DIGITAL VOICE RECORDER MEMS

"SOROKA (Forty)-06"

Manual

TABLE OF CONTENTS

Operation Manual contains information on specifications, the device and the operating principles, the rules of storage, instructions for use and maintenance, necessary for the proper operation and full usage of the technical capabilities of the voice recorder "SOROKA (Forty) -06".

Voice Recorder "SOROKA (Forty) -06" has three possible scopes of delivery.

SOROKA (Forty)-6.1 "Full"   **SOROKA (Forty)-6.2 "Normal"**   **SOROKA (Forty)-6.3 "Minimum"**

Fig. 1. Scopes of delivery of the voice recorder "SOROKA(Forty)-06":

Table 1. List of items supplied

Name	Num-ber	SOROKA (Forty)-6.1	SOROKA (Forty)-6.2	SOROKA (Forty)-6.3
Voice Recorder "SOROKA(Forty)-06"	1	+	+	+
USB Cable to charge the internal accumulator	1	+	+	+
AC adapter with USB output	1	+	-	-
The adapter to charge the external battery	1	+	+	-
External power cable with a built-in stabilizer (U_{inp} = 5..28V)	1	+	-	-
External Accumulator	1	1.8 Ah	1 Ah	-
Cable with one external microphone	1	+	+	+
Cable with two external microphones (stereo)	1	+	-	-
Memory Card micro SD / SDHC	1	32 GB	16 GB	4 GB
CD ROM disk with software and manual	1	+	+	+
Passport	1	+	+	+
Package	1	+	+	+

1. Product specification and description of the voice recorder

Voice Recorder "SOROKA(Forty)-06" is designed to record audio signals with the built-in or external digital MEMS microphones in the mono / stereo modes to the memory card microSD or microSDHC Class4 or higher.

Basic specifications of voice recorder are shown in Table 2.

Table 2. Specifications of voice recorder "SOROKA(Forty) - 06".

№	Parameter		Description			
1	Dimensions, mm		45x24x8.5			
2	Operating temperature range		-20°C to +40°C			
3	Recording file format		«WAV»			
4	Memory type		removable memory card microSD/SDHC			
5	PC interface		via microSD card			
6	Type of the charger		from the USB port			
7	Discretization of sound frequency		8 kHz and 16 kHz			
8	Sound resolution		16-bit / 8-bit u-law			
9	Microphone Sensitivity		-26 dBFS at 94 dB SPL (8-9 meters)			
10	Sound / Noise ratio		of 64 dB			
11	Non-Linear Distortion Ratio		less than 3%			
12	Frequency range as per level -3 dB.	Discretization frequency				
		8 kHz	50 Hz - 3.5 kHz			
		16 kHz	100 kHz - 7 kHz			
13	Length of operation from internal accumulator (**Kingmax memory card 16 GB 10 cl**)	The frequency of discretization	Typical operating time (hours)		Not less than * (hours)	
			Mono	Stereo	Mono	Stereo
		8 kHz / 16-bit	42	21	25	13
		16 kHz / 16-bit	25	13	15	8
		8 kHz / 8 bit u-law	52	26	31	16
		16 kHz / 8 bit u-law	31	16	19	10
14	Length of continuous recording with an external accumulator 1.8 A h, 8 kHz, 8 bit		Up to 670 hours (28 days)			
15	Function of real-time clock		Yes			
16	Function of work as an alarm clock		Yes (up to 10 alarms or daily cyclical alarm)			
17	File encryption function		Yes			
18	The digital signature of files function		Yes			
19	Mode of voice operated switch (VOX)		Yes (three levels of sensitivity and record labels while voice activation)			
20	Ability to manually control the recording level		Yes; -12 dB to +18 dB with step 6 dB.			
21	Mode of automatic recording level control		Yes; -12 dB to +18 dB with step 6 dB.			
22	Logger		Yes			
23	The possibility of connecting external mono / stereo microphones		Yes			
24	The possibility to connect an external power supply		Yes			
25	The system of recording tags in the files		Tags for beginning and end of the file; tags by pressing; tags for actuating the voice activation.			

* Minimum time of operation of the voice recorder due to loss of accumulator capacity by 40% in the aging process, or at low temperatures.

Light indication of operation modes and accumulator charging mode

Light indication of operating modes and emergencies of the voice recorder, see Table 3.

Table 3. Light indication of modes and emergencies.

