Technical description

for alphanumerical displays

with profibus-DP

series SZLx and MZLx

software (MP1023)

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Technical description for alphanumerical displays with profibus series SZLx and MZLx software (MP1023)

Content list

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1. Start-up the display

a) Supply the display with voltage
(Assignment see data sheet point St.0)

The display makes a self test. At first the display confirms the supply with voltage with “OK”. Than i information about the current interface adjustments will be displayed.

e. g.:

adr.: 1 → field: 1 → baud: 9600 → sio: 8/N/1 → MP: 1023

adr.:	=	shows the adjusted address of the display
field:	=	shows the number of the adjusted fields
baud:	=	shows the adjusted transmission rate
sio:	=	shows the adjusted transmission parameter
MP:	=	shows the number of the software used in the display

This information runs through the display in the above mentioned sequence and has to be checked.

b) Create profibus connection
(Assignment see data sheet point St.0)

c) Send data telegram to the display as described

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2. Control the display

2.1 Transmission principle

For the transmission of the data are 16 data output- and 16 data input bytes (byte 0 toe byte 15) or 16 data output- and 16 data input words (word 0 to word 15) available.

Data output bytes (send from SPS/PC to the display):

byte 0	send release	(80 hex or 00 hex possible)
byte 1	telegram byte	(1 sign)
byte 2	telegram byte	(1 sign)
:		
:		
byte 15	telegram byte	(1 sign)

or

word 0	send release	(1. byte 80 hex or 00 hex possible, 2. byte 1 sign)
word 1	telegram byte	(2 sign)
word 2	telegram byte	(2 sign)
:		
:		
word 15	telegram byte	(2 sign)

Byte 0 is reserved for the send release. If in byte 0 the bit 7 (MSB) changes the condition, it will be taken over the inputted data (byte 1 to byte n, max. 2) by the display. (Change from 00 hex to 80 hex or in opposite).

funktion principle: First input the telegram data in byte 1 to byte n,
than inverte in byte 0 the bit 7 (MSB).
(Change from 80 hex or in opposite)

hint: It has to be sent all signs (also start- and stop sign)
to the display according to the command telegram.

So it is possible to sent to the display up to 31 telegram bytes (signs) at the same time.

If 31 bytes are not enough for a whole telegram, will be send after the first 31 bytes the next 31 bytes of the data telegram. (Transmit telegram in blocks). This process will be repeat as long as the stop sign (last telegram byte) has been reached. The eventually not assigned telegram bytes in the last block has to be filled up with 00hex.

The function principle is any time the same:

First input the telegram data (byte 1 to byte n), than inverte in byte 0 the bit 7 (MSB),
(change byte 0 from 80 hex to 00 hex or in opposite).

ident-No.: 3104 hex
kind of protocol: DP protocol

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2. Control the display

data input bytes (send from display to SPS / PC)

byte 0	block – quitting	(80 hex or 00 hex possible)
byte 1	telegram byte	(00 hex)
byte 2	telegram byte	(00 hex)
.	.	.
.	.	.
byte 15	telegram byte	(00 hex)

Every sent block will be confirmed through a invertation of bit 7 (MSB) from byte 0 (quitting). (Change from 00 hex to 80 hex or in opposite). Only than the output bytes may be changed. If in a block of the command telegram will be transmitted "CR", it will be inverted for indication of the answer telegram the bit 6 in the data input byte 0.

Command telegram: (send form SPS/PC to the display)

start sign/line/command/kind of representation/display data 1 ... display data n/stop sign

start sign:	„ESC“	=	1Bhex
line:	„0“ to „O“	=	30hex to 4Fhex (line 1 = 30hex, line 2 = 31hex and so on)
command:	„A“	=	41hex – online operation
kind of representation:	„0“	=	30hex – standing type
	„1“	=	31hex – blinking type 1 (slow)
	„2“	=	32hex – blinking type 2
	„3“	=	33hex – blinking type 3
	„4“	=	34hex – blinking type 4 (fast)
	„5“	=	35hex – running type
	:		
	:		
	(further kind of representation see at point 3.1 „data format generally)		
option sign:	"ACK"	=	06h field number recognition
	"BEL"	=	07h clock_1 to clock_13
	"BS"	=	08h variables_text_2
	"HT"	=	09h variables_text_1
display data:	„ “ to „DEL“	=	20hex to 7Fhex
variables:	" " to "ÿ"	=	20h to FFh
check sum recognition:	"ETX"	=	03h
check sum:	"0" to "o"	=	30h to 6Fh
stop sign:	„CR“	=	0Dhex

answer telegram (receive from the display):

start sign:	„ESC“	=	1Bhex
device- or line address:	„0“ to „O“	=	30hex to 4Fhex
fault recognition:	„0“ to „I“	=	30hex to 49hex
stop sign:	„CR“	=	0Dhex

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2. Control of the display

2.2 Example with 8 byte input/output:

Control the display with the text „WIBOND“ in standing type.
telegram <ESC> 1 A 0 W I B O N D <CR> will be send to the display.

