

SUBTITLE GENERATOR GeNa-2

Operation Manual

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1. General

1.1. Designation

The Subtitle Generator GENA is designed to merge any texts that can be imported from any source (e.g. fiscal cash registers, LCD displays, PC computers) with visual images from a video camera. Finally, the overall information can be recorded on any carrier, e.g. on a VCR tape. Due to the fact that the text information is combined with the visual images as they are recorded by the video camera, a user of such a system is provided with extended information about any object being watched. It is why the GENA unit can be successfully used for a large variety of monitoring systems to enhance performance thereof.

1.2. Operation of the Subtitle Generator

The GENA Subtitle Generator uses an in-system programmed microcontroller. Owing to such a solution high flexibility of the unit has been reached and the device is adaptable to capture various types of information and incorporate them into the visual image. The microcontroller software is composed of two modules that are mutually separated by functional features. The first module is the loader that makes it possible to load new software applications as well as to update old ones. The second software module is the exact user's procedure or software application, as it was mentioned before. The application procedure is the core software that processes the already captured information. The application software may contain several subroutines that are used for analysis of information, however only one of them can be activated at a moment. The active subroutine for analysis of information is selected by the associated software.

The structural diagram of the GENA device is shown of Fig. 1. Programming of the unit as well as loading of applications is carried out through the serial interface RS-232 and with use of relevant computer software. Desired text information is also captured through the RS-232 serial interface (alternatively RS-485) with optically coupled isolators. Owing to such a solution the galvanic separation between the information source and the monitoring system is assured. The captured information subjects to processing mechanisms which are suitable for any specific analysing subroutine and then passed to the video channel where the text and visual images are combined. The text window can comprise no more than 12 lines with 40 characters per each line however the window is split into several sub-areas:

1. operational window where the captured and analysed text appear,
2. date field (the yy:mm:dd format is applied),
3. time field – to display current time
4. one line where any customised text can be inserted.

Location of all the window components as well as their availability is defined by the software although such areas as the date and time fields obviously depend whether the unit is equipped with a real-time clock or not. The texts are overlapped onto the image with transparent background hence the text does not cover the image beyond.

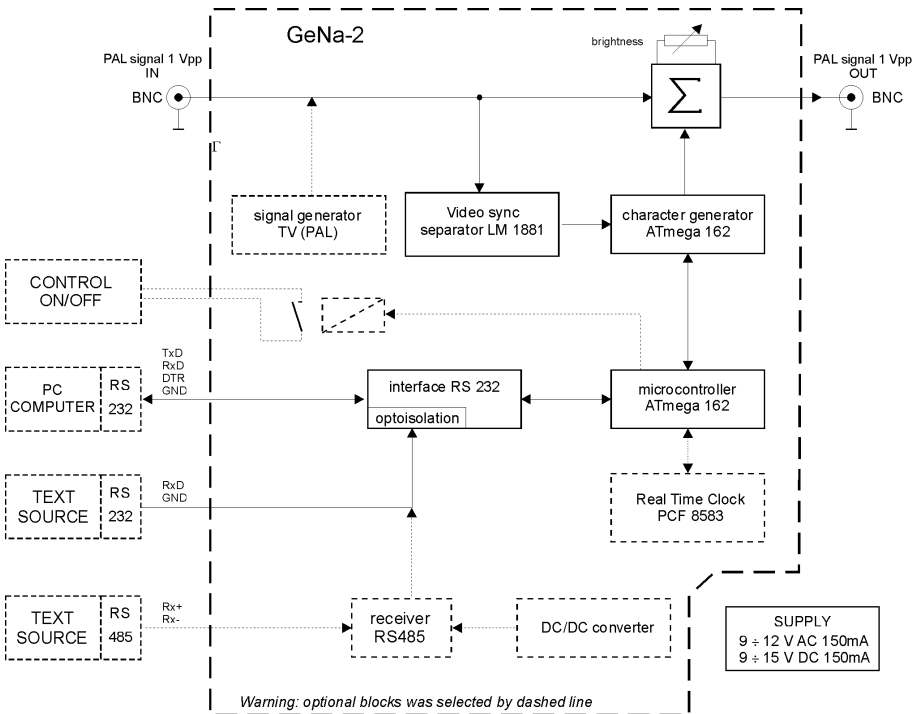


Fig.1 Structural Diagram of the Subtitle Generator GENA

Typically, the unit incorporates two standard matrices of characters: ASCII and LATIN2. However, several conversion tables can be loaded for various standards of Polish alphabet (e.g. for the standards: MAZOWIA, MICROVEX, CYFROMAT, DHN, CSK). The conversion tables can be modified and customised by the user and then loaded along with the application routines.

