THE IDS3102-MCT LWIR 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 LWIR HgCdTe (MCT) focal plane array, with 30x30 um pixels in 320x240 format that can be expanded to 384x288. The sensor is a staring type device with selectable gain, frame size and integration time. Sensitivity of the device spans approximately 2 um to 10 um.

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 LWIR applications is A/R coated ZnSe. A/R coated Ge is available as an option. Provision is made in the cold shield and sensor clamp for a standard-sized (25-25.4mm) "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-MCT IRFPA CAMERA SYSTEM SPECIFICATIONS

IRFPA	Material	HgCdTe
	Format	320x240 nominal
		384x288 max
	Pixel size	30x30 um
	ROIC noise	< 150 uV
	ROIC output voltage range	2 V typ
	Spectral response	7.5 – 10.5 um (measured)
		2 – 10.5 um typical
	QE	> 0.45 typical
	Capacity	>29 Me-

FPA Signal Processing		
	Preamp	2 channels
	Gain Adjustment	Hardware gain is controlled via software

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	± 1.25V

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 |

Camera Control		
	P1394a Interface	● Input Offset (DAC)
	Software Controls	● ADC Offset (DAC)
		● Brightness
		● Contrast
		● Global Digital Gain
		● Background collection
		● Integration time
	RS232C Interface	All of above, plus:
		● Debug features
		● RAM test
		● Temperature display
		● Gain map calibration
		● Gain map upload/download
		● Image RAM download

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 30x20x33 cm
	Weight	20 lbs
	Vacuum port	Cryolab SV8 ISO DN16 flange or ½" tube
	LN2 capacity	1 liter

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