data output bytes (send from SPS/PC to the display)

byte 0	80 hex	change from 00 hex to 80 hex (only if in byte 1 to byte 7 the telegram data had been inputted!)
byte 1	1B hex	<ESC> (start sign)
byte 2	30 hex	line 1 (address of the text display)
byte 3	41 hex	online command
byte 4	30 hex	standing type
byte 5	57 hex	„W“
byte 6	49 hex	„I“
byte 7	42 hex	„B“

block 1 (first part of the telegram) has been sent to the display.

data input bytes (send from display to SPS / PC):

byte 0	80 hex	form 00 hex to 80 hex (only if the first block has been received successfully)
byte 1	00 hex	
byte 2	00 hex	no answer telegram = 00hex
:	:	
byte 7	00 hex	

Receipt of block 1 has been confirmed.

data output bytes (send form SPS/PC to display):

byte 0	00 hex	change from 00 hex to 80 hex (only if in byte 1 to byte 7 the telegram data had been inputted!)
byte 1	4F hex	„O“
byte 2	4E hex	„N“
byte 3	44 hex	„D“
byte 4	0D hex	<CR> (stop sign)
byte 5	00 hex	The remaining fields
byte 6	00 hex	has to be filled up
byte 7	00 hex	with 00 hex.

block 2 (second and last part) has been sent to the display.

data input bytes (receive from the display):

byte 0	40hex	bit 6 and 7 changes from 00hex to 40hex (if the previous block had been received successfully!)
byte 1	1Bhex	<ESC> (start sign)
byte 2	30hex	line 1 (address of the text display)
byte 3	30hex	fault code „all OK“
byte 4	0Dhex	<CR> (stop sign)
:	:	
byte 7	00hex	

Receive of block 2 had been confirmed.
End of telegram transfer.

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3. Data format

3.1 Data format generally

command:
start sign address mode (kind of representation option sign data variables check sum recognition check sum) stop sign

start sign	"ESC"	=	1Bh	
address	"0" to "o"	=	30h to 6Fh	(64 different addresses)
modue	"A"	=	41h	online operation
	"B"	=	42h	delete of the text storage
	"C"	=	43h	program the text storage
	"D"	=	44h	text call-up with stored adjustments
	"E"	=	45h	colour data for the sign
	"F"	=	46h	adjust number of line and field mask definition
	"G"	=	47h	adjust font
	"H"	=	48h	text call-up with current adjustments
	"I"	=	49h	state call-up
	"J"	=	4Ah	set the clock
	"K"	=	4Bh	call-up clock
	"L"	=	4Ch	gong telegram
	"M"	=	4Dh	adjust gong setup
	"N"	=	4Eh	adjust country reconition for character set
	"O"	=	4Fh	alternating text call-up with stored adjustments
	"P"	=	50h	alternating text call-up with current adjustments
kind of representation - text mode	"/"	=	2Fh	standing type (automatically centring)
	"0"	=	30h	standing type
	"1"	=	31h	blinking type 1 (slowly)
	"2"	=	32h	blinking type 2
	"3"	=	33h	blinking type 3
	"4"	=	34h	blinking type 4 (fast)
	"5"	=	35h	running type 1 (slowly)
	"6"	=	36h	running type 2
	"7"	=	37h	running type 3
	"8"	=	38h	running type 4
	"9"	=	39h	running type 5 (fast)
	"A"	=	41h	scroll up 1 (slowly)
	"B"	=	42h	scroll up 2 (fast)
	"C"	=	43h	scroll down 1 (slowly)
	"D"	=	44h	scroll down 2 (fast)
	"E"	=	45h	wipe from the left side to the right side
	"F"	=	46h	wipe from the right side to the left side
	"G"	=	47h	wipe from top to bottom
	"H"	=	48h	wipe from top to bottom
	"I"	=	49h	wipe from the middle to outside
	"J"	=	4Ah	wipe from outside to the middle
	"K"	=	4Bh	lightning from the right side
option sign	"ACK"	=	06h	field number recognition
	"BEL"	=	07h	clock_1 to clock_13
	"BS"	=	08h	variables_text_2
	"HT"	=	09h	variables_text_1
data	" " to "ÿ"	=	20h to FFh	
variables	" " to "ÿ"	=	20h to FFh	
check sum recognition	"ETX"	=	03h	
check sum	"0" to "o"	=	30h to 6Fh	
stop sign	"CR"	=	0Dh	

not possible at active clock reprensen-tation

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3. data format

3.1 data format generally

answer telegram:
start sign address fault recognition (option sign data)
(check sum recognition check sum) stop sign

fault recognition	"0"	=	30h	no fault	
		"1"	=	31h	fault: worth area
		"2"	=	32h	fault: telegram length
		"3"	=	33h	fault: field number is outside the worth area
		"4"	=	34h	fault: field coordinates outside the worth area
		"5"	=	35h	fault: field intersection
		"6"	=	36h	fault: kind of representation outside the worth area
		"7"	=	37h	fault: field is already existing
		"8"	=	38h	fault: clock is already active in an other field
		"9"	=	39h	fault: clock may be activated only in standing type
		"A"	=	41h	fault: fault at write on the EEPROM
		"B"	=	42h	fault: false worth area for the parameter text number
		"C"	=	43h	fault: the indicated text number is already existing
		"D"	=	44h	fault: the indicated text number is not existing
		"E"	=	45h	fault: It has been programmed a text call-up in advance
		"F"	=	46h	fault: false worth area for parameter switching time
		"G"	=	47h	fault: running type existing
		"I"	=	49h	fault: colour data not existing

