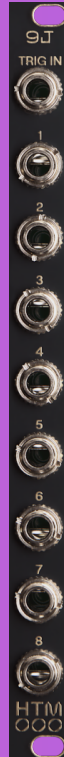


HALFTIME
MODULAR

8TR + 9J

8 TRACK RECORDER
+ 9J EXPANDER

USER
MANUAL



GETTING STARTED

8TR comes with a 16-pin to 10-pin ribbon cable, a pair of screws and an interchangeable 1U panel. Before installing it into a case, make sure that both rails of your power supply have sufficient current capabilities for your new configuration (see "Specs" section).

Switch off the power supply before plugging the module into the case. Plug the 10-pin connector of the ribbon cable into the power input on the back of the module, and the 16-pin connector into the power supply's busboard. Make sure that you connect both connectors with the correct polarity on both sides before switching the power supply on. The -12V pole is in red on the ribbon cable; it corresponds to the white stripe on the module.

If you are unsure about any step of this process, please get in touch with us before doing anything. We are glad to help!

Happy patching :)

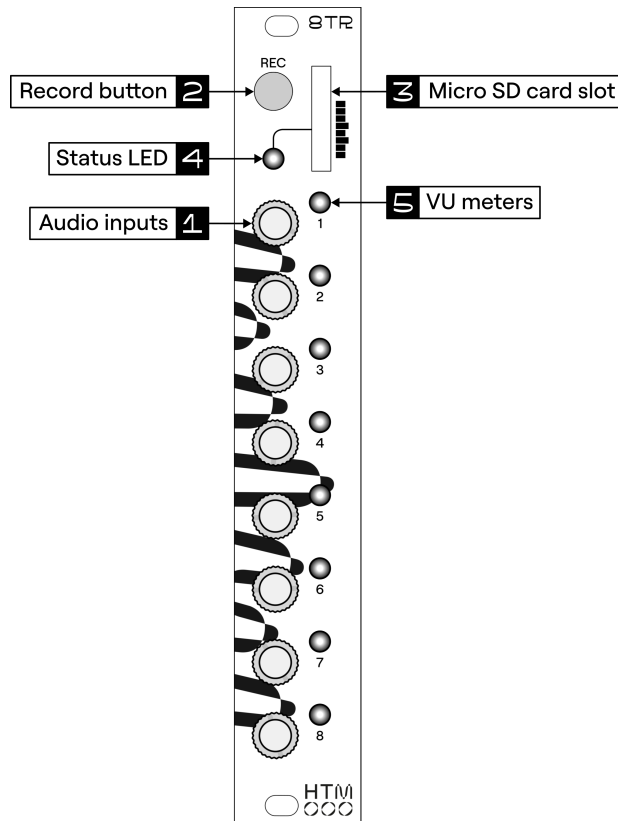


O V E R V I E W

8TR is a high fidelity, 8 audio channel multitrack recorder designed for Eurorack systems. The included 32GB micro SD card provides up to 7 hours of continuous recording in 24bit/48kHz quality.

The optional 9J expander provides passive copies of the input signals, as well as a trigger input for starting and stopping the recording using an external control voltage.

While it can be used as a basic audio recorder out of the box, there are several options and configurations that make it a versatile ecosystem even for the most demanding setups.



I N D E P T H

Recording

Plug the audio tracks you want to record into the audio inputs₁. Make sure the tracks are properly plugged in and not muted by watching the VU meters₅ that show the input signal activity.

To start recording, simply press the REC button₂. It should light up when 8TR is recording. Press it again to stop recording - the button LED should turn off. There are no predefined stereo pairs; all inputs are recorded on the micro SD card₃ as independent tracks in a multichannel WAV file.

Note that the VU meters are only showing relative loudness since there cannot be any clipping: 8TR is designed to handle the full -12V to +12V eurorack signal range.

Folder and File Structure

For each recording session, 8TR creates a folder named *SESH0000 ... SESH9999*. 8TR always uses the lowest session number available and never overwrites sessions, so having a *SESH9999* folder already existing on the SD card will result in a critical error (see "Status LED" section).

The last session folder might be empty if no recordings were made during the last session.

Each session folder can contain up to 100 recordings, each split up to 100 files. The recordings are named *RECXX-YY.WAV*, where XX is the recording number and YY is increased when the recording has to be split to a new file. If more recordings are made during a single session, they will be moved to the next session folder.

The recording settings are set in the *SETTINGS.TXT* file that can be found on the root folder of the SD card.

Recording Settings

The recording settings can be edited in the *SETTINGS.TXT* file using a basic text editor from a computer. The table opposite summarizes up all the possible parameter values and their meaning.

