migan MPB CAN

Large Format Numeric LED Display with CANopen Interface

User manual

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1 General

This 7 segment displays are designed for professional use. Depending on the type of device they are suitable for indoor or outdoor use.

The modular design allows for cost-effective models of various interfaces with different character heights and numbers of digits.

Change of the Controlling Protocol!

The displays use a new controlling protocol.

Due to the advanced possibilities, we recommend the use of this new option.
By default, the displays are already set to this new universal protocol.

For compatibility reasons, however, the “old” controlling can be activated by software (MKS).
For details, refer to chapter “Protocol Classic”.

2 Technical Information

Display type:	7 segment LED
Character heights:	Indoor use: 60 / 100 / 150 / 200 / 250 mm Outdoor use: 100 / 200 / 300 mm
Number of digits:	1...100
Number of lines:	Standard 1 line, multiple lines on request
Display colour:	Standard red, other colours on request
Operating voltage:	230 VAC / 50 Hz, 110 VAC / 60 Hz or 24 VDC ±20%
View:	Single sided to four sided
Interface:	CANopen (according to the specifications below)
Displayable characters:	see corresponding chapter
Labelling:	on request
Housing:	Industrial version, powder coated aluminum
Housing colour:	RAL 7016 (anthracite)
Mounting:	Articulated arm, angle bracket, hanging on chain or mounting frame
Protection:	see chapter “Device Configuration“
Operating temp.:	see chapter “Device Configuration“
Storage temp.:	-25 ... +70 °C

Interface Specifications

Interface:	CANopen per CIA standard DS301, V4.02
Bitrate:	10...1000 kBit/s (DIP switch)
Node ID:	1...127 (DIP switch)
PDOs:	1 receive PDO, 1 transmit PDO
PDO linking:	yes (COB IDs for utilised PDOs can be adjusted via SDO)
PDO mapping:	fixed
Node guarding:	yes
Heartbeat:	yes

2.1 Device Configuration

Itemnumber:_____

Type:
☐ for inside use ☐ for outside use

Character height:
☐ 60 mm ☐ 100 mm ☐ 150 mm ☐ 200 mm ☐ 250 mm ☐ 300 mm

Number of lines: _____ ***Number of digits per line***: _____

Display colour:
☐ red ☐ green ☐ yellow ☐ white ☐ blue

View:
☐ single sided ☐ double sided ☐ ____ sided

Operating voltage:
☐ 230 VAC / 50 Hz ☐ 110 VAC / 60 Hz ☐ 24 VDC

Protection:
☐ IP40 ☐ IP54 ☐ IP65 ☐ IP _____

Operating temperature:
with type for inside use:
☐ 0...+50 °C (standard)

with type for outside use:
☐ -20...+50 °C (standard)
☐ -25...+50 °C (optional with heating)

special version:
☐ _____°C

Housing dimensions: _____x_____x_____mm

Housing Material:
☐ Aluminum profile ☐ Stainless steel ☐ Sheet metal

CANopen Interface:
Factory settings:

Baud rate:
☐ 10 kBaud ☐ 20 kBaud ☐ 50 kBaud ☐ 125 kBaud
☐ 250 kBaud ☐ 500 kBaud ☐ 800 kBaud ☐ 1000 kBaud

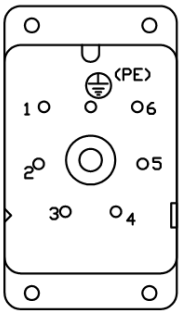
Device address (Node ID): _____Hex

Protocol (at delivery):
☐ Universal (standard)
☐ Classic

2.2 Connector Pin Assignments

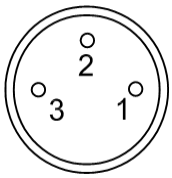
Please see inside labelling of the mating plug for pin assignment.

