

DESCRIPTION

The RC 24T (or “PAQRAT”) allows you to record and play back stereo digital audio signals with up to 24 bits of resolution using your Tascam DA-88 modular digital multitrack.

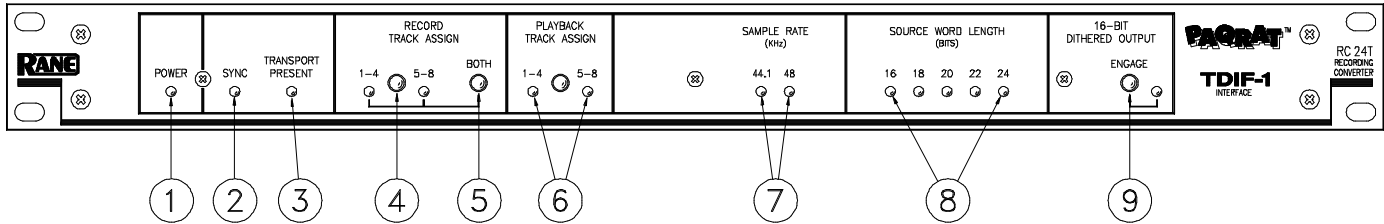
The RC 24T accomplishes this task by converting the AES/EBU (or SPDIF) stereo 24-bit digital audio source signal to four 16-bit channels compatible with Tascam’s proprietary “TDIF-1” DA-88 interface. The RC 24T simultaneously writes these signals onto the DA-88 and reads them back off again. Controls on the front panel allow you to assign these four channels to tracks 1-4, 5-8, or 1-8 (two identical groups of four tracks) on the DA-88. The odd tracks carry the upper 16 bits of the original digital audio signal, and the even tracks carry the lower eight bits plus a -20dB reference tone.

Note: Although it is nearly impossible to achieve better than 20-bit performance from today’s A/D converters, we refer to the high resolution inputs and outputs to/from the PAQRAT as 24-bit anyway, just to simplify things. You can interface any AES/EBU or SPDIF signal to the input and output of the PAQRAT from 1 to 24 bits.

SETUP & OPERATION

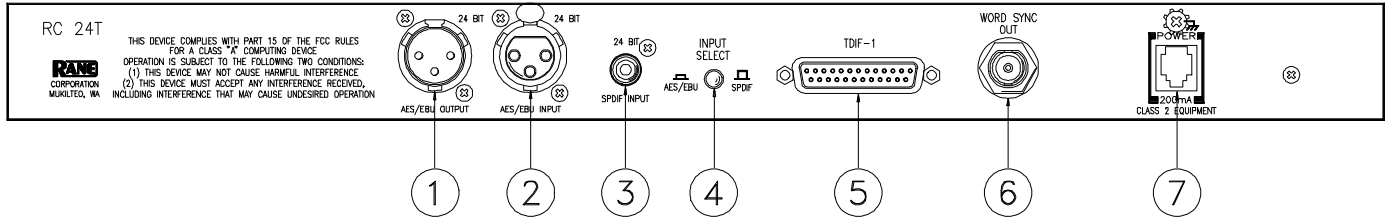
1. Connect the supplied TDIF Cable between the DB-25 TDIF-1 connector on your DA-88 and RC-24T.
2. Connect the supplied BNC Cable between the RC-24T WORD SYNC OUT connector and the WORD SYNC IN connector on the DA-88.
3. Connect a stereo digital audio source signal (up to 24-bit) to the AES/EBU (or SPDIF) INPUT on the rear of the RC-24T. Set the AES/EBU or SPDIF SELECT SWITCH to the appropriate position to select the proper input.
4. Connect the AES/EBU OUTPUT on the rear of the RC-24T to whatever is receiving the 24-bit digital audio signal during playback (and monitoring).
5. Connect the supplied Rane RS-1 remote power supply to the red POWER jack on the rear of RC-24T.
6. Make sure the DA-88 is plugged in and turned on.
7. Press the DIGITAL IN button on the DA-88 to select the TDIF-1 interface as the audio signal source.
8. Press the CLOCK button on the DA-88 to select “WORD” sync.
9. Press the RECORD TRACK ASSIGN and PLAYBACK TRACK ASSSIGN buttons on the RC-24T to select tracks 1-4, 5-8, or 1-8 (record only). Arm the corresponding tracks on the DA-88 for recording.
10. Record and play back tracks on the DA-88 as normal, using the AES/EBU (and SPDIF) input and output on the RC-24T as the source and destination for the 24-bit digital audio signal.

