Audio/video recorder µAVR H.264x4

OPERATION MANUAL

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Contents

Overlook

Audio and Video Recorder MAVR-H264x4 is intended for professional recording of video data with sound feedback onto 4 memory cards at the capacity up to 32 Gb each. With the help of "Manager" program which is on the delivery set the records can be further decoded (converted) and recorded onto the hard drive of the PC as sound files to be played back by one of the players installed on the PC with all necessary codecs (see Playing back Video Record for more detail).

The Recorder offers wide opportunities concerning both operational parameters and the recorded signal setting:

- Recording of video signal either from an external source or from the built-in video camera (AVC format, H.264) providing resolution 640x480 for video camera or 720x576 (for an external source)
- Adjustable video signal filtering
- Independent setting of bitrate for audio and video stream
- Adjustable frames per second for video stream
- Automatic regulation of built-in video camera

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sensitivity (can be deactivated)
- Automatic correction of white balance for built-in video camera
- Elimination of flickering caused by day electric lamps etc (at the frequency 50 and 60 Hz)
- Disposition of text onto video signal (date, time, GPS data, text line) – up to 2 lines with 24 symbols each (depending on the resolution selected)
- When recording video signal – automatic or manual selection of video standard to be used
- Option to set video signal parameters (brightness, contrast, saturation, color)
- Recording of audio signal either from an external sound source (line output) or from built-in microphones in AAC format (mono or stereo)
- Manual or automatic adjustment of the amplification of audio channels
- Built-in clock with an option to correct its accuracy and set according to GPS time and calendar
- Starting the Recording by:
    - switch,

- timer,
- control input signal,
- built-in motion detector
- VAS (Voice Activating System)
- Linear or circular recording onto memory card (up to 4 memory cards)
- Recording of place coordinates through GPS system
- Prehistory recording before the event that initiated the recording (can be deactivated)
- Power supply either from an external source or by built-in Li-ion rechargeable battery. When powered from an external source rechargeable battery is being charged
- Power supply for an external power consumer (for example video camera) with output voltage option (5 or 12 V)
- Setting of parameters through menu or with the help of "Manager" program
- Option to select interface language (Russian, English)
- Opportunity to upgrade internal software
- Option to connect GPS receiver and analog-to-digital adapter.

Figure 1.
Video Recorder's Appearance
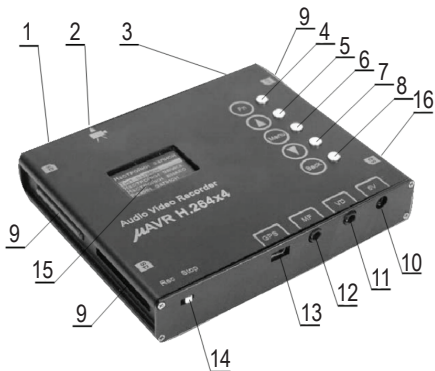
1. Left Microphone
2. Video Sensor
3. Right Microphone
4. "Fn" button
5. « ▲ » button
6. "Menu" button
7. « ▼ » button
8. "Back" button
9. Connector for memory card with LED indicator
10. Connector for "5V" external power supply
11. connector for "VD" external devices
12. connector for "MF" microphone
13. Connector for GPS receiver
14. "Rec-Stop" Switch
15. OLED display
16. Slot for master card with LED indicators.
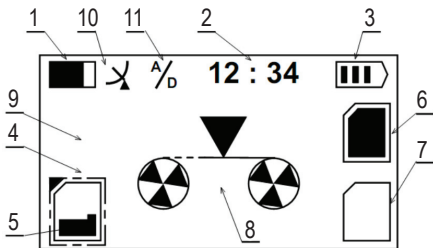
Figure 2.
Video Recorder's Indicator (Main View)

Legend Keys

1. Indicator of internal buffer fill
2. Current Time Indicator
3. Charge level Indicator
4. The frame means that data is being recorded onto this card
5. Indicator of Memory Card fill
6. Full Memory Card is inserted
7. Empty Memory Card is inserted
8. Operational Mode Indicator (see Figure below)
9. No Memory Card
10. GPS Module is on
11. Analog-to-digital adapter is on

 — main data block record

 — prehistory record

 — pause (time for motion detector to respond, VAS system, time for memory card to complete scanning)

 — recording stopped (memory card is full)

 — recording did not start (external video signal source is not connected)

