

# OPERATION MANUAL for digital voice recorders

## EM-Card and EM Card16 series

### Contents

1. Purpose.....	2
2. Main Features.....	2
3. Overlook.....	2
4. Technical Characteristics.....	3
5. Recording Duration.....	3
6. Recorder's Battery Life.....	3

### Operating the Recorder at the initial level

7. Battery Charging.....	4
7.1 Power supply for recorders with external power source.....	4
8. Recording.....	4
9. Record Playback.....	5

### Using all of the Recorder's options

10. Changing Settings using Configuration File.....	5
11. Recording by Timer.....	6
12. Recording by Sound Level.....	6
13. Recording by Timer and Sound Level.....	6
14. Recording using AGC.....	6
15. Setting File Size Restrictions.....	7
16. Setting Time and Date.....	7
17. Reset.....	7
18. System Event Log.....	7

# Specifications

## 1. Purpose

The recorders of the EM-Card16 family are professional devices intended for making high quality record of voice messages onto microSD memory card in wav format. The format is supported by all flash players on the PC and any other playback devices.

## 2. Main Features

- long recording duration. Up to 1088 hours depending on the capacity of memory card in use
- the option to enable recording automatically according to sound activation.
- long recording duration in sound activation mode (up to 1 year)
- built-in clock and calendar, the option to enable recording at the preset time using timer.
- the Recorder is operational under wide temperature ranges under shaking or dustiness.

## 3. Overlook

The Recorder is designed for high-quality audio recording . The device is powered by a built-in rechargeable battery, with microSD card as data carrier. During recording, the files are saved on the microSD card in WAV format. The Recorder features built-in real-time clock and 4 timers to automatically enable recording. It also has the option of recording according to voice activation and the display of remaining battery charge level. Real-time clock automatically takes into account leap years and various number of days within months. There is a configuration file on the memory card to configure Recorder's functions. Its contents can be changed on the PC using any word processor.

LED indicator is used for indication, its color being green or red. The Recorder has a Switch, its position being either ON or OFF. When the Switch is in OFF position, all the functions of the Recorder are off. After the Switch has been shifted to OFF position, the Recorder may need some time (up to 30 sec) to complete current functions and switch to the "off" state. Shutdown of the indicator states, the Recorder has completed current functions and switched to OFF state.

## 4. Technical Characteristics

Signal-to-noise ratio	<b>68dB</b>
Dynamic range	<b>96dB</b>
Record mode	<b>mono</b>
Sampling rate	<b>8/16KHz</b>
Frequency band	<b>from 100 to 10 000Hz</b>
ADC bitrate	<b>8/16 bit</b>
<b>Current consumption in record mode*</b>	
8kHz 8 bit	<b>2 mA</b>
16KHz 8bit	<b>3 mA</b>
8KHz 16bit	<b>3 mA</b>
16KHz 16bit	<b>4.5 mA</b>
<b>Current consumption in Sound Check Mode*</b>	
Continuous Check	<b>1.2 mA</b>
Periodical Check	<b>0.6 mA</b>
<b>Current consumption in standby mode</b>	<b>3.5 <math>\mu</math>A</b>

*\* The current consumption depends on the memory card in use and may be lower or higher than the specified values (up to 3 times). High consumption (more than 30mA) may be caused by a microSD malfunction.*

## 5. Recording Duration

Recording duration depending on record mode and memory card capacity, exclusive of battery capacity.

	<b>4Gb</b>	<b>8Gb</b>	<b>16Gb</b>	<b>32Gb</b>
<b>8 bit 8KHz</b>	136h	272h	544h	1088h
<b>8 bit 16KHz</b>	68h	136h	272h	544h
<b>16 bit 8 KHz</b>	68h	136h	272h	544h
<b>16 bit 16 KHz</b>	34h	68h	136h	272h

## 6. Recorder's Battery Life

Recorder's battery life is determined by the charge level of the rechargeable battery, recording quality selected, and memory card capacity.

# Operating the Recorder

## 7. Battery Charging

Before using the Recorder, check battery charge level. If there is a necessity, charge the internal battery of the Recorder by following the procedure: remove memory card from the Recorder, and insert it into memory card slot, charging cable included. Then connect the cable to the PC or any power supply unit that has a 5 volt USB connector with a current of at least 500 mA, no more than 1000 mA. The red LED will be on to indicate battery charging, which takes 3-4 hours. After that the green LED will be on to indicate charging has been completed. Disconnect the cable off the PC or charger, **then gently press the inner part of the slot with cable connector and remove the cable from the Recorder.**

***Attention!!! Pulling the cable out of the Recorder may damage memory card slot, which is not covered by warranty.***

***Important!!! In order to prevent battery failure, do not store the device in a discharged state. Charge it at least once a month.***

### 7.1 For voice recorders with external power source

Connect a DC voltage source (3.6-6V) to connectors 1 (gold wire - minus) and 2 (red wire - plus) of the cable from the delivery set. If the voltage source is a Li-Pol battery, then by connecting the contacts 2 and 3 (green wire) of the cable you can provide current of 100 mA (by connecting an adapter to the voice recorder and connecting the adapter to the computer's USB)

## 8. Recording

Shift the Switch from OFF to ON position in order to switch the Recorder to operating mode. After that, the Recorder will switch to Record Mode, which is confirmed by 5 flashes of red LED. In case of the absence or malfunction of the microSD card, there will be 10 flashes repeated every 5 seconds, until microSD card is inserted or the Recorder is disabled.

