# spinner® T

**No Sprocket, No Capstan, No Limits! The generational change is initiated.**

## spinner T Sound Follower

**Hardware Features**

Sprocketless and Capstanless continuous motion transport

High precision winding motors with increments per revolution.

Unlimited shrinkage, any film geometry definable.

Precise measurement and control of the film tension.

Stable transport with super low film tension down to 20 grams (0.2 Newton).

Robust and simplified design with only one linear tension roller.

Fast winding through the film path, the gate moves down automatically, so the film runs only over passive rollers.

Automatic end stop, automatic winding direction, automatic laser positioning.

New : Automatic stop at sticky reels.

Large Rollers for reduced stress on splices.

Rollers easily exchangeable for exotic film widths.

Easy format change, simply pull out and plug in the gate.

Strong blower prevents dust particles on the light source.

MWA Laser Registration 2.0 with two lasers and motorized track selection.

Built in touch screen control.

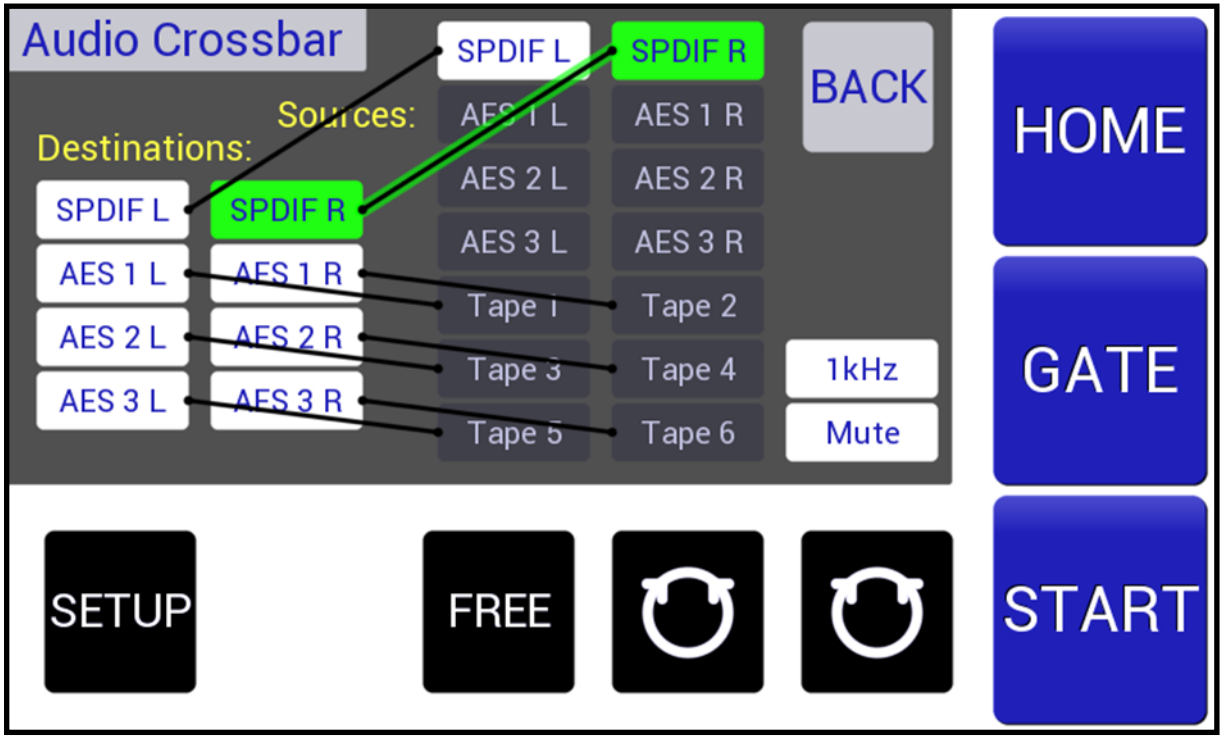
Fast boot time, machine wakes up and has touch screen operable in 1 second.