Technical characteristics

- Video Recording parameters:
- Resolution of built-in video camera: 640x480
- Video input resolution: 720*480 (NTSC) 720*576 (PAL, SECAM)
- Format size of video stream: 160x120, 320x240, 640x480 (built-in video camera); 180x120, 360x240, 720x480 (NTSC); 180x144, 360x288, 720x576 (PAL, SECAM)
- Frames per second: 1, 2, 5, 10, 12, 20, 25, 30
- Video compression standard: AVC (h.264)
- Bitrate, Kb/s: 768, 1024, 1536, 2048, 2560, 3072, 3584

- Video input resistance: 75 Ohm
- Supportable video standards: NTSC (M, 4.43) PAL (B, G, H, I, M, N) SECAM
- Viewing angle of built-in video camera, 64 degrees
- Dynamic range of built-in video camera: 68dB

Audio Recording parameters:
- Sample rate: 44100 Hz
- Resolution: 16 bit
- Audio compression standard: AAC
- Audio bitrate, Kb/s: 32, 64, 96, 128
- Amplification range: 60 dB
- Dynamic range: 92 dB
- Frequency range: 80-20000 Hz
- Resistance for electret microphones: 3 KOhm
- Voltage of electret microphones: 2.5 V
- Maximum input voltage (actual parameter): 0,7 V

Storage medium parameters:
- Memory cards in use: up to 4
- SD card capacity: 2 Gb
- SDHC card capacity: 4-32 Gb
- File system: FAT 32
- Power system parameters:

- Battery life in record mode: 8 hours
- Battery life in Record mode with VAS (audio signals below threshold): up to 15 hours
- Battery life in stand-by mode: 12 months
- Rechargeable battery: Li-ION (2200 mAh)
- Charging time from an external source: 5 h
- External source voltage: 4.5-5.5V
- External source current (recording+charging+ external camera): up to 1.7A
- External video camera voltage: 5.12V
- External video camera current: 150A

Other parameters:
- Indicator: OLED
- Dimensions: 82x70x15 mm
- Weight (memory card not included): 110 g

Operating the Recorder

Preparing for Work
1. Format Memory Card in FAT-32 format. (You can use either the means of operating system or "Manager" program)
2. At least one memory card must be prepared in "Manager" program to operate the Recorder. To do this select "Settings" Tab in

«Manager MAVR-H.264x4» program. Click on "Setting". In the appeared window specify the path to your card and the place to save the records. Click on "Prepare". At this service files will be recorded onto the memory card (see Instructions for «Manager MAVR-H.264x4» for more detail)

3. Insert memory card (master card) with the recorded service files into the slot (position 16) of the device (see Figure "Recorder's Appearance" at page 3).

4. Check charge level of the battery from charging icon on the Recorder's indicator (see position 3 at "Recorder's Indicator"). To do this press any button to turn on the Recorder. If needed charge the rechargeable battery (see Section "Charging the Rechargeable Battery").

Attention!

▮▮▮▮⟩ *If the charging indicator is full that means fully charged rechargeable battery.*

Starting the Recording without Prehistory

There are 4 connectors for memory cards in the Recorder. The Recorder reads service information necessary for the Recorder's operation from memory card inserted into the slot (position 16). This information is recorded onto the memory card when preparing it in "Manager" program.

There also can be any memory card formatted in FAT-32 format in other slots. When starting the recording the data will be recorded onto the memory card marked by a frame on the indicator (see position 4 at Figure "Recorder's Indicator" at p.4). Frame indicator can be transferred from one memory card onto the other by "Fn" button (see position 4 at Figure "Appearance" at p.3). The indicator is transferred through inserted memory cards, not the slots themselves.

To start the recording make sure that there is a master card (memory card with the recorded service information) in the slot (see position 16) (see Section "Working with memory cards").

There are the following ways to start the recording:

- by "Rec-Stop" Switch (see position 14 at Figure "Appearance" at p.3)
- by Timer
- by Control Signal (contact "remote" of "VD" connector, see position 11 at Figure "Appearance" at p.3, for base diagram see Appendix 2)
- by internal motion detector activation
- by VAS system activation

Starting the Recording by "Rec-Stop" Switch

When installing master card or while quitting standby mode the master card inserted into the connector (position 16) is being scanned. After that the Recorder is ready to start operating. When shifting "Rec-Stop" switch to "Rec" position the recording starts. The data will be recorded onto the card marked by a frame on the indicator.

