TECHNOPOL

TOP ELECTRONIC

CD 1000

RECEIVER BASE STATION

for

alarm signals

from encoders/transmitters

Operating instructions

v 3.80

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CD-1000

RECEIVER BASE STATION FOR ALARM SIGNALS MONITORING

The receiver station CD-1000 is designed to receive and process signals sent via a radio channel or a spare phone pair from End-Users that are secured with technical means. The station recognises the subscriber objects and any Alarm events taking place there, displaying them in an appropriate way on a monitor, a computer and a printer. It allows for monitoring of security, fire alarm, fire extinguishing, gas alarm and mobile equipment.

OPERATIONAL FEATURES

- Number of radio input ports – 4 nos. Designed for the input of analog data, and fitted for a direct connection to output ports of radio stations or receivers;
- Number of radio output ports – 2 nos. Designed for the output of analog data and fitted for a direct connection to radio stations or transmitters;
- INPUT signal level ranges from 30 mV to 3 V. Recommended level is 1 - 2 Vpp. Output impedance: 10 kOhm.
- Frequency band: min. 600 - 2000 Hz.
- OUTPUT signal level: from 0 to 5 V, adjustable. Output impedance: 100 Ohm.
- OUTPUT for radio station PTT control: COLLECTOR open to GROUND; max. current - 1 Amp.;
- Printer OUTPUT - a parallel Centronics interface port;
- Computer OUTPUT - two serial RS232C interface ports, 7and 8-bit data accounts, with/without odd/even parity control, with 1 and 2 stop-bits; speeds of 300 to 9600 bps, w/ or w/o computer confirmation, freely programmable;
- Interface accounts: RADIONICS RAD6500, ELECTRONICS LINE and TEC98
- 8-button Keypad;
- Display on an illuminated LCD monitor in 4 lines of 40 characters each. Information is displayed in several languages;
- Handling of up to 8192 fixed objects with a cascade extension option for new receiver stations to cover up to 65536 objects;
- Recognising of standard events ALARM, RESTORE and TROUBLE in Quadrants 1 through 8, OPEN/CLOSE states on subscriber objects, STARTING, TEST, AC TROUBLE and RESTORE, LOW BAT and BAT RESTORE and up to 256 different events in all;
- Capable of handling GPS data to position the precise location of moving vehicles under surveillance;
- Retaining the status in case of power failure;
- Provided with a system for dynamic self-testing and self restoring of its operation;
- Completely compatible with IGP8000 Receiver Station manufactured by ELECTRONICS LINE and Encoders/Transmitters KEL 780 and CK-021/CK-022/CK-023/CK-024/CK-025;
- Capable of joint operation with ALARM SIGNAL REPEATERS CD1000R
- Optional increase of the input ports through the use of CD1000E module. This enables each input to be extended to four new radio inputs;
- A metal casing designed as a module to be built in control panels;
- Power Supply of 9V to 24V DC (saved);
- Power consumption – 100mA with no illumination and less than 220mA with fully lit up illumination at 14V.

FUNCTIONAL DESCRIPTION

- Recognising of Alarm events by the four INPUT ports, data processing and displaying it in an appropriate way onto an LCD Monitor, a printer and two computers (a desired language option);
- Storage and readily accessible reference to the latest 4096 Alarm events. Power independent memory;
- Storage and readily accessible reference to the status of each subscriber object;
- Reference for the time lapsed since the latest TEST signal received;
- Report on the events for the time lapse since the last Alarm signal received.
- Assessment of the instant data transfer rate regarding most recent events received from each subscriber object in percentages, a general assessment of the radio communication link to each object. It includes separate assessments of the signals at the radio input ports and those that have passed through a repeater. This ensures an excellent way of assessing a link to an object with regard to finding the best location of its transmitter (aerial) both in cases of starting a new object, and for conducting of operation control to objects under surveillance;
- Integrated assessment of the data transfer rate available for the latest events at each object in percentages aimed at the achievement of a general evaluation of the radio link to each individual object;
- Generation of Alarm messages in case of an instant or integrated communication loss of links to objects that have dropped down below the pre-set threshold values;
- Generation of Alarm messages about a malfunctioning radio INPUT port in case of no INPUT signals for longer than the pre-set time period to allow for prompt detection and elimination of any possible failures in the external equipment;
- Audio signal upon receiving of an Alarm signal (by sound or visual marking);
- Information about the instant activity status of the inputs and the sources of the events received;
- Information about the distribution of data packages received for each event at the radio input ports and passing through repeaters. This statistics is particularly needed when starting a new object;
- Request for a confirmation to react to each Alarm event received;
- The system status is retained in case of power failures;
- Remote clock setting via a serial channel from a computer;
- Operates a transmitter to send control signals to end devices and repeaters. It maintains all radio formats and a selectable radio frequency channel;
- When using some of the radio formats of CK-022 Encoders/Transmitters it offers additional features such as recognising of lost events, a jumping code for the information on the radio channel to ensure a greater reliability and not allowing for simulation of events i.e. scanning and replay of fake events), a simultaneous operation on several radio frequencies, a transmission of additional information, etc.

STATION INSTALLATION

Front and rear panel schematic diagrams are given in Appendix 1 hereto. First, connect all cables between the Receiver Station, Radio Stations 1-4, the printer and the computer/s. Then, plug it into a 9-24VDC Power Supply source, following the prescribed polarity. A protection is provided in case of wrong polarity connection. It is advisable that a saved Power Supply is used i.e. a standard accumulator battery and a charger or an UPS and a 12V adapter.

Once you have made sure that installation is made properly, turn the master key to ON position and the name of the system will appear on the display. If necessary, turn on the additional display illumination from the black switch on the rear panel. If you turn off the power supply please wait at least one minute before re-starting the station.

The factory set-up of all INPUT and OUTPUT levels is suitable for almost all most common radio stations. It is recommended that a 1 Vpp OUTPUT port is provided after the Frequency Discriminator. Any subsequent frequency processing of the audio signal by filters and low frequency limit amplifiers may deteriorate the quality of the digital signal. The same effect might have the SQUELCH system, used to reset the OUTPUT with some delay, which can cause a loss of some information packages from the most remote subscriber objects in particular.

When the INPUT level is higher than 2.5 - 3 Vpp, it can be turned down by the INPUT level control potentiometer for the respective channel. Level measurements can be taken using an oscilloscope at pin 2 of the FSK-Demodulator for the respective channel upon receiving of an INPUT signal.

Two LED are provided on the bottom PCB to ensure light indication of any INPUT signals in the Receiver Station. The LED on the left (viewed from the rear) is lit up during the reception of an active INPUT signal at some of the INPUTS (noise is ignored). The LED on the right-hand side changes alternatively its mode upon receiving of a valid information package from the INPUT signal. The two LED's go on when a signal is transferred to some of the radio outputs (1 or 2) and they indicate the he transmitter is operating in its transmission mode. All these LED's are designed to visualise signal transfer from the Radio Station to the Receiver Station and to facilitate any adjustments to the base equipment and any further diagnostic procedures.

The LED in the middle of the PCB goes on intermittently for 5 seconds at initial starting or re-starting of the system. When it starts blinking at a frequency of 1 Hz it shows that the system is completely ready for operation. The trouble free operation of the receiver station is controlled by a special circuit that monitors the operation of all its parts and in case of trouble it resets.

Information about the interface connections and the cables is given in Appendix 2 hereto.

OPERATION

Turn ON the power supply and the headline on the display will show information about the type of the receiver station, the software version and the manufacturer's name. Press <ENTER> to display the current date and time which should be reset.

```
------------------------------------------------------------
CENTRAL STATION     CD-1000 V3.8
(C) TECHNOPOL &Top Electronic 1997,2000
------------------------------------------------------------
```

The operation of this system is standard. Unless otherwise specified in this manual, you should know the following:

- lines 1, 2 and 3 on the display are used to bring out information;
- line 4 is only used to display reference information about pushbuttons that can be currently used and their functions;
- press <**MENU**> key to switch from operation to setting modes or help through the menus;
- use <**ENTER**> key to confirm any information, selected from the menus and to store it. Use this key also to confirm an Alarm signal, received by the operator;
- press <**EXIT**> key to cancel wrong information that has been entered and to return to a higher MENU level;
- press <**LEFT/RIGHT**> keys to move cursor position when selecting a menu or some part to be edited;
- press <**UP/DOWN**> keys to increase or decrease the value of a selected parameter by one unit measure when editing;

Set the time and date, wait a bit until it coincides with the astronomical time, and then press <**ENTER**>. The station will start operation and its indication will be as follows:

```
------------------------------------------------------------
17/05/98            10:37:54
------------------------------------------------------------
MENU - select main menu, ENTER-accept
```

- ress <**USER**> key to switch ON/OFF alternatively screen illumination

In case of an event it is immediately reported on the display, the printer and the computer :

```
------------------------------------------------------------
17/05/98   10:38   0042,   ALARM   ZONE   6
------------------------------------------------------------
MENU -   select  main menu, ENTER - accept
```

Confirm it by pressing <**ENTER**> which will be followed by the display of the next event (if any) received from the buffer. In case of no other event it will display the present time and date. If the station is set to <**BUZZER ON**>, then any alarm message received will be accompanied by a continuous sound signal. To reset the sound signal press <**ENTER**> or leave it. If no pushbutton is pressed it will sound for 1 minute and then the station will switch to the next event. If the sound is set to <**BUZZER-MARK**> a short sound signal will be produced in the receiver station at any new event received. If the sound is set to <**BUZZER OFF**> no sound signal will be produced.