Parameters of the serial port are specified on the stage when the analysing subroutine is selected however they can be also altered by software. The range of allowed alterations is presented in the forthcoming table.

The unit has only one control element located in its bottom part and designed to adjust brightness of the displayed characters. The control is preset by the manufacturer and only occasionally has to be tuned during installation of the unit.

The upper part of the device comprises optical signalization by means of two LEDs:

- the red LED blinks when transmission through the COM2 port is in progress (in line with the byte transmission from the text source),

- the green LED confirms correct operation of the unit (1 blink every second).
The GENA unit operates with the PAL standard (625 lines, 50 Hz) and with conventional signal voltages 1Vpp.

1.3. Technical specifications

The tables below present technical specifications of the Subtitle Generator with breakdown to individual functional modules.

VIDEO BLOCK			
parameter	unit	value	
		min	max
system	none	PAL 625 lines 50Hz	
signal level	[Vpp]	1	
number of raws	raw	1	12
number of columns	character	1	40
code table	none	ASCII, LATIN2	

COMMUNICATION BLOCK WITH PC (RS-232)		
parameter	unit	value
used signal	none	TxD, RxD, DTR
baud rate	[bit/s]	9600
data bits	[bit]	8
stop bits	[bit]	1
parity check	brak	NONE
PC program	none	GENA2.EXE

COMMUNICATION BLOCK WITH THE INFORMATION SOURCE (RS232 OR RS485)			
parameter	unit	value	
		min	max
used signal	none	RxD, Rx+, Rx-	
baud rate	[bit/s]	1200	115200
data bits	[bit]	7,8	
stop bits	[bit]	1,2	
parity check	none	NONE, ODD, EVEN	

SUPPLY AND DIMENSION			
parameter	unit	value	
		min	max
voltage	[V AC]	9	12
	[V DC]	9	15
current	[mA]	-	150
length/width/high	[mm]	150/90/35	
weight	[g]	~100	

1.4. Set of delivery

The GENA unit is delivered along with the power adapter (9V AC 150mA) and necessary wires for the RS-232 port. Specification of the RS-232 interface signals for individual wires is shown in the tables below.

cable GeNa – PC computer	
RJ12 (6P6C) GeNa-2	D-SUB 9P FEMALE computer
2 TxD (out)	2 RxD (in)
3 RxD (in)	3 TxD (out)
1 GND	5 GND
4 DTR (in)	4 DTR (out)

cable GeNa – text source	
RJ12 (6P6C) GeNa	coupling DB9M-DB9F text source
5 RxD (in)	3 TxD (out)
6 GND	5 GND
short circuit 1 with 3	-

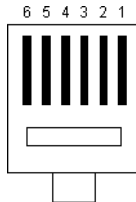


Fig.2 Contact numbers of the RJ12 (front view of the male plug).

2. DESCRIPTION OF THE INCORPORATED SUBROUTINES

2.1. *Standard*

Displays text lines on the screen display. Each line must end with the *CR - Carriage Return* (\$d0) and *LF – Line Feed* (\$0a) characters.

2.2. *Terminal*

Duplicates every character that has been received by the serial port on the screen display.

2.3. *VT-100*

Performs emulation of the VT-100 terminal according to the established standard.

2.4. *Others*

Such subroutines as POSNET, OMEGA are responsible for analysis of the information that is received from fiscal printers of related manufacturers according to the protocols of relevant software interfaces.

For instance, the POSNET subroutine can be used for the printers Thermal and Nixdorf ND77 that are offered by the POSNET company as well as for INNOVA

printers from OPTIMUS. The OMEGA subroutine matches the printer of the same name and manufactured by ELZAB.

Every of the mentioned routines can be modified upon customer's request. The list of subroutines can be extended if any other data transmission protocols are to be supported.

3. THE GENA2.EXE SOFTWARE

The device handler GENA2.EXE is designed for programming of the subtitle generator and is not necessary during normal operation of the unit. The software has been developed by means of Delphi 7 from Borland, it is why the Windows operation system (9x, Millennium, NT, 2000, XP) has to be installed on the PC-compatible master computer.

