LiDo

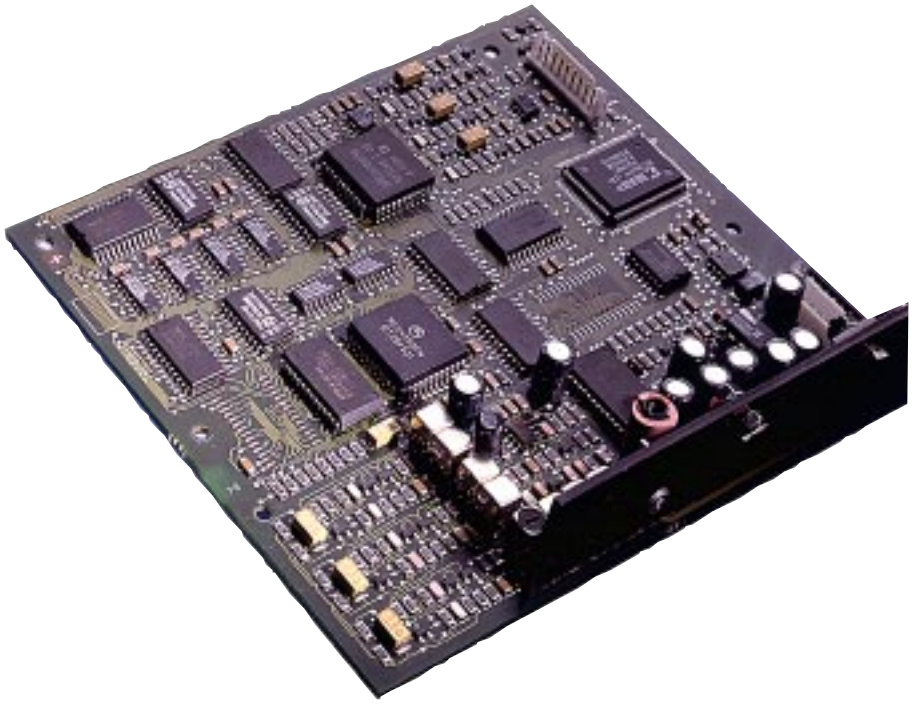
Built-in Video Line Doubler for BARCO Projectors and RCVDS 05 Switcher

BARCO's LiDo is a proprietary, state-of-the-art digital Video Line Doubler (31.25 kHz) which may be incorporated into most current BARCO CRT projectors, or into BARCO's RCVDS 05 Switcher. It greatly reduces visible line structure inherent in video images and produces a smoother, more film-like video image.

BARCO's LiDo works in unison with the Video Decoder of the projector, which incorporates a three-line adaptive Comb Filter and special Enhancement Circuit.

- The three-line adaptive Comb Filter improves color transitions and reduces noise in the video signal.
- The Enhancement Circuit integrated in the decoder provides sharper images with clearer outlines.
- The LiDo line doubling circuit reduces visible line structure by doubling the number of lines of the video image through BARCO's digital Smart Motion Detection Filtering. An integrated, specially designed Phase Locked Loop (PLL) circuit stabilizes the image quality, especially when using poor quality video tapes.

These three circuits work in unison to produce a smoother yet sharper image which is significantly more appealing when watching video images.