- Press <**EXIT**> to switch to TEST mode and it will display some additional information together with the events received:

```
---------- IN1(A)------ IN2(P)----- IN3(A)---------- IN4(P)----------
17/05/98 10:38 0042, ALARM ZONE 6 IN3
-----------------------------------------------------------------------------------------------
MENU – select main menu, ENTER – accept
```

Following the text the display will indicate the radio input port where the event was first received and the top line will indicate the instant activity of the radio inputs. (A) – active mode (a signal is being received at the moment; (P) – passive mode. That is the same information that could be monitored on the channel LED's and it has been displayed on the LCD for a greater convenience.

To switch from Operation Mode to Setting and Reference Mode press <MENU> key. The display will indicate:

```
<SET UP> HISTORY STATUS STATISTICS

View/Modify central station parameters

<- -> - select, ENTER - accept, EXIT - abort
```

Using <**LEFT**> or <**RIGHT**> keys select an item from the menu, indicated on the first line and put into brackets. Press <**ENTER**> to enter the desired sub-menu. Press <**EXIT**> to switch back to Operation mode.

The second line gives information about the function of the item, selected by the cursors as follows:

SETUP - Enables change in the settings of the receiver station such as date and time, operation modes of the OUTPUT units, accounts, formats, system parameters, etc.

HISTORY - Enables scanning of the buffer for the latest 4096 events received.

STATUS - Gives information of the current condition of a selected object such as SURVEILANCE ON/OFF, information about the condition of every zone, power supply YES/NO, NORMAL/LOW batteries, time lapsed from last TEST signal received.

STATISTICS - Displays in an appropriate way statistics of any selected subscriber object such as its operation mode, time as from its latest test, address of latest event received, type of the last event received, number of packages received from it, number of packages that must be received from it, number of events received about this object so far, and the amount of packages, what is the current and the integral radio accessibility rate to that object in percentages, etc.

SET-UP MENU

The SETUP sub-menu contains the following components:

- SETUP
  - TIME — sets date, time, type of date and clock re-adjust
  - OUTPUT — adjusts the interface parameters to the computer, printer, indication and sound signal
  - SYSTEM — changes system parameters such as event reception timeout, radio inputs timeout period, levels of alarm events in case of deteriorated link to the objects, etc.

- TIME
  - SET-TIME — sets the astronomical time and date
  - ADJUST — eliminates errors of the clock, sec/hr
  - FORMAT — sets the type of date displayed
    - DD/MM/YY — European format
    - MM/DD/YY — American format
    - YY/MM/DD — Japanese format

- SYSTEM
  - T-OUT — a fixed time period in minutes after which any following information package received about an event is interpreted as information about a new event. This period should be longer than the number of repetitions of events multiplied by the time period between them as set in the Encoder/Transmitter. *Example*: 5 times* (20 sec. repetition time + 15 sec. interval) = 3 minutes
  - TIN — timeout in minutes after receiving of an INPUT signal from any INPUT port. Upon lapsing of that time any subsequent reception of a new event will generate an Alarm report. Any malfunctions in the aerial, feeder, radio station, connecting cables, jacks or INPUT ports of the receiver station are duly reported. The message sent to the display and the printer is as follows:
    10/05/98 20.56 0000 TIMEOUT INPUT 2
  - MEC — number of events regarded for estimation of the integrated radio accessibility rate to the relevant objects. It determines the time constant for integration or the weight of the last received message with regard to the value estimated up to that moment.
    The integrated accessibility rate can be set up to increase or decrease faster by setting a lower value for it. (10-50)
  - TC — A temporary accessibility threshold in %. Reaching of that limit will generate an ALARM message, which means that the last event for an object is received through a critically small number of packages from repetitions and there is a great probability for a radio connection dropout. The recommended threshold is 20-30%. A value of 0% excludes this function. The message is passed onto the display and the printer after reaching

timeout for the last received event from the object. The message that appears on the display is:
10/05/98 20:31 0047 BAD TEMP.CONNECTION

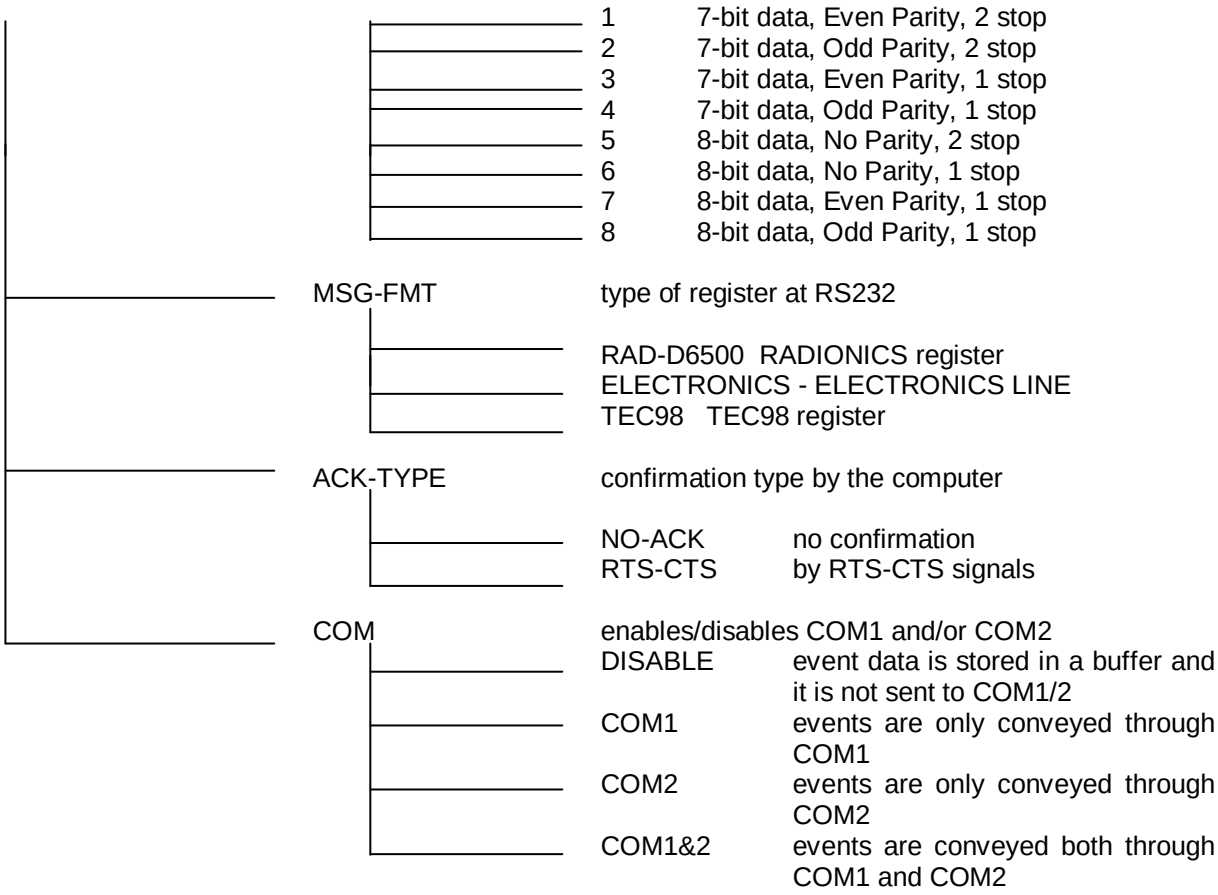
- **CC** — A threshold of permanent radio accessibility as a percentage. An ALARM message is generated upon reaching of this value and it means that the connection with an object has been at a critical low level for a long period and its reasons should be found out. Recommended level - 50 %. A value of 0 % excludes this function. The message is displayed onto the monitor and passed onto the printer after reaching timeout for all events, received at the moment for a particular object. The message that appears is:

  10/05/98 20:37 0047 BAD CONNECTION

- **ST** — Sets the way of generating data to the computer and allows for any of the following 4 levels:
  Level-0 no data generation
  Level-1 standard data generation
  Level-2 extended data generation
  Level-3 standard and extended data generation

OUTPUT

- **LCD** — LCD indication setting
  - **LANGUAGE** — the language used on the display
    - ENGLISH
    - BULGARIAN
  - **LIGHT** — display illumination rate – 16 levels
- **BUZZER** — sound signal setting
  - **BUZZER ON** — Continuous sound upon an Alarm reception and two short beeps for any other events
  - **BUZZER MARK** — It registers any event received with 2 short beeps
  - **BUZZER OFF** — Sound OFF
- **PRINTER** — Printout setting
  - **PRINTER ON** — Received events are immediately sent to the printer
  - **PRINTER OFF** — Received events are not sent to the printer. They are stored in a buffer until they are sent out for printing
- **COM** — setting of parameters to RS232 interface
  - **BAUD**
    - 300 - rate of 300 bps
    - 600 - rate of 600 bps
    - 1200 - rate of 1200 bps
    - 2400 - rate of 2400 bps
    - 4800 - rate of 4800 bps
    - 9600 - rate of 9600 bps
- **DATA-FMT** — RS232 data format



STATUS MENU

The STATUS Menu ensures the option of monitoring and making reference to the current status of the object under surveillance. First, choose the object number using keys <LEFT> and <RIGHT> to select the item to be changed and keys <UP> and <DOWN> to change this item by 1 unit up or down. Having entered the desired object number press <ENTER> and the display will indicate:

OBG – 0072 CLOSE AC-R BAT-R NOTEST-036 min
Z1-A Z2-R Z3-R Z4-T Z5-A Z6-R Z7-R Z8-T
Up/Down – select object number , EXIT - abort

where:

OBJ-XXXX is the object number

OPEN/CLOSE/XXXX is the condition of the object.

