8520
Digital Noise Reducer sub module for 8400 and 8500

The 8520 Digital Video Noise Reducer is an optional sub module for use with the 8400 and 8500 modules. The noise reduction process is downstream from the 8400 or 8500 Proc Amp controls. The 8520 can be used with any video input source. It only adds 4 microseconds to the throughput delay of the 8400 or 8500, so it does not introduce problems with system timing.

The 8520 is motion- and scene-adaptive. It removes unwanted noise and artifacts, making it perfect for MPEG compression preprocessing and satellite or ENG feeds.

Several forms of noise reduction are employed to ensure the best possible performance. Recursive Temporal Noise filtering includes Simple Recursive, Motion Adaptive and Motion Adaptive with Impulse Filters. Controls are provided for maximum signal-to-noise improvement and for noise threshold. These can be set manually or run in automatic mode.

Motion Adaptive Recursive Noise filtering works on a pixel-by-pixel basis, comparing the current frame to frames that have already been filtered. If the change that is detected is small, it is considered noise, while if it is large, it is considered motion or a scene change. The detection process uses an LMMSE (Linear Minimum Mean Square Error) filtering algorithm to evaluate the presence of motion. Combining this algorithm with recursive temporal filters preserves fine detail while reducing noise in the presence of motion, including rapidly moving objects and scene changes. Motion trails are minimized while avoiding hard motion failures that some adaptive noise filters can exhibit.

User controls for the Motion Adaptive Recursive Filter include a Noise Threshold, based on how much noise is present in the incoming signal, and Maximum Signal to Noise Improvement, based on how much noise removal is desired. The threshold setting can be automatic or user-adjustable. When set to automatic, the noise level of the input signal is measured and the threshold is set accordingly. This simplifies the setup of the noise reducer and makes it responsive to varying input signal-to-noise levels. This minimizes the need for operator intervention to accommodate feeds of differing quality.

When the combined Motion Adaptive Recursive and Impulse Noise Filter is selected, temporal impulse noise-filtering is used to remove high level, narrow noise impulses, without reducing fine stationary detail.

A special Luma Tie mode reduces dot crawl artifacts from composite originated material by identifying cross-color and cross-luminance effects as unwanted noise. The Show Noise output mode displays what areas of the picture are being affected by the noise-reducer. Noise is represented by white or black, while unaffected areas are represented in gray. This handy mode makes it easy to set optimum adjustments for the material being processed. The Split Screen mode lets you compare the processed output to the original signal.

Complete control of the 8520 is provided through the Avenue Control System. Memory registers allow you to store configurations for easy recall.

Features

- **Motion Adaptive Recursive Filtering**
- **Frame-based recursion**
- **Temporal Impulse Filtering**
- **Motion and Scene Adaptive**
- **Spatial and Temporal modes**
- **Preprocessing for MPEG**
- **12 bit processing**
- **Minimal processing delay**
- **Automatic Noise Level sensing**
- **Automatic or Manual Reduction and Threshold setting**
- **Luma and Chroma Processing with separate controls**
- **Split Screen and Show Noise mode**
- **Luma Tie reduces cross-color artifacts**
- **Use with the 8400 and 8500 Video Processing Frame Syncs**

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The Show Noise mode displays the detected noise and residual motion which will be removed from the video.
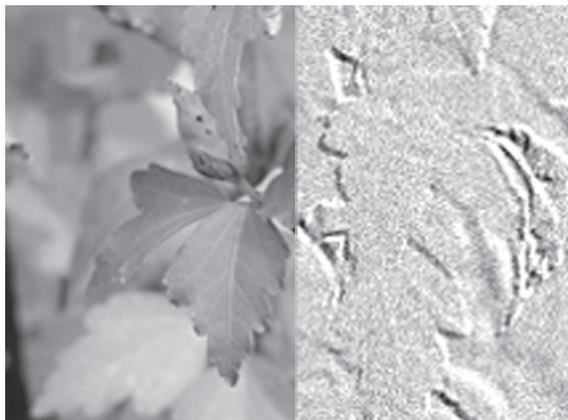
Split Screen displays the noise-reduced output next to the original scene.

Functional

Modes	Manual Adaptive
	Automatic (low gain)
	Automatic (high gain)
Processing	Temporal, Recursive
Configurations	Independent Luma/Chroma
	Chroma tied to Luma
Through Delay	<4 µSec
Resolution	12 bit internal processing

Controls

Gain	0 to 20 dB
Threshold	0.1 to 10.0 IRE

Status and Display

Automatic Mode	Displays derived Gain and Threshold
Video Out	Normal
	Show Noise
	Split Screen