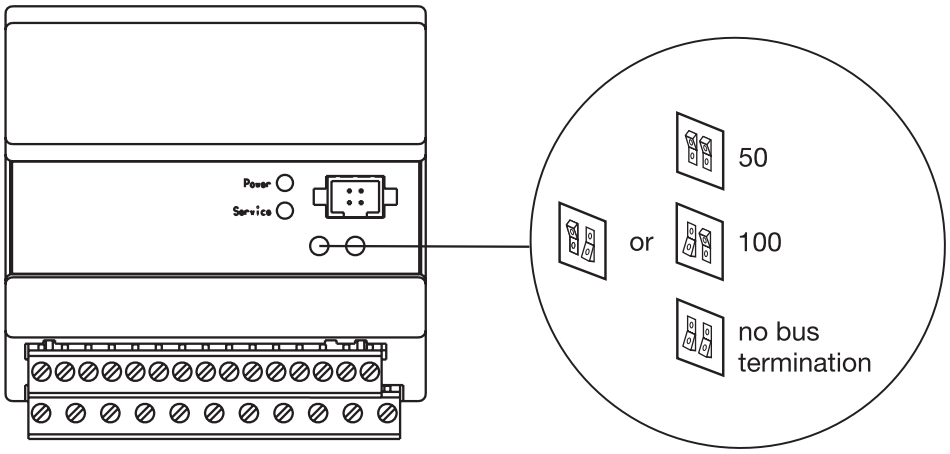


The termination resistance of any module must be set to 50Ω.

Chapter 3.3 “Setting the LON termination resistance”

3.3 Setting the LON termination resistance

mTRON modules



The switches for the termination resistance of the LON network are located on the front of the module, below the setup interface.

* Using a screwdriver, max. blade width 3mm, move both switches to the required position

switch position down: termination resistance is active (1)
switch position up: termination resistance is inactive (2)

Paperless recorder

The bus termination resistance (50Ω) of the recorder is activated through a wire link between pins 4 and 8 (see Chapter 3.1 “Connection diagram”)

3 Connecting the interface

4.1 Device info

Two function keys are available in the recorder menu *Device info,* which can be used for communication and service purposes.

"Wink" message

A "Wink" message causes all the connected mTRON modules to flash their service LEDs for 10 seconds at one second intervals (display "Wink received" on the operating unit 70.4035). This function enables the identification of mTRON modules which are not contacted by the recorder.

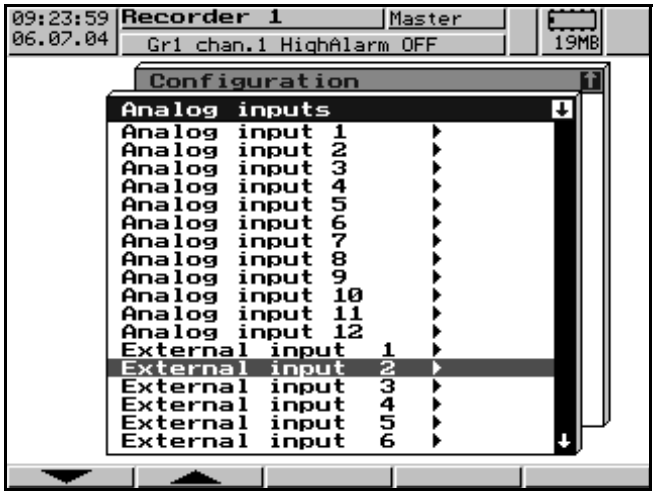
Independently of the "Wink" function, the service LED of an mTRON module flashes if a fault occurs in the module. The blink characteristics of the mTRON module are described in the corresponding installation instructions.