3.2 Use of the check sum

The use of the check sum in the command telegram is generally optional.

If the check sum will be used, it has to be used only in connection with the sign „check sum recognition“ (ETX = 03h).

The answer telegram contains the check sum (in connection with the sign „check sum recognition) only if in the preceded command had send a check sum.

3.3 Calculate the check sum

The check sum assembles through a connection of all telegram bytes (not start sign, check sum recognition, check sum and stop sign). The connection accords to following regulation:

- Connection of the corresponding sings with XOR
- if result < 30h: check sum = XOR-connection + 30h
- if result >= 70h: check sum = XOR-connection - 10h

<u>Example – state call-up with check sum</u>

start sign	address	mode	check sum recognition	check sum	stop sign
<ESC>	<0>	<“I“>	<ETX>	<“i“>	<CR>

The check sum results as follows:

address „0“	=	30h						
mode „I“	=	49h						
30h XOR 49h	=	79h						
check sum	=	79h	–	10h	=	39h	=	„i“

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4. Mode description

4.1 Online - operation

<ESC> address "A" kind of representation (data_1 ... data_256) (<ACK> field number) (<ETX> check sum) <CR>

Directly after receipt of the command the transmitted text will be displayed (data_1 to data_x) on the display. The number of data bytes can be chosen between 0 and 256. The text will be represented in the corresponding kind of representation, until a further telegram will be receipt.

If a existing text will be transmitted without changes in font, colour or kind of representation, the display will not be actualised.

With help of the field number option the test in the field will be represented with the corresponding field number.

If no data bytes will be transmitted, the display will be deleted.

option sign	"ACK"	=	06h
field number	"1" to "8"	=	31h to 38h

Example:
send command: <ESC> 0 A 0 WIBOND <ACK> 1 <CR>
reaction on the display: Display of the text "WIBOND" in standing type, if the devices has been adjusted to address "0" and field "1". (It will be used the currently adjusted colour data).

Hint: **The representation of the text in running type is only possible, if a field has been defined in the whole width of the display.**

4.2 Delete of the text storage

<ESC> address "B" (<ETX> check sum) <CR>

After receipt of this telegram the whole text storage will be deleted. This operation takes about 10 seconds. During this time the device is not ready for receipt.

4.3 Programming of the text storage

<ESC> address "C" text number_10^2 text number_10^1 text number_10^0 (data_variables_1 ... data_variables_256) (<ETX> check sum) <CR>

After receipt of the telegram the transmitted text will be stored (length 0 to 256 data bytes) in the text number in the text storage. There are maximum 999 entries possible, if the end of the text storage has not been reached with 30000 signs in advance. The process of programming takes – according to the text length – up to 150 ms. During this time the display is not ready for receipt.

Hint: **It will be stored all adjustments regarding font, colour and country recognition.**

Using of variables:
The sign „*“ can be used to reserve a sign position for a later assingment with any sign. There can be any blanks (each report up to 256) distributed on any places inside the text.

4.4 Text call-up with stored adjustments

<ESC> address "D" kind of representation text number_10^2 text number_10^1 text number_10^0 (variables_1 ... variables_256) (<BEL> clock_1 ... clock_13) (<ACK> field number) (<ETX> check sum) <CR>

With this telegram it can be displayed an existing text in the text storage. Therefore it has to be stated the text number (001 to 999) with all leading zeros.

For representation of the text the stored adjustments to this text will be used (font, colour, country recognition).

With help of the field number option the text in the field will be displayed with the corresponding field number.

With help of the option (<BEL> clock_1 ... clock_13) can be adjust the starting point of the text representation (only one time information possible).