To stop recording shift switch to "Stop" position.

Starting the Recording by Timer

The Recorder has 10 timers. Set the parameters and turn on the necessary timer using the Recorder's Menu (see Appendix 1) or "Manager"

program. When Timer is activated the Recorder starts recording data onto memory card marked by a frame (at the timer's start time).

Starting the Recording by external control signal

When external control signal appears (contact "remote" of "VD" connector) the Recorder switches to record mode. The data will be recorded onto the memory card marked by a frame (at the time the signal appears). If VAS or motion detector are active, the recording starts only after they have been activated (one or another).

Starting the Recording by motion detector activation

Adjust the parameters and turn on motion detector using Recorder's Menu (see Appendix 1) or "Manager" program. When motion detector is activated (that means the detector "detects" motion in the active zone of the vision field of video sensor) the Recorder switches to Record Mode if "Rec-Stop" Switch is in "Rec" position or one of the timers or control signal at "VD" input from the external device has been activated.

The Recording will be performed onto the memory card marked by a frame (at the time the Recorder switches to Record Mode).

Starting the Recording by VAS system activation

Adjust the parameters and start VAS system using the Recorder's Menu (see Appendix 1) or "Manager" program. When VAS is activated the Recorder switches to Record Mode if «Rec-Stop» Switch is in "Rec" position or one of the timers or control signal at "VD" input from the external device has been activated.

The Recording will be performed onto the memory card marked by a frame (at the time the Recorder switches to Record Mode).

Starting the Recording with Prehistory

Recording with Prehistory is similar to circular recording (see p.9), but the length of the rewritable recording area is limited by the settings (see Menu for "Prehistory") and counts from 10 seconds to 10 minutes.

To start recording with prehistory shift "Rec-Stop" switch to "Rec" position or set the start time for one of the timers. Prehistory recording starts if "Rec-

Stop" switch is shifted to "Rec" or one of the timers to start recording is activated.

If one of the following events occurs

- control signal appears (contact "remote" of "VD" connector)
- motion detector detects motion in the field of vision
- VAS is activated
- command from analog-to-digital adapter appears

the Recorder stops prehistory recording and starts recording of the main data block. Thus the whole record will contain recording during the time preceding the event (the time can be set in "Prehistory") and the following recording after the event.

Record Modes

The recorder provides recording in the modes:

- Linear mode
- Circular recording 1
- Circular recording 2
- All-card linear recording
- All-card circular recording

To select a record mode go to the Recorder's Menu

or use "Manager" program (see Operation Manual for Manager)

To select record mode using Recorder's Menu go to the "Main Menu". To do this press any button of the keyboard, then click on "Menu" (see position "6" at p.2). Select the Record mode item using the ⏶ ⏷ buttons. Press the ⟨MENU⟩ button. Then using the ⏶ ⏷ buttons select the desirable record mode and press the button "Menu".

Linear Recording
In the Linear Record mode, recording continues while there is free memory.

Circular Recording 1
In the Circular Record 1 mode, recording continues while there is free memory space. When there is no free memory, recording continues over the beginning of the current recording. Previous recordings stay on the memory card. If when you selected this mode there were not free memory space, the recorder cannot create a new recording.

Circular Recording 2
In the Circular Record 2 mode, when free memory space ends, recording continues over the oldest data. As a result, all the previous recordings will be deleted.

All-card linear Recording
In the Linear Record mode, recording continues while there is free memory. Then the successive card is selected. If the successive card has free space the data will be recorded on the free space until the card is full etc. If the successive card has no free space the recording stops.

All-card circular recording
This mode is similar to All-card linear Recording. The difference is that when shifting to the next card the data will be recorded from the beginning deleting the existing files.

Main Recorder Modes

Initially the Recorder is in Sleep Mode. The current consumption of the rechargeable battery is so unsubstantial that charging would be needed no earlier that in a month.

"Record" Mode

Saving data onto memory card

The recorder switches to Record mode when:

- the recorder switch is in "Rec" position
- control signal appears (contact "remote" of "VD" connector)
- the recorder starts automatically (VAS system, motion detector)
- any of the timers is activated
- the Recorder switches from analog-to digital adapter.