Power Connector 230 VAC



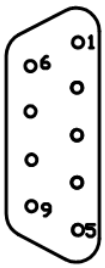
Pin	Assignment
1	L1
2	N
⏚ (PE)	PE

Power Connector 24 VDC (optional)



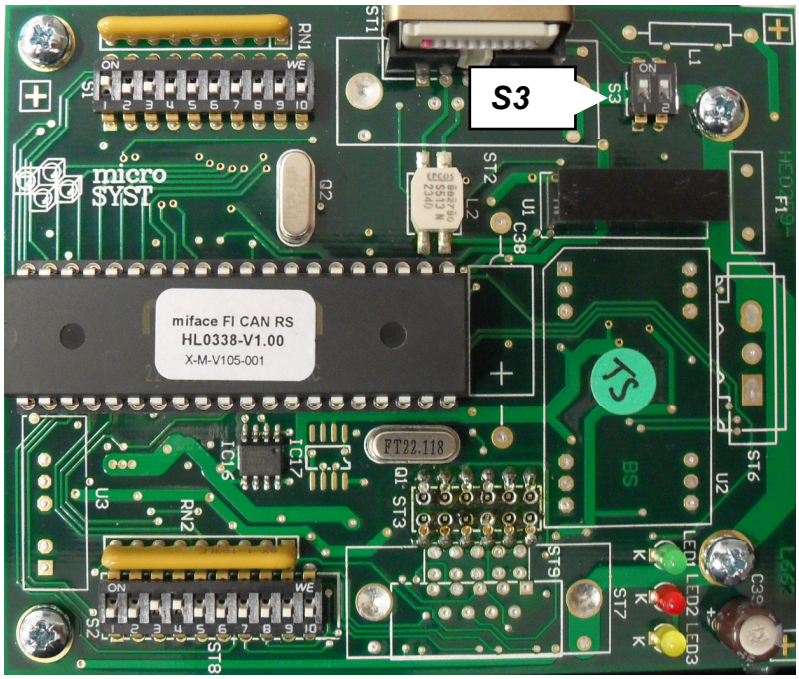
Pin	Assignment
1	GND
2	+24 VDC
3	PE

CAN



Pin	Assignment
1	
2	CAN_L
3	CAN_GND
4	
5	CAN_Shield
6	GND
7	CAN_H
8	
9	

2.3 Interface Settings (CAN)



Status LEDs

LED	Status
green (RUN)	Normal operation: blinking
red (RS/ERROR)	RS communication: flickering Error: ON
yellow (CAN)	CAN frame received or transmitted => 100 ms ON

DIP Switches

DIP switch settings are specified below (0 = OFF and 1 = ON).
DIP switch settings are read in once only during power-up (after switching the device on).

CAN Node ID (S1):

DIP							CAN Node-ID
7	6	5	4	3	2	1	
0	0	0	0	0	0	1	1_d
0	0	0	0	0	1	0	2_d
0	0	0	0	0	1	1	3_d
:							:
1	1	1	1	1	1	1	127_d

Note: Only addresses 1 through 127 are permissible!

CAN-Bitrate (S1):

DIP			CAN Bit Rate
10	9	8	
0	0	0	1000 kBit/s
0	0	1	800 kBit/s
0	1	0	500 kBit/s
0	1	1	250 kBit/s
1	0	0	125 kBit/s
1	0	1	50 kBit/s
1	1	0	20 kBit/s
1	1	1	10 kBit/s

CAN BusTermination (S3):

