

Communication protocol description

Protocol ELEN UNI_TXT

Version 1.03 TCP

1. Introduction

This manual provides basic information about controlling ELEN displays through a local data network (LAN) based on Ethernet via protocols TCP/IP or UDP.

2. LAN description

Individual displays are interconnected with a control unit into a local computer network with BUS topology. Physical layer is built on the Ethernet interface. Each display has assigned its IP address and operates as device server.

3. Communication telegrams

3.1 Sending frame

Sending frame has fixed structure with variable length of information field. The telegram length is limited to 1024 bytes.

<STX><ADR>< I ><ETX>

<STX>	0x02	– telegram start flag
<ADR>		– SLAVE device address is fixed, always 127 – bit D7 always 1
< I >		– message information content – variable length 0 ÷ 125 bytes
<ETX>	0x03	– frame end flag

4. Control commands and message format (content of < I >)

Information content contains commands for display to work with specific text message. These commands are separated by the \$ character.

4.1 Commands for writing text message

Each sending frame can contain only one command.

4.1.1 Direct writing of text

Required text message is displayed directly, while the content of the whole line will be cleared.

tttttt simple writing of ASCII text characters, which can also contain commands for formatting the text message mentioned in chapter 4.2.

4.1.2 Selection of text message from display's memory (not applicable)

Displayed will be predefined text message stored in display's memory.

\$K<k1000X><k100X><k10X><k1X>

<k1000X><k100X><k10X><k1X> – position of text message in ASCII format

range: location 0 – 8192

4.1.3 Clearing display

\$0 Clearing of user display area and all text message attributes

4.1.4 Writing variable to a specific location

\$Z<z1X>text

<z1X> – variable location in ASCII format

range: location 0 – 9

text – characters string, which should be displayed, 15 characters max.

4.2 Commands for message formatting

One sending frame can contain more commands of this type, commands can be nested only into command of direct writing of text, see chapter 4.1.1.

4.2.1. Blinking of message

\$F1 following characters will be blinking
\$F0 following characters will NOT be blinking
ASCII format, default 0

Command \$F is valid until the next change of value with \$F command, or until display is turned off, or until changing settings to default manufacturing parameters with command \$R.

4.2.2. Changing text message color and message background

Valid for color LED displays only.

Text message color (default value is C1):

\$C0 black
\$C1 red
\$C2 green
\$C3 yellow

Background color (default value is P0):

\$P0 black
\$P1 red
\$P2 green
\$P3 yellow

4.2.3. Changing font type

Selection of font from the fonts' table. Font type has its height and length, while the length of all characters of FIX type is the same.

Fonts used for displays with 16 dots matrix height

Code page DOS 437

		Font height	Font length
\$U0	FIX_8_7	7	6
\$U1	FIX_8_7_ext	7	12
\$U2	FIX_16_14_con	14	10
\$U3	FIX_16_14	14	12
\$U4	FIX_16_16	16	12
\$U5	FIX_16_16_con	16	10

Code page WIN1250

\$U6	1250_NEP_16_14_POR	14	8
\$U7	1250_PROP_16_11	11	max 8
\$U8	1250_PROP_8_6	6	max 6

Fonts used for displays with 20 dots matrix height

Code page WIN1250.

		Font height	Font length
\$U0	1250_FIX_10_9	9	6
\$U1	1250_FIX_10_9_ext	9	8
\$U2	1250_FIX_20_14	14	10
\$U3	1250_FIX_20_16	16	12
\$U4	1250_FIX_20_16_TNR	16	16
\$U5	1250_FIX_20_20	20	16
\$U6	1250_ARIAL_9_9	9	max 8

4.2.4. Inserting time into message

\$H0	basic time (hh:mm:ss)
\$H1	hours (hh)
\$H2	minutes (mm)
\$H3	seconds (ss)

4.2.5. Inserting date into message

\$N0	basic date (DD:MM:YYYY)
\$N1	day (DD)
\$N2	month (MM)
\$N3	year (YYYY)

4.2.6. Displaying a simple graph

\$J<j100X><j10X><j1X>

<j100X><j10X><j1X> – number of dot columns of the graph in ASCII format
range: 0 – 999

4.2.7. Reserving location for variables

\$I<i1X>

<i1X> – variable location in ASCII format
range: location 0 – 9

4.2.8. Inserting moving message from the right

\$M<text>\$CR

<text> – moving text message which will be inserted from the right side

4.2.9. Jump to a new line

\$CR

Immediate jump to a new line

4.3 Commands for global functions of display

After reset default values are set and command lasts until rewriting with a new command. Settings of these parameters will stay the same even if the display is restarted. Each sending frame can contain only one command.