3.1. Remarks on installation

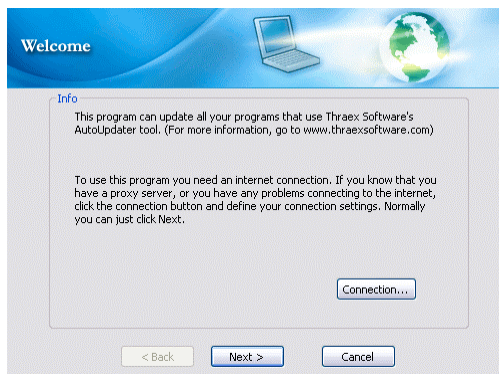
1. The software is delivered along with all the necessary subroutines on the 3.5" floppy disk in the form of a single setup program GENA2SETUP.EXE;
2. After having the program started up the user must follow the instructions relevant to subsequent phases of the installation procedure;
3. Updating and upgrading of the installed software is free of charge and available from manufacturer's websites by means of the entry [Information](#);
4. After having the software installed the start-up shortcuts of the charging programme should be available both from the computer desktop and the menu *Start → Programs → MikEL → GeNa-II Subtitle Generator*

3.2. Software update (upgrade)

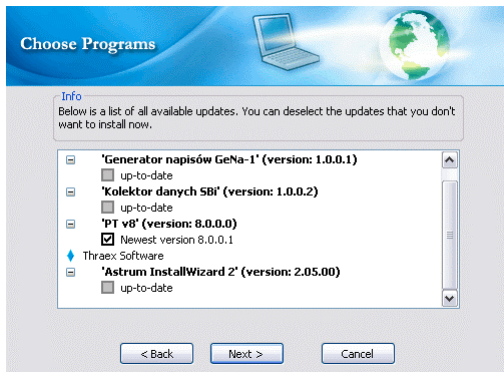
The following steps must be made to check whether a new software revision is available:

- ◆ run the GENA2.EXE software and select the entry [Information](#)
- ◆ start the function [check for a new revision](#)

The AutoUpdater starts and guides the user through the update procedure:



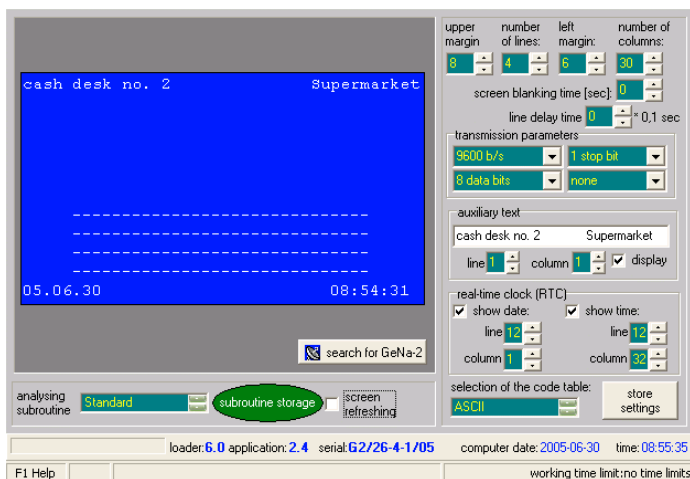
If the master computer has access to the Internet, the *Next* button must be clicked. After having established the connection with the manufacturer's website the list of available updates and upgrades appears, the list contains information about those products of the MikEL company that have already been installed on the master computer.



If the list contains the item which can be updated, the *Next* button must be selected. The upgraded device handler shall be downloaded and installed in the already existing folder. The *Cancel* button provides the option to abandon installation of new software revisions and exit the download procedure.

3.3. Software description

The following functions and parameters are available during configuration of the unit and tuning it for operation:



1. *search for GeNa-2* is the basic function that enables readouts of current parameters of the subtitle generator. The program automatically scans the serial ports COM1...COM4 to find the unit connected to one of them. The