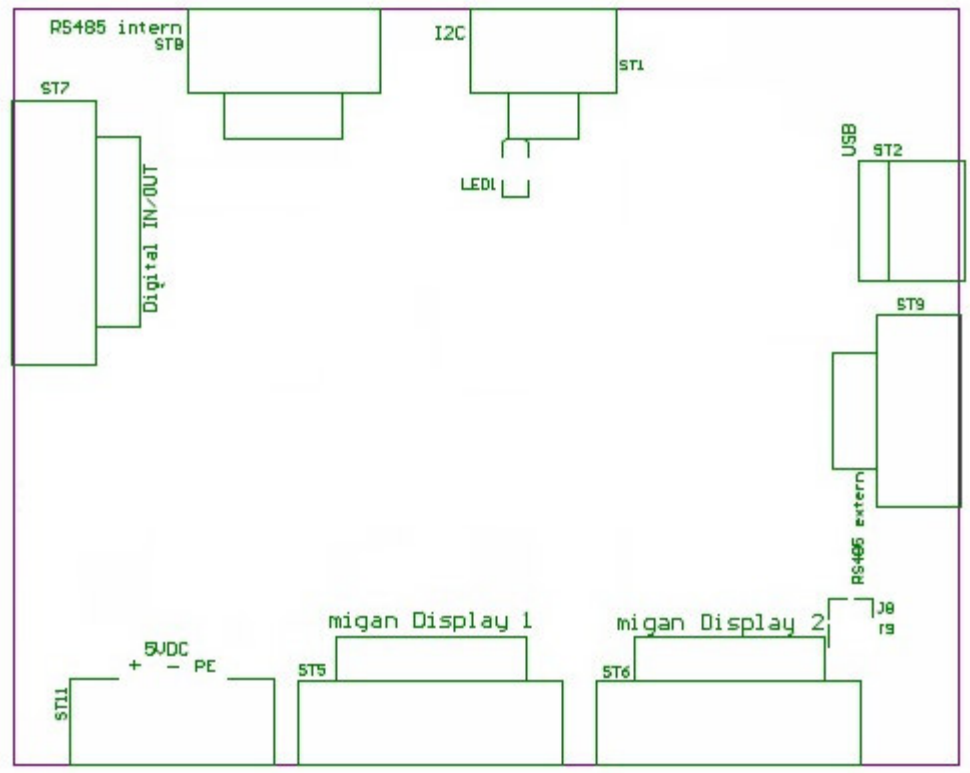
(has to be set, if the device is first or last device at the CAN bus)

DIP		CAN Bus Termination
1	2	
0	0	not set
1	1	set

RS Settings (S2):

Basic setting: DIP3 and DIP4 in position ON, remaining switches in position OFF.

2.4 Internal Settings



LED

LED	Function / Description	
LED 1 (green)	Power-up:	Blinks at a frequency of approx. 2,5 Hz
	Normal operation:	Blinks at a frequency of approx. 5 Hz
	Boot mode:	Blinks at a frequency of approx. 0,5 Hz
	Software upload:	Flickers during the upload
	Configuration:	
	Defective MKS:	Blinks with an Error Code: 1x

2.5 Device Start

- Segment test

3 CANopen Interface

3.1 CANopen Protocol

The interface is driven via the CANopen interface as defined in CIA DS301, V4.02 (CAN in Automation e.V., Erlangen, Germany).

The protocols integrated into the device are described briefly below.

3.1.1 NMT Frames

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
Start remote node	000 h	1	0 / node ID	-	-	-	-	-	-
Stop remote node	000 h	2	0 / node ID	-	-	-	-	-	-
Enter pre-operational state	000 h	128	0 / node ID	-	-	-	-	-	-
Reset node	000 h	129	0 / node ID	-	-	-	-	-	-
Reset communication	000 h	130	0 / node ID	-	-	-	-	-	-

All CANopen nodes are in one of the following operating states: “INITIALISATION”, “PRE-OPERATIONAL”, “OPERATIONAL” or “STOPPED”.

After power-up, the INITIALISATION state is executed and entries in the object index are set to their default values.

Either all communications-specific entries, or only those included in the object index (1000 h -1FFF h), can be reset to their default values at any time with the help of the “reset node” and “reset communication” commands.

The device then enters the “PRE-OPERATIONAL” state.

The device is switched to the OPERATIONAL state after issuing the “start remote node” command.

The device can be switched to the stopped state through use of the “stop remote node” command.

Return to the PRE-OPERATIONAL state is made possible with the “enter pre-operational state” command.

3.1.2 Nodeguard Frame

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
Receive	700 h + node ID RTR=1 DLC=1	-	-	-	-	-	-	-	-
Response	700 h + node ID RTR=0 DLC=1	128 x toggle bit (0 or 1) + current operating state: 4: STOPPED 5: OPERATIONAL 127: PRE-OPERATIONAL	-	-	-	-	-	-	-

The “nodeguard” frame may only be used when “heartbeat” is inactive (“producer heartbeat time” = object 1017 h = 0).