OPEN	- object open
CLOSE	- object closed and under surveillance
XXXXX	- no information available

AC-X indicates the power supply condition of the object

A	- no 220V power supply
R	- 220V power supply available

X - no information available

BAT-X indicates the condition of the batteries.

A - batteries low
R - batteries being recharged
X - no information available

Z1-X...Z8-X condition of zones 1 through 8

A - ALARM mode
R - RESTORE mode
T - TROUBLE mode
X - no information available

NOTEST-XXXmin - time (in minutes) since the last received message from that object. The value 255 indicates that this time has been 255 min. and over.

<UP/DOWN> keys are used to scroll through the objects either forwards or backwards and <EXIT> key returns to <MENU>.

STATISTICS MENU

The STATISTICS Menu provides the option of monitoring and making reference to the condition of an object obtained through the analysis on the quantity and quality of the event packages received about this object. This feature ensures an excellent way to assess a link to an object so as to find the best location for its transmitter (aerial) when starting a new object as well as for appraisal of the instant data transfer rate to an object followed by finding out any possible reasons for its deterioration. Choose the object number using keys <LEFT> and <RIGHT> to select the item to be changed and keys <UP> and <DOWN> to change this item by 1 unit up or down. Having entered the desired object number press <ENTER> and the display will indicate:

OBJ-0072 OPEN NO TEST-036m ADR=027 E025
R1=015 R2=000 R3=000 R4=000 REP=015 MAX=015
EventS=027 (00405) TEMP=100% TOTAL=100%
UP/DOWN –select object number, EXIT – abort

where:

OBJ-XXXX indicates the object number

OPEN/CLOSE/XXXX indicates the object status;

OPEN - object open
CLOSE - object closed and under surveilance
XXXXX - no information available of the object status

NOTEST-XXX M - time in minutes since the last received message from that object. The figure 255 indicates that this time has been 255 minutes and over.

ADR=XXX The address of the last event received. It is only used when using Encoder/Transmitters CK-022/CK-023/CK-023A/CK-024/CK-025 and radio formats 2, 4, 6. It indicates the sequence number of the last

received event that should be bigger than the previous one by 1. If that is not the case the receiver station will generate an alarm message by its computer software to indicate that there has been an omitted event at a particular object after expiry of the pre-set TIMEOUT upon receiving of several messages at a time or upon receiving of the next event through single signals. This allows for the detection of missed events at the object and for fakes resulting from 'suspicious' events reported from an object that has changed its location.

EXXX Serial number of the latest event received from the object under TEC98 format.

R1=XXX Number of packages received for the last event at radio input port #1. Used to control the communication link with the object provided by aerial 1.

R2=XXX Number of packages received for the last event at radio input port #2. Used to control the communication link with the object provided by aerial 2.

R3=XXX Number of packages received for the last event at radio input port #3. Used to control the communication link with the object provided by aerial 3.

R4=XXX Number of packages received for the last event at radio input port #4. Used to control the communication link with the object provided by aerial 4.

The sum R1 + R2 + R3 + R4 is the total number of packages received for the latest reported event including those received through a repeater.

REP=XXX Number of packages received for the latest reported event coming from repeaters (for radio formats 1 through 6 only). Used to determine the link with the object through a repeater.

MAX=XXX Number of packages that should be received for each event. Updated automatically depending on the currently received packages of events and containing their maximum number received about an object up to that moment. It is reset upon a Start command for a particular object. Used for statistics. For example, if we have a layout of two aerials for direct connection and one for a repeater and if the data emission from the object follows the pattern 5 x 3, then the maximum number of events should (5x3)x3 = 45 packages which corresponds to 100 % data transfer rate. In case that the number of packages displayed on the monitor is for some reason different from the actually estimated number, a manual adjustment should be made using the keys <LEFT> and <RIGHT> that can change the indication by one unit at each pressing up or down until obtaining the required figure. So, the figure indicated by the next reports will be true.

Events=XXX(YYYYY) Number of events received up to that moment for the selected object using module 256. The number in brackets indicates the total number of packages received for these events. Used for statistics.

TEMP=XXX% The data transfer rate for the last received event in percentages. It gives a picture of the instantaneous condition of the radio link to a selected object. Upon reaching a critical threshold of 20% an Alarm message is generated to indicate poor connection with the selected object. An analysis should be made for the reasons that might have caused this considerable loss of information and a solution should be

worked out on how to improve the link. This, for example, could be done by relocation of the Transmitter to another place, further exposure of the aerial, increasing the number of repetitions to the packages, connecting of the object to a repeater or any other way.

TOTAL=XXX% The integrated data transfer rate for the latest 256 events in percentages. It conveys information of the radio link condition for a particular object over a longer period of time at a rate as determined by the number of events for integrated appraisal set up in the system menu (MEC feature). Upon reaching a critical threshold (pre-set at CC%) an Alarm message is generated to indicate a poor connection with the selected object. Measures as described above should be taken. Otherwise there is a risk of missing events. The integrated information about the radio link with a particular object is more reliable and therefore it should be carefully monitored when related to the start-up of a new subscriber object or whenever some part of the system has been modified, for instance, change of location, transmitter, aerial, repeater, radio station, etc.

The MAX parameter should have a valid value to ensure higher reliability of the above information. As its updating takes place automatically, an error is possible to occur in case of a TEST signal received after a longer hold of the TEST button on the Encoder/Transmitter. It is advisable that users refrain from using that button after object start-up or if used that should be for a very short while.

T The <UP< and <DOWN> keys are used to scroll through the objects either forward or backward and <EXIT> key returns to MENU.

The <LEFT> and <RIGHT> keys are meant for changing of the constant provided it has a wrong value.

The <USER> key can be used to reset all values stored for a selected object up to that moment and statistics is restarted thereof. This function is performed automatically for all objects at initial start-up of the radio station and for each object upon receiving of a STARTING event. It is very convenient when determining the most appropriate location of the aerial to a new object. Instead of waiting for the timeout lapse at the receiver station press this key between each two trials to verify the statistics.

HISTORY MENU

The History Menu provides the User with the option to scan the buffer of the receiver station containing the latest 4000 events in their sequence of reception or generation.

17/05/98 10:38 0042, RESTORAL ZONE 1

UP – next event, DOWN – previous, EXIT – abort

The <UP< and <DOWN> keys are used to scroll through the objects either forward or backward and the <EXIT> key returns to MENU.

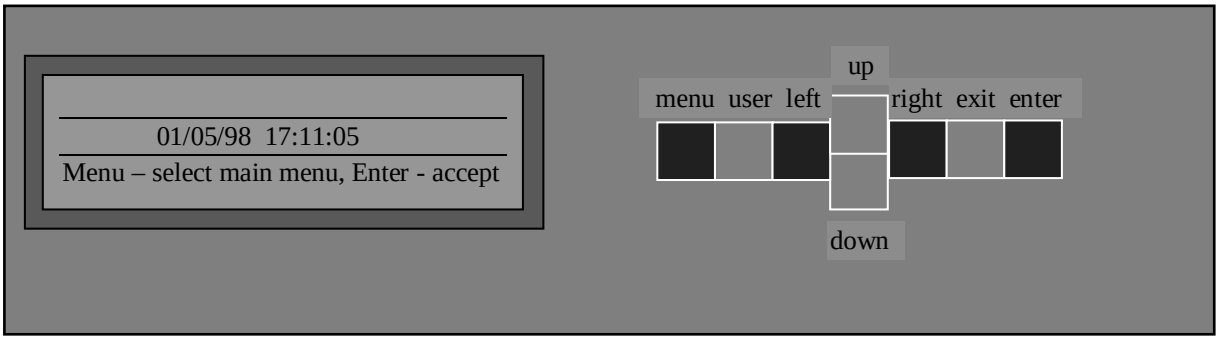
Click <ENTER> at an event and you will get more additional information about it.

```
EVENT=16   SOURCE=003       ADR=001
       D1=001       D2=001       D3=000
       D4=000       D5=034       D6=000
                    Press ENTE R to continue!
```