- successful communication session ends up in displaying the version of the unit software along with the unit serial number in the bottom of the screen.
2. *analysing subroutine* decides in which way the data are to be analysed after having them received through the serial port. The number of available subroutines depends on current software revision (user's application). The function *subroutine storage* makes it possible to transfer the pattern as is intended to be currently used for data analysis and store it into the subtitle generator unit.
 3. settings for location and dimensions of the text window that is merged with the video image. The maximum window size comprises 12 lines with 40 characters per each line. To set up the window parameters the following items must be specified:
 - ◆ *upper margin* defined by the uppermost line number of the screen where the first line of the received characters should be displayed,
 - ◆ *number of lines* defines the height of the text window,
 - ◆ *left margin* defined by the leftmost column number of the screen where the first character of the presented text is to be displayed,
 - ◆ *number of columns* defines the width of the text window,
 4. *screen blanking time* [s], that enforces disappearing of the text window content if no information is received by the serial port during the specified time period.
 5. *line delay time* [multiple of 0.1 s], which results that displaying of subsequent lines shall be delayed by the specified time interval. Settings for that parameter can be useful if the source of the text information transmits the entire message at once (as a single package). Such a text, after merging with the video image, would be illegible, even if the video track is played at very low speed. According adjustment for the delay time extensively facilitates analysis of the information recorded.
 6. alteration of the *serial transmission parameters*
 - ◆ baud rate from 1200 bps to 115200 bps
 - ◆ 7 or 8 data bits
 - ◆ 1 or 2 stop bits
 - ◆ parity checking for the serial transmission (don't care, odd, even),
 7. *auxiliary text*, not more than 40 characters that is displayed depending on settings for the parameter *display* from the location as is specified by the *line* and *column* co-ordinates.
- NOTE:** If location of the auxiliary text is exactly the same as the location of the text window the auxiliary text shall be overwritten by the messages as received from the serial port and displayed as subtitles.
8. setting of date and time for the *real-time clock (RTC)* as well as specification whether the clock is to be displayed on the screen or not and where the clock should appear, is applicable

NOTES:

- ◆ For programming the real—time clock (RCT) of the unit the computer clock time is assumed as the reference. The current date and time of the computer clock is displayed in the bottom part of the program window.
 - ◆ If the location for date & time is exactly the same as the location of the text window the date & time values shall cover the messages as received from the serial port and displayed as subtitles.
9. *selection of the code table* for national characters, which informs the unit in which way the characters of the received text are encoded. In practice, a whichever pre-defined matrix of characters can be supported, depending on the application software as developed by the manufacturer of the unit.

All the above parameters can be stored into the memory of the unit by means of the function *store settings*.

NOTES:

- ◆ While programming, the subtitle generator must be connected to any of the serial ports (COM1...COM4) of the master computer, searching for the connected equipment is performed in the automatic mode.
- ◆ Correct programming of the subtitle generator ends up in enabling the function *screen refreshing*. This function can be enabled and disabled at any moment of time and can be used for periodical (once per second) readouts of the video memory of the unit, hence rough presentation of the displayed text on the display screen is possible (without the video camera image).

Currently developed software applications for the subtitle generator are contained in files with the extension **.hex* (e.g. *gena2.hex*). If an upgraded software revision for the unit is released by the manufacturer, the upgraded software can be transferred into the unit's memory in the following way:

- ◆ copy the new application file into the folder where the installable software is stored,
- ◆ run the option *Application upgrade*. After completion of the procedure the parameter *analysing subroutine* shall present the updated list of the applications available.

The bottom part of the program screen displays detailed information about:

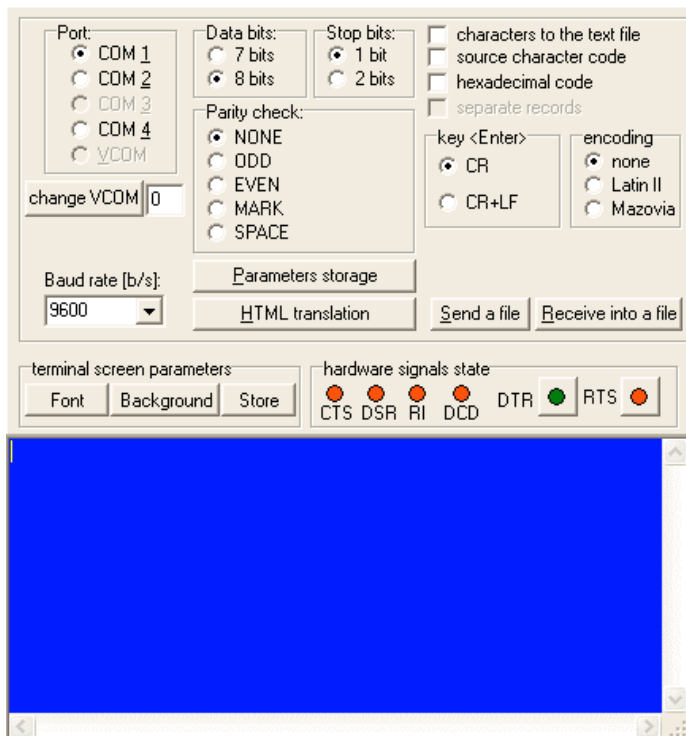
- ◆ loader version (the part of the device software that can be altered only on the manufacturing stage of the unit),
- ◆ current revision of the application program (the part of the device software that can be substituted by transmission through a serial port),
- ◆ serial number of the unit, e.g. G2/26-4-1/05 that stands for the first GeNa2 subtitle generator that was manufactured on the 4th day of the 26th week of the year 2005.