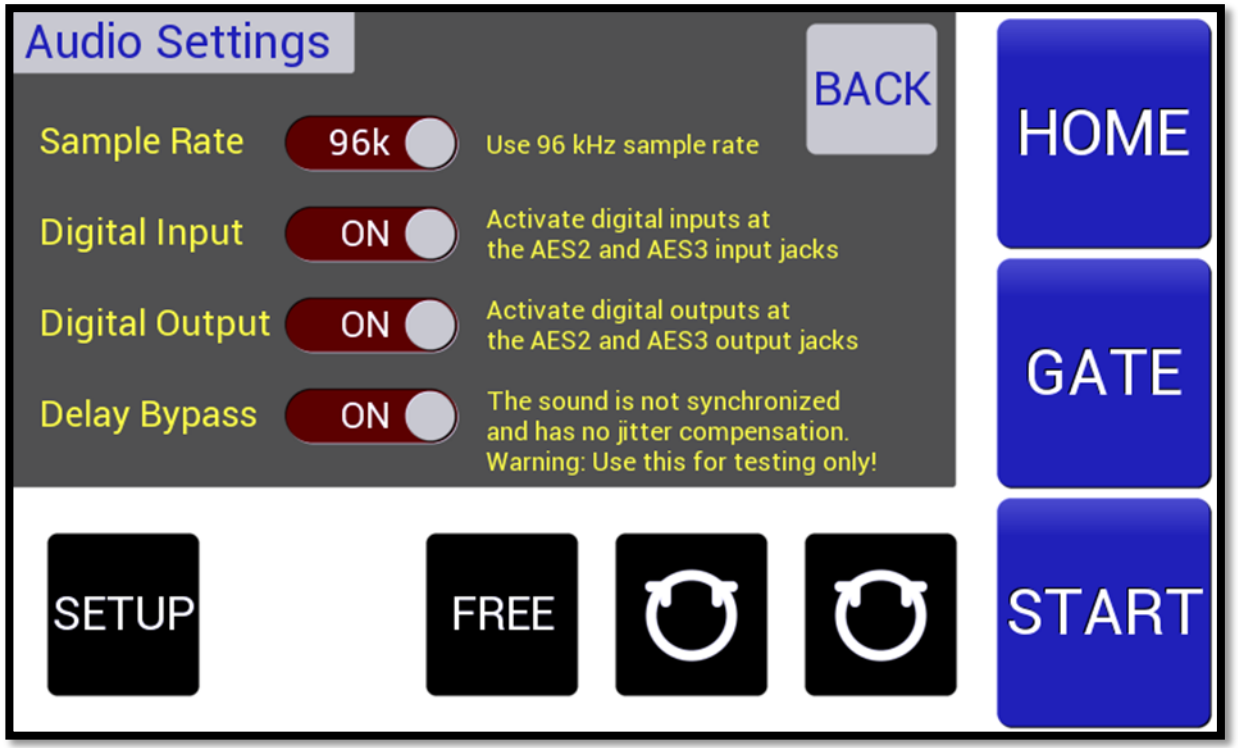
| | |
|---|---|
| **Audio Features** | Dedicated sound heads for optical and magnetic sound (no extraction from the picture) |
| | Ultralow sound jitter through velocity-adaptive sampling. |
| | Standalone operation as sound reproducer, no computer needed. |
| | Two Spinner S synchronizable for Sepmag (Two Stripe) transfers, Biphase (master or slave) sync to other scanners/telecines. |
| | Sepmag syn connection between two machines for accurate transport sychronasation (better than biphase, biphase available for compatibility) |
| Sound samplinge rate | 24bit 48kHz WAV / 96kHz available |
| Sound bit rate | 24 bit |
| | |
| **Combined head** | Precisely adjustable azimuth and tracking position |
| **for 16mm and 35mm** | motor driven sound focussing, timeline controlled |
| **optical sound** | No head contact during shuttle speed operation |
| | Improved wow+flutter through integrated encoder |
| | Digitization directly at the head, 100dB signal-to-noise ratio |
| | (measured at non moving film) |
| | |
| **Optional Accessories:** | Acrylic top cover for operational safety and dust protection. |
| | Adjustable table height, motorized. |
| | PTRs |
| | Sound heads for all kinds of tracks. |