During recording, the LED flashes in 2 series, the number of flashes shows:

Number of flashes	Battery charge level (1st series)	Free memory capacity (2nd series)
1	70-100%	75-100%
2	30-60%	50-75%
3	0-30%	25-50%
4		1-25%

The interval between the first and second series of flashes is 4 seconds, and then, after 8s, the first series follows, etc. If recording cannot be started, there is a red LED flashing:

**3 red flashes** indicate low battery

**10 red flashes** state that microSD card is either not inserted or not writable.

If while recording, microSD is full, the Recorder stops recording and quits operating mode. If during recording, battery charge level is too low, the Recorder stops recording and quits operating mode. Shift Switch from On to Off to stop recording (if any) and quit operating mode.

Each time recording is activated, a new file will be created. It closes after recording stops. Both record start time and stop time can be viewed on the PC in the properties of the file.

Before removing microSD card, shift the toggle switch to OFF position and wait till red LED flashes once, which means recording has stopped and the Recorder quitted operating mode. Failure to do so can lead to abnormal termination of recording and loss of all the data on the memory card.

## **9. Record Playback**

To playback records use any player program on the PC, for example Windows Media Player. To transfer records to the PC, remove memory card from the Recorder, install it into the card reader of the PC and connect the reader to the PC.

# **Using all of the Recorder's Options**

## **10. Changing Settings with Configuration File**

All the Recorder's settings are made using the CONFIG.INI configuration file. This is a text configuration file, which the Recorder saves in the memory card. Any word processor on your PC can be used to open the CONFIG.INI file, make changes to it, save. Then having inserted a memory card into the Recorder, you can start processing the configuration file, and the settings specified in the file will be saved by the Recorder.

Processing of configuration file is available while the Recorder is off. It starts by quick double toggling the Switch from OFF to ON and back. After processing, the indicator makes one flash. If the battery charge is not sufficient, battery is not installed or memory card is full or can not be read, the Recorder makes red flashes to indicate it, as described in Section 8.

After starting configuration file processing, the Recorder first searches for an existing configuration file on the Recorder's memory card. If the file is found, its contents is processed, and if there are no errors, the Recorder's settings will be updated. After that, regardless of search results and file processing, a new CONFIG.INI file will be written (old file, if any, is replaced by a new one). The newly recorded file contains Recorder settings and time of the built-in clock. Thus, using the configuration file, you will be able not only to update settings and time of the Recorder, but also find out the Recorder's settings in time.

## 11. Recording by Timer

Timers are enabled and configured via configuration file (CONFIG.INI). If at least one of the timers is on, the Recorder switches to record mode automatically from the off state, i.e. the Switch is in OFF position. Regardless of the timer setting, recording can be enabled manually, by shifting the Switch from OFF to ON. Recording enabled manually is continuously in progress, timer settings not affecting it.

To activate the timer (s) after setting, enable it by changing “N” to “Y”.

When starting a timer recording, the indication is similar to the one of regular Record mode.

***IMPORTANT! In order to prevent errors, avoid overlapping of timers within each other.***

## 12. Recording by Sound Level

Recording by sound level can be activated and adjusted via configuration file (CONFIG.INI). If the function of sound level recording is on, then when switching to record mode, the Recorder does not start recording immediately, but needs to check sound level. After the sound appears, the Recorder starts recording. If there is no sound for the time set in the settings, the Recorder stops recording. Sound check can be continuous, or periodical. During periodic testing, current consumption is reduced, but sounds that fall between the checks are not recorded. During recording, the Recorder checks sound level continuously, regardless of check regularity configured.

After setting, do not forget to enable its operation, by changing “N” to “Y”.

While checking sound level, there is a dim red LED on, and when the threshold is exceeded, the Recorder indicates operation the same way as during regular recording.

## 13. Recording by Timer and Sound Level

The use of timers is described in Section 10. The use of sound level recording is described in section 11. If you use both functions at the same time (recording by timer and sound level), when the timer is activated, the Recorder switches to sound level check mode, and remains so for the whole timer period. The Recorder starts recording as any sound is registered, and stops when there is no sound.

## 14. Recording using AGC\*

The Recorder provides the option to use AGC (automatic gain control). AGC system provides automatic increase of signal amplification in case of silent sound, and attenuation of the recorded signal with very loud sound, which avoids large distortions (overloads) in the recording.

Attention! This effect is also achieved by processing the record.

***\* AGC function is available only for the recorders of the CARD16 series***

## **15. Setting File Size Restrictions**

File size restrictions can be activated and adjusted via configuration file. If during recording, file size exceeds maximum permitted size, the file is closed and recording continues in a new file. If at the end of recording, the recorded file is smaller than the minimum allowable size, it is deleted. Restrictions are operational only as long as they are active. If the restrictions are off, files of any small size are saved in the Recorder's memory card. Old file is closed and the recording continues in a new file only in case of file size approaching the level of 2GB.

## **16. Setting Time and Date**

Time and date can be set via configuration file. Time and date need to be set correctly for proper timer operation. The Recorder automatically takes into account leap years and various number of days in months. For smooth operation of the Recorder, the date should be specified exactly as it is stated in calendar. In order to set new time, specify time and date values in the corresponding fields of the configuration file and allow time update, insert memory card into the Recorder and process configuration file. The newly saved configuration file contains Recorder's actual time, i.e. the one of its internal clock at the time the configuration file was launched.

## **17. Reset**

Delete configuration off the memory card file to reset all settings to the factory ones. After installing microSD into the recorder and the initiation of recording, or by toggling the switch once, it will create a new configuration file on the memory card with factory settings.

## **18. System Event Log**

The Recorder automatically records EVENTS.TXT file on the memory card, which contains all information about the use of the Recorder, messages about start-ups and shut offs, timer operations, battery charge level, sound level checks, etc.

***P.S. And do not forget to recharge the Recorder in time to prolong its operation functionality.***