Service

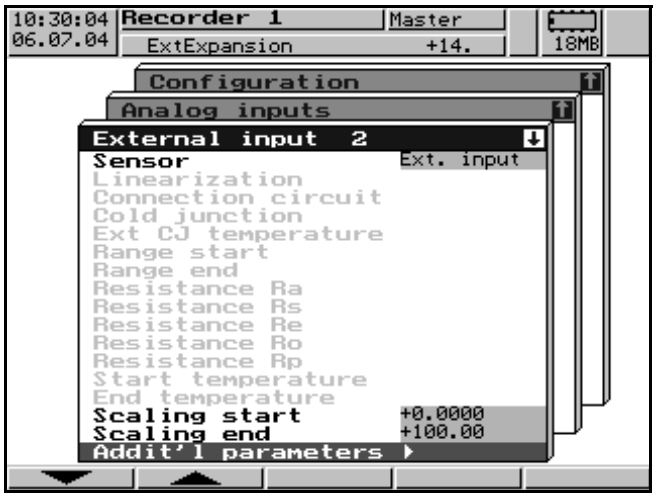
The "service-pin message" is only required with simultaneous use of the JUMO mTRON-iTOOL project design software. Using this function, the position of the recorder that is connected can be determined within iTOOL and reported ("joining").

4.2 External analog inputs

The external analog inputs which are connected are configured in the recorder menu *Configuration* ➔ *Analog inputs.* One of the menu entries “External input 1 — 24” or “External counter 1 — 2” has to be selected for this purpose.



After an external input has been selected, its configuration menu will appear on pressing the ENTER key.



Only the parameters “Scaling start”, “Scaling end” and the sub-menu “Additional parameters” are available here. All other parameters for the mTRON modules are either pre-configured ex-factory to customer specification, or have to be altered using the JUMO mTRON-iTOOL project design software. The parameters which are available are described in detail in the Operating Instructions B 70.6570.0

Sampling cycle The external analog inputs are registered by the recorder with a maximum delay of 1 second.

4.3 External logic inputs

The menu *Configuration* ➔ *Digital signal name* is available for the external logic inputs that are connected.

Ater selecting the menu entry “External input 1 — 6” and subsequently pressing the ENTER key, a character string can be entered that will identify the input. This identification is shown in different graphical representations on the recorder.

Sampling cycle The external logic inputs are registered by the recorder with a maximum delay of 1 second.

4.4 External counters

The two inputs (external counters 1 — 2) are a special feature. They are intended for connection to the counter outputs of two mTRON analog input modules. Each counter contains the result of a hardware pulse counter of the Neuron firmware for two cycles of the mTRON analog input module (one cycle = 420msec) and has 16 bit (without sign). Up to 65535 pulses in 840msec can be counted in this way.

The counters are configured via the menu *Configuration* ➔ *Control functions* ➔ *Counters*.

4 Operation and visualization

4.5 Group configuration

In the recorder menu *Configuration* ➔ *Grp configuration,* the inputs that are externally connected are assigned to recorder groups.

	Parameter	Value/selection	Explanation
Analog channels	Configuration ➔Grp configuration ➔ Group 1 — 6 ➔ Analog channels ➔ Analog channel 1 — 6 ➔ Input signal	Off, Analog inp1 — 12, Ext. inp. 1 —36, Counter 1, Counter 2 Ext. counter 1, Ext. counter 2	Assignment of the hardware inputs (internal and external) to the channels of the group
Digital channels	Configuration ➔Grp configuration ➔ Group 1 — 6 ➔ Digital channels ➔ Digital channel 1 — 3 ➔ Input signal	Off, Logic inp.1 — 7, Alarm gr.1 — 6, Comb. alarm, Logged in, Error, Modbus flag, Ext. Inp. 1 — 6, CF plugged in, Stolen CF, Int. mem. al./CF, Int. mem. al./ser, Mem. al. CF card	Assignment of the hardware inputs (internal and external), or of the signals generated by software, to the digital channels of the group.

5 JUMO mTRON-iTOOL project design software

This chapter contains all the information necessary to establish a connection between the paperless recorder and the mTRON modules, using the JUMO mTRON-ITOOL project design software.

The data between the recorder and the mTRON modules are exchanged via LON network variables (NVs) which are “bound” with the aid of the iTOOL project design software. The same conditions apply (bus transfer parameters) as for all mTRON modules. For further information, please refer to the mTRON system manual.

5.1 Establishing a network connection

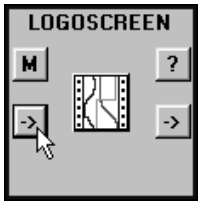
The setup interface of an mTRON module is used to provide the connection between the PC (iTOOL) and the mTRON modules. As long as a module is used for configuration purposes (setup connector plugged-in), it is not active. All the other mTRON modules continue to operate unchanged during configuration.