**Scanner Hardware Technical specifications (preliminary):**

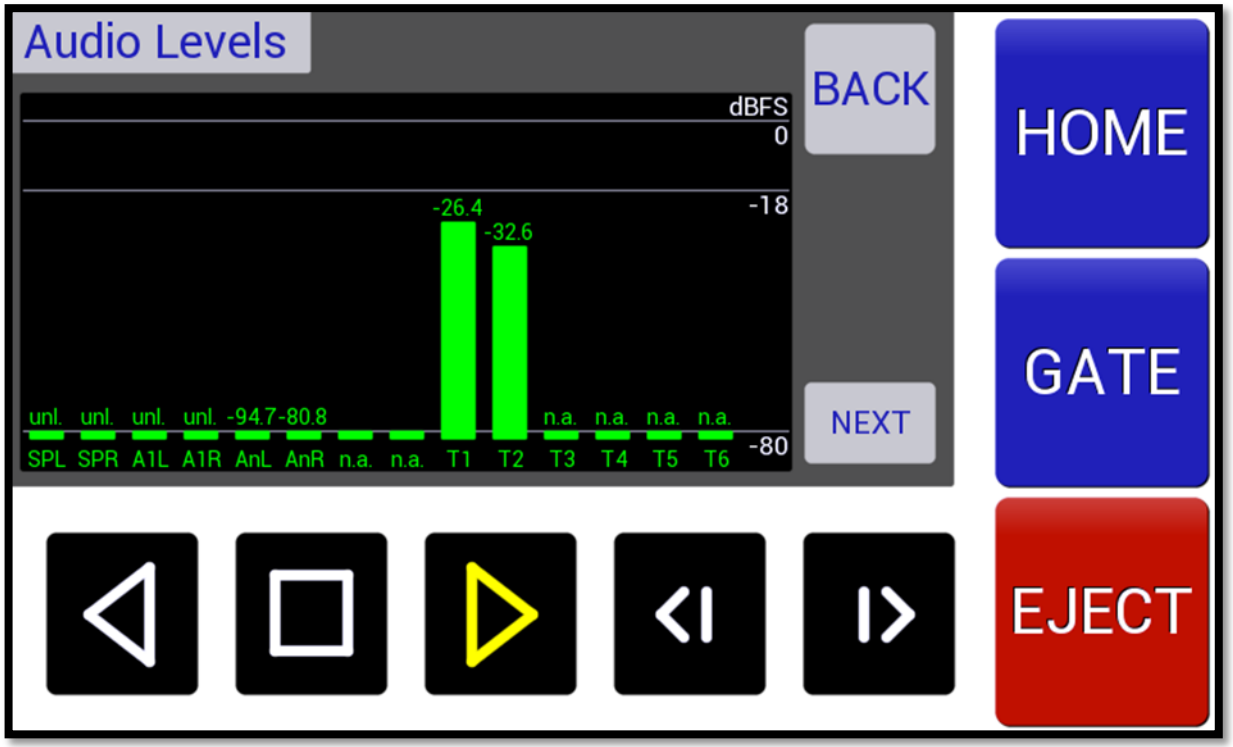
| | |
|---|---|
| **Transport speeds:** | 8mm - 1200fps |
| | 16mm - 600fps |
| | 35mm - 300fps |
| **Reel size:** | Maximum 600m (2000ft), free space for reels 420mm |
| | Minimum 20mm |
| **Film Tension** | 0.2N ... 6.0N (20g ... 600g) |
| **Film shrinkage** | ±5% for predefinded formats, custom formats definable for any shrinkage. |
| **Vertical stabilization** | MWA Laser Registration (pat.), Revision 2.0 with two lasers@35mm. |
| **Connector Options** | SDI out |
| | GPIOs |
| | Biphase Sync IO |
| | MWA Sepmag Sync for precise coupling of two machines |
| | AES/EBU IO for external sound capture and replay |
| **Power consumption** | 50W ... 100W average, play forward 25fps |
| | (scanner hardware only)800W rated supply, only exhausted for short time when accelerating heavy reels |

