

## LaserShrinkageDetector

The L.S.D. (Laser Shrinkage Detector) is a modification kit for the MB51 magnetic film reproducer. It enables it to play shrunk films with shrinkage rates up to 4 %.

### The problem about shrunk film

The MB51 synchronizes itself to external sources by the help of a sprocket wheel. The encoder pulses from the sprocket wheel and the synchronisation pulses are counted and the machine regulates the capstan speed in a way to keep the counters equal. Shrunk film has the problem that it does not run over the sprocket wheel because the perforation pitch does not match the sprocket distance. The sprockets could also damage the film when they hit between the holes. A simple measure would be to file off the sprockets. The MB51 will transport the film in this case but of course not synchronous and at wrong speed. One could think of correcting the audio length afterwards with an editing program, but that is no solution since the shrink-age is likely to vary a lot during playback. The sound would never be in lip-sync.

### How L.S.D. works

The L.S.D. modification includes:

- A special sprocket-less wheel to replace the existing sprocketed wheel
- A laser light barrier will be mounted nearby the sprocketless wheel
- A microcontroller module with display will be installed inside the machine

The signals from the sprocketless wheel encoder and the light barrier run into a digital signal processor which calculates the position of a "virtual sprocket wheel". It then generates the according output pulses which replace the original encoder pulses from the sprocket wheel.

From the machine's point of view nothing has changed. That means the MB51 can be operated and synchronized as usual. The laser light barrier is sensitive enough to detect the perforation even in clear film. In case of damaged perforations, sophisticated software algorithms sort out the useless perfs and calculate their position from their neighbours. Timecode and frame sync remain consistent up to 15 unreadable holes. A display provides some information like actual shrinkage rate and exact speed as well as the number of bad perforations found.

### Benefits of an L.S.D. modification

The MB51 will be able to reproduce any kind of film with shrinkage rates up to 4%. The speed is corrected during playback and stays perfectly in sync with external sources like word-clock, biphas or video sync.

Unlike solutions with exchangeable sprocket wheels, L.S.D. also works when the shrinkage rate varies during playback. Since no sprockets exist in the whole film path, there is no danger of damaging valuable archive material.

In combination with the specialized vinegar sound head the user gets a solution for not only shrunk films but also films in curly and waved condition.