The setup interface of the recorder can **not** be used for this purpose; it is reserved for the setup program.

5.2 Input network-variables

Values and operating signals from other modules can be transferred to the recorder via the network through the input network-variables.

List of input network variables



Name	Type	Explanation
Bool_In01 . . . Bool_In06	logic	The “external logic inputs” of the recorder are provided via these variables. ⇨ Section 4.3 “External logic inputs”
Real_In01 . . . Real_In24	float value	The “external analog inputs” of the recorder are provided via these variables. ⇨ Section 4.2 “External analog inputs”
Counter_In01 Counter_In02	long	The “external counters” of the recorder are provided via these variables. ⇨ Section 4.4 “External counters”

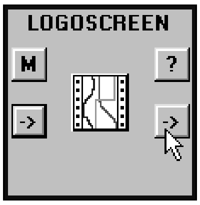
Transfer rate

All “bound” network variables are transferred within a maximum of one second.

5.3 Output network-variables

The internal analog and logic inputs, as well as the two counters of the recorder, can be transferred via the network to other modules, using the output network-variables. In conjunction with a logic module (70.4030), for example, eight measurement inputs can thus be logically linked.

List of output network-variables

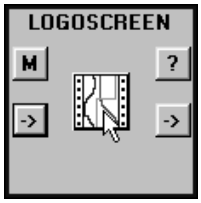


Name	Type	Explanation
Bool_Out01 . . . Bool_Out06	logic	The "internal logic inputs" of the recorder can be accessed via these variables.
Real_Out01 . . . Real_Out12	float value	The "internal analog inputs" of the recorder can be accessed via these variables.
Counter01 Counter02	float value	The "internal counters" of the recorder can be accessed via these variables.

Transfer rate All "bound" network variables are transferred within a maximum of one second.

5.4 Parameter setting

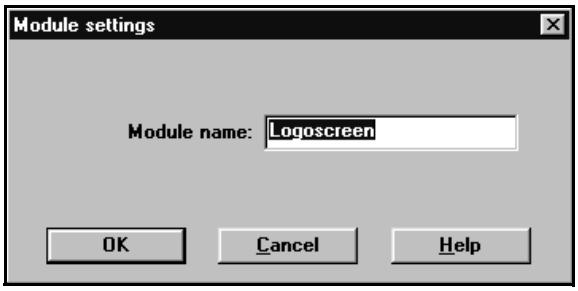
Basic menu



5.4.1 Module settings

A characteristic designation for the paperless recorder is provided here. Through assignment of a module name, for example, several recorders which are connected to the system can be differentiated more easily.

Setup dialog



Parameter

Parameter	Selection/settings	Explanation
Module name [16 characters]	LOGOSCREEN	Name of the module (16 characters)

■ = factory setting [ ] = short name in the operating unit

Further setup dialogs are not available for the recorder. All the other settings for the recorder have to be made either through its setup program, or from the instrument keys.

By assigning different module names, several recorders can be operated in one LON network.

5.5 mTRON modules

All available mTRON modules can be linked to the recorder.

5.5.1 mTRON operating unit

If an mTRON operating unit is connected to the LON network, it can be used to read all the network variables (except the input counter) at the “current module data” level.

5.5.2 Communications module

The communications module enables remote monitoring of the recorder and the mTRON modules. The addresses required for establishing a connection to the recorder using the communications module are described in the “JUMO mTRON communications module” system manual. All the network variables (except the input counter) of the recorder can be addressed.