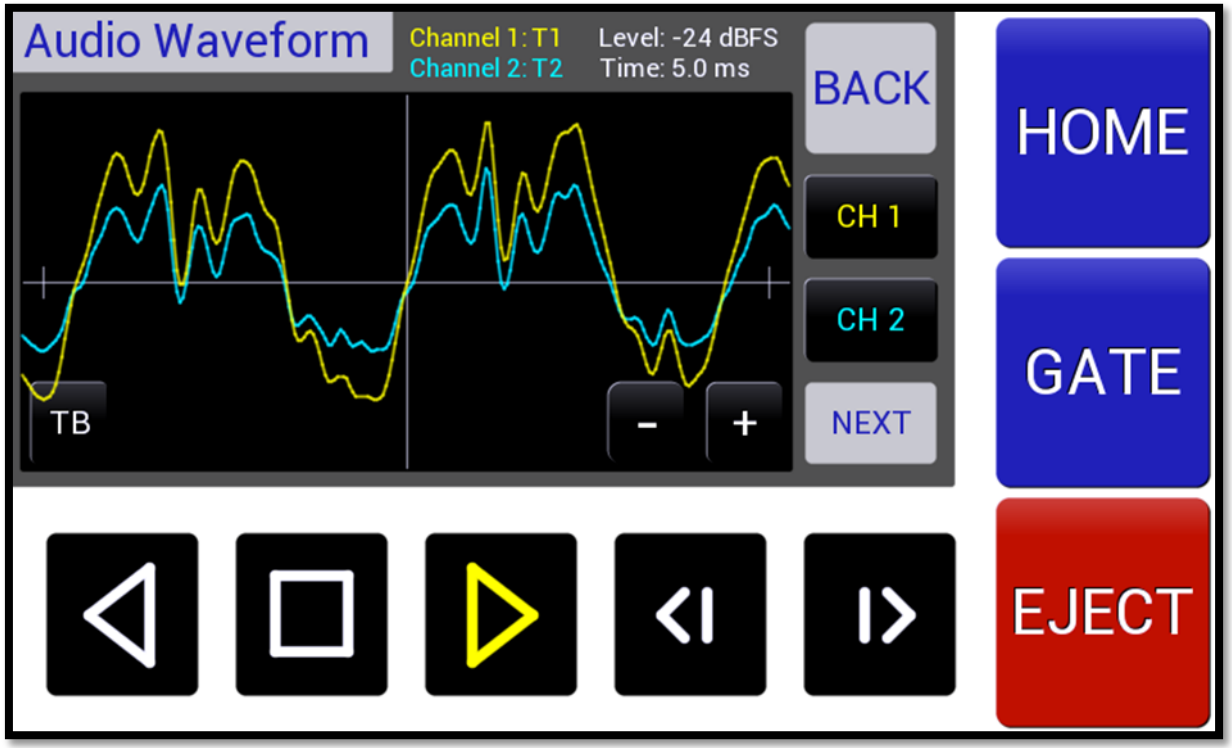

MWA
spinner T
MENU
CTRL
EJECT

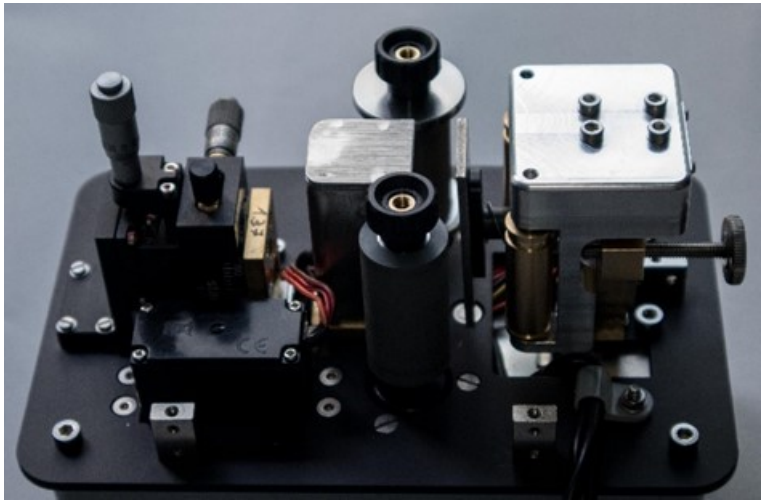

Audio Crossbar
Sources:
Destinations:
SPDIF L
SPDIF R
AES 1 L
AES 1 R
AES 2 L
AES 2 R
AES 3 L
AES 3 R
Tape 1
Tape 2
Tape 3
Tape 4
Tape 5
Tape 6
BACK
1kHz
Mute
HOME
GATE
START
SETUP
FREE


Audio Settings
BACK
Sample Rate
96k
Use 96 kHz sample rate
Digital Input
ON
Activate digital inputs at
the AES2 and AES3 input jacks
Digital Output
ON
Activate digital outputs at
the AES2 and AES3 output jacks
Delay Bypass
ON
The sound is not synchronized
and has no jitter compensation.
Warning: Use this for testing only!
HOME
GATE
START
SETUP
FREE


Audio Waveform
Channel 1: SPL
Channel 2: SPR
Level: -6 dBFS
Time: 25.0 ms
BACK
CH 1
CH 2
NEXT
TB
–
+
HOME
GATE
EJECT

