Digital voice recorders
of EM Tiny+, Tiny16+ series
Operation manual

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Contents

Overlook

1. Purpose

Voice recorders of the Edic-mini Tiny (16) + series are professional devices intended for making high quality record of voice messages into built-in flash memory. The recordings can be further uploaded onto the PC. These voice recorders feature really unique characteristics (the world's smallest size, maximum autonomy, high acoustic sensitivity etc).

The recorders are marketed as personal means of documenting audio information providing protection against fake records as well as unauthorized access to records. The EMPlus program located in the built-in memory is used to operate the recorder. SoundProcessor program is designed to process the transferred records and to facilitate the conversion of records to text. The programs operate under Windows XP (SP2, SP3)/Vista/7/8/10.

2. Features

Depending on the model, the recorder features:

- extremely small dimensions,
- weight and current consumption,
- long record duration (from 150 hours at sampling rate 8 kHz),
- wide frequency and dynamic range,
- built-in clock and calendar,
- the option to start recording at the preset time using timer,
- due to the absence of removable elements the recorder is operational under wide temperature ranges when shaking or dusted,
- the LED indicates operating modes of the device as well as its status.

3. Short description

The recorder is equipped with Voice activation system (VAS) enabling to compress pauses efficiently in messages therefore saving considerably the recorder's memory. When uploading records onto the PC the duration of pauses can be restored in the form of silence or deleted depending on the settings specified.

The recorder makes it possible to perform timer recording: either daily (with record start and end time specified) or once (with date and time of record's start and end parameters specified).

To protect the recorder's information and setting there is the option to set user's password. Each record performed by the recorder has a mark of time and date supplied with "digital signature" to identify the model of the recorder to have performed the recording and the attempts to modify it after uploading to PC.

The user may set tabs while recording. These markers will be visible by SoundProcessor program on PC. Using them it is easy and quick to find important moments in long records.

Depending on the modification, recorders differ in:

- Power source (battery, built-in rechargeable battery or rechargeable battery + solar battery, external power supply)
- Built-in memory capacity
- The option to quickly replace the memory

The user can upgrade the recorder's firmware via USB port.

4. Technical Characteristics

Signal-to-noise ratio for Tiny+	65dB
Signal-to-noise ratio for Tiny16+	80dB
Record Mode	Mono
Compression algorithms	without compression, uLaw

Sampling rate (for Tiny+)	8,11,16, 22 kHz
Sampling rate (for Tiny16+)	8, 11, 13,3, 20 kHz
Frequency band	100 Hz...10 kHz
Exchange rate	up to 7 Mb/s
Acoustic sensitivity for Tiny+	12m
Acoustic sensitivity for Tiny16+	15m
Bitrate of ADC for Tiny+	10 bit
Bitrate of ADC for Tiny16+	16 bit
Operating temperature	from 0 to +40 °C
Storage media	built-in flash-memory
Memory capacity in hours (8kHz compression uLaw)	150HQ (4Gb)

5. Recording Duration

Recording duration depends on the type and quality of the battery in use, its charge level, and the record mode specified.

It is recommended not to use mode 22kHz for recording on to recorders with battery, because operation in this mode requires very large currents. Often batteries are not designed for such currents and the recorder records much less time than the one specified. Accordingly recording time in the mode 22kHz depends greatly on the battery quality. If this mode is needed, please use batteries which designed to work not with watches but with technique. Battery 2016 brands that we recommend – Duracell, Sony Energizer, Renata, Varta.

6. *Installing and replacing batteries*

Note! Only for recorders with replaceable battery (B-type models)

Before starting, install the supplied battery. The LED flashes 3 times and it will be on for about 40 sec. Now the recorder is ready to start operating. When installing, always observe polarity (marking on the recorder's case corresponds to the one on the battery). *Incorrect installation of battery may lead to malfunction, which is not covered by the warranty repair.*

7. *Supplying power for E71,E72,E84*

Switch the recorder to OFF position and then connect DC power supply (3.6-6V) to pins 1 (minus, gold colored wire) and 2 (plus, red colored wire) of the cable coming from the Recorder. If the voltage source is represented by a Li-Pol battery, the connected pins 2 and 3 (green colored wire) of the cable can provide battery charge with the current of 100mA (provided the recorder is connected to the adapter, and the adapter is connected to the USB).

8. *Start and Stop Recording*

To start recording, set the Switch to «On». The LED flashes five times, and the recorder starts recording. During recording, the LED is flashing, the number of flashes indicating:

Number of flashes	Battery charge level (1st series)	Free memory capacity (2nd series)
1	80 - 100%	75 - 100%

2	20 - 80%	50 - 75%
3	2 - 20%	25 - 50%
4		1 - 25%

The interval between the first and second series of flashes is approximately 4 seconds, and between the second and first is about 8 seconds. Note that in battery recorders the first series of flashes shows battery charge at the time the recorder has been activated and is not controlled during recording.

To stop recording, shift the Switch to «Off» position. The LED flashes once for 10-12 seconds and the recorder stops recording.

Attention:

- *Avoid using the recorder with nearly discharged battery, Otherwise it may turn off at the wrong moment.*
- *The higher the record's sampling rate, the more energy is consumed by the recorder. At the frequency of 22 kHz the consumption is almost twice higher than at 8 kHz, and for the recorders with batteries the autonomy is down by more than three times.*
- *Fast switching during recording*
  (On → Off → On) puts the tab which is visible in the Sound Processor program. Thus it is possible to mark the desired parts of records and then quickly find them.
- *Fast switching when the recorder is off*
  (Off → On → Off) shows battery charge level and free memory capacity through flashing of LED. For this indication, see «Start and Stop Recording»

9. Playing Back and Uploading to the PC

Use EMPlus program to play back and upload records onto the PC as well as to configure your recorder. SoundProcessor program is designed to process the transferred records.

Both programs including the instructions are in the built-in memory of the recorder and operate under OS Windows XP (SP2, SP3), Windows Vista/7/8/10. Newer versions are always available on the website http://www.ts-market.com

Note! For recorders with replaceable battery (B-type models) the battery should be inserted. Otherwise the Recorder may not be detected by computer.

1. Turn the Recorder to OFF position and wait until the LED turns off. Connect USB adapter to the recorder, then to the PC. Red and green LEDs blink briefly on the adapter. Windows recognizes a new removable drive. It is very important to observe the connection sequence: **Recorder→USB adapter→PC**

2. Run the EMPlus program from the recognized removable drive. The content of the recorder is on the left side of the window. Select the desired record.

3. To play back select the record and press the Play button at the bottom of the left panel. To upload right click on the selected record and choose «Copy to PC» from the context menu. The record will be converted to WAV to be displayed at the right panel. You can also drag and drop the selected record from the left panel to the right one.

- *Do not disconnect the recorder while performing any operations in the EMPlus program. This can cause data corruption (during such operations the recorder's LED is flashing).*
- *When the recorder is connected to the PC, recording is unavailable. If the recorder is in record mode, recording stops after connecting to USB port of the PC.*

Observe disconnection order: first disconnect USB adapter from the PC, then recorder from USB adapter!

9.1. Uploading from the B70 recorder

1. From page of the B70 recorder on our web-site www.ts-market.com, from section Product files (Software) download folder «B70 soft» to the PC.

2. Unzip the folder and install (using PC administrator name) the Recorder's driver, file B70_DrvSetup_1_0.exe.

3. Slide the Recorder's cover with flash memory in the direction indicated by the arrow and remove it off the Recorder.

4. Place the Recorder's lid onto the USB adapter of the B70 recorder

5. Connect USB adapter of the Recorder to the USB port of the PC. The adapter's LED flashes.

6. From the 'B70 soft' folder run the EMPlus.exe program. Select type of connection USB 2.0 Reader.

7. The Recorder's contents is on the left of the program's window. Select record and press Play in the bottom left panel.

8. To transfer to the PC, right click the selected record and select Copy to default folder. The record will be converted to WAV and will be in the right window of the program.

If your PC already contains USB2.0 driver, remove it using RemoveOlddrivers.exe program from RMUsbDrv folder (if your OS is Windows Vista / 7/ 8, run this program as an administrator). Connect reader to PC and there will be a suggestion to install driver from folder RMUsbDrv via New hardware wizard window.

Using All Functions of Recorder

10. Setting Microphone Amplification for Tiny16+

The recorder provides the option to adjust amplification of the microphone's signal (from 0 dB to +40 dB). Both fixed amplification and Automatic Gain Control can be set. AGC

enables it to automatically adjust amplification according to the sound level. That makes it possible to perfectly record very loud sounds and amplify silent ones. Choose suitable for you AGC level from pre-installed:

- amplification without AGC;
- AGC1 – for recording in a quiet room;
- AGC2 - for recording in a noisy room;
- AGC3 - for recording from large distances;
- AGC4 - for recording in a noisy large room;
- AGC5 - for recording on a noisy street.

11. Timers

The recorder has two timers: Daily and Once. Timers enable recording to start automatically, without user's control.

1. When setting Once Timer you need to specify the record's start and end time and date. For example, «start 31.12.2013 23:00 stop 03.01.2014 10:00» - with these settings your recorder will record from 23:00 on the 31st of December 2013 until 10:00 of January 3, 2014. However while configuring you should take into account the capabilities of your recorder, i.e. whether it's free memory is enough to perform the operation. To check this see «free memory « in EMPlus and continuous operation time in Appendix 1.
2. When configuring Daily Timer you need to set record's start and end time. For example «start 09:20 stop 13:05» - with these settings the recorder starts recording every day at 9:20 and stops recording at 13:05. Recording will be carried out as long as the recorder has free memory, enough charge and as long as the timer is on.
3. You can use both timers simultaneously, but you should take into account that timer's operation times must not overlap or intersect.

Timer recording by can be stopped by shifting the recorder's switch to ON, then again to OFF position.

If timer is on, you don't have to enable recording using switch (don't forget to synchronize the recorder's time with the PC time).

12. Voice Activation System (VAS)

Voice Activation System (VAS) can significantly (up to 100 times if properly configured) reduce both memory consumption and energy consumption from the power source. The principle of VAS is as follows: after the user starts recording, the recorder starts tracing signal from the microphone. If the signal is less than the one specified in settings (VAS level), it is not the sound from the microphone that is stored in memory, but only the time value during which the threshold hasn't been exceeded.

When signal level exceeds the preset threshold, recording of sound into memory starts. When the signal from the microphone is less than the preset threshold, after some time (VAS time) the recorder stops recording sound into memory and only saves silence duration. That continues until recording stops.

In case of signal level exceeding the preset threshold, indication while recording with VAS is the same as during standard recording (two series of flashes). In case of signal below threshold (silence), there is constant faint glow of LED. When uploading record onto the PC, you can specify the operations with pauses: save them in the file uploaded or not. If you save pauses, the duration of the resulting record will correspond to the actual one, and the fragments when the signal was below threshold will be played back silent. If the pauses are not saved, then the resulting record will consist of recorded parts only (signal exceeds the threshold). These parts will be played one after another without interruption.

13. Configuring VAS

Voice Activation System (VAS) is configured in the EMPlus program by changing two parameters:
1. **VAS threshold level and VAS time.** VAS level can be adjusted from 0 to -55 dB. 0 dB corresponds to very low sensitivity (the device records only very loud sounds) and the value of -55 dB to very high sensitivity (the slightest

rustle is enough for the recorder to start recording). The best of VAS is achieved experimentally. You can start by setting VAS level at - 20 dB (after you have changed the settings, do not forget to press the button «Apply changes to the Recorder»). After disconnecting the recorder off the PC enable recording and place it in the conditions similar to the planned recording (for example, lecture in a classroom). With the level of VAS properly configured, after the desired signal, the recorder switches to record mode which will be indicated by a LED flashing. If desired signal stops, and the VAS time is up, the recorder switches to Signal Standby mode.

- If in case of silence, the recorder does not go to Signal Standby Mode and continues recording, VAS level is to be changed to be closer to zero (if it was -20 dB, now it should be set at -17 dB).

- If when desired signal appears the recorder does not go to Record Mode, the level of VAS should be changed to be closer to -55 dB (if it was - 20 dB, now you need to set it at - 25 dB).

2. **VAS time is adjusted from 1 to 15 seconds.** If you set VAS time at 1 second, the record within the file will be divided into many pieces with the pauses in conversation for more than 1 second. If you set 15 seconds, after any knocking the recorder will continue recording silence for 15 seconds. The best of VAS is achieved experimentally, but for most cases the value of 7 seconds is enough.

If VAS operates together with timers, you don't have to enable recording as it starts automatically with the timer, providing that you synchronized the recorder's time with the time on the PC.

14. Circular Recording

The Recorder has the option of circular recording. In the EMPlus program you can devote a part of the recorder's memory (or the whole memory) to circular recording. After there is no more free memory, the recorder begins to record new data over old ones. The volume of the memory specified determines the duration of the resulting

circular record.

15. Charging and Battery Maintenance

Note! Only for recorders with rechargeable battery (A and S-type models)

The battery starts charging automatically when you connect the recorder to the USB-port of the computer. Full charging takes 3 hours (while charging LED is flashing gradually with the interval of 5 seconds). With maximum charging LED will continuously and smoothly change its brightness. The user can recharge the rechargeable battery via power source with standard USB- output (5 V), during which the LED is permanently on and one can assess the process according to the charging time only (3 hours).

Do not leave the rechargeable battery discharged. Recharge it at least once a month, even if you don't use the recorder. Failure of the battery due to customer's fault is not covered by the warranty.

Attention!

In firmware versions 1.14 for Tiny+ and 1.15 for Tiny16+ after memory filling, recorder does not turn to Standby mode. That may lead to deep battery discharge and its damage.

See your firmware version in EM PLUS program on the bottom line of the main menu (for instance FW: 1.14).

In case of battery discharge, fulfill the following steps as soon as possible:

1. Clear the memory
2. Charge the battery

If you could not charge the battery, follow these steps:

1. Connect USB adapter to PC
2. Turn the switch to On position

3.   Connect recorder to the PC
4.   Hold down the Reset button within 10 second
5.   After 10 minutes, with recorder connected to PC, turn the switch to Off position and then press Reset button once.
6.   Leave the recorder to charge for 3 hours

This problem will be solved in next firmware upgrade, which you will be able to download from our web-site www.ts-market.com

16. Recorder Settings

With the EMPlus program you can set all the necessary parameters of the recorder, such as:

- Enabling and configuring timers
- Enabling and configuring VAS
- Enabling and configuring circular recording
- Recording quality adjustment
- Setting the control method (depends on recorder model)
- Password protection of the recorder
- Synchronization of time and date of the recorder with the PC
- Moving records (and files) from the recorder to the PC
- Records playback before moving to the PC

To configure the recorder connect it using the cable which is included into the delivery set and run the EMPlus program located in the internal memory of the recorder.

Appendix

Troubleshooting

Trouble Symptom	Trouble	Possible Solution
Faint LED is permanently ON	The recorder is unresponsive to the user's activity	Replace the battery (for battery recorders) Press the Reset button for 2 seconds or switch off and then back on the recorder's power (for rechargeable battery recorders)
When connecting the recorder to the PC the LED is flashing frequently	The recorder is unresponsive to the user's activity - the rechargeable battery is discharged	Leave the recorder connected to the PC. After some time depending on the battery discharge level the PC will recognize a removable media and the LED will be flashing gradually with the interval of 5 seconds.
No flash of LED on the recorder after disconnecting off the PC	When disconnecting off the PC the recorder won't g to Standby Mode	Remove and install battery again (for the recorders with batteries). Press the Reset button for 2-3 seconds (for the recorders with rechargeable batteries).
10 flashes of LED after enabling recording	When enabling recoding, the recorder won't record	Try to format the recorder in RecManager, but remember the contents will be deleted
Recording starts at the wrong time	Malfunction of timer	Recorder's clock may fail because: 1. Lost or switched off power 2. Recorder's time was not synchro nized with the PC time, 3. You forcedly enabled recording. Synchronize the recorder's time with the PC. In recorder settings untick «Time synchronization with the PC». Adjust the desirable timer and make record. After connecting to the PC verify the time on the recorder and the PC.
Red and green LEDs are not on the adapter	The recorder can't be connected to the PC	Forced connection is needed: set the switch to ON position and press reset for rechargeable battery recorders or insert battery for battery ones. The LED must start flashing. Shift the Switch to On position and connect to the PC.

Technical Support

Technical support is available by e-mail: **support@ts-market.com**

We are constantly working to improve the software and documentation. You can always download the latest version of the software for free and get information on products on our website: **http://www.ts-market.com**.