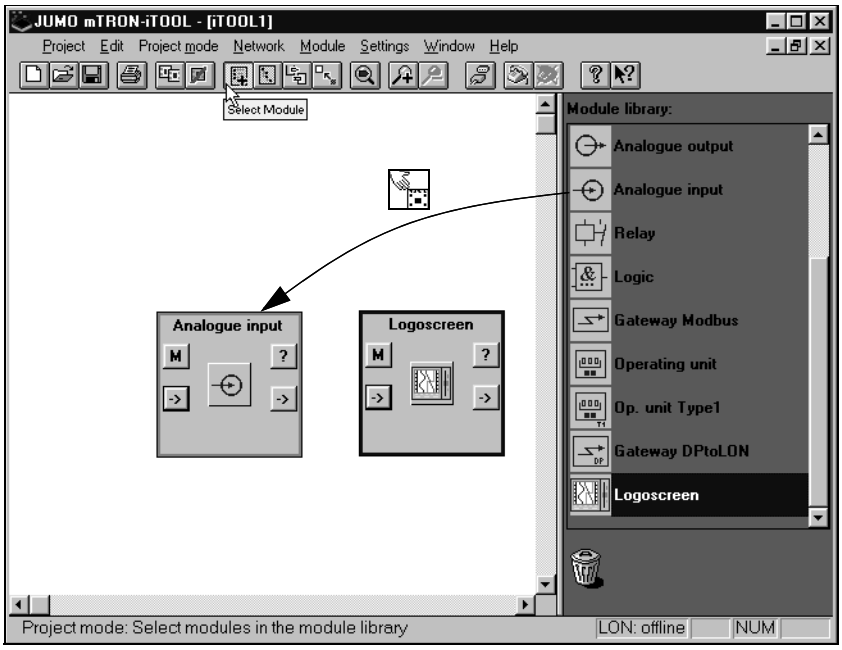
5.6 Project design example

The JUMO mTRON-iTOOL project design software must be used if no configured mTRON modules are available, or if these have to be reconfigured.

When operating the software it is essential to follow a defined path.

- Selection of the software module from the module library
- Configuration of the mTRON modules
- Binding of the input and output network variables
- Transfer of project to the modules (download)

Selection of the software modules

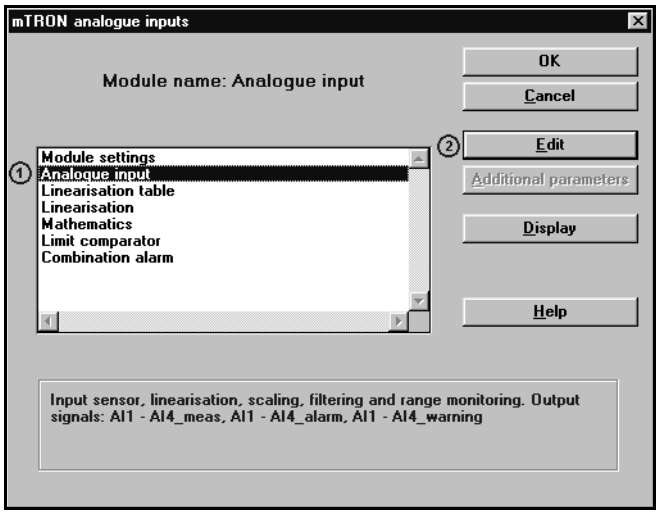


The modules available in the module library can be dragged into the working area by keeping the left mouse button pressed down (drag & drop). Each module can subsequently have a name assigned.

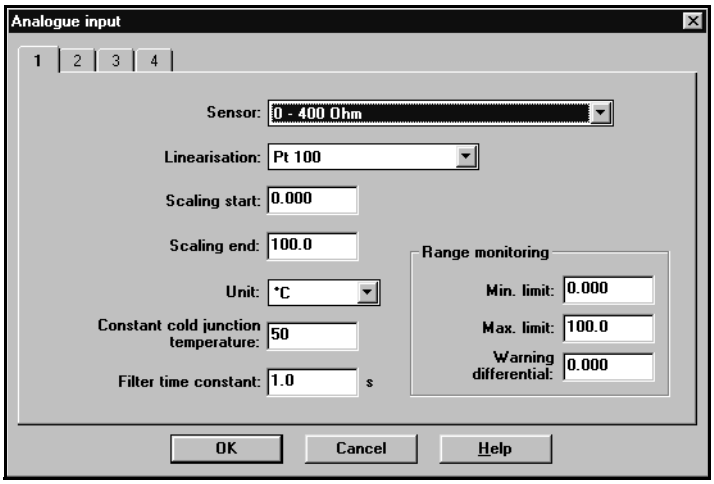
Configuring the mTRON modules

In order to connect a temperature probe to an mTRON module, this module has to be configured.