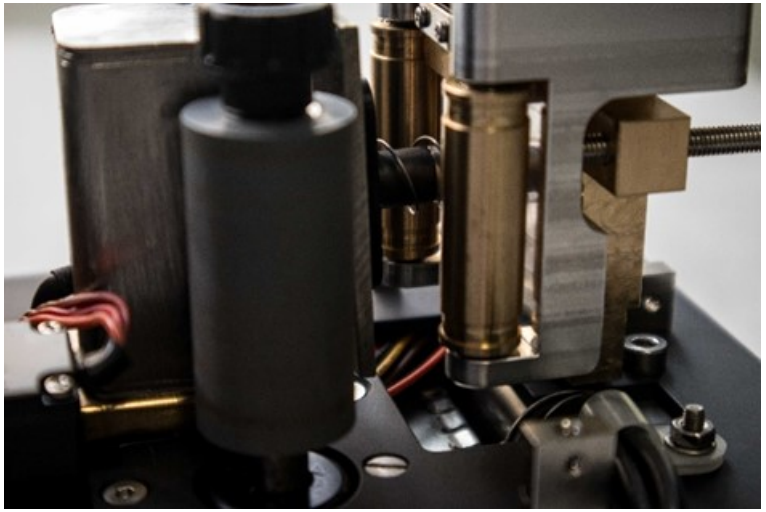

Audio Levels
dBFS
0
-18
-80
-26.4
-32.6
unl. unl. unl. unl. -94.7 -80.8 n.a. n.a. n.a. n.a.
SPL SPR A1L A1R AnL AnR n.a. n.a. T1 T2 T3 T4 T5 T6
BACK
NEXT
HOME
GATE
EJECT

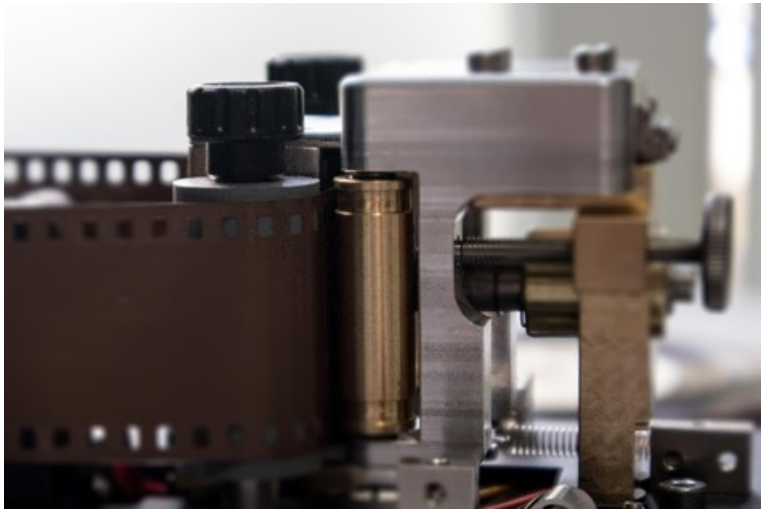

Audio Waveform
Channel 1: T1
Channel 2: T2
Level: -24 dBFS
Time: 5.0 ms
BACK
CH 1
CH 2
NEXT
TB
–
+
HOME
GATE
EJECT

