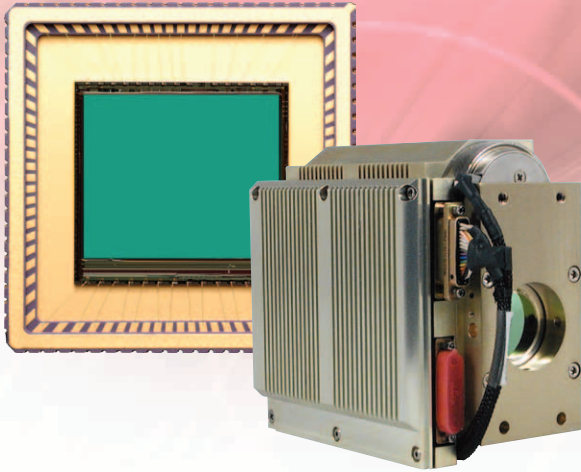


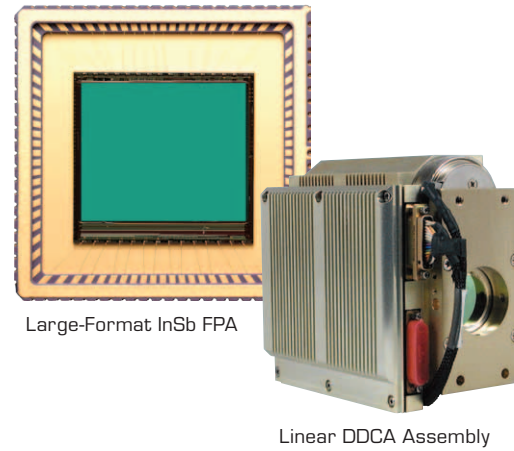
Mid-Wave IR Components

Focal Plane Arrays and
Detector Dewar Cooler Assemblies



Mid-Wave IR Components

- Proven Performance and Reliability for Research, Industrial, and Military Applications
- High-Sensitivity Indium Antimonide Detectors
- Mid-, Euro-, and Large-Formats with Common Electrical Interfaces
- User-Configurable, Multiple Packaging Options
- Industry Standard Devices



Large-Format InSb FPA

Linear DDCA Assembly

Focal Plane Arrays

FLIR Systems, the world's premier supplier of infrared products, presents the "Core by Indigo" line of Indium Antimonide (InSb) components. Our InSb detectors and advanced readout integrated circuit (ROIC) technology form the basis of these commercial off-the-shelf staring focal plane arrays (FPAs) and detector dewar cooler assemblies (DDCAs).

These cores are available in mid-, euro-, and large-format, including 320 x 256, 384 x 288, and 640 x 512 pixel arrays. Mid-wave InSb FPAs are hybrid assemblies mounted on 84-pin leadless chip carriers, customer supplied substrates, or integrated into detector dewar cooler assemblies.

"Core by Indigo" arrays use a direct-injection circuit design optimized for high flux applications. All designs include two operation modes: a simplified default mode and a user-configurable command mode that provides the flexibility necessary to support a wide range of infrared systems. From handheld cameras that use a single channel video rate output, to high-speed scientific testing needing multiple outputs and dynamic windowing – FLIR focal plane arrays surpass the needs. The windowing feature allows two-dimensional sub-array read-outs at frame rates of up to 38,000 frames each second for small window sizes. Other advanced on-chip features of the ROIC include: variable gain, multiple output channels, snapshot integration with variable integration time settings, signal skimming, and dynamic image transposition that allows inversion of the image in either or both axes. The detector bias setting and overall power control for the chip are also user-adjustable.

FLIR delivers its focal plane arrays packaged in 84-pin leadless chip carriers, wire-bonded, and fully tested to meet the listed specifications. We also deliver a wire-bonding diagram and interface documentation as part of the standard product configuration. Volume customers have the choice of supplying their own substrates for FPA mounting, with advance approval.

Detector Dewar Cooler Assemblies

Designed to perform in harsh environmental conditions and across a wide operating temperature range, DDCAs may come with either rotary or linear cryogenic coolers. Controllers for the coolers are typically integrated as part of the DDCA assembly. The standard rotary design uses a 1/2 watt cooler for both mid- and large-format arrays; the standard linear design uses a 1/3 watt cooler. Coolers are integrated with FLIR designed hard-vacuum dewars and a choice of apertures: f/4.1 for rotary-based DDCAs, and f/2.5 or f/4.1 for linear-based. A 3-5 μm spectral range cold filter is incorporated into the dewar assembly. The dewar front window is germanium. FLIR supplies the connector required for electrical interface to the DDCA, as well as all necessary interface documentation. Custom configurations are available, depending on requirements and subject to FLIR approval.