When “life-guarding” is activated (“guard time” = object 100C h > 0 and “life time factor” = object 100D h > 0), a timer is started each time a nodeguard request occurs, which automatically switches the device to the PRE-OPERATIONAL state after “life time” has elapsed (“guard time” x “life time factor” ms), if the next nodeguard request is not received on time.

3.1.3 Heartbeat Frame

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
Response	700 h + node ID RTR=0 DLC=1	Current operating state: 0: BOOTUP 4: STOPPED 5: OPERATIONAL 127: PRE-OPERATIONAL	-	-	-	-	-	-	-

The “boot-up” frame is transmitted after the device is switched on (operating state = “BOOTUP”).

After selecting the setting “producer heartbeat time” = object 1017 h (unit of measure: ms), the device starts transmitting the heartbeat frame in a cyclical fashion.

3.1.4 SDO Frames

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
"Initiate download request"	600 h+ node ID	22 h or 23 h + *	Index - LOW	Index - HIGH	Subindex	D0 (LSB)	D1	D2	D3 (MSB)
"Initiate download response"	580 h+ node ID	60 h	Index - LOW	Index - HIGH	Subindex	0	0	0	0
"Initiate upload request"	600 h+ node ID	40 h	Index - LOW	Index - HIGH	Subindex	0	0	0	0
"Initiate upload response"	580 h+ node ID	43 h+ *	Index - LOW	Index - HIGH	Subindex	D0 (LSB)	D1	D2	D3 (MSB)
"Abort domain transfer" (receive SDO)	600 h+ node ID	80 h	Index - LOW	Index - HIGH	Subindex	Additional code	0	Error code	Error class
"Abort domain transfer" (send SDO)	580 h+ node ID	80 h	Index - LOW	Index - HIGH	Subindex	Additional code	0	Error code	Error class

* 4 times "number of unused data bytes"

The object index of all CANopen nodes can be accessed with the help of the SDO frame.

3.1.5 Receive PDO Frame

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
RPDO1	200 h + node ID	send data 1	send data 2	send data 3	send data 4	send data 5	send data 6	send data 7	send data 8

RPDO1 is mapped to object 2000 h, subindex 1 through 8.
RPDO1 must be transmitted to the interface (repeatedly), in order to generate a complete frame.

3.1.6 Transmit PDO Frame

	COB ID	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8
TPDO1	180 h + node ID	RS receive data 1	RS receive data 2	RS receive data 3	RS receive data 4	RS receive data 5	RS receive data 6	RS receive data 7	RS receive data 8

TPDO1 is mapped to object 2001h, subindex 1 through 8.
TPDO1 is received as an answer, after a valid frame has been sent.

3.2 Notes for CAN Controlling

Before data can be sent to the display, CANopen state “OPERATIONAL” must be activated. After that, data are transmitted with the help of RPDO1 in the form of sub-frames. Please notice that at the first sub-frame the toggle bit = 1. After data evaluation, the display answers with TPDO1 (here, first toggle bit = 1 too).

Important:

The device must be already connected to an active CAN bus at power-on! Otherwise a CAN error happens at sending the bootup message and it is not possible to change (immediately) to „OPERATIONAL“!

If it can not be assured that there exists at least one other active CAN bus member (f.e. the PLC) at power-on, then the following startup procedure for the CAN-device is recommended (example for node-ID=1):

a) Send "NMT, Start remote node":
TX: ID=000, LEN=2, RTR=0, DATA=01 01

b) Request the "Nodeguard Frame":
TX: ID=701, LEN=1, RTR=1
RX: ID=701, LEN=1, RTR=0, DATA=05/85 or 7F/FF

c) If DATA=7F/FF (=> still PRE-OPERATIONAL, red ERROR-LED is ON)
- Repeat step b) 40 times (=> red ERROR-LED goes OFF)
- Do step a) again (=> node starts successful now)

3.3 Transmit Frame (CAN -> migan)

Receive PDO 1 (object 2000_h, subindex 1 through 8)