This is done by clicking on the button with the left mouse button. A dialog window appears in which first the entry *Analog input* (1) is selected, and then the Edit function (2) is called up.



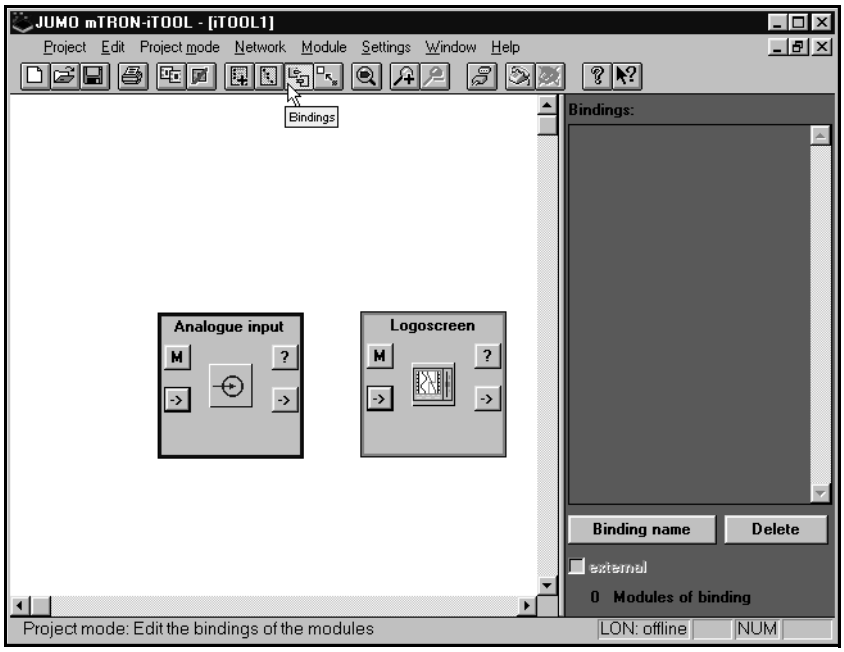
In the dialog window which now opens, the required input can be configured.



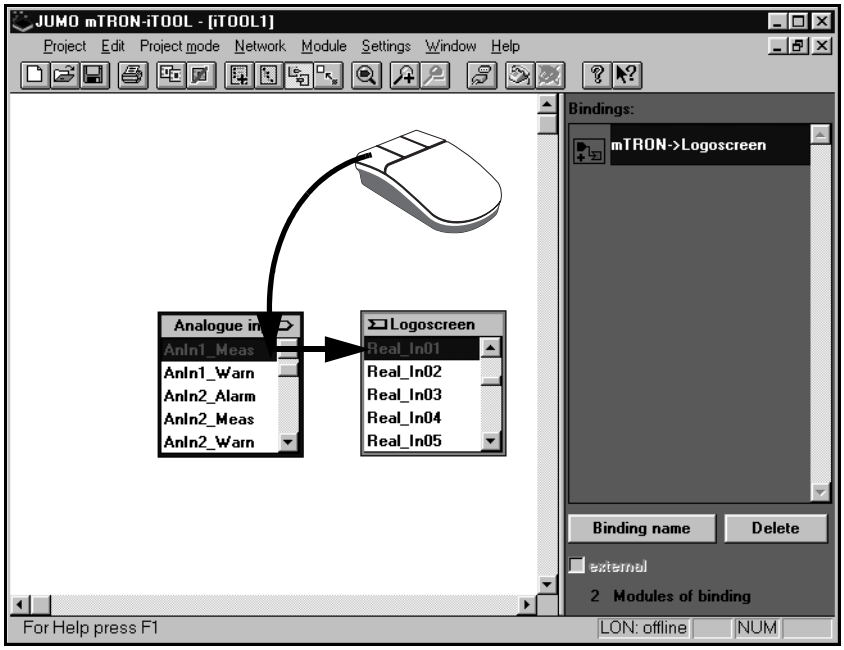
Confirm the entry by pressing the OK key.

Binding the network-variables

After the analog inputs have been successfully configured, the software inputs and outputs are selected. To do this, it is necessary to change to the “bindings” level.



Afterwards all available inputs/outputs are made visible on the screen using the buttons → (analog input) and → (LOGOSCREEN).



