TALKTRONICS, INC.  
IDS3102-InSb  
MWIR FPA IMAGER SYSTEM

THE IDS3102-InSb MWIR IRFPA SYSTEM

The IDS3102 IRFPA Imager System consists of the LN2 pour-fill cryostat, rear-mounted electronics assembly, and external power supply. The system is intended to serve as a development tool for engineers and scientists interested in evaluating sensors or developing IRFPA applications. The system also serves as a standalone IRFPA camera system for dedicated installations, using the p1394a (FireWire™) interface available on many computers. For spectrometer applications, the system can utilize the Talktronics DTSpec Imaging Spectrometer system software and external user-defined optics for a complete spectrometer system.

The electronics module contains the digital timing controller that generates all clock signals and bias voltages for the IRFPA, digitizes the pixels and sends the digitized pixel information to a computer (PC or other) via the p1394a (FireWire™) Digital Camera Interface.

The IRFPA is a MWIR InSb focal plane array, with 30x30 um pixels in 320x256 format. The sensor is a staring type device, with adjustable gain and integration time. Sensitivity of the device spans 1-5 um due to AR coating.

The electronics module can be controlled via software in the p1394a Camera Setup software control panel, or alternatively can be commanded via the RS232C serial port. Pixel correction is provided via two-point correction method, with a gain map downloaded via the RS232C serial port, and stored in the camera while power is maintained. The Camera Setup software provides global control of analog gain (via FPA), digital gain (via pixel processor), offset, automatic background subtraction mode, integration time and image capture functions. A trigger output is provided for synchronizing external hardware (TTL pulse).

The IDS3102 IRFPA Camera Dewar and electronics assembly may be remotely located from the PC (standard cable is 6 feet), and the power supply (6 ft. cable).

LN2 CRYOSTAT

The IRFPA sensor is enclosed in an LN2-cooled Cryostat. Breakdown of the Cryostat for access to the device is simplified, suitable for rapid disassembly for test purposes.

Cool-down time from room temperature to <80° K is typically about thirty-five minutes. Hold time with <100 mW device heat load is greater than 15 hours.

The window is nominally 50mm X 3mm, and is replaceable. The standard window supplied for MWIR applications is A/R coated CaF. A/R coated ZnSe is available as an option. Provision is made in the cold shield and sensor clamp for a standard-sized (25 mm) "cold filter" (not included, optional order item).

Automatic LN2 filling kits are available that include an LN2 transfer line, valve, and thermal controller for use with pressurized LN2 storage vessels.
**IDS-3102-InSb IRFPA CAMERA SYSTEM SPECIFICATIONS**

<table>
<thead>
<tr>
<th>IRFPA</th>
<th>Camera Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>InSb</td>
</tr>
<tr>
<td>Format</td>
<td>320x256 nominal</td>
</tr>
<tr>
<td>Pixel size</td>
<td>30x30 µm</td>
</tr>
<tr>
<td>ROIC noise</td>
<td>&lt; 300 µV</td>
</tr>
<tr>
<td>ROIC output voltage range</td>
<td>2 V typ</td>
</tr>
<tr>
<td>Spectral response</td>
<td>7.5 – 10.5 µm (measured)</td>
</tr>
<tr>
<td>QE</td>
<td>2 – 10.5 µm typical</td>
</tr>
<tr>
<td>Capacity</td>
<td>&gt; 0.45 typical</td>
</tr>
</tbody>
</table>

**FPA Signal Processing**

- Preamp: 2 channels
- Gain Adjustment: TBD
- S/N: >70 dB
- INL: ±1 LSB
- DNL: ±3/4 LSB
- Noise: < 1 DN, input shorted
- Non-uniformity correction: Per-pixel DC offset, Per-pixel gain

**ADC**

- Resolution: Dual 14 bits
- Sample Rate: 2 MHz
- SNR: >70 dB
- INL: ±1 LSB
- DNL: ±3/4 LSB
- Noise: < 1 DN, input shorted
- Non-uniformity correction: Per-pixel DC offset, Per-pixel gain
- Input signal range: ±1.25 V

**System**

- Analog Gain, per channel: 1.5 to 150 V/V (fixed resistors)
- Digital Gain: 0.5 to 2
- Sensitivity: 3 uV min
- Noise: < 5 DN rms at 2 MHz
- Integration control: <100 usec to 16 msec typ
- Background subtraction: Performed in real time
- Gain correction: Performed in real time
- Frame buffer: Dual image buffer
- Pixel clock rate: 1 – 2 MHz typ
- Frame rate: 15 fps typical

**Interface**

- P1394a (FireWire) 6 pin (power not used)
- RS232C 9 pin "D"

**Software**

- P1394a Image Capture: Image capture to disk *.avi* movie or *.bmp* snapshot files

**Power Supply (External)**

- Input: 85 – 240 VAC 50/60 Hz
- Power Consumption: 200 VA
- Size: 12x8x3 inches
- Weight: 5 lbs

**LN2 Dewar (including electronics)**

- Size: 12"x8"x13" HxWxD
- Weight: 30x20x33 cm
- Vacuum port: Cryolab SV8 ISO DN16 flange or ½" tube
- LN2 capacity: 1 liter

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FireWire™ is a trademark of Apple Computer