Note that all parameters must be written in UPPERCASE, as provided on the original file which can be found at halftimemodular.com.

If a setting is invalid, misspelled, or if the settings file is missing, the following settings are used by default:

BIT_DEPTH=24

MEM_THRESHOLD=80%

MAX_FILE_SIZE=4GB

SYNC=OFF

The version of the firmware run by 8TR is appened at the end of the *SETTINGS.TXT* file automatically.

Parameter	Values	Notes
BIT_DEPTH	16	Smaller file size, but lower quality when using 16-bit.
	24	
MEM_THRESHOLD	5% to 95%	Memory level above which the status LED turns orange.
MAX_FILE_SIZE	1GB to 4GB 500MB to 999MB	Maximum file size before splitting the recording to a new file. 4GB corresponds to 1 hour of recording in 24 bit and 1 hour and 30 minutes in 16 bit.
SYNC	OFF	Disables sync between units, allows latency-free start/stop.
	LEADER	Serves as the master device for all units daisy chained through the SYNC OUT port.
	FOLLOWER	Synchronizes its recording start/stop and time base to a master unit connected to its SYNC IN port, and passes the master time base through the SYNC OUT port for connection to additional FOLLOWER units.

Status LED

The status LED₄ shows the current state of 8TR:

- Off: SD card not ready or not inserted
- Green: SD inserted and ready
- Orange: memory warning threshold reached
- Red: memory full; any current recording will be stopped, and no new recordings can be made. Note that 8TR typically stops around 500MB before the actual SD card physical memory limit.

- Blinking green or orange: missed audio samples in the current recording; see "SD card" section.
- Blinking red: critical error; you need to either power cycle or remove and reinsert the SD card to exit this state. This should not happen during normal use. If it does, please send the *DEBUG.TXT* file that might have been created in the root folder of the SD card to support@halftimemodular.com!

Multichannel WAV format

The multichannel WAV format allows the recording and storage of several audio channels inside a single .WAV file.

This format is used by 8TR for optimal performance and flexibility; users can chose to record any combination of mono or spatialized audio tracks without having to set it up.

8TR records the 8 audio inputs as separate tracks inside the multichannel .WAV file.

As of the writing of this manual, not all DAWs and audio processing software can import multichannel WAV files.

To split the files created by 8TR into individual tracks for further processing, we recommend using Audacity or Wave Agent by Sound Devices. Both are free to use.

Sync Connection

Several 8TR units can be chained together to synchronize the recording start and end points. The audio data of each synced unit is saved on their respective SD cards.

Chaining two units is achieved by connecting a *leader* unit's SYNC OUT port to the SYNC IN port of a *follower* unit using the optional sync cable.

Any number of additional *follower* units can be daisy chained to a *follower*, but it is important to keep a *leader* unit at the beginning of the chain. Simply connect the SYNC OUT of a follower to the SYNC IN of another follower to add more units to the chain.

When chained, the recording can only be started and stopped on the leader unit. The REC button and trigger input are always disabled on follower units, but the REC button LED still shows when the unit is recording.

The internal time bases of all followers also get synced to the leader time base to prevent drift between units, meaning the transients stay aligned, no matter the length of the recording.

File splitting might occur at slightly different moments on synced units, but the total length should be the same when all the files are put together.

To have consistent result between all chained units, it is recommended to delete all recording folders on the synced units to have consistent folder names. With the exception of the SYNC parameter, all other settings can be set to different values on synced units. This also avoids follower units stopping prematurely due to a full memory card; the next daisy chained units will also be stopped.

The sync cable can be purchased from our website or by asking your local dealer. You can also get in touch with us for other sourcing options, e.g. if a specific cable length or connection between racks is required.

SD card

We recommend only using the included 32GB micro SD card with 8TR, in order to comply with the writing speed and timing requirements of the system. Feel free to try other SD cards, but please make sure that it works well with 8TR before doing any critical recording with it.

To test the compatibility of an SD card, record more than 1 hour in 24 bit quality. Check for missed audio data by watching the status LED; it will periodically blink OFF if the SD stalled and prevented 8TR from writing some samples.

It is best to use an SD card with at least a V30/U3 rating for 24 bit recording, but 16 bit recording might work with lower rated cards. There is no theoretical limit to the maximum SD capacity. It must be formatted in FAT32, and the preferred way to format it is to use the SD Association's tool.

If using another formatting method, which is needed to format SD cards larger than 32GB in FAT32, select a cluster size (aka allocation unit) of 32kB if you can.

All SD cards should be periodically reformatted to avoid reduced performance due to fragmentation.