FPA Specifications (at 80 K operating temperature)

Parameter	Mid-Format (ISC9705)	Euro-Format (ISC0208)	Large-Format (ISC9803)
Spectral Range	1.5 to 5.0 μm	1.5 to 5.0 μm	1.5 to 5.0 μm
Resolution	320 x 256 pixels	384 x 288 pixels	640 x 512 pixels
Pixel Pitch	30 μm	25 μm	25 μm
Integration Time	5 μsec to full frame	9.6 μsec to full frame	9.6 μsec to full frame
Well Capacity (min-max gain)	18 x 10 ⁶ e ⁻ 13.5 x 10 ⁶ e ⁻ 9 x 10 ⁶ e ⁻ 4.5 x 10 ⁶ e ⁻	13 x 10 ⁶ e ⁻ 9.8 x 10 ⁶ e ⁻ 6.5 x 10 ⁶ e ⁻ 3.2 x 10 ⁶ e ⁻	11.2 x 10 ⁶ e ⁻ 8.4 x 10 ⁶ e ⁻ 5.6 x 10 ⁶ e ⁻ 2.8 x 10 ⁶ e ⁻
Operability	> 99.5%, > 99.8% typical	> 99.5%, > 99.8% typical	> 99.5%, > 99.8% typical
Power Dissipation (1 output)	< 50 mW	<100 mW	<100 mW
NEΔT	< 25 mK	< 25 mK	< 25 mK
Corrected Uniformity	< 0.1%	< 0.1%	< 0.1%
Uncorrected Uniformity	< 5.0%	< 5.0%	< 5.0%
Output Range	3 V	2.5 V	2.5 V
Outputs	1, 2, or 4 selectable	1, 2, or 4 selectable	1, 2, or 4 selectable
Max Frame Rate (1, 2, and 4 outputs)	110, 200, 346 Hz	80, 150, 260 Hz	30, 58, 107 Hz
Pixel Rate	10 MHz	10 MHz	10 MHz
Input Biases	VDETCOM 5.5 V VPOS 5.5 V VPOSOUT 5.5 V VPD 5.5 V VREF 1.6 V VREFOUT 1.6 V VNEG 0.0 V VNEGOUT 0.0 V VND 0.0 V VOS 1.6 to 5.5 V	VDETCOM 5.5 V VPOS 5.5 V VPOSOUT 5.5 V VPD 5.5 V VREF 1.6 V VREFOUT 1.6 V VNEG 0.0 V VNEGOUT 0.0 V VND 0.0 V VOS 1.6 to 5.5 V	VDETCOM 5.5 V VPOS 5.5 V VPOSOUT 5.5 V VPD 5.5 V VREF 1.6 V VREFOUT 1.6 V VNEG 0.0 V VNEGOUT 0.0 V VND 0.0 V VOS 1.6 to 5.5 V
Input Clocks	CLK VPD \pm 0.5 V to VND LSYNC VPD \pm 0.5 V to VND FSYNC VPD \pm 0.5 V to VND DATA VPD \pm 0.5 V to VND	CLK VPD \pm 0.5 V to VND LSYNC VPD \pm 0.5 V to VND FSYNC VPD \pm 0.5 V to VND DATA VPD \pm 0.5 V to VND	CLK VPD \pm 0.5 V to VND LSYNC VPD \pm 0.5 V to VND FSYNC VPD \pm 0.5 V to VND DATA VPD \pm 0.5 V to VND FIELD VPD \pm 0.5 V to VND

Specifications are subject to change without notice.

DDCA Specifications

Physical Specifications	Rotary DDCA (supports Mid-, Euro-, & Large-Format FPAs)	Linear DDCA (supports Mid-, Euro-, & Large-Format FPAs)
Size (L x W x H)	See ICD, drawing number 500-0105-00	See ICD, drawing number 500-0134-41
Weight	≈ 1.2 lbs	≈ 3 lbs
Mounting	Cooler Base, Side Mount	Warm Finger
Temperature/Altitude Range, Operational *	-20°C to +71°C 0 to 40,000 feet	-20°C to +71°C 0 to 40,000 feet
Temperature/Altitude Range, Non-Operational *	-55°C to +80°C 0 to 40,000 feet	-55°C to +80°C 0 to 40,000 feet
Shock	N/A	20 g, 11 msec half sine pulse
Vibration	≈ 7.14 g rms	≈ 7.409 g rms
Humidity	100% RH	100% RH
Power Dissipation at 22°C	9 watts typical steady state, 18 watts max	15 watts typical steady state
Cooler MTTF **	6000 hours	10,000 hours
Standard Dewar F#	4.1	2.5 or 4.1
Dewar Window Spectral Range	1.5 to 5.5 μm	1.5 to 5.5 μm
Cold Filter Spectral Range	3 to 5 μm	3 to 5 μm
Transfer Line Length	N/A	3 standard lengths

*Requires customer supplied thermal management

**Under specified operating conditions

Specifications are subject to change without notice.



SANTA BARBARA

CVS World Headquarters

FLIR Systems, Inc.

70 Castilian Drive,

Goleta, CA 93117

USA

PH: +1 805.964.9797

FX: +1 805.685.2711

www.flir.com