Cores and components for thermal imaging applications

Mini-Core HRC

Thermal imaging core in a small, light and affordable package

Mini-Core HRC 300Z with zoom lens

Mini-Core HRC with fixed, interchangeable 200 mm lens

Mini-Core HRC 460T

Mini-Core HRC lens-less configuration

www.flir.com
**Mini-Core HRC**

Thermal imaging core in a small, light and affordable package

The “Mini-Core HRC” has been especially designed for Original Equipment Manufacturers (OEM). It can easily be integrated into systems that require a small, compact and lightweight thermal imaging core with a cooled detector. The “Mini-Core HRC” can be easily integrated in small airborne gimbals or in any other application. Different version of the “Mini-Core HRC” are available.

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**Thermal imaging core**

Thermal imaging camera cores are subsystems that provide similar features and functions to those found in some of FLIR Systems’ standard camera products. However, cores are designed to allow integration into other systems. Camera cores can be used in whole or subsystem form by an OEM in many applications.

FLIR Systems provides different components and cores for a large number of advanced thermal imaging platforms. With FLIR’s strength in focal plane array manufacturing, vacuum packaging, video processing electronics and system integration, along with high commercial product manufacturing rates, FLIR Systems is a powerful partner to many OEM customers.

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**Cooled MCT detector**

The “Mini-Core HRC” is equipped with a cooled Mercury Cadmium Telluride (MCT) detector. This offers excellent range performance.

The MCT detector produces crisp thermal images of 640x512 pixels on which the smallest of details can be seen. It operates in the mid-wave infrared band (3 – 5 µm).

A thermal imaging core with a cooled detector gives you the advantage that you can see and detect potential threats much farther away than with an uncooled detector. But there is more. Objects which are at a close distance can be seen with much more detail. You can see what people are carrying. There is no need any more to send someone out in the field to check things out since small details can clearly be seen on the thermal image.

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**Continuous optical zoom lens**

The “Mini-Core HRC” is available with a zoom lens. The Mini-Core HRC 300Z is equipped with a 20 x, 15 – 300 mm zoom lens. It continuously zooms between a 1.8° narrow field of view and a 36° wide field of view. It offers excellent situational awareness but also the possibility to zoom-in, and see more detail, once a target has been detected. This way operators can see further recognize more detail and react more quickly to security threats.

For OEMs that are looking for even longer range performance, the Mini-Core HRC 600Z is available. It can continuously zoom between a 0.9° narrow field of view and a 18.0° wide field of view.

The advantage of continuously zooming compared to other systems that are using a rotating lens system is that there is no switch or swapping between the different images. You can gradually zoom in while keeping your focus all the time.

The system allows you to experience better situational awareness in the wide field of view, while maintaining detailed recognition capabilities in the narrow field of view.

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**Triple field-of view optics**

The Mini-Core HRC is also available with triple filed of view optics: Mini-Core HRC 460T. It is equipped with a wide angle lens offering a wide field of view; a medium field of view lens and a narrow field of view lens.

It has the capability to switch from one lens to another within a fraction of a second. A wide angle lens will give you excellent situational awareness. When a potential threat is detected you can easily switch to the medium field of view lens to have a closer look at the situation or even to the extremely narrow field of view lens so that you can see the smallest details.
of details. This way operators can see further recognize more detail and react more quickly to security threats.

**Fixed, interchangeable lenses**
The "Mini-Core HRC" equipped with a MCT detector is also available with a fixed lens. It is available with a 25 mm, 50 mm, 100 mm or 200 mm lens. Lenses are interchangeable which means that OEMs can make one design and just change the lens according to their users needs.

**Lens-less core**
A version of the "Mini-Core HRC" without lens is also available. This means that the "Mini-Core HRC" can be used for any thermal imaging application that requires a special optical path.

**Vilga Tracker and E-stab module available**
Optionally, the "Mini-Core HRC" can host the Vilga video processor. The Vilga video processor offers video tracking from the "Mini-Core HRC" and multiple video sources installed in the optical payload.

Multiple algorithms are available and selectable by external commands amongst which, Centroid, Correlation and Scene. Tracking result is outputted at video rate from the Vilga board through a serial communication port at high speed rate using a proprietary documented software protocol. Through the software communication protocol the user can command all parameters from the Vilga tracker, select algorithms and obtain tracking results.

Vilga also offers electronic stabilization of images from external sensors. This can be useful when cameras are installed on high poles or in other environments susceptible to movement caused by wind or other factors. Electronic stabilization can be enabled whether the video tracking is activated or not.

**Extremely compact - Easy to integrate**
All modules are extremely compact and lightweight. They provide a turnkey thermal imager with advanced image processing features built-in and ready for system integration. They incorporate easily with common power and video interfaces found in existing and new systems.

**Advanced image processing**
All versions of the "Mini-Core HRC" contain powerful image processing algorithms which are embedded in the module’s hardware and software. Automatic Gain Control (AGC), histogram equalization and other functions are guaranteeing high quality thermal imaging in any night or daytime environmental conditions.