BARCO

Superior Video Quality through BARCO's Intelligent Video Processing Algorithms

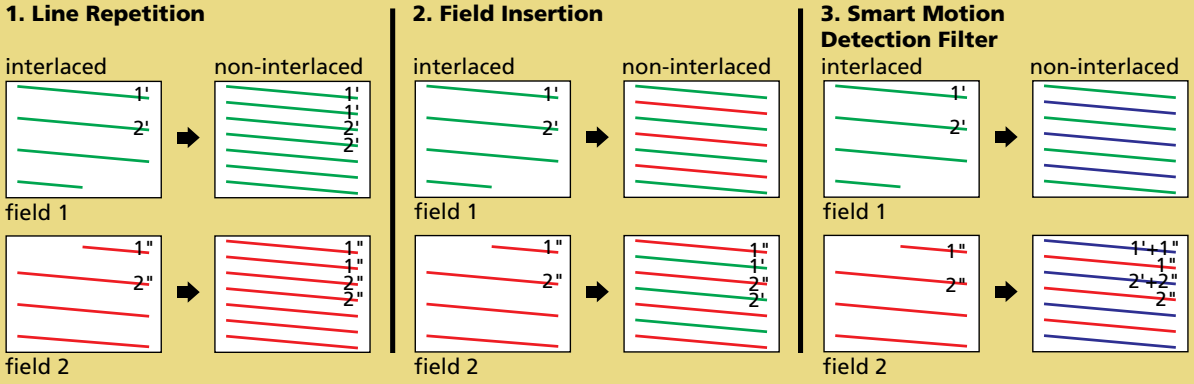
BARCO's LiDo works together with the built-in digital Video Decoder of the projector, which incorporates a three-line adaptive Comb Filter and a special Enhancement circuit

Three-line Adaptive Comb Filter
The three-line adaptive Comb Filter guarantees perfect color transitions and renders exceptional image detail. Video noise in the image is significantly reduced. This filter is based on a 2-line delay for NTSC and a 4-line delay for PAL, and utilizes 8-bit in / 10 bit out AD/DA convertors.
Sophisticated image processing algorithms guarantee optimal horizontal resolution.

Enhancement Circuit
The Enhancement Circuit integrated in the decoder improves image contours and enhances the useful range of the sharpness control. This circuit is particularly effective in reducing ringing effects on luminance transitions in order to provide maximum image quality.

Line Doubler
BARCO's LiDo is an 8-bit digital motion adaptive line doubler. Pixel reproduction is based on advanced Smart Motion Detection filtering, which takes into account pixel information from the previous line, the following line and the previous image field. The output frequency of the LiDo is 31.25 kHz, 50 or 60 Hz (depending on the vertical input frequency). A specially designed PLL circuit is used to stabilize the image quality when using poor quality VHS tapes.

Advanced Smart Motion Detection Filter



Basically, there are three different line doubling techniques: line repetition, field insertion and smart motion detection filtering.

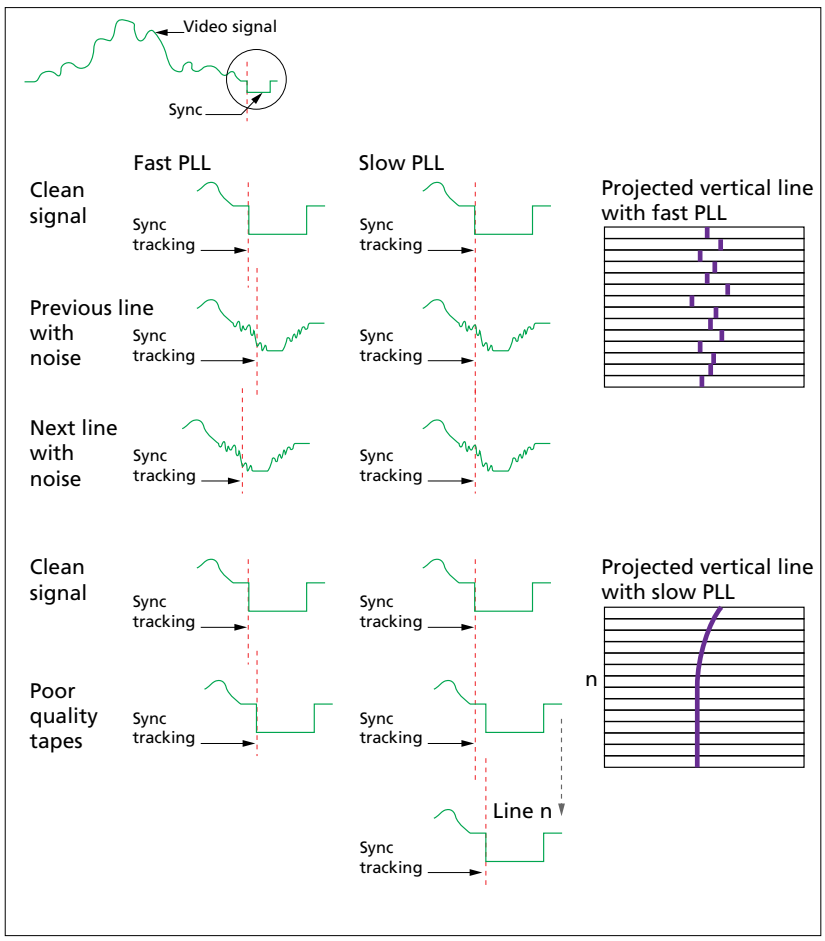
Line Repetition
Every line in a frame is duplicated (figure 1). This is a rather simple technique , which does not totally eliminate line flicker, with poor results on images with diagonal lines. However, this technique has no motion artifacts.