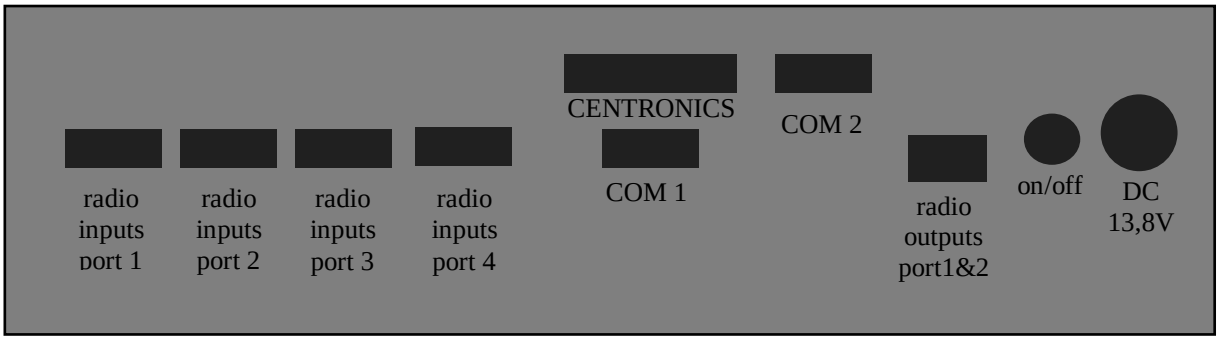
A description of the above parameters is given in the System Engineer's Manual

APPENDIX 1 : Schematic view of the front and rear panels

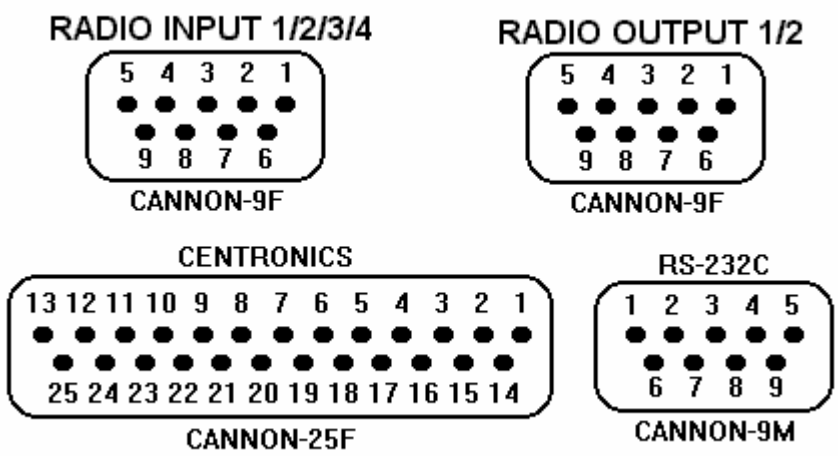
FRONT PANEL :



REAR PANEL :



APPENDIX 2 : INTERFACE CONNECTIONS AND CABLES



RADIO INPUT 1/2/3/4:

1. NC – not used
2. DGND - ground
3. RADIO IN - input analog signal from radio station, 30mV-3V
4. AGND – ground
5. NC – not used

6-9. GND – ground

RADIO OUTPUT ½:

1. DATA1 – analog output for data at radio output 1
2. PTT1 – output 1 to switch the transmitter to transmission mode (active ground – an open collector output at 1 Amp current)
3. AGND – ground
4. PTT2 – output 2 to switch the transmitter to transmission mode (active ground – an open collector output at 1 Amp current)
5. DATA2 – analog output for data at radio output 2
6. CH1 – digital output 1 (0/5V) to select a transmission channel on the transmitter
7. CH2 – digital output 2 (0/5V) to select a transmission channel on the transmitter
8. CH3 – digital output 3 (0/5V) to select a transmission channel on the transmitter
9. CH4 – digital output 4 (0/5V) to select a transmission channel on the transmitter

RS-232C:

1. NC - not used
2. RxD - receiver for serial data (for COM1 only)
3. TxD - transmitter for serial data
4. NC - not used
5. GND - ground
6. NC - not used
7. RTS – a transmission request (for COM1 only)
8. CTS – a reception confirmation
9. NC - not used

CENTRONICS

1. STROB - strobe for data
2. D0 - data 0
3. D1 - data 1

4. D2 - data 2
5. D3 - data 3
6. D4 - data 4
7. D5 - data 5
8. D6 - data 6
9. D7 - data 7
10. NC - not used
11. BUSY - the end unit is busy
12-17. NC - not used
18-25. GDN - ground

COMPUTER-RECEIVER STATION LINKING CABLE (COM1 w/o confirmation)

PC		CD-1000	
25 pin	9 pin		9 pin
TXD	2.....	3	2 RXD
RXD	3	2	3 TXD
GND	7	5	5 GND

COMPUTER-RECEIVER STATION LINKING CABLE (COM1 with confirmation)

PC			CD-1000
25 pin	9 pin		9 pin
TXD	2	3	2 RXD
RXD	3	2	3 TXD
GND	7	5	5 GND
CTS	5	8	7 RTS
RTS	4	7	8 CTS

COMPUTER-RECEIVER STATION LINKING CABLE (COM2)

PC		CD-1000	
25 pin	9 pin		9 pin
RXD	3	2	3 TXD
GND	7	5	5 GND

APPENDIX 3. RADIO INPUT SETTINGS:

The radio inputs have their default settings made by the manufacturer for best reception of signals from a radio station or directly from CK-02X. However, the use of other receiver types or radio stations with non-standard outputs may require some settings that should be made while installing the station (in case of no or unstable reception of signals).

1. Level incompatibility

The input channels are highly sensitive with a built-in timing system for input signals within a very wide range (from 3mV up to 3V and over). In cases of input signals different from the above and to achieve higher reliability with signals near the limit values of the range it is advisable that the input potentiometers at the relevant channels are re-adjusted. The level at leg 2 of the 14-legged integrated circuit for the relevant channel should have an alternating current level of 1-2 Vpp (measured with an oscilloscope) at the time of receiving an input signal. If that is not the case, turn the potentiometer for the relevant input 9i.e. the one that is nearest to the input socket) until obtaining an amplitude that is nearest to the above values.

2. Frequency band incompatibility

Some radio stations perform frequency adjustments upon reception (de-emphasis) aimed at adjustment of the audio signal received because a pre-emphasis has been performed during signal sending. That is made to achieve the best possible transmission of audio signals (speech). On the other hand, that breaks the digital signal frequency band and sometimes it deteriorates the quality of recognition between signals and noise at the input channels. In such cases adjust the main frequency for the respective channel and proceed as follows:

Feed continuous input signal, for example, by pressing the Test key on the encoder/transmitter with a CK-02X PCB. Adjust as described under item 1 above. Start turning the main frequency potentiometer for the respective channel (the one that is nearest to the 14-legged integrated circuit for the relevant channel).First turn it 40 times until reaching its left-most position. Then start turning it right until the decoder LED (the one in the group of three) starts flickering. Keep turning it right counting the turns or half-turns until the decoder LED stops flickering. Divide the number of turns by two and turn it to the left as many times as the resulting number of turns. Now we have fixed the center point for stable reception and the setting is completed. Do the same for the next input that is used. Make sure that the setting is performed in lieu with the respective receiver (radio station or else) that will be used for operation. If you change the receiver make a new setting for the new receiver.

APPENDIX 4. DATA EXCHANGE ACCOUNTS

1. Output to computer

A/ IRCSN III Format (ELECTRONICS LINE):
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
a c c t n n n .....message.....LF CR

ACCT = 000..8191 - object number
NNN= 000...255 - event number

1-8	**ALARM ZONE 1-8**
17-24	**RESTORE ZONE 1-8**
33-40	**TROUBLE ZONE 1-8**
51	**AC ALARM**
59	**AC RESTORE**
52	**LOW BATTERY**
60	**RESTORE BATTERY**
57	**TEST**
58	**OPEN**
66	**CLOSE**
55	**STARTING**

Message - textual sequence giving information of event type

No:	TAL FORMAT	D-6500	No:	TAL FORMAT	D-6500
Dec	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	1 2 3 4 5	dec	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	1 2 345 6
1	ALARM ZONE 1	A 1	33	TROUBLE ZONE 1	T 1
2	ALARM ZONE 2	A 2	34	TROUBLE ZONE 2	T 2
3	ALARM ZONE 3	A 3	35	TROUBLE ZONE 3	T 3
4	ALARM ZONE 4	A 4	36	TROUBLE ZONE 4	T 4
5	ALARM ZONE 5	A 5	37	TROUBLE ZONE 5	T 5
6	ALARM ZONE 6	A 6	38	TROUBLE ZONE 6	T 6
7	ALARM ZONE 7	A 7	39	TROUBLE ZONE 7	T 7
8	ALARM ZONE 8	A 8	40	TROUBLE ZONE 8	T 8
17	RESTORAL ZONE 1	R 1	51	AC TROUBLE	T 0
18	RESTORAL ZONE 2	R 2	52	LOW BATTERY	T 9
19	RESTORAL ZONE 3	R 3	55	STARTING	R 9
20	RESTORAL ZONE 4	R 4	57	TEST	R E
21	RESTORAL ZONE 5	R 5	58	OPENING	O
22	RESTORAL ZONE 6	R 6	59	AC RESTORED	R 0
23	RESTORAL ZONE 7	R 7	60	BATTERY NORMAL	R 9
24	RESTORAL ZONE 8	R 8	66	CLOSING	C

LF = 0x0A Paper scroll
CR = 0x0D New line

TECHNOPOL

TOP ELECTRONIC

CD 1000

RECEIVER BASE STATION

for

alarm signals

from encoders/transmitters

Operating instructions

v 3.80

6000 Stara Zagora,Slavyanski, bul. No 57,Bulgaria,tel+359 42 600 362, 660008
Fax:+359 42 633134; E-mail: sales@technopol.biz

CD-1000

RECEIVER BASE STATION FOR ALARM SIGNALS MONITORING

The receiver station CD-1000 is designed to receive and process signals sent via a radio channel or a spare phone pair from End-Users that are secured with technical means. The station recognises the subscriber objects and any Alarm events taking place there, displaying them in an appropriate way on a monitor, a computer and a printer. It allows for monitoring of security, fire alarm, fire extinguishing, gas alarm and mobile equipment.