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4. Mode description

clock_1	"0" to "6"	=	30h to 36h	Sunday to Saturday		
	"7"	=	37h	Monday to Friday		
	"8"	=	38h	Saturday and Sunday		
	"9"	=	39h	daily		
	"-"	=	2Dh	deactivated		
clock_2	"0" to "9"	=	30h to 39h	year	(tens)	
clock _3	"0" to "9"	=	30h to 39h	year	(ones)	
clock _4	"0" to "1"	=	30h to 31h	month	(tens)	
clock _5	"0" to "9"	=	30h to 39h	month	(ones)	
clock _6	"0" to "3"	=	30h to 33h	day	(tens)	
clock _7	"0" to "9"	=	30h to 39h	day	(ones)	
clock_8	"0" to "2"	=	30h to 32h	hours	(tens)	24h - mode
clock_9	"0" to "9"	=	30h to 39h	hours	(ones)	
clock _10	"0" to "5"	=	30h to 39h	minutes	(tens)	
clock _11	"0" to "9"	=	30h to 39h	minutes	(ones)	
clock _12	"0" to "5"	=	30h to 39h	seconds	(tens)	
clock _13	"0" to "9"	=	30h to 39h	seconds	(ones)	
field number	"1" to "8"	=	31h to 38h			

Using of variables:
If the stored text has been marked with blanks, so it will be displayed instead of the blanks the data signs following the text number. This means, that every "*" will be replaced in each case through the following sign. If less signs will be transmitted, than blanks are in the text, so the last blanks will not be replaced but really represented as "*".

If a stored text will be called-up from the text storage, so the eventually stored blanks will be transmitted in the answer. So it is possible to select the text storage.

4.5 Adjust the colour

<ESC> address "E" colour data_1 ...colour data_256 (<ACK> field number) (<ETX> check sum) <CR>

colour data	"D"	=	44h	dark	
	"R"	=	52h	light red	
	"G"	=	47h	light green	
	"O"	=	4Fh	light yellow	
	"a"	=	61h	red	
	"b"	=	62h	green	
	"c"	=	63h	yellow	
	"d"	=	64h	dark red	
	"e"	=	65h	dark green	
	"f"	=	66h	brown	
	"g"	=	67h	green orange	
	"h"	=	68h	green yellow	
	"i"	=	69h	dark yellow	
	"j"	=	6Ah	yellow orange	
	"k"	=	6Bh	orange	
	"l"	=	6Ch	orange red	
	"m"	=	6Dh	rainbow_1	(light)
	"n"	=	6Eh	rainbow_1	(dark)
	"o"	=	6Fh	rainbow_2	(light)
	"p"	=	70h	rainbow_2	(dark)
	"q"	=	71h	rainbow_3	(light)
	"r"	=	72h	rainbow_3	(dark)
	"s"	=	73h	rainbow_4	(light)
	"t"	=	74h	rainbow_4	(dark)
	"u"	=	75h	colour mix	

It can be adjusted for every sign the corresponding colour.

e.g.:	colour data:	RRRRRR	GGGG	uuuuuuuu
		WIBOND	GmbH	Parkstein
		light red	light green	colour mix

All following texts will be displayed with the actual colour adjustment from now on.
The eventually currently displayed text will not be changed!

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4. Mode description

4.6 Field mask definition

<ESC> address "F" field number
field_1_from_x_10^2 field_1_from_x_10^1 field_1_from_x_10^0
field_1_to_x_10^2 field_1_to_x_10^1 field_1_to_x_10^0
field_1_from_y_10^2 field_1_from_y_10^1 field_1_from_y_10^0
field_1_to_y_10^2 field_1_to_y_10^1 field_1_to_y_10^0
finish sign

With help of this command the display will be marked with a mask. In this mask can be stated maximum 8 different fields. This fields can be controlled self-contained via the commands having a field number option.
The x- and y-coordinate corresponds to the LED-points (pixel).
Following field heights are possible (number of pixel in y-direction):
device type: TXTxxx-060A, MTAxxx-060A : 7 or 8
TXTxxx-120A, MTAxxx-120A : 7, 8, 12 or 16

Before fields will be defined, already existing fields has to be deleted.

For every field that should be defined are four position information necessary,

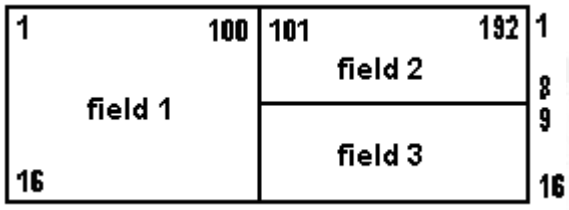
the X-crack appoints the start position in the X-axle,
the Y-crack appoints the start position in the Y-axle,
the dX-crack appoints the end position in the X-axle,
the dY-crack appoints the end position on the Y-axle

The fields are not allowed to intersect!

Example:

The text displays have following resolution:
MTA or TXT 116-060 8 * 96 pixel
MTA or TXT 108-120 16 * 96 pixel
MTA or TXT 116-120 16 * 192 pixel
MTA or TXT 121-120 16 * 256 pixel

z. B. MTA 116-120 with three fields



field1:
field 2:
field 3:

The font height corresponds to the y-coordinates.
A assignment of the x- and y-field coordinate with “0” (30h) results in deletion of the particular field.

field number	"1" to "8"	=	31h to 38h

Attention: If no field has been adjusted via the software, field 1 will be generated at the first start-up of the display automatically. This field corresponds to the whole size of the display area. If fields has been adjusted via the software, they also stay stable at a power blackout.