FRONT PANEL DESCRIPTION



- 1. POWER LED.** When dim, this LED indicates that you forgot to plug in the RC-24T.
- 2. SYNC LED.** Indicates that a suitable AES/EBU (or SPDIF) sync source is plugged in. If this LED is not lit, the RC-24T is not receiving signal from a source. Check the INPUT SELECT switch to make sure the proper input is selected. The RC-24T generates WORD SYNC from the AES/EBU INPUT and feeds it to the DA-88. It is necessary for the ADC (or other 44.1kHz or 48kHz sync source with AES/EBU or SPDIF output) to feed the RC-24T AES/EBU or SPDIF Input at all times (whether you're recording or playing). It is highly recommended that the same sync source be used while recording or playing back.
- 3. TRANSPORT PRESENT LED.** When lit, this LED indicates that a DA-88 is connected to the RC-24T via the TDIF-1 connector.
- 4. RECORD TRACK ASSIGN BUTTON.** This push button switch lets you select which four tracks of the DA-88 are recorded with the stereo 24-bit digital audio source signal. An LED indicates whether you are recording onto tracks 1-4 or 5-8.
- 5. RECORD TRACK ASSIGN "BOTH" BUTTON.** This push button selects all 8 tracks for recording, no matter what the state of the RECORD TRACK ASSIGN BUTTON (previous section) is. Tracks 1-4 are identical to tracks 5-8. Use this option when you are archiving a stereo master, and wish to create a redundant copy on the same tape.
- 6. PLAYBACK TRACK ASSIGN BUTTON.** This push button switch lets you select which four tracks of the DA-88 are converted back to 24-bit AES/EBU, and transmitted out the AES/EBU OUTPUT. An LED indicates whether you are playing tracks 1-4 or 5-8.
- 7. SAMPLE RATE LEDS.** These LEDs indicate the sample rate of the AES/EBU or SPDIF source (sync) Input (44.1kHz or 48kHz).
- 8. SOURCE WORD LENGTH LEDS.** These LEDs indicate the word length (in bits) of the AES/EBU or SPDIF Input.
- 9. 16-BIT DITHERED OUTPUT ENGAGE SWITCH.** This switch engages 16-bit dithering and truncation on the AES/EBU OUTPUT. Dither should be engaged when the AES/EBU OUTPUT is feeding a device that truncates the signal to 16 bits (e.g. DAT recorder, digital signal processors, and so on). The dithering used by the RC-24T follows the Triangular Probably Density Function described by Stanley Lipshitz and John Vanderkooy in their paper: "Resolution below the least significant bit...".

