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1. Purpose

Witness Digital Recorder is a professional device intended for making high quality record of voice messages into built-in flash memory. The recordings can be further uploaded onto the PC. Recorders of the Witness series are applied as personal system of audio surveillance for various companies and its workers, which helps to improve not only the work performance, but also to protect the workers against probable conflicts; and in case a conflict is unavoidable to solve it easily and immediately.

The supplied USB adapter allows data exchange between the Recorder and the PC, whereas the supplied software allows it to save messages as standard audio files, set the Recorder's parameters, as well as to administrate the Recorder's operations.

The Recorder can be used simultaneously as a voice recorder and a flash media to store and transfer data of any standards. The Recorder features Voice Activation System to increase recording duration by efficient compression of pauses in voice messages.

With further processing the recorded files by the supplied software, the duration of pauses can be restored.

Password can be applied to prevent unauthorized access to the Recorder's data.

2. Main Features

- Voice Activation System (VAS);
- Two timers to enable recording at the preset time (Daily and Once);
- Circular Recording;
- System of digital markers to check unauthorized record editing;

- LED indication of recording status;
- Magnet mount to fix the Recorder on clothes

3. Technical Characteristics

Parameters	Value
Sampling rate	4,8,16, kHz
ADC bitrate	16 bit
Compression algorithms	Without compression/ u-Law/ADPCM 2 and 4 bit
Frequency band	from 70 Hz to 6 kHz
Signal-to-noise ratio	70 dB
Exchange speed	from 1,5 Mb/s via USB adapter
Acoustic sensitivity	up to 9 m
Power supply	Built-in Li-Ion rechargeable battery 130 mAh 3.7 V
Rechargeable battery charge current	up to 80 мА
Operating temperature	from 0 to +40 °C
Data carrier	built-in Flash-memory
Memory capacity in hours (8kHz compression 2-bit ADPCM)	300 HQ (2Gb)

Operating the Recorder

4. Recording

Before starting, make sure the device is in Standby mode. Press the Rec button twice - after short LED flashes, the Recorder will start recording, red LED flashing. Recording will continue until the Recorder switches to Standby mode. To do so press the Rec button twice.

To pause recording, press the Rec button once - recording will be paused, red LED flashing more frequently. To resume recording, press the Rec button again - recording will continue, and the red LED flashing mode will be restored.

Attention!

If while recording, the internal memory of the Recorder is full or the battery is discharged, the Recorder automatically switches to Standby Mode. Recording will not be resumed until there is enough memory or the battery is charged.

5. Connection to the PC

To operate the Recorder, use RecManager for EM-LCD software. It is available for download on www.ts-market.com (see Support section).

It is also necessary to install CDM20824 driver for the FTDI232 adapter chip. Connect the adapter to the PC, and the second connector to the Recorder. If the Recorder's battery is not fully charged, the red LED will indicate battery charging is in progress.

To shift from charging mode to data exchange, leave the Recorder connected to the PC and then keep the Rec button pressed until blue LED starts flashing. After that the button can be released. Then launch RecManager for EM-LCD program and make sure USB 1.1 is selected as connection interface. Otherwise choose Recorder - Connection Type - Adapter USB 1.1

Press 'Connect' if necessary.

After data exchange has been completed, switch the Recorder to battery charging mode by keeping the Rec button pressed (until blue LED goes off and red LED starts flashing; or until there is green LED indicating the battery is fully charged) or by connecting the Recorder off the PC. After connecting the Recorder off the PC, the red (or green) LED can flash for 1-2 seconds, after that the Recorder switches to Standby Mode.

6. Record Profile Selection

Using the software (RecManager for LCD program), there are up to 8 user record profiles available that differ in compression algorithm and sampling frequency. In each of the profiles, you can enable or disable voice activation, and also select linear or circular record mode. For more information on operating RecManager program, read Operation Manual for the program. It is available for download on the Recorder's page on www.ts-market.com.

7. Timer Activation Mode

There are two types of timer activation in the Recorder:

Once Timer starts recording at the preset time (minutes, hours, day, month, year) and stops recording at the preset time (again minutes, hours, day, month, year)

Daily Timer starts recording at the preset time of the day (minutes, hours) and stops recording at the preset time of the day (again minutes, hours). That will continue day after day until the timer is disabled. To set and configure timers, use RecManager program.

Attention:

The timer starts recording only if the adapter is not connected to the Recorder and it is not in power saving mode due to battery discharge.

Once and daily timers do not operate at the same time. If timers' activation times overlap, there will be only one timer recording file created, the one that has been activated first.

8. 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 enables recording, the Recorder starts recording and 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 is 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 threshold). These parts will be played one after another without interruption.

9. Configuring VAS

Voice Activation System is configured in the RecManager program by changing two parameters:

1. **Threshold 'VAS level' and VAS time.**

VAS level can be adjusted from 0 to -55 dB. 0 dB corresponds to very low sensitivity (the Recorder 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 the Recorder 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 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.

'1 second' means 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.

Attention!
If VAS operates together with timers, you don't have to enable recording as it starts automatically after the timer (don't forget to synchronize the Recorder's time with the time on the PC).

10. Circular Recording

The Recorder has the option of circular recording. In the RecManager 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.

11. Battery Charging and Maintenance

To charge the battery, simply connect the Recorder to the USB port of the PC via supplied USB cable, or use any other charger with a USB connector and output current of at least 100 mA. While this the red LED will start flashing. The duration of LED flashing is inversely proportional to the degree of battery charge level (the longer the LED flash, the deeper battery discharge is). When the battery is fully charged, red LED goes off and the green LED will be on.

Attention!

Deep discharge is extremely detrimental to the battery, and can lead to rechargeable battery failure. Please note this is not covered by the warranty.

To prevent deep discharge, charge the recorder at least once per month and do not store the device in a discharged state.

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