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4. Mode description

4.7 Adjust the font

<ESC> address "G" font (<ACK> field number) (<ETX> check sum) <CR>

font	"1"	=	31h	proportional type
	"2"	=	32h	fixed-width-font (every sign the same length)
	"3"	=	33h	extra wide font
	"4"	=	34h	extra wide, bold font
	"5"	=	35h	extra narrow font

All following texts will be represented in the current font from now on.
The eventually currently displayed text will not be changed.

4.8 Text call-up with current adjustments

<ESC> address "H" kind of representation text number_10^2 text number_10^1 text number_10^0 (variables_1 .. .variables_max. 256) (<BEL> clock_1 ... clock_13) (<ACK> field number) (<ETX> check sum) <CR>

With this telegram can be displayed an existing text from the text storage and date- and clock format respectively.
Therefore it has to be stated the text number (001 to 999) will all leading zeros. If the chosen number is not available, the display will be deleted.

The representation of the date and the clock is only inside a field possible!

With the option (option sign clock_1 ... clock_13) can be adjusted the starting point of the text representation (max. 8 different time information!).

With help of the field number option will be represented the text in the field with the corresponding field number.

For representation of the text will be used the current adjustments of the display (font, colour, country recognition).

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4. Mode description

Representation of clock- and date formats

text number_x_--2	"-"	= 2Dh		
text number_x_--1	"-"	= 2Dh		
text number_x_--0	"0"	= 30h	clock	format: (hh:mm) 24h
	"1"	= 31h	clock	format: (hh:mm.ss)24h
	"2"	= 32h	clock	format: (tt.mm.jj)24h
	"3"	= 33h	date / clock	format: (tt.mm.jjhh:mm) 24h
	"4"	= 34h	date / clock	format: (tt.mm.jj hh:mm.ss) 24h
	"5"	= 35h	clock	format: (hh:mm) 12h
	"6"	= 36h	clock	format: (hh:mm.ss)12h
	"7"	= 37h	clock	format: (tt.mm.jj)12h
	"8"	= 38h	date / clock	format: (tt.mm.jjhh:mm) 12h
	"9"	= 39h	date / clock	format: (tt.mm.jj hh:mm.ss)12h

clock_1	"0" to "6"	= 30h to 36h	Sunday to Saturday	
	"7"	= 37h	Monday to Friday	
	"8"	= 38h	Saturday and Sunday	
	"9"	= 39h	daily	
	"-"	= 2Dh	deactivated	
clock_2	"0" to "9"	= 30h to 39h	year	(tens)
clock_3	"0" to "9"	= 30h to 39h	year	(ones)
clock_4	"0" to "1"	= 30h to 31h	month	(tens)
clock_5	"0" to "9"	= 30h to 39h	month	(tens)
clock_6	"0" to "3"	= 30h to 33h	day	(tens)
clock_7	"0" to "9"	= 30h to 39h	day	(ones)
clock_8	"0" to "2"	= 30h to 32h	hours	(tens) 24h - mode
clock_9	"0" to "9"	= 30h to 39h	hours	(ones)
clock_10	"0" to "5"	= 30h to 39h	minutes	(tens)
clock_11	"0" to "9"	= 30h to 39h	minutes	(ones)
clock_12	"0" to "5"	= 30h to 39h	seconds	(tens)
clock_13	"0" to "9"	= 30h to 39h	seconds	(ones)
field number	"1" to "8"	= 31h to 38h		

Using of variables:
If the stored text has been marked with blanks, so it will be displayed the transmitted data signs following the text number. This means, every "*" will be replaced through the next sign. If less signs will be transmitted, than blanks are in the text, so the last blanks, that can not filled up, will be represented really as "*".

If a text will be called-up from the text storage, so the data and the eventually stored variables will be transmitted in the answer. So it is possible to read out the text storage.

If the time will be represented in seconds, so in the other fields is no blinking type available!

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4. Mode description

4.9 state call-up

<ESC> address "I" (<ETX> check sum) <CR>

After receipt of the command the display sends a report, that gives information about following conditions:

font has been chosen via software
field(s) had been chosen via software
colours had been adjusted via software
clock has been setted

answer telegram:
<ESC> address fault recognition state (<ETX> check sum) <CR>

state	"0" to "?"	=	30h to 3Fh	worth area

The state byte will be assigned as follows:

bit 0 / 20 :	font has been setted via software
bit 1 / 21 :	field(s) had been chosen via software
bit 2 / 22 :	colours had been chosen via software
bit 3 / 23 :	clock has been setted

4.10 Adjust the clock

<ESC> addresse "J" clock_1 ... clock_13 (<ETX> check sum) <CR>

clock_1	"0" to "6"	=	30h to 36h	Sunday to Saturday		
clock_2	"0" to "9"	=	30h to 39h	year	(tens)	
clock_3	"0" to "9"	=	30h to 39h	year	(ones)	
clock_4	"0" to "1"	=	30h to 31h	month	(tens)	
clock_5	"0" to "9"	=	30h to 39h	month	(ones)	
clock_6	"0" to "3"	=	30h to 33h	day	(tens)	
clock_7	"0" to "9"	=	30h to 39h	day	(ones)	
clock_8	"0" to "2"	=	30h to 32h	hours	(tens)	24h - mode
clock_9	"0" to "9"	=	30h to 39h	hours	(ones)	
clock_10	"0" to "5"	=	30h to 35h	minutes	(tens)	
clock_11	"0" to "9"	=	30h to 39h	minutes(ones)		
clock_12	"0" to "5"	=	30h to 35h	seconds	(tens)	
clock_13	"0" to "9"	=	30h to 39h	seconds	(ones)	

Directly after receipt of the telegram will be taken over the date and the clock.