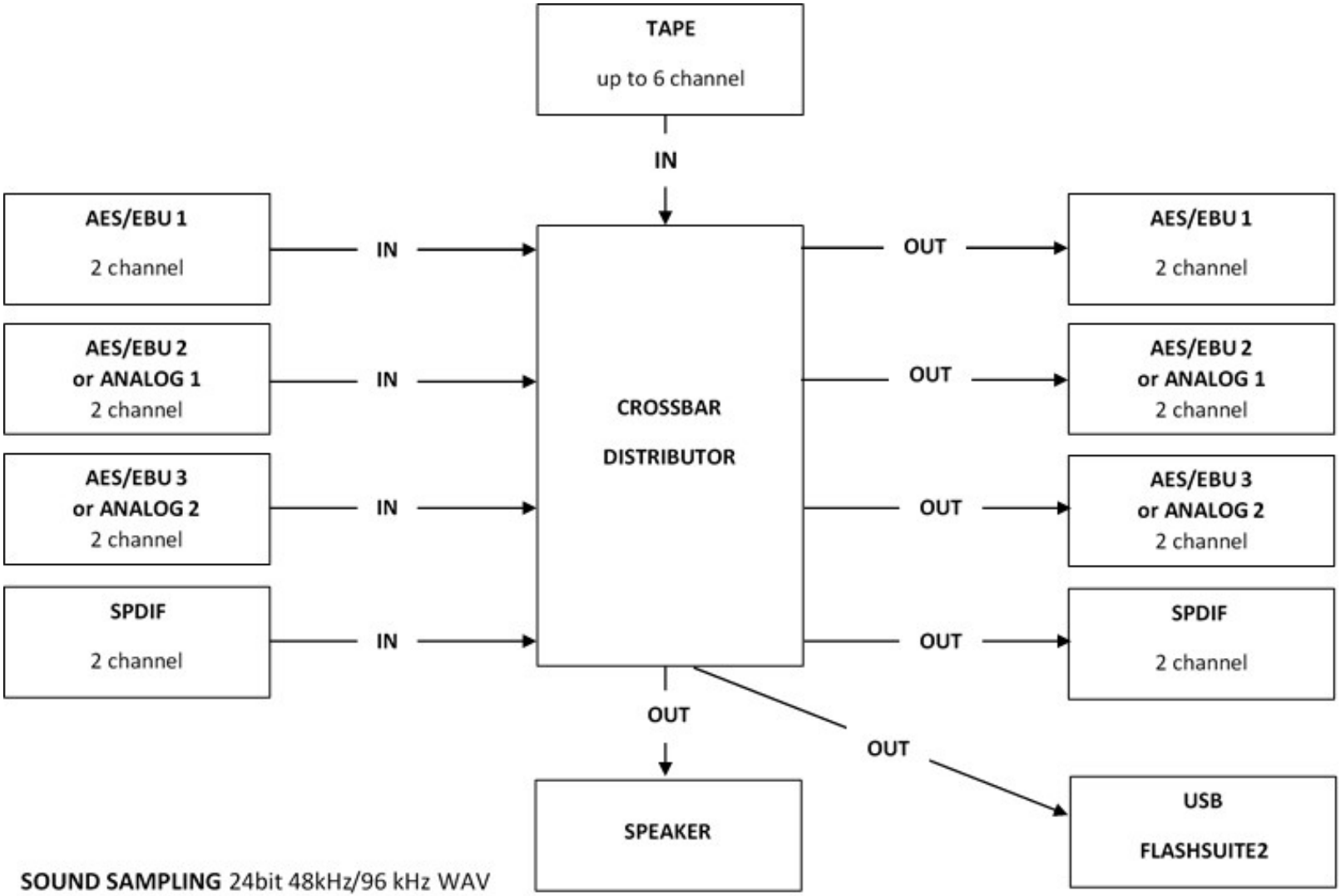


**Audio Head 35 mm 3 Track**

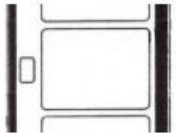
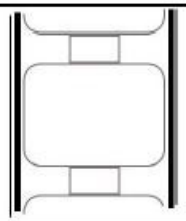
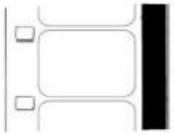
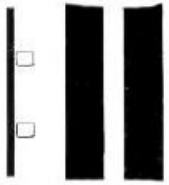
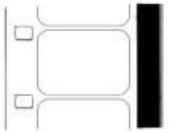
**customized with additional adjustments**

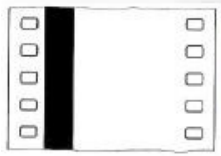
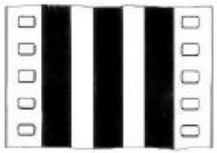
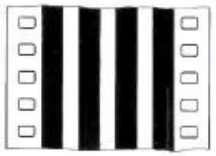
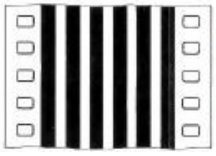