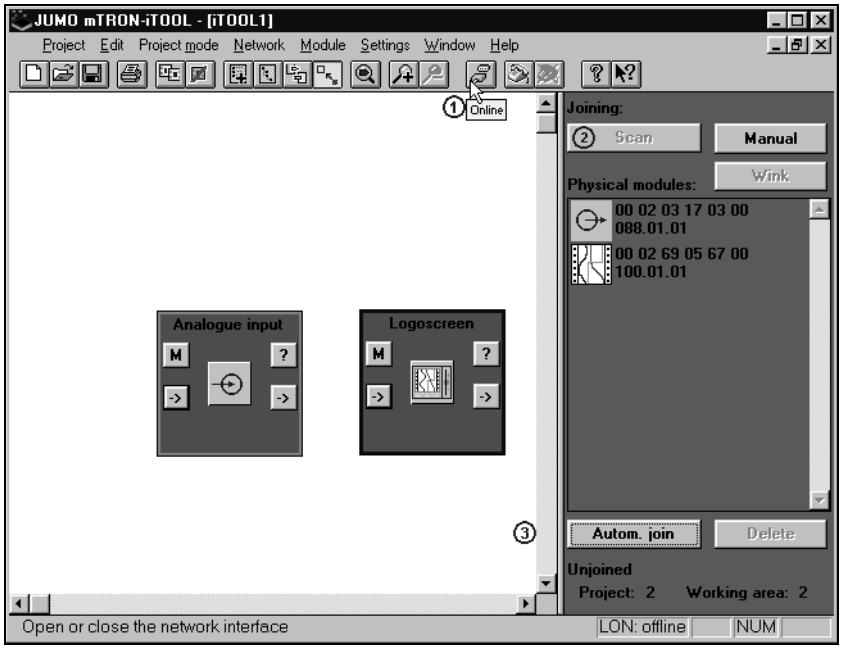
The bindings between input and output are made with the mouse (keep left mouse button pressed down). The binding can be identified by a name which can be selected.

☞ There are bindings that are not permitted (prohibition sign appears). It comes up, for instance, when an attempt is made to link analog network variables to logic ones.

5 JUMO mTRON-iTOOL project design software

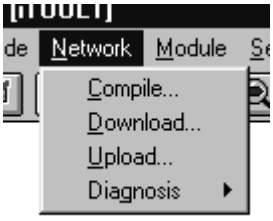
Transferring the project

The following steps have to be carried out before all settings can be transferred from the project design software to the recorder and the mTRON modules.



1. The button is used to establish the on-line connection to the modules.
2. Using the Scan button, all modules that are physically available are entered within the project design software.
3. The button Autom. join is used to assign the modules that are physically available to the software modules.

The project can now be transferred to the modules. The menu *Network* is available for this purpose.



A check has first to be carried out using the function *Network* ➔ *Compile.* Only when the check has been successfully completed, can the project be transferred to the individual modules with the aid of the *Network* ➔ *Download* function.

6.1 Response after a power failure

After the supply voltage has been restored and the subsequent initialization phase completed, all network-variables are reset to the correct values. The input and output counters continue to operate with the values present at the time of the power interruption.

6.2 Response on failure of mTRON module

When the recorder recognizes the failure of an mTRON module (within a maximum of 20 seconds after the failure) which provides values for its input network-variables, it triggers the “Error” event. Measurements are designated “no measurement” (display “-------”), counters are assigned the value 0 and logic inputs the value FALSE. In addition, the info symbol flashes and in the menu *Device info* ➔ *Error* the message “Ext. input” appears.

Within a maximum of 10 seconds after rectifying the error, the alarm should cease to be present within the recorder and the exchange of data should function again.

mTRON modules which have failed can only be recognized if there is at least one network-variable binding between them and the recorder.

6 Error handling

JUMO GmbH & Co. KG

Street address:
Moltkestraße 13 - 31
36039 Fulda, Germany
Delivery address:
Mackenrodtstraße 14
36039 Fulda, Germany
Postal address:
36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2TT, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO PROCESS CONTROL INC.

885 Fox Chase, Suite 103
Coatesville, PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
e-mail: info@JumoUSA.com
Internet: www.JumoUSA.com