Modes and emergency situations of the voice recorder	Status Indicator "Mode"
a) Getting Started (turning on of the voice recorder by user - pressing the button for more than 4 seconds)	1. In normal recording mode, indicator turns *green* and stays until the end of the process of opening the file (duration of opening the file depends on the size of opened files and free space on the map). After opening the file, indicator "Mode" repeatedly flashes *green* when recording from the internal microphone or *orange* when recording from external microphone microphones. If the accumulator is depleted LED "Mode" flashes *red*. Further indication is only possible by pressing a button. 2. If on the memory card, file *"dict.ini"* is recorded, and it is tasked for the alarm clocks, the indicator lights up for 1 second *green* and the voice recorder enters standby mode by switching on alarm clocks. A further indication is only possible by briefly pressing the button. 3. If the recorder is configured for voice activation mode, the indicator lights up for one second *green* and then lights up for one second *orange*. Further indication is only possible by only briefly pressing the button (after opening the file).
b) Recording mode from the internal microphone (after **the brief pressing of** control **button**)	1. If the accumulator voltage is normal, the indicator flashes **green** 8 times. 2. If the accumulator is low, the indicator flashes 8 times **red**.
c) Recording mode from external microphones / microphone (**after brief pressing** control **button**)	1. If the accumulator voltage is normal, the indicator flashes **orange** 8 times. 2. If the accumulator is low, the indicator flashes 8 times **red**.
d) Recording mode with voice operated switch (VOX) (after brief pressing of a button)	After detecting the audio signal of the preset level, similar to normal mode. Before detection of the audio signal, indicator flashes twice in **orange**.
e) Mode to record audio signal as per an alarm clock (after brief pressing of the button)	The indicator flashes several times alternately **red and green**, regardless of other recording modes and accumulator status.
f) Standby mode for alarm clocks (**after briefly pressing the** control **button**)	After brief pressing the button, triple-time winking **red and green** of indicator will happen.
g) Emergency - incorrect filing system, the lack of a memory card or fault of memory card	After turning on of the voice recorder's LED is **green**, and then it lights up **red**, then the voice recorder turns off .
h) Status of "No free space on the disk"	Indicator after turning the voice recorder on continuously glows **green** for some time (depending on the size of the micro SD and size of files), then the voice recorder turns off.

Light indication of charging modes of the internal accumulator is shown in Table 4.

Table 4. Light indication modes of the internal accumulator of the voice recorder.

Charging modes	Indicator Status "Charge"
a) the end of the charge of the internal accumulator	Indicator "Charge" lights green
b) the charge of the internal accumulator	indicator "Charge" lights red

Light indication of the charger during charging external battery is shown in Table 5.

Table 5. Light indication mode charge the external battery

Charging mode	Status Indicator "Charge"
c) End-of charge.	The indicator is green
d) The battery charge	Indicator lights red

Design and operation of the voice recorder.

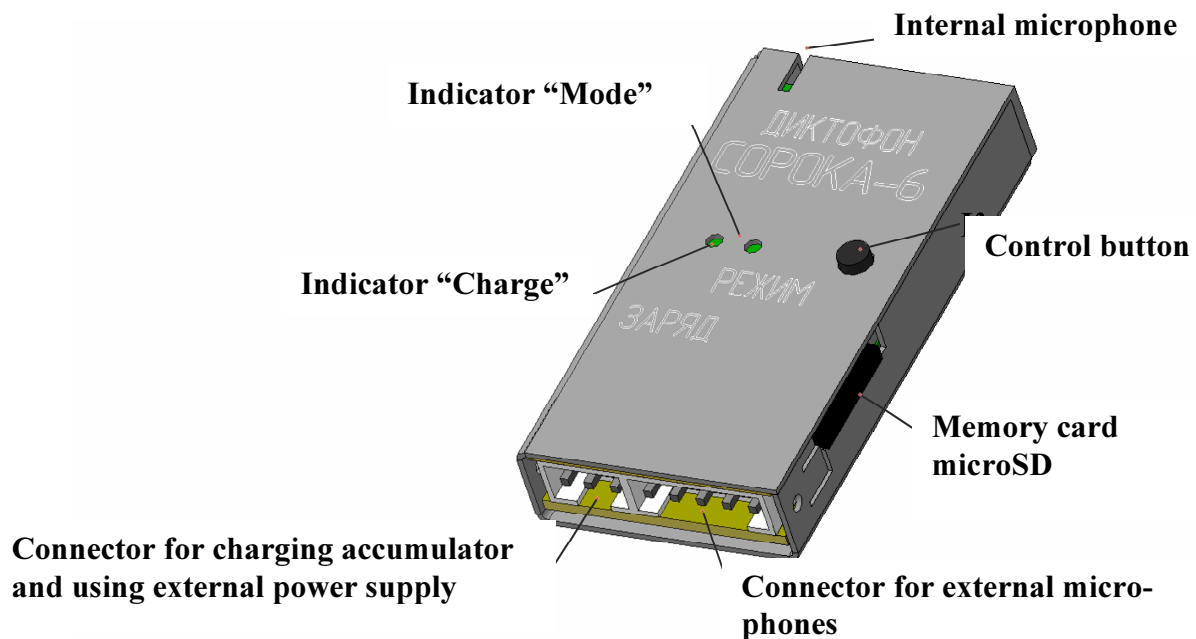Outlook of the voice recorder "SOROKA(Forty)-06" is shown in Figure 2.

Fig. 2. The outlook of the voice recorder "SOROKA(Forty)-06."

Usage and setting up the voice recorder

Operating limitations.

To avoid the voice recorder failure, observe the following rules:

a) The built-in / external accumulator of the voice recorder should be carried out only with the help of equipment supplied;

b) **Protect the voice recorder and external microphones from mechanical shocks – severe bumps may lead to possible destruction of the microphone.** If the voice recorder, received mechanical damage during operation, and this led to its failure, it is not covered under warranty any more.

c) Do not allow dust and moisture on the microphones, as it can lead to significant deterioration in the performance of the microphone.

Charging the internal accumulator.

