IMP20

Video Processing Mezzanine Card

Features

- Add on module for the ADEPT104 and AIM12 automatic video trackers to provide the cards with a supplementary image fusion capability

- Real-time, full-frame, multi-resolution image fusion; which aims to maximize scene detail and contrast in the fused output

- Built in warp engine to provide rotation, scale and translation for each video source to compensate for image distortion and misalignment between the video sources

- Composite or S-video (Y/C) inputs and outputs, compliant with PAL or NTSC colour encoding and timing

- Rugged, commercial, off-the-shelf (COTS) product

- Compact and lightweight

The number of sensors on military vehicles is increasing rapidly leading to a requirement for intelligent ways to present information to the operator without information overload, while reducing the power consumption, weight and size of systems. Military and paramilitary imaging systems can include sensors sensitive to multiple wavebands including colour visible, intensified visible, near infrared, thermal infrared and teraHertz imagers. Typically these systems have a single display that is only capable of showing data from one camera at a time, so the operator must choose which image to concentrate on, or must cycle through the different sensor outputs. Image fusion is a technique which allows us to combine the complementary information from each sensor into a single, superior image which can be displayed to the operator.

The IMP20 is an add-on module for GE Intelligent Platforms' ADEPT104 and AIM12 automatic video tracker boards providing them with an image fusion capability. The result is a very small, lightweight and low power consumption system for detection, tracking, stabilization and image fusion. The IMP20 may be retrofitted to many existing systems to add fusion capability. The unit may also be used as a standalone fusion module by the addition of a small I/O mezzanine card.

The IMP20 offers intelligent, real-time, full-frame, multi-resolution image fusion; which aims to maximize scene detail and contrast in the fused output, producing superior fused image quality with maximized information content. The image fusion algorithm embedded into the IMP20 is a new approach to multi-scale fusion which benefits from much faster execution times and reduced memory overheads. The IMP20's novel algorithm gives significantly improved results over the baseline weighted average algorithm while still performing in real time on live imagery.

It's built-in warp engine provides rotation, scaling and translation for each video source to compensate for image distortion and misalignment between the imagers, reducing the need for accurate matching of imagers with a resulting reduction in overall system cost.

The combination of the IMP20 image fusion module with either the ADEPT104 or AIM12 automatic video trackers results in the most powerful and compact ruggedized real-time video image processing system on the open market. Compared to existing products (either software-based with limited performance or using non-ruggedized hardware) the IMP20 offers greater functionality in a ruggedized and compact form factor.

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Specifications

Electrical Interface

Video Inputs
- Analog Inputs
  - Composite video 1.0Vp-p, 625/525 Line, CCIR, PAL or RS170, NTSC, differential

Video Outputs
- Analog Output
  - Composite video 1.0 V p-p into 75 ohm single-ended

Control Interfaces
- Serial Interfaces
  - Via host AIM12 or ADEPT104 automatic video tracker
  - RS232 and 2 off RS422, asynchronous, up to 115,200 baud, providing access to all configuration and status data

Power Requirements
- +5 V, 2.7A (max)

Weight
- Approximately 100g

Environmental

Rugged Convection
- Temperature
  - Operating: -40°C to +70°C
  - Storage: -55°C to +90°C
- Relative Humidity
  - Up to 95% non-condensing
- Vibration
  - Sine: 10g from 15 to 2000Hz
  - Random: 0.04g2/Hz from 15 to 2000Hz
- Shock
  - >30g 11msec. Sawtooth

ENVIRONMENTAL SPECIFICATION SUBJECT TO MOUNTING

Example of Video Fusion

Visible image

Infrared image

Fused image (Visible plus white hot thermal)

Fused image (Visible plus black hot thermal)

For more information, please visit the GE Intelligent Platforms Applied Image Processing website at: www.ge-ip/applied-image-processing.com

About GE Intelligent Platforms

GE Intelligent Platforms, a General Electric Company (NYSE: GE), is an experienced high-performance technology company and a global provider of hardware, software, services, and expertise in automation and embedded computing. We offer a unique foundation of agile, advanced and ultra-reliable technology that provides customers a sustainable advantage in the industries they serve, including energy, water, consumer packaged goods, government and defense, and telecommunications. GE Intelligent Platforms is a worldwide company headquartered in Charlottesville, VA and is part of GE Home and Business Solutions. For more information, visit www.ge-ip.com.

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