4.3.1. Brightness control

\$B<type of brightness control><brightness level>

< type of brightness control > – brightness control type sign
0 – brightness control by setting direct value of PWM without automatic control
1 – brightness control by setting the steepness of regulation curve in ASCII format, default 0
<brightness level> – level value, while bit D7 is 1
range 0 – 100%
default 100

4.3.2. Setting message TIMEOUT (not applicable)

\$T<time-out value>

<time-out value> – value of time-out from 0 to 127, while bit D7 is 1
range 0 – 127 seconds
default 0

4.3.3. Clearing display before writing new message

\$A<clearing method>

< clearing method >

L – before writing of new line, will clear the entire display content

R – before writing of new line, will keep the entire display content

ASCII format, default L

4.3.4. Real time synchronization packet

Display will set the internal real time according to synchronization packet. Display is expecting information about time and date in format which contains correction for time zone and DST (summer/winter time).

\$S<Y10X><Y1X><M10X><M1X><D10X><D1X>H10X><H1X><MIN10X><MIN1X><SEC10X><SEC1X>

<Y10X>	tens of year in ASCII format
<Y1X>	ones of year in ASCII format
<M10X>	tens of month in ASCII format
<M1X>	ones of month in ASCII format
<D10X>	tens of day in ASCII format
<D1X>	ones of day in ASCII format
<H10X>	tens of hours in ASCII format
<H1X>	ones of hours in ASCII format
<MIN10X>	tens of minutes in ASCII format
<MIN1X>	ones of minutes in ASCII format
<SEC10X>	tens of seconds in ASCII format
<SEC1X>	ones of seconds in ASCII format

4.3.7. Blinking message parameters

\$G<period><filling>

<period> – blinking time period x 100 ms
range 0 – 127 (that is 0.1 – 12.7 seconds), value of bit D7 is 1
default 5

<filling> – what percentage of blinking period is display ON
range 0 – 100%, bit D7 is 1
default 50

4.3.8 Setting default values

\$R all display parameters will be set to default values

Examples of text messages (e.g. display matrix = 144 columns x 16 lines x 1 row)

Example 1

Command sent:

\$U2Hello World123

String [Hex]:

02H,FFH,24H,55H,32H,48H,65H,6CH,6CH,6FH,20H,57H,6FH,72H,6CH,64H,31H,32H,33H,03H,

Display:



Example 2

Command sent:

\$U0123456789012345678901234123456789012345678901234

String [Hex]:

02H,FFH,24H,55H,30H,31H,32H,33H,34H,35H,36H,37H,38H,39H,30H,31H,32H,33H,34H,35H,36H,37H,38H,39H,30H,31H,32H,33H,34H,35H,36H,37H,38H,39H,30H,31H,32H,33H,34H,35H,36H,37H,38H,39H,30H,31H,32H,33H,34H,03H,

Display:



Example 3

Command sent:

\$U0\$C2\$Mmoving message\$CR\$C1\$H0 \$N3 \$J015\$C3\$J015\$C2\$J015

String [Hex]:

02H,FFH,24H,55H,30H,24H,43H,32H,24H,4DH,6DH,6FH,76H,69H,6EH,67H,20H,6DH,65H,73H,73H,61H,67H,65H,24H,43H,52H,24H,43H,31H,24H,48H,30H,20H,20H,24H,4EH,33H,20H,20H,24H,4AH,30H,31H,35H,24H,43H,33H,24H,4AH,30H,31H,35H,24H,43H,32H,24H,4AH,30H,31H,35H,03H,

Display:

