EMM Tiny Module

Operation manual

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The EMM Tiny Module is designed for professional voice recording on Flash media that can be downloaded into a PC. This module is the development of the Tesystems Company's miniature digital voice recorders of the EM Tiny model. The module has extremely small size and weight, long recording time (depending on the modification from 18 hours up to 890 hours at sampling rate 8 k Hz, compression – 2 bits ADPCM), reduced power consumption, wide band range (100- 10,000 Hz), and a wide dynamic diapason. As the module does not have moving parts, it can function in challenging environment: at wide temperature range, dustiness, or shaking.

Using the supplied USB cable, the module can be connected to a computer. The supplied software works with Windows 2000/XP and allows storing audio recordings as standard audio files and programming module's parameters. The module can work in a flash-disk mode with memory capacity depending on modification from 128 MB up to 6 GB.

The module's firmware can be renewed using a USB interface.

The module has:
- A built-in real time clock, a calendar, and a timer that can start recording on a preset time, once and repeatedly.
- The Voice Activating System (VAS) that allows compressing pauses in audio messages while increasing real recording time. This system saves memory space while the time in-

tervals stay the same. When recordings are uploaded onto a computer, pauses can be restored as silence or skipped depending on previous settings.
- The LEDs that provide indications depending on modes of operation.
- The switch that provides control of module's work.

In flash-disk mode, the module can be used for storing and transferring any type of data. The module can function as a flash media and voice recorder simultaneously. Distribution of memory space is assigned by the user.

Password protection provides security of audio recordings and the module's settings. In addition, every recording has a digital watermark containing date and time of the recording along with the module's identification data and history of the recording changing.

The module's software supports the multi language interface.

Main Technical Characteristic

Characteristic	Meaning
Signal-to-noise ratio	-64 dB
Recording format	Mono, Stereo *
Compression algorithm	Without compression, u-Law, ADPCM 2 and 4-bits
Sampling rate	5.5, 8, 11, 16 or 22 kHz
Frequency band	Up to 100… 10k Hz (depending on settings)
Input signal	2.9 Vpp with constant 1.5 V
Consumption current	3+/-0.2V
Consumption current in stand–by mode	Not more 25 microA
Supply voltage (recording in mono mode, without compression)	2 mA
Design	PCB
PC interface	USB 1.1 transfer rate up to 5.5 Mbps

*Stereo recording function is optional and compatible only with Windows XP

Recording time depending on the modification (sampling rate 8 kHz, 2 bits ADPCM)

Index	Recording time	Flash memory capacity
1120	1120 min (18.6 h)	128 Mbytes
2240	2240 min (37.3 h)	256 Mbytes
4480	4480 min (74.6 h)	512 Mbytes
8960	8960 min (149.3 h)	1 Gbytes
17920	17920 min (298.6 h)	2 Gbytes
35840	35840 min (597.3 h)	4 Gbytes
53760	53760 min (896 h)	6 Gbytes

Without compression (linear), sampling rate 22 kHz, 220 kbits/sec, k=13.8
Without compression (linear), sampling rate 16 kHz, 160 kbits/sec, k=10
Without compression (linear), sampling rate 11 kHz, 110 kbits/sec, k=6.9
Without compression (linear), sampling rate 8 kHz, 80 kbits/sec, k=5
Without compression (linear), sampling rate 5.5 kHz, 55 kbits/sec, k=3.4
Logarithmic compression (u-Law), sampling rate 22 kHz, 176 kbits/sec, k=11.2
Logarithmic compression (u-Law), sampling rate 16 kHz, 128 kbits/sec, k=8
Logarithmic compression (u-Law), sampling rate 11 kHz, 88 kbits/sec, k=5.6
Logarithmic compression (u-Law), sampling rate 8 kHz, 64 kbits/sec, k=4
Logarithmic compression (u-Law), sampling rate 5.5 kHz, 44 kbits/sec, k=2.8
Modified 4-bit ADPCM, sampling rate 22 K Hz, 88 kbits/sec, k=5.6
Modified 4-bit ADPCM, sampling rate 16 K Hz, 64 kbits/sec, k=4
Modified 4-bit ADPCM, sampling rate 11 K Hz, 44 kbits/sec, k=2.8
Modified 4-bit ADPCM, sampling rate 8 K Hz, 32 kbits/sec, k=2

Modified 4-bit ADPCM, sampling rate 5.5 K Hz, 22 kbits/sec, k=1.4
Modified 2-bit ADPCM, sampling rate 22 kHz, 44 kbits/sec, k=2.8
Modified 2-bit ADPCM, sampling rate 16 kHz, 32 kbits/sec, k=2
Modified 2-bit ADPCM, sampling rate 11 kHz, 22 kbits/sec, k=1.4
Modified 2-bit ADPCM, sampling rate 8 kHz, 16 kbits/sec, k=1
Modified 2-bit ADPCM, sampling rate 5.5 kHz, 11 kbits/sec, k=0.7

k is a coefficient that shows how many times the maximum recording time decreases relatively to the maximum recording time in the 2-bit ADPCM mode when recording mode is changed. For instance, maximum recording time (1120 modification, without compression, sampling rate 8 kHz, k=5) is 1120/5=224 minutes. In stereo mode, memory consumption increases twice relatively to mono mode.

Sampling rate defines the recorded frequency band that is lightly less than a half of the chosen sampling rate.

The best recording quality is in a mode without compression, then as the quality decreases: Logarithmic, 4-bit ADPCM, and 2-bit ADPCM. In addition, modes with high sampling rate increase the consumption current of the module.

Working with the Module

Preparing for Work

The Module is designed as a printed circuit board (PCB) that can be installed in to a user's device for sound recording functions. To operate, the module has to be connected to a power source and an external audio source (or two sources for stereo mode).