Standby Mode

The Recorder switches to Standby Mode only if powered from a rechargeable battery. Recording stops and the Recorder switches to Standby Mode when:

- shifting the Switch to "Stop" position
- the recorder's memory card is full
- timer to stop recording is activated
- there is no signal at the control input (contact "remote" of "VD" connector) for more than specified in the Settings (see "Power Control" of the Recorder's Menu)
- the recorder's rechargeable battery is discharged

Working with Memory Cards

Memory card with service files and file with settings for the Recorder (for preparing this card see "Preparing for work") must be inserted into the slot (position 16) (see Figure 1 "Appearance" at p.3) marked on the case by a scaled-up icon comparing to other slots for memory cards. Each time memory card is inserted into the slot (Position 16) or the Recorder quits Standby Mode (when powered from external power source the Recorder doesn't switch to Standby Mode) the Recorder scans memory card.

If the Recorder's parameters have been modified new settings are recorded onto the memory card in the slot (position 1).

It is recommended to mark the card to save service file and Recorder's setting parameters. The data are recorded onto the card marked by an external frame on the Recorder's indicator (see position 5 at Figure 2 "Video Recorder's Indicator" at p.4). LED is on while recording onto the memory card.

The card mustn't be extracted from the slot during recording.

You can select memory card to record data by "Fn" button. Slots for memory cards are selected by the moving frame counterclockwise. If any memory card not being in the slot (position 16) has been selected for recording, this card can be extracted from the slot, for example, for conversion of data in "Manager" program.

Attention! If there is no memory card in the slot (position 16) it is not recommended to modify recorder's setting parameters as they won't be saved.

Playing back of the video recording
The Recorder records data onto memory card in the internal format. To play the recording back, you need:
1. to convert the recording with the help of the mAVR-H.264 V1.15 Manager Program
2. play back the recording using video player (for instance, Windows Media Player)

Conversion of Video Data
To convert video data, follow these steps:
1. copy folder from the Software CD onto the hard drive: :/ Miniature audio and video

recorders/ MAVR H264x4\Manager

2. Connect memory card to the PC via card reader
3. Run the "mavr_h264x4" program
4. Select "Setting" Tab. Press the button "Setting". In the appeared window specify the path to your memory card and the path to save records.
5. Go to "Conversion" Tab. Press the button "Scan". The window displays records with the following names: D090714_T011628_P0 with D090714 - specifying data, 09 – year, 07 – month, 14 - date T011628 specifying time: 01 – hour, 16 – minutes, 28 – seconds (recording start time).

   P0 – part's number; part 0 (numeration starts from 0).

   The division of one incessant record to several parts is possible due to the limitation of file size (maximum file size is specified in "Manager" program).

Playing back of the made video recordings

To play back the received video records the following programs can be used:
- QuickTime Player (www.apple.com) – testing performed with 7.4.5 version
- VLC media player (www.videolan.org) testing performed with 0.8.6f version
- Windows Media Player with H.264 codec installed (for example from K-Lite Codec Pack (www.codecguide.com) testing performed with 5.2.0 version

Setting the Recorder (in Menu)

In the Menu, you can change the recorder settings using the buttons on the Recorder's case. To go to the "Main Menu" click on "Menu". You can go from one menu option or submenu to the other using «▲ » and «▼ » buttons. By clicking on "menu" you can select menu option or submenu. You can also change parameters using this button. To quit use "back" button.

See Appendix 1 for the list of all the adjustable parameters.

Battery Charging
To charge the rechargeable battery, connect power adapter (which is on delivery set) to the recorder's slot "5V" (see Figure "Appearance" at p.4),
and then connect network adapter to AC power (voltage 220V). Full charging takes about 5 hours. Recorder's Indicator (position 15) (see Figure "Appearance" at p.4) displays the work mode of the charging process.

— The rechargeable battery is fully charged.

— The rechargeable battery is fully discharged.

— Charging is in progress.

— Charging is completed, power supply from the adapter.

To keep the rechargeable battery operational a periodic charging is recommended (at least once in 3 moths).

In Box

- Audio and Video Recorder mAVR H.264x4;
- Network adapter;
- 2 Gb SD card;
- Video input cable with remote control;
- Instructions.

Warranty
Manufacturer Warranty Coupon

Warranty: The Telesystems Company provides warranty repair for 1 year from the selling date, but not more than 2 years from the manufacturing date.

This warranty is voided if the recorder is:
- improperly used;
- mechanically damaged;
- received without supplier warranty tag on this document.