OPERATIONAL FEATURES

- Number of radio input ports – 4 nos. Designed for the input of analog data, and fitted for a direct connection to output ports of radio stations or receivers;
- Number of radio output ports – 2 nos. Designed for the output of analog data and fitted for a direct connection to radio stations or transmitters;
- INPUT signal level ranges from 30 mV to 3 V. Recommended level is 1 - 2 Vpp. Output impedance: 10 kOhm.
- Frequency band: min. 600 - 2000 Hz.
- OUTPUT signal level: from 0 to 5 V, adjustable. Output impedance: 100 Ohm.
- OUTPUT for radio station PTT control: COLLECTOR open to GROUND; max. current - 1 Amp.;
- Printer OUTPUT - a parallel Centronics interface port;
- Computer OUTPUT - two serial RS232C interface ports, 7and 8-bit data accounts, with/without odd/even parity control, with 1 and 2 stop-bits; speeds of 300 to 9600 bps, w/ or w/o computer confirmation, freely programmable;
- Interface accounts: RADIONICS RAD6500, ELECTRONICS LINE and TEC98
- 8-button Keypad;
- Display on an illuminated LCD monitor in 4 lines of 40 characters each. Information is displayed in several languages;
- Handling of up to 8192 fixed objects with a cascade extension option for new receiver stations to cover up to 65536 objects;
- Recognising of standard events ALARM, RESTORE and TROUBLE in Quadrants 1 through 8, OPEN/CLOSE states on subscriber objects, STARTING, TEST, AC TROUBLE and RESTORE, LOW BAT and BAT RESTORE and up to 256 different events in all;
- Capable of handling GPS data to position the precise location of moving vehicles under surveillance;
- Retaining the status in case of power failure;
- Provided with a system for dynamic self-testing and self restoring of its operation;
- Completely compatible with IGP8000 Receiver Station manufactured by ELECTRONICS LINE and Encoders/Transmitters KEL 780 and CK-021/CK-022/CK-023/CK-024/CK-025;
- Capable of joint operation with ALARM SIGNAL REPEATERS CD1000R
- Optional increase of the input ports through the use of CD1000E module. This enables each input to be extended to four new radio inputs;
- A metal casing designed as a module to be built in control panels;
- Power Supply of 9V to 24V DC (saved);
- Power consumption – 100mA with no illumination and less than 220mA with fully lit up illumination at 14V.

FUNCTIONAL DESCRIPTION

- Recognising of Alarm events by the four INPUT ports, data processing and displaying it in an appropriate way onto an LCD Monitor, a printer and two computers (a desired language option);
- Storage and readily accessible reference to the latest 4096 Alarm events. Power independent memory;
- Storage and readily accessible reference to the status of each subscriber object;
- Reference for the time lapsed since the latest TEST signal received;
- Report on the events for the time lapse since the last Alarm signal received.
- Assessment of the instant data transfer rate regarding most recent events received from each subscriber object in percentages, a general assessment of the radio communication link to each object. It includes separate assessments of the signals at the radio input ports and those that have passed through a repeater. This ensures an excellent way of assessing a link to an object with regard to finding the best location of its transmitter (aerial) both in cases of starting a new object, and for conducting of operation control to objects under surveillance;
- Integrated assessment of the data transfer rate available for the latest events at each object in percentages aimed at the achievement of a general evaluation of the radio link to each individual object;
- Generation of Alarm messages in case of an instant or integrated communication loss of links to objects that have dropped down below the pre-set threshold values;
- Generation of Alarm messages about a malfunctioning radio INPUT port in case of no INPUT signals for longer than the pre-set time period to allow for prompt detection and elimination of any possible failures in the external equipment;
- Audio signal upon receiving of an Alarm signal (by sound or visual marking);
- Information about the instant activity status of the inputs and the sources of the events received;
- Information about the distribution of data packages received for each event at the radio input ports and passing through repeaters. This statistics is particularly needed when starting a new object;
- Request for a confirmation to react to each Alarm event received;
- The system status is retained in case of power failures;
- Remote clock setting via a serial channel from a computer;
- Operates a transmitter to send control signals to end devices and repeaters. It maintains all radio formats and a selectable radio frequency channel;
- When using some of the radio formats of CK-022 Encoders/Transmitters it offers additional features such as recognising of lost events, a jumping code for the information on the radio channel to ensure a greater reliability and not allowing for simulation of events i.e. scanning and replay of fake events), a simultaneous operation on several radio frequencies, a transmission of additional information, etc.

STATION INSTALLATION

Front and rear panel schematic diagrams are given in Appendix 1 hereto. First, connect all cables between the Receiver Station, Radio Stations 1-4, the printer and the computer/s. Then, plug it into a 9-24VDC Power Supply source, following the prescribed polarity. A protection is provided in case of wrong polarity connection. It is advisable that a saved Power Supply is used i.e. a standard accumulator battery and a charger or an UPS and a 12V adapter.

Once you have made sure that installation is made properly, turn the master key to ON position and the name of the system will appear on the display. If necessary, turn on the additional display illumination from the black switch on the rear panel. If you turn off the power supply please wait at least one minute before re-starting the station.

The factory set-up of all INPUT and OUTPUT levels is suitable for almost all most common radio stations. It is recommended that a 1 Vpp OUTPUT port is provided after the Frequency Discriminator. Any subsequent frequency processing of the audio signal by filters and low frequency limit amplifiers may deteriorate the quality of the digital signal. The same effect might have the SQUELCH system, used to reset the OUTPUT with some delay, which can cause a loss of some information packages from the most remote subscriber objects in particular.

When the INPUT level is higher than 2.5 - 3 Vpp, it can be turned down by the INPUT level control potentiometer for the respective channel. Level measurements can be taken using an oscilloscope at pin 2 of the FSK-Demodulator for the respective channel upon receiving of an INPUT signal.

Two LED are provided on the bottom PCB to ensure light indication of any INPUT signals in the Receiver Station. The LED on the left (viewed from the rear) is lit up during the reception of an active INPUT signal at some of the INPUTS (noise is ignored). The LED on the right-hand side changes alternatively its mode upon receiving of a valid information package from the INPUT signal. The two LED's go on when a signal is transferred to some of the radio outputs (1 or 2) and they indicate the he transmitter is operating in its transmission mode. All these LED's are designed to visualise signal transfer from the Radio Station to the Receiver Station and to facilitate any adjustments to the base equipment and any further diagnostic procedures.

The LED in the middle of the PCB goes on intermittently for 5 seconds at initial starting or re-starting of the system. When it starts blinking at a frequency of 1 Hz it shows that the system is completely ready for operation. The trouble free operation of the receiver station is controlled by a special circuit that monitors the operation of all its parts and in case of trouble it resets.

Information about the interface connections and the cables is given in Appendix 2 hereto.

OPERATION

Turn ON the power supply and the headline on the display will show information about the type of the receiver station, the software version and the manufacturer's name. Press <ENTER> to display the current date and time which should be reset.

```
----------------------------------------------------------------------------------------------
CENTRAL STATION      CD-1000  V3.8
(C)  TECHNOPOL &Top Electronic 1997,2000
----------------------------------------------------------------------------------------------
```

The operation of this system is standard. Unless otherwise specified in this manual, you should know the following:

- lines 1, 2 and 3 on the display are used to bring out information;
- line 4 is only used to display reference information about pushbuttons that can be currently used and their functions;
- press <**MENU**> key to switch from operation to setting modes or help through the menus;
- use <**ENTER**> key to confirm any information, selected from the menus and to store it. Use this key also to confirm an Alarm signal, received by the operator;
- press <**EXIT**> key to cancel wrong information that has been entered and to return to a higher MENU level;
- press <**LEFT/RIGHT**> keys to move cursor position when selecting a menu or some part to be edited;
- press <**UP/DOWN**> keys to increase or decrease the value of a selected parameter by one unit measure when editing;

Set the time and date, wait a bit until it coincides with the astronomical time, and then press <**ENTER**>. The station will start operation and its indication will be as follows:

```
----------------------------------------------------------------------------------------
                    17/05/98              10:37:54
----------------------------------------------------------------------------------------
              MENU - select main menu, ENTER-accept
```

- ress <**USER**> key to switch ON/OFF alternatively screen illumination

In case of an event it is immediately reported on the display, the printer and the computer :

```
----------------------------------------------------------------------------------------------------
          17/05/98    10:38    0042,   ALARM   ZONE   6
----------------------------------------------------------------------------------------------------
          MENU  -   select  main menu, ENTER - accept
```

Confirm it by pressing <**ENTER**> which will be followed by the display of the next event (if any) received from the buffer. In case of no other event it will display the present time and date. If the station is set to <**BUZZER ON**>, then any alarm message received will be accompanied by a continuous sound signal. To reset the sound signal press <**ENTER**> or leave it. If no pushbutton is pressed it will sound for 1 minute and then the station will switch to the next event. If the sound is set to <**BUZZER-MARK**> a short sound signal will be produced in the receiver station at any new event received. If the sound is set to <**BUZZER OFF**> no sound signal will be produced.