Byte	Function	
1	Function byte: • Bit 7: end bit • Bit 6 = 0 • Bit 5 = 0 • Bit 4: toggle bit • Bit 3 = 0 • Bits 2...0: sub-frame length	
2	Sub-frame byte 1	See chapter "Control Frame (Display Output)"
3	Sub-frame byte 2	
4	Sub-frame byte 3	
5	Sub-frame byte 4	
6	Sub-frame byte 5	
7	Sub-frame byte 6	
8	Sub-frame byte 7	

Toggle Bit:
Each time the toggle bit is changed, the current sub-frame is added to the end of the transmit buffer.

End Bit:

= 0: Sub-frames are accumulated.

= 1: Accumulated sub-frames are transmitted (including the sub-frame which has just been transferred if the toggle bit has also been changed).

The transmit buffer is cleared after transmission has been completed (in order to be able to store new sub-frames), and the end bit is set to 0 (in order to be able to detect the end of the transmit procedure via SDO).

Sub-Frame Length:
Length of the transferred sub-frame

Sub-Frame Bytes:
They are added to the end of the frame which has already been transferred to the transmit buffer when the toggle bit is changed.

Procedure at the CANopen Side for Transmitting a Frame:

1. Break down the control frame into sub-frames of max. 7 bytes each.

2. Transfer the sub-frames to the display.

   - Prepare the contents of the PDO to be transmitted:
     - Enter frame bytes of the sub-frame to be transmitted to PDO bytes 2 through max. 8.
     - PDO byte 1:
       - Enter “sub-frame length” (1 to 7).
       - Change the “toggle bit”.
       - Set the “end bit” to 1, if no additional sub-frame needs to be transmitted.
   - Transmit the PDO.
   - Wait until the PDO has been transmitted.
   - Wait additional 5 ms.
   - Repeat the last 4 steps until all sub-frames have been transferred.

3. Wait for the answer (TPDO1).

3.4 Receive Frame (migan -> CAN)

After evaluation of the control frame, the display responds with following Transmit PDO:

Transmit-PDO 1 (Objekt 2001_h, Subindex 1 bis 8)

Byte	Function	
1	Function byte: • Bit 7: = 1 • Bit 6 = 0 • Bit 5 = 0 • Bit 4: toggle bit • Bit 3 = 0 • Bits 2...0: frame length	
2	Response frame byte 1	See chapter "Response Frame"
3	Response frame byte 2	
4	Response frame byte 3	
5	Response frame byte 4	
6	Response frame byte 5	
7	Response frame byte 6	
8	Response frame byte 7	

Toggle Bit:
Changes with every received response frame

Frame Length:
Length of the current transferred response frame

Response Frame Bytes:
According to chapter "Response Frame"

3.5 Controlling Example

For details see chapter “Control Data”.
The use of the protocol “universal” is required (standard, see chapter “General”).
All values are written in hexadecimal notation.

Requirements:
- CANopen node ID: 01
- Display with 3 digits
- Show value “1.23”
- Data type: unsigned CHAR

- Initialise the node (if it is not yet “OPERATIONAL”):
  Transmit NMT frame (COB ID = 000_h):

  01 01

- Transmit RPDO1 frame (COB-ID = 201_h), last toggle bit was 0.

```
17 01 06 00 30 80 00 7B
  \/ \/ \_________/ \/
  | |     |     |
  | LEN    O1…O4  “123”
  |
 ADR
```

- Wait at least 5 ms.

- Transmit RPDO1 frame (COB-ID = 201_h):

```
81 55 00 00 00 00 00 00
  \/
  |
 CHK
```

- Receive TPDO1 frame (COB-ID = 181_h), last toggle bit was 0:

```
94 01 02 00 55 00 00 00
```

Note

At start-up, the device must already be connected to an active CAN bus.
Else, a CAN error would appear with transmission of the Boot-Up-Message.

See chapter 3.2!

4 Control Data

Following chapters describe the current controlling with the protocol “universal” (see also chapter “General”).

