

CHEMICAL & BIOLOGICAL DEFENSE ◀
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TITLE: **Electronic Image Stabilization**

TECHNICAL BRIEF

Electronic Image Stabilization

Features and Applications

- Low Cost Missile Seekers
- Supplement Gimbal Stabilization
- Stabilize Imagery from Rolling Airframe Missiles
- Real-Time Video Image Transformation
- Two VME Bus Compatible Modules (160 mm 6U size)
- Supports up to 640 X 480 Video Image Resolution
- Inertial Measurement Unit Inputs

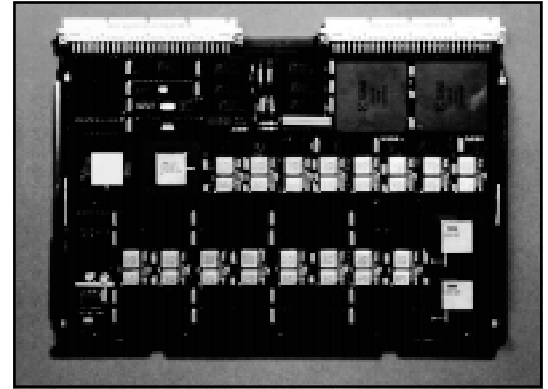
Description and Operation

The Systems Development Department (SDD) has developed an Electronic Image Stabilization processor which performs real-time translation, zoom, and rotation of a video image stream. The EIS system accepts RS-170 video input, digitizes the (TV or IR) video to 8-bit resolution, and stores it in field/frame memory for transformation on the next video field/frame. This high-speed method produces output video synchronized with the incoming video, with only one field/frame delay. Applications include missile seekers, terminal guidance systems, and tracking systems.

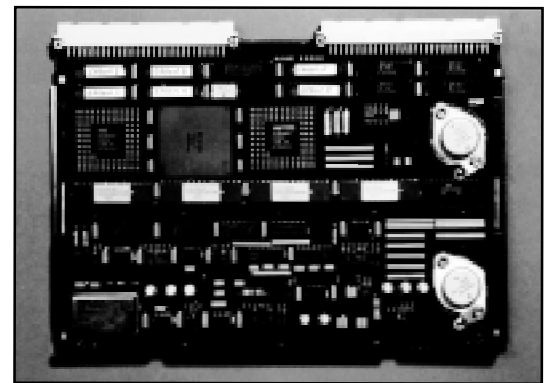
SDD's EIS system is designed using very high levels of circuit integration and high-density packaging techniques, such as gate arrays, to render the system on only two VME bus modules. These modules are available in commercial, ruggedized, or full mil-spec configurations, for convection or conduction cooled VME systems.

The EIS modules include a high-speed analog-to-digital front-end section which phase-locks to the incoming video, digitizes it at 12 MHz, and constructs the sync information to be used on the output side. There are three video field memories which are dual-ported for simultaneous read/write. Address generators provide incoming video sequential memory addresses, while other hardware generates transformed addresses to read data from the memory for output.

On the output side, four pixels of video are read in parallel and bilinear interpolation is performed for filtering. This results in an undistorted output image. Digitally interpolated output video is converted to analog and formatted to RS-170 video. Finally, the original sync information is added to the video. Outgoing video is synchronized with incoming video with exactly one field/frame delay.



Digital Board



Analog Board

Performance Specifications:

Size: Two 160 mm 6U VME Boards

Power: <18 Watts

Weight: <2.2 lbs.

Video Format: RS-170 (input and output)

Video Resolution: 640 x 480

Memory: 3 banks of 128K Bytes Dual-Ported SRAM

Detailed Specifications:

Memory Type: 3 128K Bytes Dual-Ported SRAM

ADC: 8-bits; 12.8 MHz

Modes: Field or Frame

Interpolation: Nearest Neighbor or Bilinear

Subpixel Resolution: 1/32 Pixel (5 bits)

DAC: 8-bits; 12.8 MHz

Output Drive: 1 v p-p; 75 Ω (RS-170 format)

VME bus Interface:

Complies with VME bus specification:

ANSI/IEEE STD 1014-1987

A16:D16 DTB Slave

Memory: 16 Kbytes dual-ported memory

Command String:

Mode Select: Field or Frame

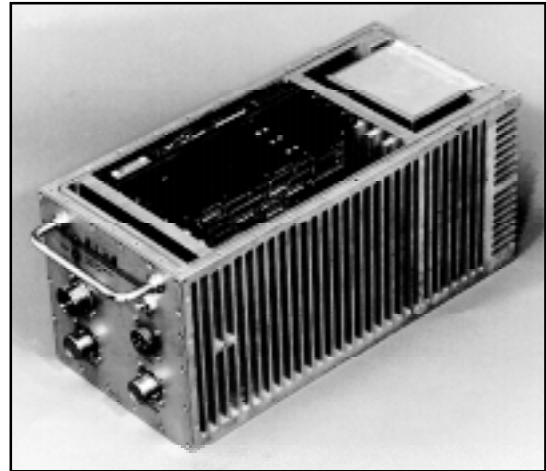
X Offset: +/- 1 FOV Full Scale

Y Offset: +/- 1 FOV Full Scale

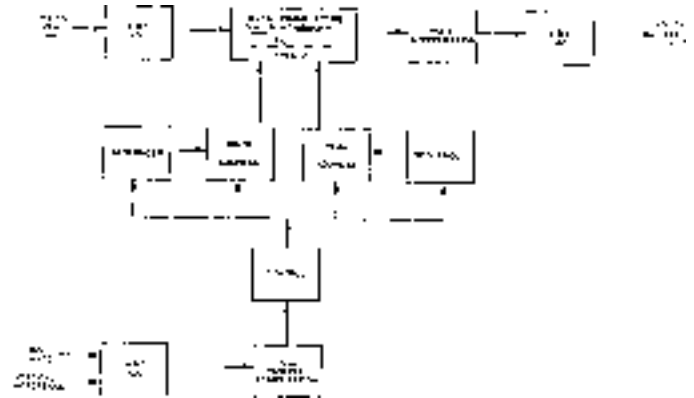
Roll Angle: 360° Full Scale

Zoom Factor: IN: 128 X

OUT: 128X



EIS with Video Tracker in 3/4-ATR



EIS Block Diagram

For more information about the Electronic Image Stabilization or other related technology, contact:

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