Connect the USB cable for charge to the voice recorder and then plug it into the USB port of your computer.

If the accumulator of the voice recorder is discharged, the indicator "Charge" lights up in red. Once fully charged, the accumulator indicator "Charge" will turn green. The charging time of a fully discharged battery is approximately 2-3 hours.

Attention! If you want to keep the recorder for storage for over than 1 month, firstly, completely discharge it and then charge for 30 minutes.

Charging the external accumulator

Connect the supplied charger to the accumulator, and then plug it into the mains supply 220V.

If the accumulator is discharged, the indicator on the charger will light up red. Once fully charged, the accumulator charge indicator lights up in green. The charging time of a fully discharged accumulator with capacity of 1 A.h. is about 2 hours.

Attention! If you want to keep the recorder for storage for over than 1 month, firstly, completely discharge it and then charge for 30 minutes.

Setting parameters of the voice recorder.

Insert the micro SD card into the card reader. Format the micro SD under the file system FAT32.

Create a folder with any name on your computer.

Copy the *dict.exe* program from the supplied CD disk into the created directory.

Run *dict.exe* program into the created directory and follow chapter 2.7 of this document, create a configuration file named *dict.ini.*

Write down the created file *dict.ini* to the memory card.

Insert the memory card into the voice recorder and switch it on. The voice recorder will read configuration file and **save** it to the internal memory. After reading the settings from the file, the voice recorder will **automatically remove** it and **continue to work in a user-defined mode** (indication as shown in Table 3).

Usage of the voice recorder.

Insert the formatted under FAT32 micro SD card into the voice recorder.

Turn on the voice recorder by pressing the control button for 4 seconds. After turning on, the voice recorder enters the operating mode which has been set by the user at the last setting (c.2.4).

To display the current status of the voice recorder, briefly press the control button. The current state is determined according to the indications on the table. 3.

To switch off the recorder, press the control button and hold it down till the mode indicator stops flashing and goes out (indicator must either begin to turn solid green, or goes off). Moreover, if the operation has been set for the alarm clock, the operation of all alarms is canceled.

After switching off the voice recorder, remove the memory card from it and insert it into a card reader. To decode the recorded files and verify their digital signatures, use the tab "Decoding and verifying files integrity" of the program *dict.exe*. When using program, please, read c. 2.8 of this document.

To listen to the audio files produced, use any player that supports "WAV" format (recommended is SOUND FORGE version 6.0 and above).

To use the external accumulator or power supply, simply connect the supplied accumulator or power cable to the voice recorder and turn it on. The power cord must be firstly connected to the external power supply voltage of 5 ... 28 V.

Selection of operation from the external microphones and mono / stereo recording mode.

To record sound using the external microphone / microphones, it is necessary to connect them to the voice recorder's connector before you start (see. Fig. 3). After turning on, the voice recorder will automatically detect the connected microphones and their

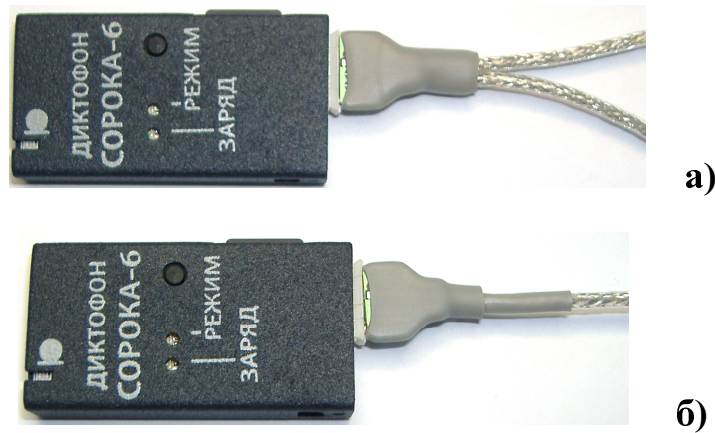quantity. Without connected microphones, the voice recorder will start operation from the built-in microphone.

a)

б)

Fig. 3. Operation of the voice recorder) in stereo mode; b) in mono mode with wired microphone;

Creating a configuration file of the voice recorder.

Run ***dict.exe*** program and select in the opened window tab "Setting the voice recorder", as shown in Fig. 4. This tab is used to create / read configuration files ***dict.ini*** and contains the following parameters and options:

a) **Enable / disable voice activation of the voice recorder.** When you activate this mode, the voice recorder starts recording when the audio level exceeds a certain threshold. If the sound level is below the threshold for 15 seconds, the voice recorder stops recording and goes into standby mode of the sound. Closing of the current file does not happen. Fragments of the audio recording in VOX mode are sequentially written to the current file (up to 70 fragments in one file). For each voice activation, response file will be generated with label, indicating the date and time of response acoustic start (Fragment starting point) (see the n. 3). Fragments of recording with voice activation start in the current file will be separated either by absolute silence, or by beep (p. 2.7 (b)).

b) **Hooter between fragments.** While the voice activation mode, the user can select the method of separation of fragments of the audio recording in the current file. In case of flag "**Beep between fragments**" all the fragments of the audio recording in the current file will be separated by beeps, or by absolute silence. The usage of beeps between the fragments of the recording allows the user to determine the start of the new track while listening to the recorded files.