4.1 Control Frame (Display Output)

ADR	LEN	O1
Device address	Number of following bytes (from O1 to CHK)	Options
01_H	06_H ... n	Bit 7: report software version* Bit 6: 0 = Statically display the last received data (standard) 1 = Display “----“, if no new data is received within 5 s. Bits 5...4: Brightness 00 = 100% 01 = 80% 10 = 60% 11 = 40% Bit 3 = Digital output 4 Bit 2 = Digital output 3 Bit 1 = Digital output 2 Bit 0 = Digital output 1 Output will be set, if corresponding bit = 1

* at communication with response frame

O2
Output format
Bits 7...4: Physical number of digits (bit coded) 0001...1111 = 1...15 digits 0000 = ASCII representation with up to 40 digits Bit 3: Mode 0 = LSB first 1 = MSB first Bits 2...0: Data type* — max. number of digits 000 = unsigned CHAR (0...255) — 3 001 = unsigned INT (0...65535) — 5 010 = unsigned LONG (0...4294967296) — 10 011 = signed CHAR (-128...127) — 4 100 = signed INT (-32768...32767) — 6 101 = signed LONG (-2147483648... 2147483647) — 11 110 = ASCII representation — 40 111 = reserved * at value representation: right-aligned display at ASCII representation: left-aligned display

O3	O4
Decimal points	Decimal points, blinking
Bit 7 = Point for digit 1 Bit 6 = Point for digit 2 Bit 5 = Point for digit 3 Bit 4 = Point for digit 4 Bit 3 = Point for digit 5 Bit 2 = Point for digit 6 Bit 1 = Point for digit 7 Bit 0 = Point for digit 8	Bit 7 = Point for digit 9 Bit 6 = Point for digit 10 Bit 5 = Point for digit 11 Bit 4 = Point for digit 12 Bit 3 = Point for digit 13 Bit 2 = Point for digit 14 Bit 1 = Point for digit 15 Bit 0 = Display blinks

A point is set, if corresponding bit = 1

D1…Dn	CHK
Data bytes (value- or ASCII representation)	Checksum
Value representation: CHAR value: 1 byte INT value: 2 bytes LONG value: 4 bytes ASCII representation (max. 80 bytes): 1 byte per character, max. 40 digits, Bit 7 = 1: digit blinks The decimal point has character code $2C_H$ or $2E_H$ and is always set at the previous digit.	depending on S4-DIP5: standard: 55_H (fixed value) **or** LOW byte of the sum of all previous bytes (ADR...Dn)

Controlling devices with multiple display areas (e.g. 2 lines):
The partition from O2…Dn is used repeatedly according to the number of display areas (see example 3).
Please attend to the maximum total frame length of 150 bytes.

Example 1:
Display with 4 digits, device address 1, unsigned INT (LSB first), brightness = 60%, display value = 1.23

01 07 20 41 40 00 7B 00 55

Example 2:
Display with 4 digits, device address 1, ASCII representation, brightness = 60%, display value = 12.34

01 0A 20 46 00 00 31 32 2E 33 34 55

Example 3:
Display with 2 lines and 4 digits per line, device address 1, unsigned INT (LSB first),
display value for line 1 = 1.23,
display value for line 2 = 5.67

01 0C 00 41 40 00 7B 00 41 40 00 37 02 55
_____/_____/
Line 1 (O2...D2) Line 2 (O2...D2)

4.2 Response Frame

Digital inputs are optionally available (depending on display type).

ADR	LEN	I1	CHK
Device address	Length	Digital Input	Checksum
01_H	02_H	Bit 7 = Event digital input 4 Bit 6 = Event digital input 3 Bit 5 = Event digital input 2 Bit 4 = Event digital input 1 Bit 3 = Status digital input 4 Bit 2 = Status digital input 3 Bit 1 = Status digital input 2 Bit 0 = Status digital input 1	depending on S4-DIP5: standard: 55_H (fixed value) **or** LOW byte of the sum of all previous bytes (ADR + LEN + I1)

Event of a digital input = 1, if it has been set at least once since the last query (f.e. with a button). The event is deleted after every query.