- Press <**EXIT**> to switch to TEST mode and it will display some additional information together with the events received:

```
---------- IN1(A)------ IN2(P)----- IN3(A)---------- IN4(P)----------
17/05/98 10:38 0042, ALARM ZONE 6 IN3
-----------------------------------------------------------------------------------------------
MENU – select main menu, ENTER – accept
```

Following the text the display will indicate the radio input port where the event was first received and the top line will indicate the instant activity of the radio inputs. (A) – active mode (a signal is being received at the moment; (P) – passive mode. That is the same information that could be monitored on the channel LED's and it has been displayed on the LCD for a greater convenience.

To switch from Operation Mode to Setting and Reference Mode press <MENU> key. The display will indicate:

```
<SET UP> HISTORY STATUS STATISTICS

View/Modify central station parameters

<- -> - select, ENTER - accept, EXIT - abort
```

Using <**LEFT**> or <**RIGHT**> keys select an item from the menu, indicated on the first line and put into brackets. Press <**ENTER**> to enter the desired sub-menu. Press <**EXIT**> to switch back to Operation mode.

The second line gives information about the function of the item, selected by the cursors as follows:

SETUP - Enables change in the settings of the receiver station such as date and time, operation modes of the OUTPUT units, accounts, formats, system parameters, etc.

HISTORY - Enables scanning of the buffer for the latest 4096 events received.

STATUS - Gives information of the current condition of a selected object such as SURVEILANCE ON/OFF, information about the condition of every zone, power supply YES/NO, NORMAL/LOW batteries, time lapsed from last TEST signal received.

STATISTICS - Displays in an appropriate way statistics of any selected subscriber object such as its operation mode, time as from its latest test, address of latest event received, type of the last event received, number of packages received from it, number of packages that must be received from it, number of events received about this object so far, and the amount of packages, what is the current and the integral radio accessibility rate to that object in percentages, etc.

SET-UP MENU

The SETUP sub-menu contains the following components:

- SETUP
  - TIME — sets date, time, type of date and clock re-adjust
  - OUTPUT — adjusts the interface parameters to the computer, printer, indication and sound signal
  - SYSTEM — changes system parameters such as event reception timeout, radio inputs timeout period, levels of alarm events in case of deteriorated link to the objects, etc.

- TIME
  - SET-TIME — sets the astronomical time and date
  - ADJUST — eliminates errors of the clock, sec/hr
  - FORMAT — sets the type of date displayed
    - DD/MM/YY — European format
    - MM/DD/YY — American format
    - YY/MM/DD — Japanese format

- SYSTEM
  - T-OUT — a fixed time period in minutes after which any following information package received about an event is interpreted as information about a new event. This period should be longer than the number of repetitions of events multiplied by the time period between them as set in the Encoder/Transmitter. *Example*: 5 times* (20 sec. repetition time + 15 sec. interval) = 3 minutes
  - TIN — timeout in minutes after receiving of an INPUT signal from any INPUT port. Upon lapsing of that time any subsequent reception of a new event will generate an Alarm report. Any malfunctions in the aerial, feeder, radio station, connecting cables, jacks or INPUT ports of the receiver station are duly reported. The message sent to the display and the printer is as follows:
    10/05/98 20.56 0000 TIMEOUT INPUT 2
  - MEC — number of events regarded for estimation of the integrated radio accessibility rate to the relevant objects. It determines the time constant for integration or the weight of the last received message with regard to the value estimated up to that moment.
    The integrated accessibility rate can be set up to increase or decrease faster by setting a lower value for it. (10-50)
  - TC — A temporary accessibility threshold in %. Reaching of that limit will generate an ALARM message, which means that the last event for an object is received through a critically small number of packages from repetitions and there is a great probability for a radio connection dropout. The recommended threshold is 20-30%. A value of 0% excludes this function. The message is passed onto the display and the printer after reaching

timeout for the last received event from the object. The message that appears on the display is:
10/05/98 20:31 0047 BAD TEMP.CONNECTION

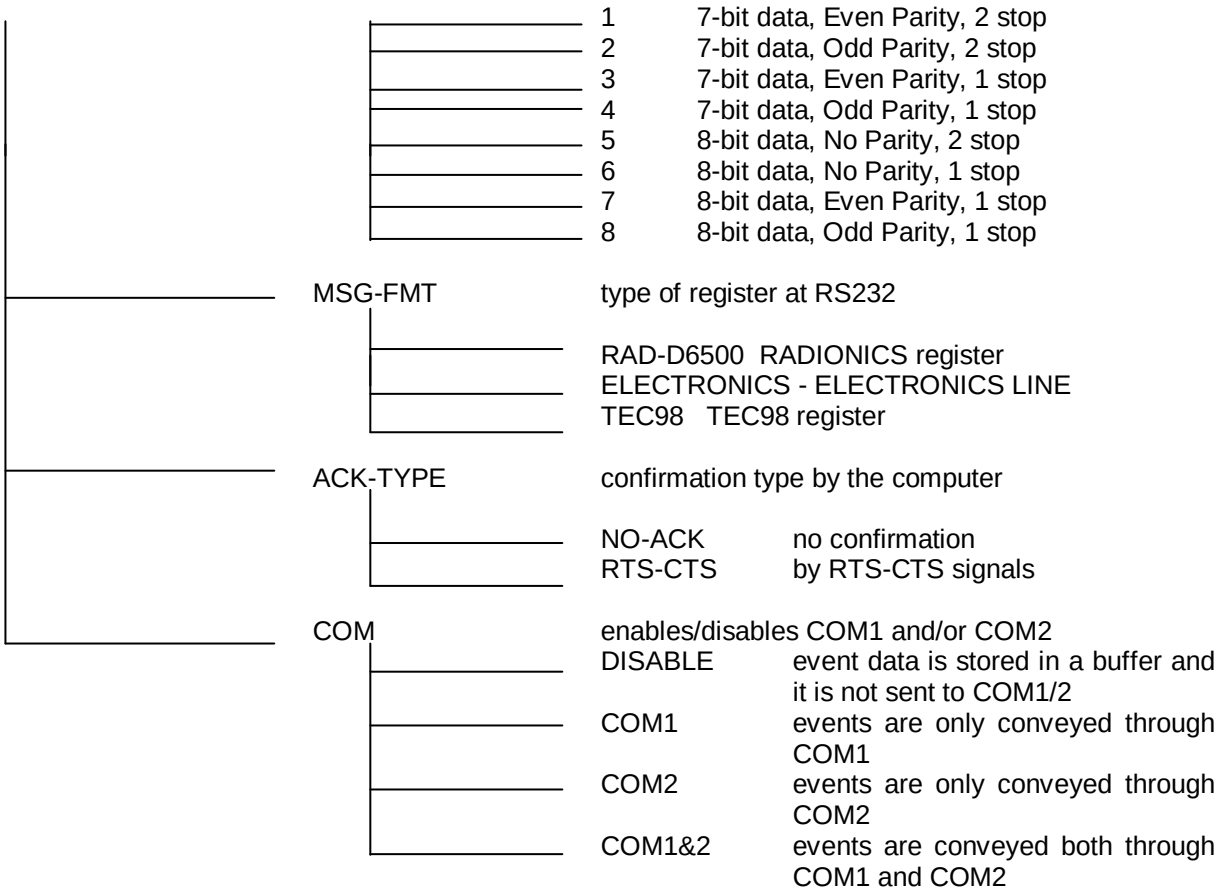
- **CC** — A threshold of permanent radio accessibility as a percentage. An ALARM message is generated upon reaching of this value and it means that the connection with an object has been at a critical low level for a long period and its reasons should be found out. Recommended level - 50 %. A value of 0 % excludes this function. The message is displayed onto the monitor and passed onto the printer after reaching timeout for all events, received at the moment for a particular object. The message that appears is:

  10/05/98 20:37 0047 BAD CONNECTION

- **ST** — Sets the way of generating data to the computer and allows for any of the following 4 levels:
  Level-0 no data generation
  Level-1 standard data generation
  Level-2 extended data generation
  Level-3 standard and extended data generation

OUTPUT

- **LCD** — LCD indication setting
  - **LANGUAGE** — the language used on the display
    - ENGLISH
    - BULGARIAN
  - **LIGHT** — display illumination rate – 16 levels
- **BUZZER** — sound signal setting
  - **BUZZER ON** — Continuous sound upon an Alarm reception and two short beeps for any other events
  - **BUZZER MARK** — It registers any event received with 2 short beeps
  - **BUZZER OFF** — Sound OFF
- **PRINTER** — Printout setting
  - **PRINTER ON** — Received events are immediately sent to the printer
  - **PRINTER OFF** — Received events are not sent to the printer. They are stored in a buffer until they are sent out for printing
- **COM** — setting of parameters to RS232 interface
  - **BAUD**
    - 300 - rate of 300 bps
    - 600 - rate of 600 bps
    - 1200 - rate of 1200 bps
    - 2400 - rate of 2400 bps
    - 4800 - rate of 4800 bps
    - 9600 - rate of 9600 bps
- **DATA-FMT** — RS232 data format



STATUS MENU

The STATUS Menu ensures the option of monitoring and making reference to the current status of the object under surveillance. First, choose the object number using keys <LEFT> and <RIGHT> to select the item to be changed and keys <UP> and <DOWN> to change this item by 1 unit up or down. Having entered the desired object number press <ENTER> and the display will indicate:

OBG – 0072 CLOSE AC-R BAT-R NOTEST-036 min
Z1-A Z2-R Z3-R Z4-T Z5-A Z6-R Z7-R Z8-T
Up/Down – select object number , EXIT - abort

where:

OBJ-XXXX is the object number

OPEN/CLOSE/XXXX is the condition of the object.