c) **The sensitivity of the voice activation.** The user can adjust the threshold of acoustic start by selecting a value in the window "**Voice activation sensitivity**". The higher the sensitivity, the more quiet sounds will be triggered by voice activation. The recommended value of the sensitivity is - the "**average**".

d) **Enable / disable the automatic adjustment of the volume level.** After activating this function, loud sounds will be attenuated and quiet, on the contrary, increase. That will automatically align the level of by-writes of an audio signal.

e) **Setting of the fixed gain level of the sound.** If the user or the program itself turned off automatic adjustment of the recording level, you must specify strengthening out of existing series. Recommended values are **0 dB, 6 dB and 12 dB**.

f) **Specify the size of the recorded files.** In this window, the user must select the size of the files being recorded on the card from the following series: 50 MB, 100 MB, 250 MB, 500 MB, 1000 MB, 1800 MB.

g) **Enable / disable encryption of audio files.** You can enable this feature if you want to eliminate the possibility of non-authorized interception and change of the recorded information on the map. All encrypted files will have the extension ".xxx". After activation of encryption feature, the program will ask to set a password in the range from 0 to 65535, inclusive. **The user must remember this password, otherwise the recorded and encrypted files will not be suitable for use.**

h) **The choice of the discretization frequency.** Possible values are 8 kHz and 16 kHz. The higher the discretization frequency rate of the sound, the higher the quality of files being recorded, but the battery life of the voice recorder goes shorter.
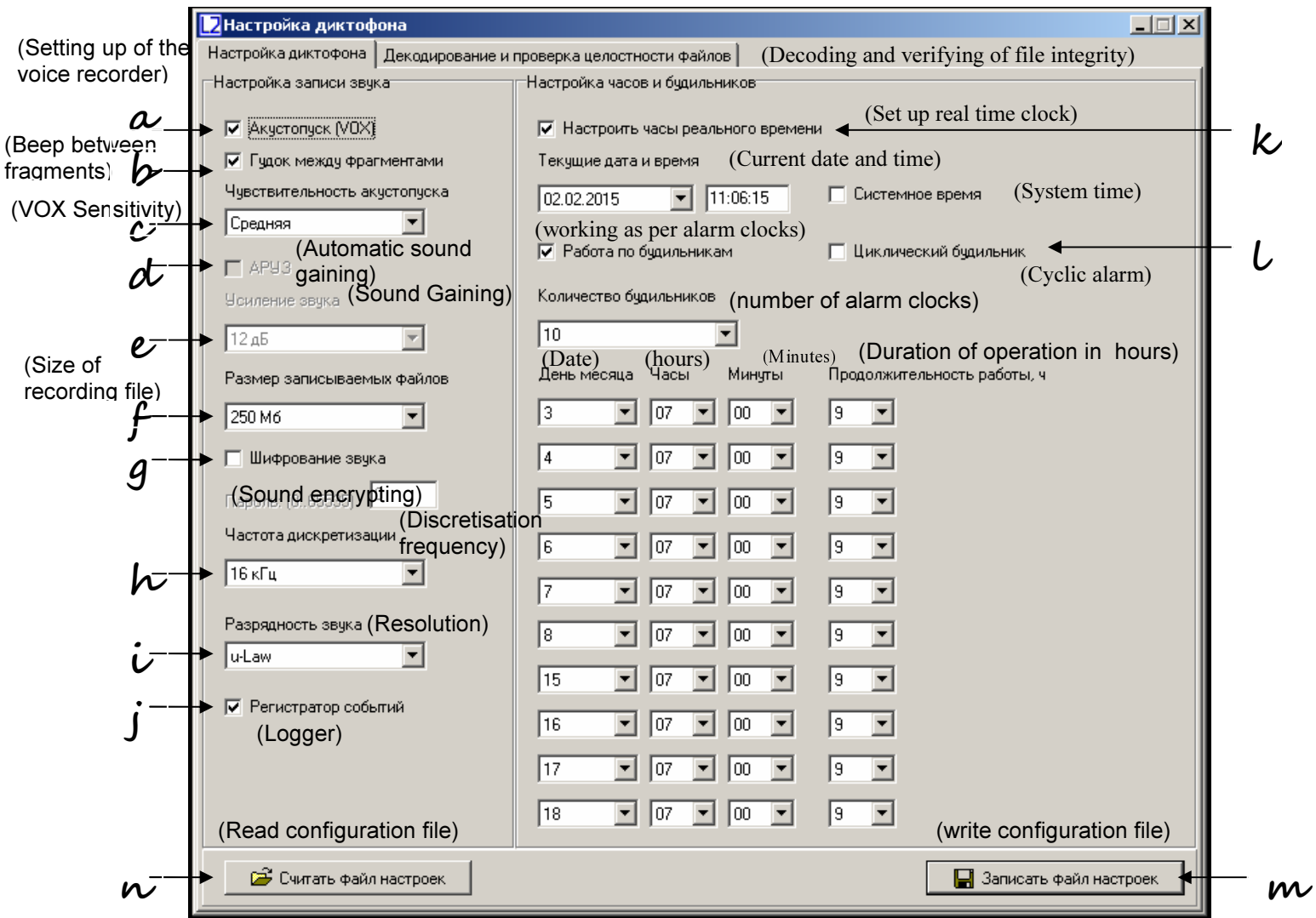
(Setting up of the voice recorder)