REAR PANEL DESCRIPTION



- 1. AES/EBU OUTPUT.** The AES/EBU OUTPUT transmits digital audio conforming to the AES/EBU standard. Digital audio exiting this Output is identical to the original digital audio fed to the AES/EBU (or SPDIF) INPUT and recorded onto the DA-88. This Output is typically connected to a D/A converter, hard disk recorder or a CD mastering system. The AES/EBU OUTPUT follows international conventions, with pin 2 hot, pin 3 negative, and pin 1 tied to chassis ground.
- 2. AES/EBU INPUT.** The AES/EBU Input receives digital audio following the AES/EBU standard. This Input follows international conventions, with pin 2 hot, pin 3 negative, and pin 1 tied to chassis ground. This input is typically connected to the digital audio source, such as an A/D converter or the output of a digital mixer.
- 3. SPDIF INPUT.** The SPDIF Input is just like the AES/EBU INPUT, except data received here is formatted with the consumer "Sony Philips Digital Interface Format".
- 4. INPUT SELECT SWITCH.** This switch allows you to select the desired input (SPDIF or AES/EBU). Another way of putting it is: you must select the proper input (the one you plugged a cable into). Note: The RC 24T generates the DA-88 WORD SYNC from the AES/EBU (or SPDIF) input. Therefore, it is necessary for the A/D converter (or whatever your AES/EBU source is) to feed the PAQRAT AES/EBU (or SPDIF) INPUT at all times (whether you're recording or playing back).
- 5. TDIF-1.** This connector interfaces the RC-24T to the DA-88 modular digital multitrack. A TDIF cable must be used! *DO NOT USE A STANDARD COMPUTER CABLE WITH THIS INTERFACE!* The connectors are not wired the same! Use only a Rane part #280-100 or Tascam part #PW-88D.
- 6. WORD SYNC OUT.** This Output sends a digital audio synchronization signal to the DA-88. It must be connected to the DA-88's WORD SYNC IN connector with a typical BNC cable (terminated with male BNC plugs on each end). Failure to connect this cable will prevent the RC-24T from synchronizing with the DA-88.
- 7. POWER INPUT.** Plug the external power supply into this connector. *Caution: Never connect anything except the Rane RS 1 AC power supply (enclosed with the unit) to the thing that looks like a red telephone jack on the rear of the RC-24T.* This is a low-voltage AC power input, and connecting it to telephones, computer keyboards, or other devices will result in unpredictable, and potentially catastrophic, results. If you want to destroy your RC-24T, we suggest wiring it to the output of a power amplifier, or dropping it out of an airplane.

IMPORTANT NOTE

FCC & VDE NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules, and similar requirements found in European specifications VDE 0871/0875. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used

in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. **USE OF SHIELDED DIGITAL CABLES IS REQUIRED FOR FCC COMPLIANCE.**

OPERATING NOTES

By Roger Nichols

Formatting new tape. When formatting a new tape, press the CLOCK button on the DA-88 to select "INTERNAL" sync. If this is not done, interruptions to the digital Input to the RC-24T will result in an incorrectly formatted tape. After formatting is complete, press the CLOCK button on the DA-88 to select "WORD" sync.

Mixing to PAQRAT. The first time I used the PAQRAT was to store 20-bit mixes of Walter Becker's solo album. In mastering, more than once, a drop-out on the optical disk made us scramble for the PAQRAT encoded tape to save the day. If you are printing your mixes to PAQRAT and DAT, connect the DAT machine on the output of the PAQRAT and engage OUTPUT DITHER on the PAQRAT front panel. This way you will get the benefit of 16-bit dithering for DAT storage. If the DAT machine is connected directly to the 20-bit data, the 16 bits stored on the DAT will be truncated, resulting in lower fidelity.

Hard Disk Audio. If you perform DSP operations on hard disk (if the hard disk contains digital audio, should the spelling of disc end in a "C" instead of a "K"?), the highest fidelity would be realized if the resultant file was stored as a 24-bit file. If multiple DSP operations are to be performed, such as noise reduction on one pass, limiting on

another pass, EQ on another pass, and then finally digitally mixed with another audio file, then all of the processing should be done in the 24-bit mode. The resultant audio file then needs to be converted to 16-bit only once, and the nasty artifacts are kept to a minimum. The 24-bit files can be backed up through a PAQRAT to maintain the highest quality in the audio data.

Mastering with PAQRAT. When mastering a project that was mixed 16-bit, use the PAQRAT to make an EQ safety. The output from digital mastering consoles is usually 24-bit (the 24-bits is generated by the math used to perform digital EQ, limiting, compression and level changes). If the EQ tape is only 16-bit, the noise floor increases because of the rounded off math.

Selecting Both. When using the PAQRAT to store two channel mixes, select "BOTH" for the RECORD TRACK ASSIGN. This provides you with an added level of redundancy. The audio data is recorded twice. If for some reason you were to encounter a drop out on the primary tracks, then it may be possible to retrieve the data from the other set of tracks by switching the PLAYBACK TRACK ASSIGN to the other set of tracks. This method lets you think of the eight track as a giant DAT machine with built-in redundancy.

RC 24T AND TASCAM DA-88 SYSTEM CONNECTION