**Digital Detail Enhancement (DDE)**
FLIR Systems has developed a powerful, FLIR Systems patented, algorithm that helps to overcome the problem of finding low contrast targets in high dynamic range scenes: Digital Detail Enhancement (DDE). It assures clear, properly contrasted thermal images and delivers a high contrast image even in extremely dynamic thermal scenes.

**Proven technology with a wide range of possibilities**
All cores are designed for easy integration in airborne, land or maritime systems. The modules have been integrated into many of FLIR Systems’ successful thermal imaging cameras. Numerous systems, used for a wide variety of applications, are out in the field with a proven track record. Applications include security and surveillance, thermal sights, airborne gimbals for e.g. powerline inspections, research and development and numerous others.

**Based on proven design of Carthage DCL**
The Carthage DCL is an advanced video processing module specifically developed for size-limited thermal imagers, such as small airborne gimbals or handheld IR binocular systems. It primarily addresses new state-of-the-art digital IRFPAs, and is also adapted to other standard cooled sensors. The Carthage DCL includes standard IR processing such as Non Uniformity Correction and Bad Pixel Replacement, as well as the DDE (Digital Detail Enhancement) advanced video enhancement processing. Since the “Mini-Core HRC” is based on the Carthage DCL, it includes all these features as well.
**Mini-Core HRC Technical specifications**

**IMAGING PERFORMANCE**
- Detector type: Cooled Mercury Cadmium Telluride 640 x 512 pixels
- Spectral range: 3 – 5 µm
- NETD without lens: < 18 mK typical
- Image processing: ACG, Manual Gain & Control, Tunable Detail Enhancement (DDE), Non-Uniformity Correction, Tunable frame rate (1 Hz step) up to 100 Hz
- Digital zoom: Continuous

**LENSES**
- Field of View: Continuous
- Continuous optical zoom: Mini-Core HRC 3002: 1.8° (H) x 1.4 (V) to 30° (H) x 27° (V) with 15 x 300 mm lens
- Mini-Core HRC 6002: 0.9° (H) to 0.7° (V) to 18° (H) x 15° (V) with 30 x 600 mm lens
- Mini-Core HRC: 460T:
  - 1.2° (H) x 0.9° (V) for 460 mm lens
  - 5° (H) x 4° (V) for 110 mm lenses
- Fixed lenses:
  - 21° (H) x 17° (V) for 25 mm lens
  - 11° (H) x 8.8° (V) for 50 mm lens
- Spatial resolution (IFOV):
  - 1 mrad for 15 mm zoom lens
  - 0.5 mrad for 30 mm zoom lens
  - 0.25 mrad for 60 mm zoom lens
  - 0.06 mrad for 50 mm lens
  - 0.015 mrad for 460 mm lens

**ENVIRONMENTAL**
- Operating temperature range: -30°C to +55°C
- Storage temperature range: -40°C to +70°C
- Humidity: 95% relative
- Random vibration: MIL STD 810F Method 514.5 procedure I
- Shock: MIL STD 810F Method 516.5

**INTERFACES**
- Digital Video Output: Option for Gige or CamLink (additional separate mini-board)
- Analogue Video Output: PAL/NTSC, W/H and B/H palettes
- Communication:
  - RS232/422 or optional Gige or CamLink + spare RS232 for external device control
  - LVTTL

**POWER**
- Requirements: 24 VDC
- Consumption: < 30 W
- Ext. Sync In: LVTTL

**VILGA TRACKER BOARD (OPTIONALLY AVAILABLE)**
- Video autotracker (correlation, scene, centroid modes): Yes
- Electronic Stabilisation: Yes
- Picture in Picture: Yes
- Graphical Overlay: Yes

**PHYSICAL CHARACTERISTICS**

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<tr>
<th>Lens less configuration</th>
<th>Mini-Core HRC 300Z</th>
<th>Mini-Core HRC 600Z</th>
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**FLIR Commercial Vision Systems B.V.**
Charles Petteweg 21
4847 NW Breda
The Netherlands
Phone: +31 0 765 79 41 94
Fax: +31 0 765 79 41 99
E-mail: flir@flir.com

**FLIR Systems, Inc**
CVS World Headquarters
70 Castilian Drive
Santa Barbara, CA 93117
USA
Phone: +1 805 964 9797
Fax: +1 805 685 2711
E-mail: sales@flir.com

**FLIR Systems Ltd.**
United Kingdom
Phone: +44 (0) 1732 220 011
Fax: +44 (0) 1732 220 014
E-mail: flir@flir.com

**FLIR Systems AB**
Spain
Phone: +34 915 73 48 27
Fax: +34 915 73 58 24
E-mail: flir@flir.com

**FLIR Systems AB**
Sweden
Phone: +46 (0) 8 753 25 00
Fax: +46 (0) 8 753 23 64
E-mail: flir@flir.com

**FLIR Commercial Vision Systems**
China
Phone: +86 10 5869 8768/8762
Fax: +86 10 5869 8763
E-mail: sales@flir.com

**FLIR Commercial Vision Systems B.V.**
Dubai - United Arab Emirates
Phone: +971 4 299 6898
Fax: +971 4 299 6895
E-mail: flir@flir.com