(Beep between fragments)

(VOX Sensitivity)

(Automatic sound gaining)

(Sound Gaining)

(Size of recording file)

(Sound encrypting)

(Discretisation frequency)

(Resolution)

(Logger)

(Read configuration file)

(Decoding and verifying of file integrity)

(Set up real time clock)

(Current date and time)

(System time)

(working as per alarm clocks)

(Cyclic alarm)

(number of alarm clocks)

(Date) (hours) (Minutes) (Duration of operation in hours)

(write configuration file)

Fig. 4. Tab "Setting the voice recorder" of program dict.exe.

i) **Sound Resolution.** The recorder can record in either a **16-bit** per sample without compression or in format **8 bits** per sample using the **compression u-law**. Using compression u-law can significantly (**up 30%**), increase duration of the voice recorder operation and **requires half of memory size on microSD card** in comparison with recording mode in format 16 bit uncompressed.

j) **Turn on / off logger of the voice recorder.** When logger of the voice recorder is switched on, all the main events will be recorded in the internal memory of the voice recorder, as well as their time and date. Besides, in logger stores data on manufacturing of the voice recorder (identification number and internal software number). When you turn off the voice recorder, normally last 48 events will be copied to the memory of the microcontroller on the microSD to file **INF_REG.TXT**. For more information about logger, see. In c. 5.

k)   **Setting the current time and date**. In order to change the date and time in the filing system of the voice recorder, select "Set real-time clock". To use the current system time, leave the flag "System Time" set. To set the date and time manually, this flag should be removed and required parameters entered manually.

l)   **Turn on / off operation by timers**. In order that the voice recorder would be turned on at a strictly fixed moments of time, and was working over some definite time, you should select flag "Work on alarm clocks". It is possible to work either in a mode of "**Cyclic alarm**" or by separately set alarms. In the mode of "**Cyclic alarm**" the voice recorder makes recording on a daily basis at preset time interval. When operating by separate alarm clocks, it is necessary to set the certain number of alarms in the window "**Number of alarm clocks**", depending on the desired number of voice recorder inclusions. To initialize each of the alarms it is needed to set the date (day of the month) and time of initialization , as well as the duration of operation of this alarm. After this period the voice recorder will turn off and wait for the next turn on by the alarm clock. Alarms operate in a strict sequence from the first to the tenth. The voice recorder will turn itself off after the run for the last alarm.

m)   **Save the configuration file.** After setting the desired configuration of the voice recorder, click the "**Save configuration file.**" The program will create a new one or overwrite an existing configuration file **dict.ini** to the directory. Copy the created file **dict.ini** to used on the microSD card and turn on the voice recorder.

n)   **Read the configuration file.** If you want to read the contents of a previously created configuration file, click "**Read configuration file**" and select the directory for reading the file dict.ini.

 Decoding and verifying of the digital signature of files.

Run *dict.exe* program and select the window tab "**Decoding and verifying file integrity**", as shown in Fig. 5. This tab of the program is designed to work with encrypted files and verifying digital signatures of the desired file.

Attention! The decoding process of large files may take a fairly long time. To speed up the decoding process it is recommended initially copy encrypted files to a computer.
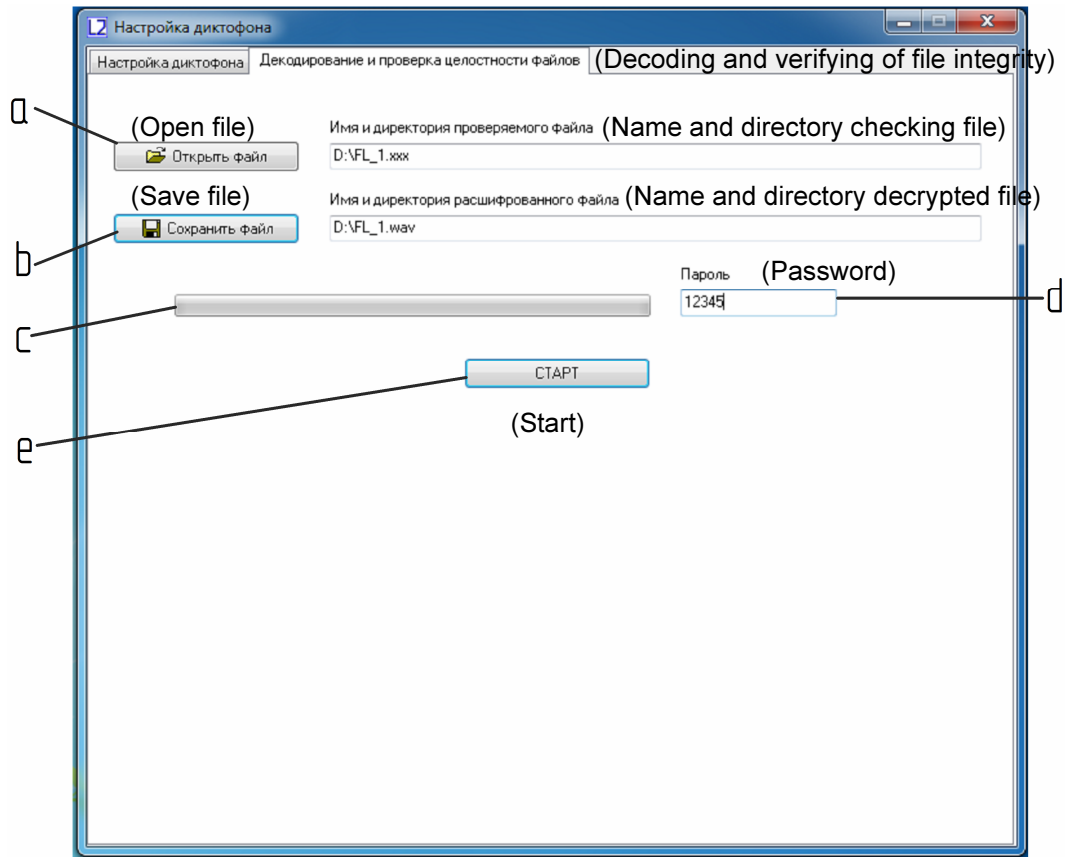
Fig. 5. Example of verifying the digital signature of files and their decoding.