Field Insertion
With field insertion (figure 2), line doubling is done by copying the corresponding line of the previous field between two lines of the current field. Since this system combines information from different time slots (different fields) in one field, it has poor results with images with a lot of motion. However, this technique is the ideal solution for still video images.

Smart Motion Detection Filtering
BARCO's LiDo makes use of advanced digital Smart Motion Detection Filtering. This enhanced line doubling technique takes into account pixel information from the previous line, the following line and the previous image field (figure 3). This results in a smooth, line flicker free image quality, with almost no motion artifacts. This method is the ideal line doubling solution for the highest quality video images.

BARCO's digital Line Doubler incorporates adaptive line and field memory processing to significantly reduce visible line structure in the projected image. The result is a smoother, more film-like image.

Picture left: standard video projection. Picture right: video projection with BARCO's built-in LiDo (Actual projected images).



The PLL circuit for the sampling of the video signal in the LiDo locks on the sync signal.

A slow PLL is not sensitive for noise, but has a slow response to shifts in the sync signal (e.g. with poor quality VHS tapes), which results in a 'bending' at the top of the image.

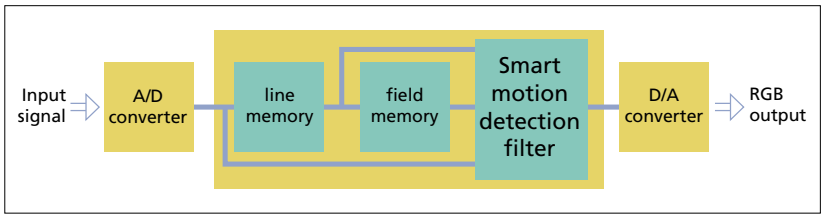
A fast PLL immediately responds to sync shifts, but results in jitter of the video image when there is noise in the sync signal.

BARCO has designed an advanced PLL circuit, which has a fast response to sync shifts, but eliminates the influence of noise.

Specially designed Phase Locked Loop (PLL) circuit
In BARCO's LiDo, the incoming video signal is sampled before it is processed. A special PLL circuit, locked on the sync signal, is used to synchronize the sampling rate with the video signal.

Fast PLL circuits immediately respond to sync shifts (e.g. with poor quality VHS tapes), but result in image jitter when there is a lot of noise in the sync signal. Slow PLL circuits are not sensitive for noise, but have a slow response to shifts in the sync signal, which results in a bending of the image. BARCO's specially designed PLL circuit eliminates the influence of noise and sync shifts, which results in a very good and stable image quality.

Technical Specifications



Output Frequency
31.25 kHz/ 50 or 60 Hz

Compatibility
The LiDo can be built into any new BARCO 701, 701s, 708, 808s, 1208s, 1209s, 1609s Series projector and into the RCVDS 05 Source Switcher.

Contact BARCO for more detailed information on upgrading older units.

Order Information

LiDo for BARCO projectors	R9828161
LiDo for 701 Series (with decoder)	R9828160
LiDo for RCVDS 05	R9828280
Line Doubler RGB Input RCVDS 05	R9828410

BARCO Projection Systems is an ISO 9001 registered company.

The information and data given are typical for the equipment described. However any individual item is subject to change without any notice.

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