Status of a digital input = 1, if it's set at the moment.

Example

Digital input 3 is set

01 02 04 55

5 Appendix

5.1 Displayable characters

The data bytes are ASCII coded:

Lower / Higher	0	1	2	3	4	5	6	7
0			“Blank”	0		P		p
1				1	A	q	A	q
2				2	b	r	b	r
3				3	c	S	c	S
4				4	d	t	d	t
5				5	E	u	E	u
6				6	F		F	
7				7	G		G	
8			[	8	H		H	
9			]	9	I	y	I	y
A					J		J	
B								
C					L		L	
D			–					
E					n		n	
F					o	_	o	

5.2 Protocol “Classic” (Previous Version)

Basically, we recommend the current controlling which is described in the chapter “Control Data”.

For compatibility reasons with already delivered devices, the previous protocol and inteface properties are still integrated and can be activated by software (MKS).

Display Output

STX	ADRH*	ADRL*
Start of transmission	Device address HIGH	Device address LOW
$3C_H$ (or 02_H)	30_H	31_H

P1	P2	P3
Point byte 1	Point byte 2	Point byte 3
Bits 7...5 = 010 Bit 4 = Point for digit 1 Bit 3 = Point for digit 2 Bit 2 = Point for digit 3 Bit 1 = Point for digit 4 Bit 0 = Point for digit 5	Bits 7...5 = 010 Bit 4 = Point for digit 6 Bit 3 = Point for digit 7 Bit 2 = Point for digit 8 Bit 1 = Point for digit 9 Bit 0 = Point for digit 10	Bits 7...5 = 010 Bit 4 = Point for digit 11 Bit 3 = Point for digit 12 Bit 2 = Point for digit 13 Bit 1 = Point for digit 14 Bit 0 = Point for digit 15
To display a point, the corresponding bit must be set.		

D1...Dn	ETX
Data bytes	End of transmission
One byte per character to be displayed; ASCII coded Bit 7 = 1: Digit blinks = 0: Digits is shown statically The decimal point has character code $2C_H$ or $2E_H$ and is set at the former digit each. Writing direction is from the left to the right.	$3E_H$ if STX = $3C_H$ (03_H if STX = 02_H)

Example 1
Display “1.23“, decimal point is controlled via the point bytes
3C 30 31 50 40 40 31 32 33 3E

Example 2
Display “1.23“, decimal point as ASCII character via the data bytes
3C 30 31 40 40 40 31 2E 32 33 3E

Digital Outputs, Brightness

Digital outputs are optionally available (depending on display type).
The display content is not changed after this frame.

STX	ADRH	ADRL
Start of transmission	Device address HIGH	Device address LOW
$3C_H$ (or 02_H)	30_H	31_H

O1	O2	O3	ETX
Digital outputs	Brightness	reserved	End of transmission
Bits 7...4 = 0110 Bit 3 = Digital output 4 Bit 2 = Digital output 3 Bit 1 = Digital output 2 Bit 0 = Digital output 1 Output will be set, if corresponding bit = 1	Bits 7...4 = 0110 Bit 3: report software version* Bit 2 = 0 Bits 1, 0: Brightness 00 = 100% 01 = 80% 10 = 60% 11 = 40%	60_H	$3E_H$ if STX = $3C_H$ (03_H if STX = 02_H)

* at communication with response frame

Example
Set digital output 2, brightness = 80 %

3C 30 31 62 61 60 3E

Response Frame

The response frame can be activated with a DIP switch.
Digital inputs are optionally available (depending on display type).

STX	ADRH	ADRL
Start of transmission	Device address HIGH	Device address LOW
$3C_H$ (or 02_H) = STX from the control protocol	30_H	31_H

I1	I2	I3	ETX
Status of digital inputs	**Events** of digital inputs	reserved	End of transmission
Bits 7...4 = 0100 Bit 3 = Digital input 4 Bit 2 = Digital input 3 Bit 1 = Digital input 2 Bit 0 = Digital input 1	Bits 7...4 = 0100 Bit 3 = Digital input 4 Bit 2 = Digital input 3 Bit 1 = Digital input 2 Bit 0 = Digital input 1	40_H	$3E_H$ (oder 03_H) = ETX from the control protocol

Status of a digital input = 1, if it's set at the moment.