All questions regarding product exchange and return must be solved with the seller's company according to Protection of Consumers Law.

Technical support

Please use the following e-mail: support@ts-market.com free of charge, and telephone numbers:
+7-(495)-638-88-00, +7-(499)-940-95-75

Appendix 1. VideoRecorder's Settings menu

General Settings
- time (fields to insert values)
- date (fields to insert values)
- language
  - English / Russian
- GPS time
- summer time
- time zone

Record settings
- record type
  - video+sound / only video / only sound
- Sound settings
- sound source
  - microphone / audio input
- Mode
  - stereo / mono (left) / mono (right)
- Amplification
  - amplification / automatic gain control
  - bitrate
    - 32 Kb/s / 64 Kb/s / 96 Kb/s / 128 Kb/s
- Video settings
  - Video Source
    - built-in camera / video input
- Camera settings
  - brightness
    - brightness (slider)
  - contrast
    - contrast (slider)
  - hue
    - hue (slider)

- saturation
  - saturation (slider)
- Noise reduction
  - Noise reduction (slider)
- automatic gain control
- amplification
  - elimination of flickering
- parameters
  - picture size
    - low / medium / high / special
  - FPS
    - 1fps / 2fps / 5fps / 10 fps / 15 fps / 30 fps
  - Bitrate
    - 768 Kb/s / 1024 Kb/s / 1536 Kb/s / 2048 Kb/s 2560 Kb/s / 3072 Kb/s / 3584 Kb/s
- Video Input Settings
  - brightness
    - brightness (slider)
  - contrast
    - contrast (slider)
  - hue
    - hue (slider)
  - saturation
    - saturation (slider)
  - Color system
    - auto / PAL-B, G, H, I, N / PAL-M / PAL-Comb.N / SECAM / NTSC
  - Parameters:
    - For PAL/SECAM
      - Picture size
        - low / medium / high / special
      - FPS
        - 1fps / 2fps / 5fps / 10 fps / 15 fps / 30 fps
      - Bitrate

- 768 Kb/s / 1024 Kb/s / 1536 Kb/s / 2048 Kb/s / 2560 Kb/s / 3072 Kb/s 3584 Kb/s
      - Coding Mode
        - frame by frame / by half of frame / adaptive
  - For NTSC
    - Picture size
      - low / medium / high / special
    - FPS
      - 1fps / 2fps / 5fps / 10 fps / 15 fps / 30 fps
    - Bitrate
      - 768 Kb/s / 1024 Kb/s / 1536 Kb/s / 2048 Kb/s 2560 Kb/s / 3072 Kb/s / 3584 Kb/s
    - Coding Mode
      - frame by frame / by half of the frame / adaptive
    - Text
      - off / upper / lower / all
- Filtering
  - filtering (slider)
- Record Mode
  - linear / circular 1 / circular 2 / linear (all)
- Timers
  - timer (0÷9)
    - Timer on
    - Operatinal Mode
      - daily / once / until preset date / after preset date
  - Date
    - field to type in date
  - Record start time
    - field to type in record start time
  - Record's length
    - field to type in Record's length
  - Day

- Monday / Tuesday / Wednesday / Thursday / Friday / Saturday / Sunday
- Prehistory
  - off / 10 seconds / 30 seconds / 1 minute / 3 minutes / 5 minutes / 10 minutes
- Autostart
  - motion detector
    - on
    - Hold time
      - 5 seconds / 10 seconds / 20 seconds / 30 seconds / 1 minute / 3 minutes / 5 minutes / 10 minutes
  - Voice Activating System (VAS)
    - on
    - Sensitivity
      - sensitivity (slider)
    - Hold time
      - 5 seconds / 10 seconds / 20 seconds / 30 seconds / 1 minute / 3 minutes / 5 minutes / 10 minutes

Other settings

- Recorder's Power Control
  - Readiness Mode
  - Standby Mode
- Recorder's Power Supply
  - Operational Mode
  - Voltage
- GPS module or external adapter power supply
  - Operational Mode
  - Inputs in use
  - Active level
- Reset of settings to initial condition
- Software version
- Upgrading software

Appendix 2. Base diagram of the connectors

+5 V, + 12 V
"remote"
video input
GND

"VD" connector

not used (do not connect)
R – right channel
L – left channel
GND

"MF" connector

«+» — central wire

«–» — external wire

"5V" connector"