OPEN	- object open
CLOSE	- object closed and under surveillance
XXXXX	- no information available

AC-X indicates the power supply condition of the object

A	- no 220V power supply
R	- 220V power supply available

X - no information available

BAT-X indicates the condition of the batteries.

A - batteries low
R - batteries being recharged
X - no information available

Z1-X...Z8-X condition of zones 1 through 8

A - ALARM mode
R - RESTORE mode
T - TROUBLE mode
X - no information available

NOTEST-XXXmin - time (in minutes) since the last received message from that object. The value 255 indicates that this time has been 255 min. and over.

<UP/DOWN> keys are used to scroll through the objects either forwards or backwards and <EXIT> key returns to <MENU>.

STATISTICS MENU

The STATISTICS Menu provides the option of monitoring and making reference to the condition of an object obtained through the analysis on the quantity and quality of the event packages received about this object. This feature ensures an excellent way to assess a link to an object so as to find the best location for its transmitter (aerial) when starting a new object as well as for appraisal of the instant data transfer rate to an object followed by finding out any possible reasons for its deterioration. Choose the object number using keys <LEFT> and <RIGHT> to select the item to be changed and keys <UP> and <DOWN> to change this item by 1 unit up or down. Having entered the desired object number press <ENTER> and the display will indicate:

OBJ-0072 OPEN NO TEST-036m ADR=027 E025
R1=015 R2=000 R3=000 R4=000 REP=015 MAX=015
EventS=027 (00405) TEMP=100% TOTAL=100%
UP/DOWN –select object number, EXIT – abort

where:

OBJ-XXXX indicates the object number

OPEN/CLOSE/XXXX indicates the object status;

OPEN - object open
CLOSE - object closed and under surveilance
XXXXX - no information available of the object status

NOTEST-XXX M - time in minutes since the last received message from that object. The figure 255 indicates that this time has been 255 minutes and over.

ADR=XXX The address of the last event received. It is only used when using Encoder/Transmitters CK-022/CK-023/CK-023A/CK-024/CK-025 and radio formats 2, 4, 6. It indicates the sequence number of the last

received event that should be bigger than the previous one by 1. If that is not the case the receiver station will generate an alarm message by its computer software to indicate that there has been an omitted event at a particular object after expiry of the pre-set TIMEOUT upon receiving of several messages at a time or upon receiving of the next event through single signals. This allows for the detection of missed events at the object and for fakes resulting from 'suspicious' events reported from an object that has changed its location.

EXXX Serial number of the latest event received from the object under TEC98 format.

R1=XXX Number of packages received for the last event at radio input port #1. Used to control the communication link with the object provided by aerial 1.

R2=XXX Number of packages received for the last event at radio input port #2. Used to control the communication link with the object provided by aerial 2.

R3=XXX Number of packages received for the last event at radio input port #3. Used to control the communication link with the object provided by aerial 3.

R4=XXX Number of packages received for the last event at radio input port #4. Used to control the communication link with the object provided by aerial 4.

The sum R1 + R2 + R3 + R4 is the total number of packages received for the latest reported event including those received through a repeater.

REP=XXX Number of packages received for the latest reported event coming from repeaters (for radio formats 1 through 6 only). Used to determine the link with the object through a repeater.

MAX=XXX Number of packages that should be received for each event. Updated automatically depending on the currently received packages of events and containing their maximum number received about an object up to that moment. It is reset upon a Start command for a particular object. Used for statistics. For example, if we have a layout of two aerials for direct connection and one for a repeater and if the data emission from the object follows the pattern 5 x 3, then the maximum number of events should (5x3)x3 = 45 packages which corresponds to 100 % data transfer rate. In case that the number of packages displayed on the monitor is for some reason different from the actually estimated number, a manual adjustment should be made using the keys <LEFT> and <RIGHT> that can change the indication by one unit at each pressing up or down until obtaining the required figure. So, the figure indicated by the next reports will be true.

Events=XXX(YYYYY) Number of events received up to that moment for the selected object using module 256. The number in brackets indicates the total number of packages received for these events. Used for statistics.

TEMP=XXX% The data transfer rate for the last received event in percentages. It gives a picture of the instantaneous condition of the radio link to a selected object. Upon reaching a critical threshold of 20% an Alarm message is generated to indicate poor connection with the selected object. An analysis should be made for the reasons that might have caused this considerable loss of information and a solution should be

worked out on how to improve the link. This, for example, could be done by relocation of the Transmitter to another place, further exposure of the aerial, increasing the number of repetitions to the packages, connecting of the object to a repeater or any other way.

TOTAL=XXX% The integrated data transfer rate for the latest 256 events in percentages. It conveys information of the radio link condition for a particular object over a longer period of time at a rate as determined by the number of events for integrated appraisal set up in the system menu (MEC feature). Upon reaching a critical threshold (pre-set at CC%) an Alarm message is generated to indicate a poor connection with the selected object. Measures as described above should be taken. Otherwise there is a risk of missing events. The integrated information about the radio link with a particular object is more reliable and therefore it should be carefully monitored when related to the start-up of a new subscriber object or whenever some part of the system has been modified, for instance, change of location, transmitter, aerial, repeater, radio station, etc.

The MAX parameter should have a valid value to ensure higher reliability of the above information. As its updating takes place automatically, an error is possible to occur in case of a TEST signal received after a longer hold of the TEST button on the Encoder/Transmitter. It is advisable that users refrain from using that button after object start-up or if used that should be for a very short while.

T The <UP< and <DOWN> keys are used to scroll through the objects either forward or backward and <EXIT> key returns to MENU.

The <LEFT> and <RIGHT> keys are meant for changing of the constant provided it has a wrong value.

The <USER> key can be used to reset all values stored for a selected object up to that moment and statistics is restarted thereof. This function is performed automatically for all objects at initial start-up of the radio station and for each object upon receiving of a STARTING event. It is very convenient when determining the most appropriate location of the aerial to a new object. Instead of waiting for the timeout lapse at the receiver station press this key between each two trials to verify the statistics.

HISTORY MENU

The History Menu provides the User with the option to scan the buffer of the receiver station containing the latest 4000 events in their sequence of reception or generation.

17/05/98 10:38 0042, RESTORAL ZONE 1

UP – next event, DOWN – previous, EXIT – abort

The <UP< and <DOWN> keys are used to scroll through the objects either forward or backward and the <EXIT> key returns to MENU.

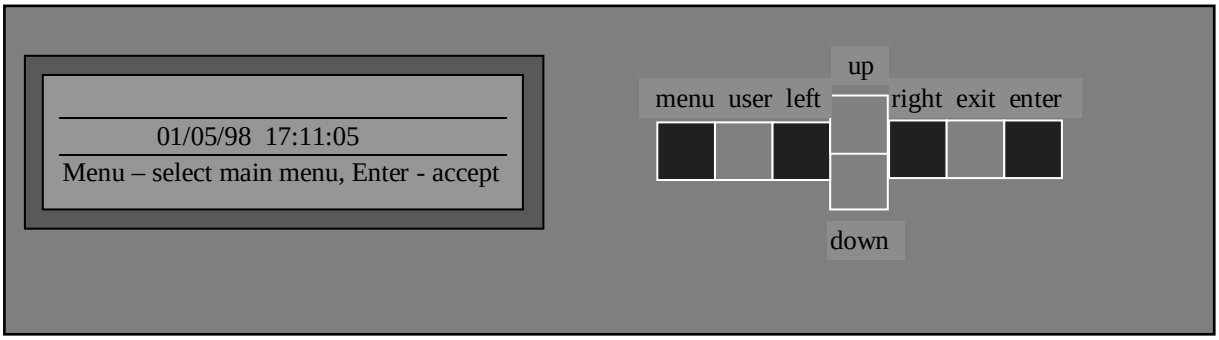
Click <ENTER> at an event and you will get more additional information about it.

```
EVENT=16   SOURCE=003       ADR=001
       D1=001       D2=001       D3=000
       D4=000       D5=034       D6=000
                    Press ENTE R to continue!
```