Emergency Shutdown

8TR has a built-in mechanism to prevent corrupted recordings when the module loses power, for example when the rack is turned off by accident.

When 8TR detects more than a 0.8V drop on the +12V power rail, it will do its best to stop and save the recording in the current session folder.

This mechanism should not be relied on to stop recordings during normal use.

Lowering the value of the MAX_FILE_SIZE setting is also a great strategy to reduce the chance of losing an entire recording session; files that are already closed when the power is lost have virtually no chance of being corrupted.

9 J E X P A N D E R

Setup

The expander can be connected to the right of 8TR using the mezzanine board supplied with the expander. Watch the orientation of the modules! The mezzanine board only fits one way.

For the trigger input, connect the GND and TRIG pins of the mezzanine and 8TR together using the supplied jumper cable pair.

Because of the way it is connected to 8TR, the expander is not compatible with 8TR in the 1U orientation.

9J is fully passive and does not require any power connection.

Trigger Input

The trigger input can be used to easily record multi-layered single shot sounds, or simply to automatically start and stop the recording from a sequencer during a performance.

The trigger latency is internally compensated to make sure that the transients are properly captured when a signal is used to trigger both a sound and the start of the recording. The effective start latency is typically smaller than one audio sample.

Keep in mind that the trigger input is ignored when 8TR is in *follower* sync mode, and that the minimal recording start latency is typically 8ms in sync mode. Because of this, synced units are not really suited to record one shot sounds using the same signal to trigger the sounds and start the recording.

1 U P A N E L

8TR can be converted to the "Intellijel" 1U format by swapping the frontpanel to the 1U panel included in the box.

To remove the frontpanel, unscrew the nuts of the 8 jacks using your fingers or pliers. Take care to not scratch the frontpanel with pliers! You can add a thin piece of cloth between the pliers and the nut to protect the panel.

When you are done, simply put the 1U panel on the module and screw the jack nuts back on using the same technique.

Feel free to get in touch with us if you are unsure about any step of the process.

Note that the 9J expander is not compatible with the 1U version of 8TR due to the way the two modules connect on the back.



S P E C S

Electrical

- Power draw (typ. max):
 - +12V: 130mA
 - 12V: 70mA
- Power input protected from reverse polarity
- I/O impedance:
 - All audio inputs: 12k Ω
 - Trigger input: 100k Ω
- Audio inputs are AC coupled
- Trigger input threshold: approx. +1.5V

Audio

- Input signal range: $\pm 12V$ (approx. +20.8dBu)
 - Frequency response, 20Hz - 20kHz: $\pm 0.2dB$
 - Equivalent Input Noise, A-weighted RMS: -110dBFS
 - THD (1kHz, 5Vpp): typ. 0.002%
 - Crosstalk, adjacent channels (1kHz, 5Vpp): typ. -115dB
- All audio specs measured using 24 bit recording.

Timing

- Recording start latency:
 - Sync off: typ. -1 audio sample (compensated)
 - Sync on: audio data fades in typ. after 8ms
- Recording stop latency:
 - Sync off: typ. 1 audio sample
 - Sync on: approx. $\pm 20ms$
- Phase difference between synced units: typ. 0 audio samples.

Mechanical

8TR, 3U version:

Height: 128.5mm
Width: 4HP (20mm)

8TR, 1U version:

Height: 39.6mm
Width: 22HP (111.4mm)

9J expander:

Height: 128.5mm
Width: 2HP (10mm)

Total depth <30mm incl. sync and 9J connections.

F I R M W A R E U P D A T E S

This manual was written for firmware V1.0.
New firmware versions can be downloaded from the
halftimemodular.com website.

To update the firmware, first copy the firmware.bin
file to the root folder of the SD card.
You can then enter the firmware update mode on 8TR
by holding the button down while turning on the rack
or while reinserting the SD card in the module, while
powered on.

The button will flash rapidly when the firmware
update is complete; 8TR will load the new firmware
when you release the button.
You can make sure that the new firmware has been
loaded successfully by checking the version number
written in the settings file.

W A R R A N T Y

8TR and 9J are covered by a 2-year warranty from the
date of purchase. This warranty excludes damage
caused by improper use of the module, such as:

- connection to wrong power supply voltages or
incorrect power connection
- intentionally modifying the circuit (i.e modding)
- reprogramming using unofficial firmware
- damage caused by mechanical stress (e.g. dropping)
- damage caused by heat or liquids (yes, Matthew,
even beer!)

If you think your module is not functioning properly,
please get in touch using the contact form at
www.halftimemodular.com/contact or by sending an
email to support@halftimemodular.com.