3.4. Terminal.

The additional advantage of the provided software package is a terminal – the tool to support serial ports. Not only can the tool be used for the tasks related to the described device but also for other purposes.

The terminal software module supports serial ports with the following range of transmission parameters:

- ◆ Selection: COM1 ... COM4 or any virtual port VCOM
- ◆ Baud rate: 110 bps ... 256000 bps (depending on the master computer capacity)
- ◆ Data length: 7 or 8 bits
- ◆ Stop bits: 1 or 2
- ◆ Parity check: none, odd or even, always the types MARK or SPACE are used.



The button *Parameters storage* makes it possible to tune the terminal to support the selected serial port in accordance with the parameter settings. This operation

leads also to storage of the most recent settings for individual serial ports in the program's memory.

The terminal software enables on-line monitoring of the hardware signals that are received by the master computer. The user is also allowed to affect the output signals that are transmitted by the computer by depressing the buttons *DTR* and *RTS*. Red colour indicates that the specific signal is inactive while green signals are active.

All the characters that are typed on the computer keyboard are displayed on the terminal screen and transmitted to the serial port that is currently selected. All the characters are virtually available as bytes with the values from 0 to 255. The following rules have been adopted to display characters on the screen:

- The characters that are typed on the alphanumeric keyboard are presented in their natural form, i.e. **zero** will be displayed as the character of **0**.
- ASCII codes of characters are obtained if the specific key is hit while the <Ctrl> is hold depressed or the character number is typed on the numeric keyboard (the NumLock key must be on!). The codes are displayed between the "<" and the ">" signs, e.g. the character with the code **48** (zero) will be displayed as **<48>**.
- The characters that are received from the selected serial port (delivered to the computer) and have ASCII codes from 32 to 127 are displayed in their exact form; otherwise the ASCII code is displayed in square brackets, e.g. **[130]**.
- If the parameter *hexadecimal code* of characters is marked all the characters are displayed in the hexadecimal form and preceded by the dollar sign (\$), e.g. the zero transmitted from the master computer is shown as **<\$30>**, whereas the same character after receiving by the computer is displayed in the form **[\$30]**.
- If the above presentation of characters is undesired activation of the parameter *source character code* is sufficient to preserve the original codes of characters and store thereof into the relevant file, however the text that is displayed on the computer screen may be illegible.

In case if special codes (CR and LF) are to be transmitted through the serial port the following rules must be observed:

- to send the *carriage return (CR)* character it is enough to hit the <Enter> key (the cursor on the screen shall move to the beginning of the subsequent line),
- to send the *line feed (LF)* character the <Enter> key must be hit while the <Ctrl> key is hold depressed (the cursor shall remain where it is)
- to send simultaneously the both characters (*CR + LF*) the operation can be simplified by assigning the two functions *CR+LF* to the single <Enter> key.

If transmission of Polish national characters encoded in accordance to *LATIN II* or *MAZOVIA* standards is required it is sufficient to change the value of the *encoding* parameter. If so, any Polish character when displayed on the screen is automatically translated in accordance to the coding scheme selected. If no encoding scheme is selected the characters are transmitted as Windows 3.1 LATIN 2 codes.

If the parameter *characters to the text file* is marked all the historical records related to transmission and reception of characters that are displayed on the terminal screen shall be appended to the specified text file.

If the text file is recorded according to the HTML standard it is possible to distinguish by different colours the characters that are transmitted by the computer from the ones that are received by it. To do so the parameter *separate records* must be activated.

All the characters that have been displayed on the screen from the moment when the terminal facility was run can be stored in the RS232.HTML file. This is executed by having depressed the *HTML translation* button.

The function *Send a file* makes it possible to send any disk file through the serial port in accordance to the current port settings.

By means of the function *Receive into a file* all the bytes delivered through the serial port can be received without any additional conversion in accordance to the current settings of the serial port. Data acquisition is terminated at the moment when the function *terminate* is executed.

To reach better visibility of the displayed characters both the background and font colours can be adjusted by means of the respective buttons *Background* and *Font*. Tuning the screen size may also prove to be a useful facility, selected screen dimensions are automatically memorized by the program.