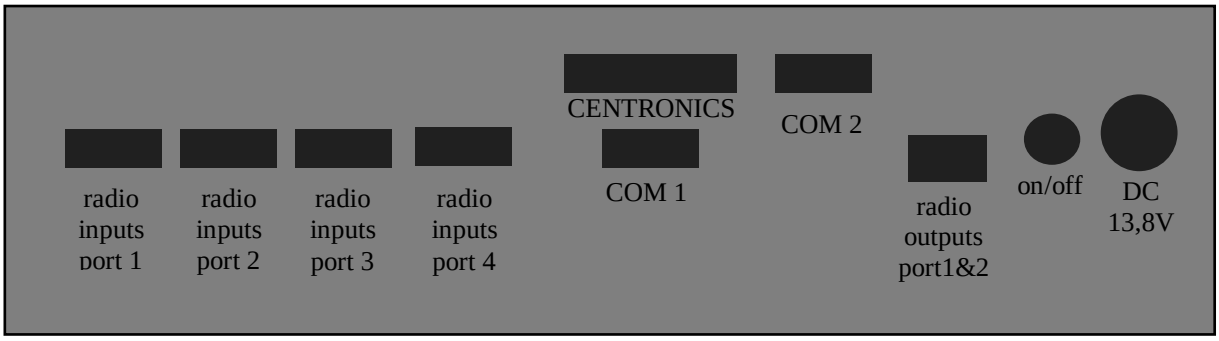
A description of the above parameters is given in the System Engineer's Manual

APPENDIX 1 : Schematic view of the front and rear panels

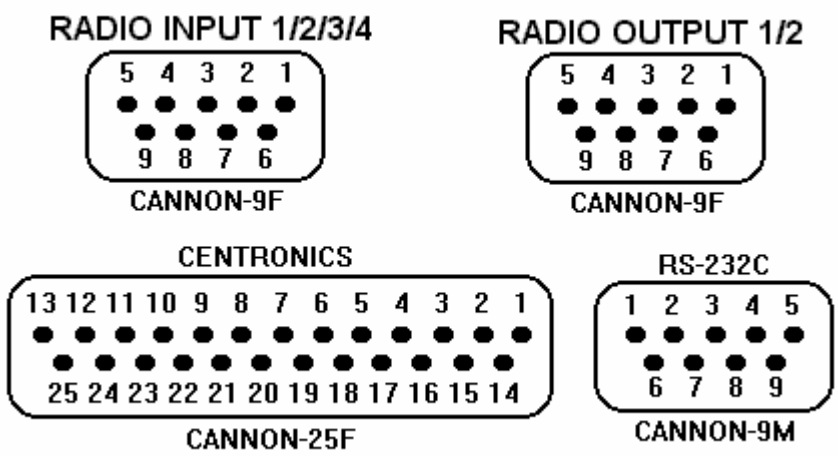
FRONT PANEL :



REAR PANEL :



APPENDIX 2 : INTERFACE CONNECTIONS AND CABLES



RADIO INPUT 1/2/3/4:

1. NC – not used
2. DGND - ground
3. RADIO IN - input analog signal from radio station, 30mV-3V
4. AGND – ground
5. NC – not used

6-9. GND – ground

RADIO OUTPUT ½:

1. DATA1 – analog output for data at radio output 1
2. PTT1 – output 1 to switch the transmitter to transmission mode (active ground – an open collector output at 1 Amp current)
3. AGND – ground
4. PTT2 – output 2 to switch the transmitter to transmission mode (active ground – an open collector output at 1 Amp current)
5. DATA2 – analog output for data at radio output 2
6. CH1 – digital output 1 (0/5V) to select a transmission channel on the transmitter
7. CH2 – digital output 2 (0/5V) to select a transmission channel on the transmitter
8. CH3 – digital output 3 (0/5V) to select a transmission channel on the transmitter
9. CH4 – digital output 4 (0/5V) to select a transmission channel on the transmitter

RS-232C:

1. NC - not used
2. RxD - receiver for serial data (for COM1 only)
3. TxD - transmitter for serial data
4. NC - not used
5. GND - ground
6. NC - not used
7. RTS – a transmission request (for COM1 only)
8. CTS – a reception confirmation
9. NC - not used

CENTRONICS

1. STROB - strobe for data
2. D0 - data 0
3. D1 - data 1

4. D2 - data 2
5. D3 - data 3
6. D4 - data 4
7. D5 - data 5
8. D6 - data 6
9. D7 - data 7
10. NC - not used
11. BUSY - the end unit is busy
12-17. NC - not used
18-25. GDN - ground

COMPUTER-RECEIVER STATION LINKING CABLE (COM1 w/o confirmation)

PC		CD-1000	
25 pin	9 pin		9 pin
TXD	2.....	3	2 RXD
RXD	3	2	3 TXD
GND	7	5	5 GND

COMPUTER-RECEIVER STATION LINKING CABLE (COM1 with confirmation)

PC			CD-1000
25 pin	9 pin		9 pin
TXD	2	3	2 RXD
RXD	3	2	3 TXD
GND	7	5	5 GND
CTS	5	8	7 RTS
RTS	4	7	8 CTS

COMPUTER-RECEIVER STATION LINKING CABLE (COM2)

PC		CD-1000	
25 pin	9 pin		9 pin
RXD	3	2	3 TXD
GND	7	5	5 GND

APPENDIX 3. RADIO INPUT SETTINGS:

The radio inputs have their default settings made by the manufacturer for best reception of signals from a radio station or directly from CK-02X. However, the use of other receiver types or radio stations with non-standard outputs may require some settings that should be made while installing the station (in case of no or unstable reception of signals).

1. Level incompatibility

The input channels are highly sensitive with a built-in timing system for input signals within a very wide range (from 3mV up to 3V and over). In cases of input signals different from the above and to achieve higher reliability with signals near the limit values of the range it is advisable that the input potentiometers at the relevant channels are re-adjusted. The level at leg 2 of the 14-legged integrated circuit for the relevant channel should have an alternating current level of 1-2 Vpp (measured with an oscilloscope) at the time of receiving an input signal. If that is not the case, turn the potentiometer for the relevant input 9i.e. the one that is nearest to the input socket) until obtaining an amplitude that is nearest to the above values.

2. Frequency band incompatibility

Some radio stations perform frequency adjustments upon reception (de-emphasis) aimed at adjustment of the audio signal received because a pre-emphasis has been performed during signal sending. That is made to achieve the best possible transmission of audio signals (speech). On the other hand, that breaks the digital signal frequency band and sometimes it deteriorates the quality of recognition between signals and noise at the input channels. In such cases adjust the main frequency for the respective channel and proceed as follows:

Feed continuous input signal, for example, by pressing the Test key on the encoder/transmitter with a CK-02X PCB. Adjust as described under item 1 above. Start turning the main frequency potentiometer for the respective channel (the one that is nearest to the 14-legged integrated circuit for the relevant channel).First turn it 40 times until reaching its left-most position. Then start turning it right until the decoder LED (the one in the group of three) starts flickering. Keep turning it right counting the turns or half-turns until the decoder LED stops flickering. Divide the number of turns by two and turn it to the left as many times as the resulting number of turns. Now we have fixed the center point for stable reception and the setting is completed. Do the same for the next input that is used. Make sure that the setting is performed in lieu with the respective receiver (radio station or else) that will be used for operation. If you change the receiver make a new setting for the new receiver.

APPENDIX 4. DATA EXCHANGE ACCOUNTS

1. Output to computer

A/ IRCSN III Format (ELECTRONICS LINE):
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
a c c t n n n .....message.....LF CR

ACCT = 000..8191 - object number
NNN= 000...255 - event number

1-8	**ALARM ZONE 1-8**
17-24	**RESTORE ZONE 1-8**
33-40	**TROUBLE ZONE 1-8**
51	**AC ALARM**
59	**AC RESTORE**
52	**LOW BATTERY**
60	**RESTORE BATTERY**
57	**TEST**
58	**OPEN**
66	**CLOSE**
55	**STARTING**

Message - textual sequence giving information of event type

No:	TAL FORMAT	D-6500	No:	TAL FORMAT	D-6500
Dec	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	1 2 3 4 5	dec	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	1 2 345 6
1	ALARM ZONE 1	A 1	33	TROUBLE ZONE 1	T 1
2	ALARM ZONE 2	A 2	34	TROUBLE ZONE 2	T 2
3	ALARM ZONE 3	A 3	35	TROUBLE ZONE 3	T 3
4	ALARM ZONE 4	A 4	36	TROUBLE ZONE 4	T 4
5	ALARM ZONE 5	A 5	37	TROUBLE ZONE 5	T 5
6	ALARM ZONE 6	A 6	38	TROUBLE ZONE 6	T 6
7	ALARM ZONE 7	A 7	39	TROUBLE ZONE 7	T 7
8	ALARM ZONE 8	A 8	40	TROUBLE ZONE 8	T 8
17	RESTORAL ZONE 1	R 1	51	AC TROUBLE	T 0
18	RESTORAL ZONE 2	R 2	52	LOW BATTERY	T 9
19	RESTORAL ZONE 3	R 3	55	STARTING	R 9
20	RESTORAL ZONE 4	R 4	57	TEST	R E
21	RESTORAL ZONE 5	R 5	58	OPENING	O
22	RESTORAL ZONE 6	R 6	59	AC RESTORED	R 0
23	RESTORAL ZONE 7	R 7	60	BATTERY NORMAL	R 9
24	RESTORAL ZONE 8	R 8	66	CLOSING	C

LF = 0x0A Paper scroll
CR = 0x0D New line