In the tab "Decoding and checking of the integrity of the files" are contained the following controls:

a)   **Open the file.** Click "Open File" and select the desired directory and file. After selecting of the desired file, the program will automatically determine by the extension of the file whether it is encrypted or not. If the file is not encrypted, the program will only perform check of its digital signature.

b)   **Save the file**. If the file is encrypted (has the extension «.xxx»), the program will prompt the user to enter the name and directory of the file to which decoded audio will be recorded, as well as the password (see ch. 0). Once the file is created with the decoded audio recording, the program will automatically go to checking of its digital signature.

c)   **Indicator of the process of decoding and calculation of its digital signature.**

d)   **The password for the encrypted files.**

e)   **Button "Start" / "Stop".** By pressing the "Start" button, the decoding of file starts and checking of its digital signature. During decoding the file, button "Start" changes its value to "Stop". By pressing the "Stop" button, the decoding process stops.

f) **The output of the check integrity result of a file to the screen.** At the end of the check of the file, program will show the message "The digital signature is valid" in the event , that the continued integrity of the scanned file is present. If checking file contains errors in recording, the program displays the message "The digital signature is not valid!". Also, for each file it is output the number recorder on which it was recorded (Fig. 6).
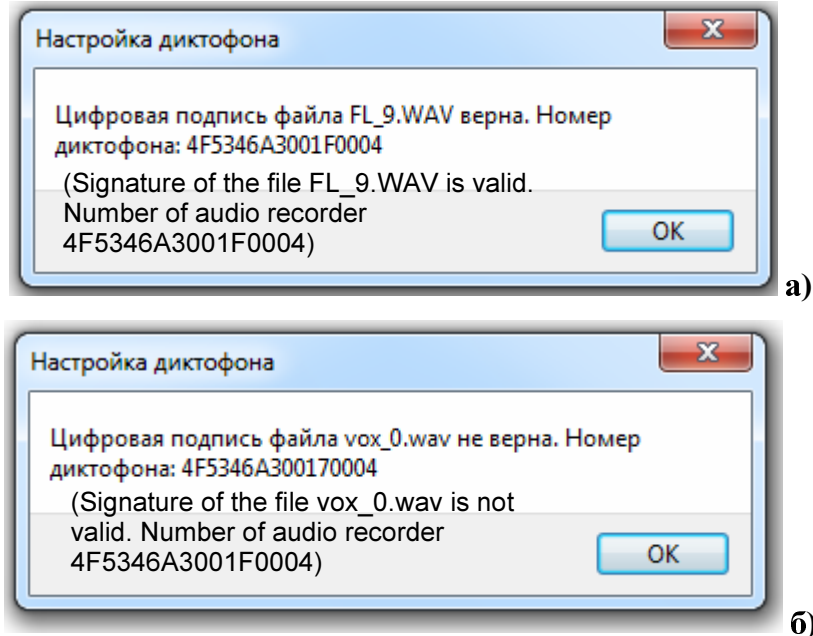
а)

б)

Fig. 6. Output of files test results: a) Digital signature of the file is valid; b) Digital signature of the file is not valid.

g) **Output of available information in the file tags**. After checking the integrity of the selected file, *dict.exe* program generates a report with information about the available tags in the file. The report contains information on the number of tags in scanned file, their names and their corresponding samples. This file has the same name as the file, which is checked, but with the extension «.txt» (for example, if the original file is named «FL_8.WAV», the file with information about the tags will have the name «FL_8.TXT»). The generated file with information about the tags is automatically stored in the directory of the originally scanned file. File with tags information may be useful when listening to audio files, which do not have function of recognition tags.

```
Информация о метках, содержащихся в файле "FL_8.WAV"
Количество меток в файле: 12
|-------|-------------|--------|------------------------------------|
| NUMBER |   SAMPLE    | SECTION |              tag                   |
|-------|-------------|--------|------------------------------------|
| 0001  | 0000002030  | data   | 2015:02:12_16:40:14                |
| 0002  | 0000108526  | data   | 2015:02:12_16:40:22                |
| 0003  | 0000200686  | data   | 2015:02:12_16:40:26                |
| 0004  | 0000268270  | data   | 2015:02:12_16:40:32                |
| 0005  | 0000444398  | data   | 2015:02:12_16:40:44                |
| 0006  | 0000802798  | data   | 2015:02:12_16:41:06                |
| 0007  | 0000935918  | data   | 2015:02:12_16:41:26                |
| 0008  | 0001003502  | data   | 2015:02:12_16:41:30                |
| 0009  | 0001050606  | data   | 2015:02:12_16:41:32                |
| 0010  | 0001296366  | data   | 2015:02:12_16:42:04                |
| 0011  | 0001443822  | data   | 2015:02:12_16:42:14                |
| 0012  | 0001497070  | data   | 2015:02:12_16:42:18                |
|-------|-------------|--------|------------------------------------|
```