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4.11 Clock call-up

<ESC> address "K" (<ETX> check sum) <CR>

It will be generated an answer telegram, that sends back date and clock after receipt of the command.

answer telegram:

<ESC> address fault recognition clock_1 ... clock_13 (<ETX> check sum) <CR>

clock_1	"0" to "6"	=	30h to 36h	Sunday to Saturday	
clock_2	"0" to "9"	=	30h to 39h	year	(tens)
clock_3	"0" to "9"	=	30h to 39h	year	(ones)
clock_4	"0" to "1"	=	30h to 31h	month	(tens)
clock_5	"0" to "9"	=	30h to 39h	month	(ones)
clock_6	"0" to "3"	=	30h to 33h	day	(tens)
clock_7	"0" to "9"	=	30h to 39h	day	(ones)
clock_8	"0" to "2"	=	30h to 32h	hours	(tens)
clock_9	"0" to "9"	=	30h to 39h	hours	(ones)
clock_10	"0" to "5"	=	30h to 39h	minutes	(tens)
clock_11	"0" to "9"	=	30h to 39h	minutes	(ones)
clock_12	"0" to "5"	=	30h to 39h	seconds	(tens)
clock_13	"0" to "9"	=	30h to 39h	seconds	(ones)

4.12 Gong telegram (cause the gong)

<ESC> address "L" gong_1 gong_2 (<ETX> check sum) <CR>

gong_1	"1"	=	31h	cause gong (one-sounding)		
	"2"	=	32h	cause gong (two-sounding)		
	"3"	=	33h	cause gong (three-sounding)		
gong_2	"1"	=	31h	volume	1	(quiet)
	"2"	=	32h	volume	2	
	"3"	=	33h	volume	3	
	"4"	=	34h	volume	4	
	"5"	=	35h	volume	5	
	"6"	=	36h	volume	6	(loud)

4.13 Adjust gong setup

<ESC> address "M" gong_1 gong_2 (<ETX> check sum) <CR>

gong_1	"0"	=	30h	deactivate gong		
	"1"	=	31h	cause gong	(one sounding)	
	"2"	=	32h	cause gong	(two sounding)	
	"3"	=	33h	cause gong	(three sounding)	
gong_2	"1"	=	31h	volume	1	(quiet)
	"2"	=	32h	volume	2	
	"3"	=	33h	volume	3	
	"4"	=	34h	volume	4	
	"5"	=	35h	volume	5	
	"6"	=	36h	volume	6	(loud)

Hint: If the gong is active in the gong setup (gong_1<> "0" = 30h) will be caused automatically at every change of the display (not at alternating display) a gong with the corresponding setup.

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4. Mode description

4.14 Adjust country recognition for character set

<ESC> address "N" country recognition (<ETX> check sum) <CR>

With this command it is possible to adjust the ASCII-character set for following signs for the corresponding country:

Country recognition	"1"	=	31h	ASCII (ISO/IEC 8859 and ISO/IEC 8859-1)
	"2"	=	32h	English (GB)
	"3"	=	33h	French
	"4"	=	34h	German
	"5"	=	35h	Italian
	"6"	=	36h	Schwedish (at names)
	"7"	=	37h	Spanish
	"8"	=	38h	Norge (version1)

hexadecimale correspondences:

name	23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh
ASCII	#	$	@	[	\	]	^	'	{	|	}	~
English (GB)	£	$	@	[	\	]	^	`	{	}	}	¯
French	£	$	à	°	ç	§	^	µ	é	ù	è	¨
German	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
Italian	£	$	§	°	ç	é	^	ù	à	ò	è	ì
Swedish (at names)	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Spanish	#	$	§	¡	Ñ	¿	^	`	°	ñ	ç	~
Norge (version 1)	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	¯

Attention: This are the country specific umlaut used at the IBM-DOS-computers in the past. Through the country adjustment ASCII you can have the widen character set according to ISO/IEC 8859-1. A table of the complete character set you can see at appendix A.