**SOUND SAMPLING** 24bit 48kHz/96 kHz WAV

| | | | |
|---|---|---|---|
|  | 8mm/S8<br>Two Tracks | Commag<br>Reproduction | HK8 |
|  | 9.5 mm<br>Two Tracks | Commag<br>Reproduktion | 2 X HK8 |
|  | 16mm<br>Edge Track<br>DIN 15681<br>ISO 4242 | Commag<br>Reproduktion | HK 34 RB |
|  | Magnetic Film 16mm<br>Two Tracks & Cue Track<br>DIN 15655 Part 3<br>ISO 4242 | Sepmag<br>Reproduction | HK 19 RB |
|  | 17,5mm<br>Edge Track | Commag<br>Reproduction | HK 34 RB |

| | | | |
|---|---|---|---|
|  | Magnetic Film 17,5mm<br>Two Tracks & Cue Track<br>DIN 15552 Part 3 | Sepmag<br>Reproduction | HK 20 RB |
|  | Magnetic Film 17,5mm<br>Track 1<br>DIN 15552 Part 2 | Sepmag<br>Reproduction | HK 14 RB |
|  | Magnetic Film 35mm<br>Tracks 1<br>DIN 15552 Part 2<br>ISIO 162 | Sepmag<br>Reproduction | HK 14 RB |
|  | Magnetic Film 35mm<br>3 Tracks<br>DIN 15554 Part 3<br>ISIO 162 | Sepmag<br>Reproduction | HK 13 RB |
|  | Magnetic Film 35mm<br>4 Tracks<br>DIN 15554 Part 1<br>ISIO 162 | Sepmag<br>Reproduction | HK 12 RB |
|  | Magnetic Film 35mm<br>6 Tracks<br>DIN 15554 Part 2<br>ISIO 162 | Sepmag<br>Reproduction | HK 11 RB |

Spinner T has L:S:D already implemented.

As we do not have any capstan or sprocket to move the Tape/Film the spinner has theoretical unlimited shrinkage.

*Spinner T has special designed audio heads and can be used for archive material.*

We can convert all inputs and outputs to the desired 96kHz, 24 bit, the entire machine then runs at 96kHz 24bit.

For this conversion further costs arise. Direct analogue output is not possible because there is no wow and flutter.

Wow and flutter is generated during the sampling/digitization and resampling.

Sound can not be picked up directly on the head. The converter of the spinner generates 110 dB.

The machine is designed without a capstan drive. For this reason the film velocity is varying a lot (typical ±1% or even more) during playback. It makes no sense to use any analog signal from the preamplifiers or heads because these signals have no wow and flutter specifications at all. The signal must be digitized (with 192 kHz, 24 Bit) and then resampled to a stable speed. The reference clock for the resampler is taken from an encoder wheel that is built into the head modules. Some filter and autocorrelation algorithms are applied to the encoder clock to generate an adequate sampling clock that perfectly eliminates the velocity variations. The result is equal or better than with a traditional capstan but we save the expensive capstan motor and are able to run at lower film tension since we don't need grip at the capstan roller. The resampling circuit (which resides in an FPGA) at the same time corrects the speed and downsamples from 192 to 48 kHz. We can make a firmware modification to 96 kHz if you require that. In this case the entire inputs and outputs are 96kHz. Mixed operation would be more difficult, but possible, of course.

no delay between video and audio

offset between picture and sound

no time offset between picture and sound audio delay

controlled the images and sound

The ADCs are built directly into each individual sound head. The audio data goes digital from the head to our signal processing FPGA. All tape equalisation and resampling is done in the digital domain.
We use PCM1865 converters with differential inputs and preamps (OPA1612). They have 110 dB SNR and put out a 192 kHz / 24 Bit signal. In our processing we downsample it to 48 or 96 kHz. The downsampling factor is constantly adapted to the measured tape speed for the compensation of wow and flutter. The compensation has a system bandwith of 100 Hz, higher jitter frequencies are damped mechanically. In this way we get a jitter-free signal even though the machine has no capstan, which would stabilise the tape speed. Without capstan we need only one tension arm because the tension is the same from supply reel to the takeup reel, and we can reduce the tension down to 0,2 N because no friction at a capstan necessary. In this way we can build a machine that is simple and cost-effective and treats the film gentle.

Since we have to process the signal digitally, there is no direct output from the head amplifiers. The signals available on the machine's rear panel jacks are jitter compensated, levelled and equalised and have the correct delay for picture/sound synchronicity. There are three AES outputs, one SPDIF output and a stereo analog output on XLRs.
The Spinner features two analog outputs on XLR. You can feed an analog Dolby SR expander from there. The output DACs have 103 dB SNR, this should be by far sufficient for an optical Lt/Rt signal.
If you want to route the expanded channels back to the machine, you'll need an external ADC with six channels. You can insert them in the machine through the AES1/2/3 inputs. In case of a Spinner S, you can then capture the expanded sound together with the picture in sync.