Fig. 7. The structure of the file with information about the tags, formed by *dict.exe* program.

The system of tags of the voice recorder "SOROKA(Forty)-06."

Voice Recorder "SOROKA (Forty)-06" supports automatic layout of files. The system of tags, which is used, makes the analysis of the files more convenient and allows to avoid the loss of time of files creation / modification while their copying. Tags are placed in the recording files in the following cases:

1) Always at the beginning and at the end of the audio recording for each file.
2) When you press the control button of voice recorder for the purpose of marking the desired recording place.
3) In the voice activation mode, every time of detection of sound signal (voice activation).
The analysis of tags may be performed, for example, by using the program Sound Forge 6.0 and above or using the supplied on disk program *dict.exe* (c. 2.8 (g).
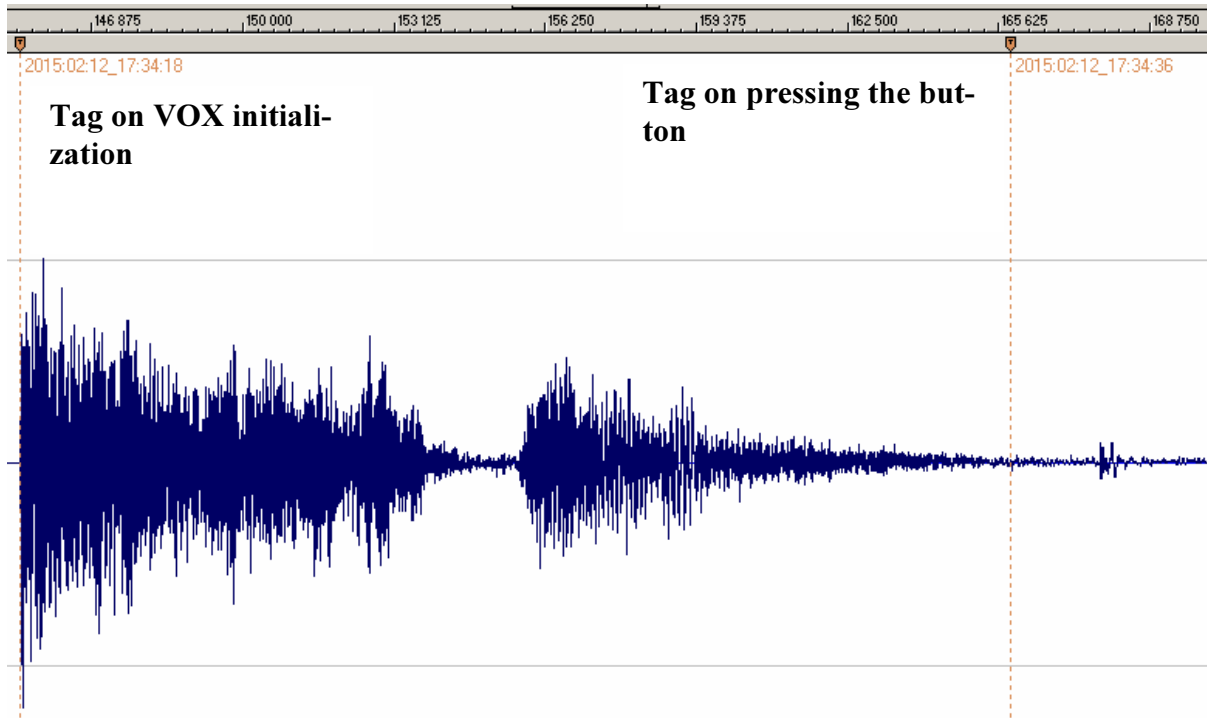
Fig. 8. Example of automatic tags recognition program **Sound Forge** in audio files of the voice recorder "SOROKA(Forty)-06." The name of each tag corresponds to the date and time of its creation.

Description of items for external power of voice recorder

Power cable

Power cable is designed for connecting the voice recorder to an external power supply with

voltage 5..28 Volt.

Voltage on the output of power cable supply is 5 V

The power cable is protected against reverse polarity voltage.

The power supply cord labeled in colors (red or blue) is positive.

External accumulator

As an external accumulator, it is used Li-Pol accumulator with an output voltage 3.3..4.2

Volt.

Fig. 9. Example of the voice recorder "SOROKA(Forty) - 06" operation with an external ac-
cumulator and external stereo microphones.