4.15 Alternating text call-up with stored adjustments

<ESC> address "O" text number_1_10^2 text number_1_10^1 text number_1_10^0 text number_2_10^2 text number_2_10^1 text number_2_10^0 switching time (<HT> variables_text_1_1 ... variables_text_2_256) (<BS> variables_text_2_1 ... variables_text_2_256) (<BEL> clock_1 ... clock_13) (<ACK> field number) (<ETX> check sum) <CR>

This command results in an alternating (changing) display of two in the text storage stored texts. The kind of representation is automatically standing type. Therefore it has to be setted the corresponding text number (001 to 999) with all leading zeros. If the chosen number is not available the display will be deleted. The switching time between both text changes is adjustable in second steps.

With the option (option sign clock_1 ... clock_13) can be adjusted the starting point of the alternating representation. With help of the field number option will be displayed the alternating texts with the corresponding field number in the field.

For representation of the text will be used the stored adjustments of the texts (font, colour, country recognition).

Using of variables:

If the stored text had been marked with blanks, so it will be displayed the transmitted data signs following the text number. This means, that every "*" will be replaced in every case through the following sign. If less signs had been transmitted than blanks are in the text, so the last blanks, that can not be filled up with signs, will be displayed really as "*".

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4. Mode description

4.15 Alternating text call-up with stored adjustments

switching time	"1"	=	31h	1 second		
	"2"	=	32h	2 seconds		
	"3"	=	33h	3 seconds		
	"4"	=	34h	4 seconds		
	"5"	=	35h	5 seconds		
	"6"	=	36h	6 seconds		
	"7"	=	37h	7 seconds		
	"8"	=	38h	8 seconds		
	"9"	=	39h	9 seconds		
clock_1	"0" to "6"	=	30h to 36h	Sunday to Saturday		
	"7"	=	37h	Monday to Friday		
	"8"	=	38h	Saturday and Sunday		
	"9"	=	39h	daily		
	"-"	=	2Dh	deactivated		
clock_2	"0" to "9"	=	30h to 39h	year	(tens)	
clock_3	"0" to "9"	=	30h to 39h	year	(tens)	
clock_4	"0" to "1"	=	30h to 31h	month	(tens)	
clock_5	"0" to "9"	=	30h to 39h	month	(ones)	
clock_6	"0" to "3"	=	30h to 33h	day	(tens)	
clock_7	"0" to "9"	=	30h to 39h	day	(ones)	
clock_8	"0" to "2"	=	30h to 32h	hours	(tens)	24h -mode
clock_9	"0" to "9"	=	30h to 39h	hours	(ones)	
clock_10	"0" to "5"	=	30h to 39h	minutes	(tens)	
clock_11	"0" to "9"	=	30h to 39h	minutes	(ones)	
clock_12	"0" to "5"	=	30h to 39h	seconds	(tens)	
clock_13	"0" to "9"	=	30h to 39h	seconds	(ones)	
field number	"1" to "8"	=	31h to 38h			

4.16 Alternating text call-up with current adjustments

<ESC> address "P" text number_1_10^2 text number_1_10^1 text number_1_10^0 text number_2_10^2 text number_2_10^1 text number_2_10^0 switching time switching time (<HT> variables_text_1_1 ... variables_text_2_256) (<BS> variables_text_2_1 ... variables_text_2_256) (<BEL> clock_1 ... clock_13) (<ACK> field number) (<ETX> check sum) <CR>

This command results in an alternating (changing) display of two existing text stored in the texts storage and date – and clock format respectively. The kind of representation is automatically standing type Therefore it has to be stated the corresponding text number (001 to 999) with all leading zeros. If the chosen number is not available, the display will be deleted. The switching time between both text changes can be adjusted in second steps.

With the option (option sign clock_1 clock_13) can be adjusted the starting point of the alternating representation.

With the field number option will be represented the alternating texts with the corresponding field number in the field.

For representation of the text will be used the current adjustments of the display (font, colour, country recognition).

Using of variables:
If the stored text had been marked with blanks, so it will be displayed the transmitted data signs following the text number. This means, that every "*" will be replaced in each case through the next sign. If less signs will be transmitted, than blanks are in the text, so the last blanks, that can not filled up with signs, will be displayed really as "*".