There are labels on the module contacts in the description of module's appearance in the manual's appendix.

The user can connect an external indicator (LED) and an external control, for instance, a switch. If the external control is connected to the module, the module built-in switch has to be in the STOP position.

To turn on the module, after power supply is provided, set the switch in the RECORD position for 2-3 seconds and then back to the STOP position. The indicator has to flash three times showing that the module has started self-testing. After 5-10 seconds, the indicator will blink for the fourth time (the length of the fourth flash depends on the module's memory capacity and can be some dozens of seconds). After this the module is ready for work.

To provide a reliable start, it is recommended to make a pause for 30-60 seconds between turning the module off and on.

Choosing the Recording Parameters

Before recording, use the RecManager program to choose the recording settings (for instance, quality/ compression relation). These settings will be saved if power supply is turned off.

Default Settings

Sampling rate – 16 kHz, without compression, VAS -off, mono, timers are off.

Voice Recording

To turn on the recording, set the switch in the RECORD position (or connect the K and GND contacts). The module will flash five times and then blinks in several sequences while recording. To turn off the recording, set the switch into the STOP position (or disconnect the K and GND contacts). When the module stops recording, the indicator will flash once (the length of this flash depends on memory capacity and can be some dozens of seconds).

During the recording process, the indicator's blinking will show the approximate level of supply voltage and memory capacity.

The first sequence of flashes (1-3 flashes) shows the level of supply voltage and the second sequence shows free memory capacity (see the manual's appendix for additional information): 4 flashes -0..25%, 3 flashes – 25-50%, 2 flashes -50-75%, and 1 flash -75-100%.

The sequences are going with 1.5 sec intervals; the sequences are repeated during a period of 6 sec.

Pay attention that recording will be stopped if the supply voltage is below the minimal level or there is not enough memory space for the recording. It is recommended to control the indicator blinking while recording.

The Voice Activating System (VAS) mode lets considerably (up to 100 times) lower memory consumption and consumption current while recording.

Playing the Recordings

Download the recordings onto a PC using the RecManager program. Then play them using any audio program, for instance, Windows Media Player.

Connecting to a PC

The module has to be connected to a PC to play/save recordings, set the module's parameters, and make other operations.
Turn on the PC. Install the RecManager program using the supplied CD (/EdicMiniTiny/ folder)
Connect your module to a computer using the supplied USB cable. The module LED will light. If it is the first time connecting, OS Windows will suggest installing the drivers. Follow the instructions in the Automatic Installation dialog windows of the Installation Wizard. While installing, this message can appear: The installed software has not been tested for compatibility with Windows XP. Click Continue.
Start the RecManager program. If the program is in demo mode, turn this mode off in the Recorder menu (Ctr+P hot key). The computer will detect the module and the program will show the module's flash media content.
As you finished your operations, exit the program. Disconnect the USB cable.

Notes: While exchanging data with the computer using the RecManager program, do not turn off the module at this time due to possible loss of data.

When the module is connected to a PC, audio recording is impossible. When audio recording is turned on, the connection to a PC is impossible.

The program manual has full information about the RecManager program. The software manual is on the supplied CD (/Edic-MiniTiny/).

Our company's support engineers constantly at work to improve our software and the documentation. You can always download a new version of our software and documentation for free from our website: http://ts-market.com .

To Renew Firmware

To renew the firmware of your module, go to the website http://ts-market.com . Follow these steps:
- Download the new firmware from the website to a PC: ET_FW_Updater_X_X.exe (X_X is the number of a version of the firmware)
- Connect the module to the PC
- Check that the RecManager program is closed.
- Run the new firmware
- Confirm that you want to renew the firmware

- When the firmware is fully renewed, this message will appear. After this message, run the RecManager program

The RecManager program will show information about the new firmware version in the status line.

Multilingual Support

You can choose English or Russian language using the program settings. However, you can translate all buttons, messages, and dialogs to any other language:

- Find EdicTiny_eng.lng and RecManager_eng.lng (EdicTiny_rus.lng and RecManager_rus.lng) files in Program Files/RecManager/ folder
- On the first line of the file change the number of the code page according to your preferred language
- Translate all signs and messages from English (Russian) into your language
- Rename files: EdicTiny_XXX.lng and RecManager_XXX.lng (XXX abbreviating of a new language expressed by the English alphabet)

After running the RecManager program, the new language will appear in the Language menu. If you like, you can send the corrected file to support@ts-market.com . The installation program that supports this new language will appear at http://ts-market.com.

Troubleshooting

If you have some problems, there are some troubleshooting tips in the table below.

Problem	Cause	Solution
The indicator did not flash three times after power supply was turned on and the switch was set in the RECORD position.	1. Power supply is not connected 2. The module was not turned on	1. Check the connection to power source 2. Disconnect and after 50-60 sec connect module's power supply
The indicator flashes 10 times in sequences.	1. the module was not turned on 2. Memory error	1. Disconnect and after 50-60 sec connect module's power supply 2. Contact to the technical support service

Problem		Cause	Solution
The module does not record	The indicator does not turn on	Power voltage is off	Check the connection to the power source
	The indicator flashes 5 times in sequences.	Power voltage is low	Check the power source
	The indicator flashes continuously	There is not enough memory space for recording	Free memory space (delete useless recordings or/and reduce flash memory space)
Can't connect the module to a PC	The indicator lights	OS Windows can't download the drivers	See "Connecting to a PC" or contact to the technical support service

Support

If you find any errors in our software or documentation, download the new one from http://ts-market.com. If the errors are not eliminated, connect to our technical support service: support@ts-market.com . We will eliminate the errors as soon as possible. Also we will appreciate the detailed information about the errors.