Event of a digital input = 1, if it has been set at least once since the last query (f.e. with a button). The event is deleted after every query.

Example
Digital input 4 was set at least once since last query

3C 30 31 40 48 40 3E

5.3 General notes

Please observe the following instructions:

- When installing the device, always make sure that the installed housing can be opened for adjustment or maintenance work. When attaching the device, leave an appropriate space on the back / front / top to ensure adequate ventilation (if available).
- Direct exposure to light sources or direct sun rays reduces the reading quality.
- Turn the device off for cleaning.
- Protect the device from excessive moisture, strong vibrations, direct sun exposure and extreme temperatures. If this is not observed, it can cause function problems or device destruction. In addition, there is the danger of electric shock, fire or explosion. Please refer to "Technical Information" chapter for detailed information regarding proper ambient conditions, especially recommended temperature ranges.
- The device may not be used if there is any damage on the device and / or power line.
- Do not attempt to repair the device yourself. Any interference by unauthorized personnel will void the warranty.

5.4 Declaration of Conformity

EU-Konformitätserklärung

EU Declaration of Conformity

Produktbezeichnung: migan
Product name:

Typenreihe: migan CAN
Type code:

Hersteller: microSYST Systemelectronic GmbH
Manufacturer: Am Gewerbepark 11
92670 Windischeschenbach

Das bezeichnete Produkt stimmt mit der folgenden Europäischen Richtlinie überein: *We herewith confirm that the above mentioned product meets the requirements of the following standard:*		**Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der angewandten Richtlinie(n) wird nachgewiesen durch die Einhaltung folgender Normen / Vorschriften:** *The conformity of the product described above with the provisions of the applied Directive(s) is demonstrated by compliance with the following standards / regulations:*
Richtlinien / *Directives*		**Europäische Norm** / *Standard*
EMV Richtlinie *EMC Directive*	**2014/30/EU**	EN61000-6-2:2005
		EN61000-6-4:2007 +A1:2011
Niederspannungs-Richtlinie *Low Voltage Directive*	**2014/35/EU**	EN IEC 62368-1:2021-05
RoHS Richtlinie *RoHS Directive*	**2011/65/EU**	EN50581:2012

Windischeschenbach, 05.05.2021

Manuel Raß

Geschäftsführer / *General Manager*

5.5 Warranty / Liability

For the product, liability is assumed for defects, which existed at the delivery date according to our General Terms and Conditions.

Technically changes as well as errors are excepted. A claim for delivery of a new product does not exist. The buyer has to check the received product immediately and indicate evident defects at the latest 24 hours after detection. Non-observance of notification requirements is equated with acceptance of the defect. Not immediately visible defects have to be indicated immediately after their perception too.

Generally, defects and their symptoms must be described as accurately as possible in order to allow for reproducibility and elimination. The buyer must provide for access to the relevant device and all required and/or useful information at no charge and must make all of the required data and machine time available free of charge.

The guarantee does not cover defects, which result from non-observance of the prescribed conditions of use, or from improper handling.

If the device has been placed at the disposal of the buyer for test purposes and has been purchased subsequent to such testing, both parties agree that the product is to be considered “used” and that it has been purchased “as is”. No guarantee claims may be made in such cases.

The General Terms and Conditions of microSYST Systemelectronic GmbH in current version apply as well.

5.6 Versions overview

Version	Date	Remarks, Description
1.00	19.12.13	Document created, based on X-M32-BSXX6X-001: Modifications for migan 2
1.10	22.01.14	migan 2 -> migan
1.20	30.10.14	Basic setting of interface switch S2
1.30	27.04.16	Declaration of conformity
2.00	15.11.16	migan2 ➔ migan MPB
2.10	13.11.17	Change of address and title MPB
2.20	18.04.18	Important notes to device startup
2.30	05.05.21	Declaration of conformity

Certified per **DIN EN ISO 9001**.