2. Logger.

Logger is designed to capture in the non-volatile memory of the voice recorder high-
lights of the voice recorder's work, as well as all emergencies. In addition, data is
stored in logger on the manufacturer of the voice recorder (voice recorder identification
number and the number of domestic software).

Logger stores from 32 to 48 last events, as well as their time and date, when they oc-
curred.

If the logger is turned on, (see. 2.7 (j)), then if the voice recorder is switched off (ex-
cept crash reset) logger is recorded to micro SD into the file INF_REG.TXT.

It is not recommended to use the logger continuously since this reduces resource of
non-volatile memory of the voice recorder (it only affects work of the logger itself).

Brief description of the recorded events and the structure of the logger is shown in Ta-
ble 6.

Table 6. Description of tags and events of registrar.

Shorthand	Description
DEVICE_NUMBER	Identification number of voice recorder
SDCARD_BUSY_COUNTER	Number of not- ready to record occurrences of the mi-croSD card in the last session of the voice recorder.
DICT_SOFTWARE_NUMBER	Number of domestic software of voice recorder
POWER_RESET	Reset by power failure
PIN_76_RESET	Processor hardware reset

PMMSWBOR	For official purposes
WAKE_UP_FROM_LPX.5	For official purposes
SECURITY_VIOLATION	For official purposes
SVSL	For official purposes
SVSH	For official purposes
SVML_OVP	For official purposes
SVMH_OVP	For official purposes
PMMSWPOR	For official purposes
WATCH_DOG_TIME_OUT	Looping\stop of the processor's program due to not serviceability of card or software failure
WDT_PSWRD_VIOLATION	For official purposes
FLASH_PSWRD_VIOL	For official purposes
PLL_UNLOCK	For official purposes
PERF_AREA_FETCH	For official purposes
PMM_PSWRD_RESET	Forced software reset (occurs when overwriting Voice Recorder microprocessor program). Is called forcibly.
LOW_VOLTAGE_TURN_OFF	Low battery – The recorder is turned off
BUTTON_TURN_OFF	Voice Recorder is turned off by pressing
BUTTON_TURN_ON	Turning the recorder on by pressing
SD_MEMORY_IS_OVER	No free space on the micro SD – the voice recorder is switched off
ALARM_TURN_OFF	Voice recorder is turned off by timer
ALARM_TURN_ON	Voice recorder is turned on by timer
SD_READ_TIMEOUT	Micro SD doesn't respond to a command to read data
SD_WRITE_FAILURE	Command to record data do not pass to micro SD
NO_SD_BLKWR_RESPONSE	It is not confirmed by micro SD on the recording data block
PROGRAM_BOR_RESET	Complete reset the voice recorder. Called of forcibly if the voice recorder has not detected a micro SD memory card or if the memory card of filing system contains errors.
SNMI_INTERRUPT	Microprocessor system failure (it is necessary to save the file INF REG.TXT)
FLASH_ACCESS_ERRORE	Error of the program (to save the file INF REG.TXT)
OSCILATOR_FAULT	Hardware failure of the oscilator
NMIFG_INTERRUPT	System failure of the microprocessor (to save the file INF REG.TXT)
EMPTY_CELL	Empty cell
UNDEFINED_ERRORE	Unspecified error or reset

Current repair of the voice recorder

General instructions

If any defect of the voice recorder is detected, repair works are needed. Current repairs of the voice recorder should be made at the factory or in the workshop.

Attention !!! Unauthorised opening of the voice recorder leads to the removal of the warranty from the voice recorder.

Typical faults

Typical faults of the voice recorder, which may be eliminated in the operating organizations are shown in Table 7.

Table 7. Typical faults of the voice recorder, and their solutions.

Faults	Methods of correction
The voice recorder doesn't switch on	To charge the storage battery
Recorded on the voice recorder audio files contain errors or are not readable	Replace the memory card. If this doesn't work, then contact the service centre.

3. Storage and transportation

The voice recorder should be kept in its original packaging in heated storage rooms at a temperature ranging from +5 to +25 C with relative humidity less than 80% (at + 20 C). The environment must be free from pairs of acids, alkalis and other aggressive impurities.

The voice recorder in a special packaging may be transported in closed transport (rail cars, containers, closed type holds of water [sea or river] modes of transport), as well as in sealed the cockpits of planes and helicopters and under ambient temperatures from -50 to +30˚C.

Attention !

If you want to keep a voice recorder for storage for over 1 month, firstly completely discharge the battery and then charge it for 30 minutes.

Li-polymer batteries in poorly charged state have the smallest loss of their capacitywhile storage!

Avoid storing the voice recorder in premises with air temperature over 25 C and less than 0 C.

4. Manufacturer's warranty

The manufacturer guarantees the accordance of the voice recorders to the technical requirements, providing that the customer obeys instructions for operating conditions, transportation and storage, set up by this manual.

The warranty period is 12 months within the warranty period of storage.

The warranty period of storage is 18 months from the date of production, if the charge / discharge cycles of the battery are held every 3 months.

The warranty period is extended for the period of warranty repairs, if any.

In the event of defects, discovered in the voice recorder due to the manufacturer's fault within the warranty period, troubleshooting, to the point of replacing of the voice recorder itself and its constituent units, are made at the manufacturer's expense.