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4. Mode description

Representation of date- and clock format

text number_x_--2	"-"	=	2Dh		
text number_x_--1	"-"	=	2Dh		
text number_x_--0	"0"	=	30h	clock	format: (hh:mm) 24h
	"1"	=	31h	clock	format: (hh:mm.ss) 24h
	"2"	=	32h	clock	format: (tt.mm.jj) 24h
	"3"	=	33h	date / clock	format: (tt.mm.jjhh:mm) 24h
	"4"	=	34h	date / clock	format: (tt.mm.jj hh:mm.ss) 24h
	"5"	=	35h	clock	format: (hh:mm) 12h
	"6"	=	36h	clock	format: (hh:mm.ss) 12h
	"7"	=	37h	date	format: (tt.mm.jj) 12h
	"8"	=	38h	date / clock	format: (tt.mm.jjhh:mm) 12h
	"9"	=	39h	date / clock	format: (tt.mm.jj hh:mm.ss) 12h
option sign	"ACK"	=	06h		
switching time	"1"	=	31h	1 second	
	"2"	=	32h	2 seconds	
	"3"	=	33h	3 seconds	
	"4"	=	34h	4 seconds	
	"5"	=	35h	5 seconds	
	"6"	=	36h	6 seconds	
	"7"	=	37h	7 seconds	
	"8"	=	38h	8 seconds	
	"9"	=	39h	9 seconds	
clock_1	"0" to "6"	=	30h to 36h		Sunday to Saturday
	"7"	=	37h		Monday to Friday
	"8"	=	38h		Saturday and Sunday
	"9"	=	39h		daily
	"-"	=	2Dh		deactivated
clock _2	"0" to "9"	=	30h to 39h	year	(tens)
clock _3	"0" to "9"	=	30h to 39h	year	(ones)
clock _4	"0" to "1"	=	30h to 31h	month	(tens)
clock _5	"0" to "9"	=	30h to 39h	month	(ones)
clock _6	"0" to "3"	=	30h to 33h	day	(tens)
clock _7	"0" to "9"	=	30h to 39h	day	(ones)
clock _8	"0" to "2"	=	30h to 32h	hours	(tens) 24h-mode
clock _9	"0" to "9"	=	30h to 39h	hours	(ones)
clock _10	"0" to "9"	=	30h to 39h	minutes(tens)	
clock _11	"0" to "9"	=	30h to 39h	minutes	(ones)
clock _12	"0" to "9"	=	30h to 39h	seconds	(tens)
clock _13	"0" to "9"	=	30h to 39h	seconds	(ones)
field number	"1" to "8"	=	31h to 38h		

If the clock will be represented in seconds, so in the other fields is no blinking type available!

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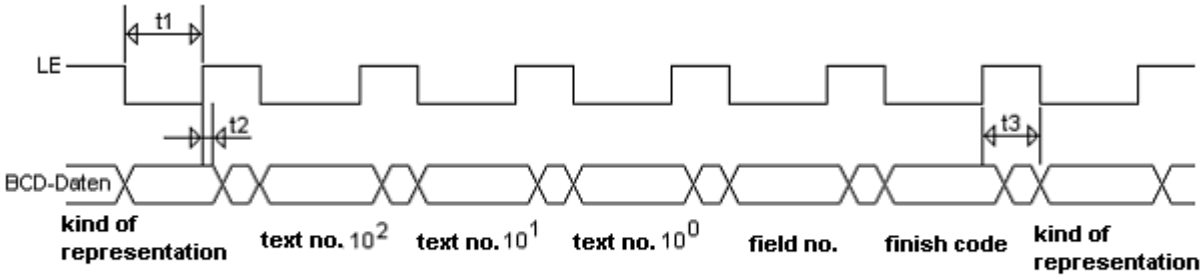
5. Controlling via parallel interface (option)

Time diagram for text call-up: (without variables)



t1 = 0,8ms
t2 = 0,5ms
t3 = 8ms

Course of the text call-up

kind of representation/ LE / text number 10^2 / LE / text number 10^1 / LE / text number 10^0 / LE / field number / LE / (variables, if neccessary / LE) / finish code / LE

kind of representation:	„0“	=	standing type	
	„1“	=	blinking type 1	(slowly)
	„2"	=	blinking type 2	
	„3"	=	blinking type 3	
	„4"	=	blinking type 4	(fast)
	„5"	=	running type	
	„6“	=	scroll up	
	„7“	=	scroll down	
	„8“	=	wipe from the left side through the right side	
	„9“	=	wipe form the right side through the left sid	
	„A“	=	wipe from top to bottom	
	„B“	=	wipe from bottom to top	
	„C“	=	wipe from the middle to the outside	
	„D“	=	wipe from the outside to the inside	
	„E“	=	standing type	(automatic centring)

text number 10^2:	data „0" ... „9"	
text number 10^1:	data „0" ... „9"	
text number 10^0:	data „0" ... „9"	
variables:	data „0" ... „9"	(if neccessary it can be stated up to 40 different variables)
finish code:	„F"	text output (all data cables at „High“)

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Appendix A

Representable signs according to ISO/IEC 8859 with extension ISO/IEC 8859-1

digit height: 30/35/50/60 mm or 7/8 pixel

Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
8	€															
9																
A		ì	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B	°	±	²	³	´	µ	¶	·	¸	¹	º	»				¿
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

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Appendix A

Representable signs according to ISO/IEC 8859 with extension ISO/IEC 8859-1

digit height: 55/70/90/120 mm or 12/16 pixel

Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
8	€															
9																
A		ì	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

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6. Service-Checkliste

Please let us know following information if there are any mistakes you can't repair by yourself:

General Information:

Kind of display: _____

Serial-No.: _____

You can find this information in your data material and on your display (next to the plugs).

Founding of the mistake:

1. Please try to describe the failure exactly.
2. When happened this mistake first time?
3. What have you still done to repair the display?
4. How can we achieve you (telephone, fax, e-mail)?

You can achieve us at

0 96 02 / 60 01 03

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