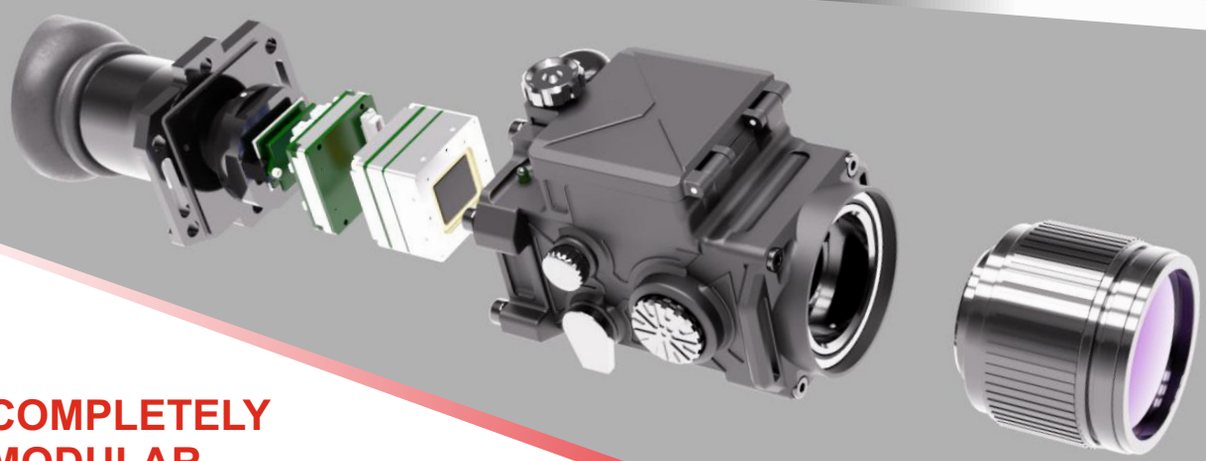
VILIR[SM]

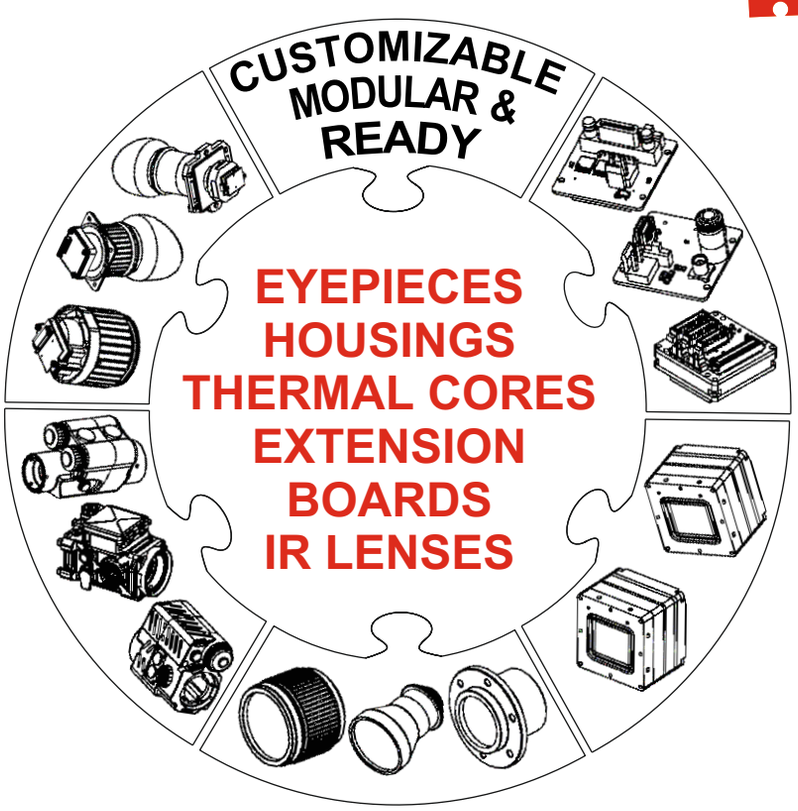
Modular Thermal Imaging System



COMPLETELY MODULAR ARCHITECTURE

CUSTOM DESIGNED USER INTERFACE & PROGRAMMING

READY DEVELOPED & TESTED HARDWARE & FIRMWARE



VILIR[SM] Thermal Imaging System

Completely modular architecture we have developed enables high level of customization in terms of both - hardware and software features.

Optimal design for the final product can be determined considering a set of different constraints, such as functionality, power consumption and price.

Our team of engineers is ready to discuss the toughest requirements for your next thermal device and offer a solution to meet your needs.

VILRIDA
Electro Tech and Security Systems

accelerated thermal project ...

ASTIR2 SHUTTERLESS UNCOOLED THERMAL IMAGING CORE:

ASTIR2 thermal imaging core is designed using a modular concept and architecture. Thermal core modularity is based on different expansion boards providing different control and communication interfaces, analog or digital video signal outputs, graphics overlay function, photo and video recording and extra features.
Interface boards – allows to integrate optimized interface and functions to the aimed application.
Micro display boards – allows to adapt thermal imaging core ASTIR2 to targeted micro display.
Custom user interface – custom design and programing for aimed applications – surveillance and security cameras, UAVs. handheld devices for civil use, police or military application with unique and custom user interface design.

Module's short power up time, low image latency, real-time automatic pixel detection and correction along with many other features make it an ideal fit for many thermal application including but not limited to monoculars, day scope clip-ons, thermal weapons sights, etc. Even though the core outputs exceptional quality image in completely shutter less mode it has the ability to reduce residual background non-uniformity even more by capturing a frame through a covered lens, which will further improve detect ability of smallest targets in extreme conditions. No mechanical shutter means the system is not only more reliably and never interrupted but completely silent too.

Thermal core ASTIR2 technical specifications

Sensor type	Uncooled amorphous silicon microbolometer
Spectral range	8-14µm
Typical sensitivity (NETD)	<55mK
Resolution	640x480 or 384x288
Image frequency	9Hz (640x480; 384x288); 25Hz (640x480, 384x288); 50Hz (384x288)
Pixel pitch	17µm

General

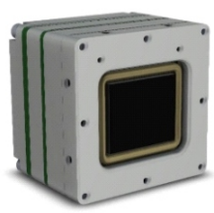
Storage ambient temperature	-55 ºC to + 105 ºC
Operating ambient temperature	-40ºC to +60ºC
Power-up time	<3.5s
Weight (bare core without lens/expansion board)	32 g (640x480); 36g (384x288)
Size (bare core without lens/expansion board)	30x30x23.5 (640x480); 30x30x25.0 (34x288)
Mounting holes	4xM1.6 (front) and 4x2xM2 (sides)
Power supply	4.5-5.5 V or – 312V

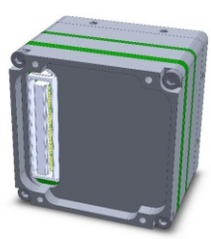
Image processing

Digital zoom	x1, x2, x4, x8; Continuous
Temporal noise filtering	Yes
Image sharpening	Yes (variable)
AGC Advanced analysis of separate scene parts	Yes
Bad pixel detection/correction	List based; automatic list based; real time
Multiple color palettes; color inversion	Yes
Residual NUC correction	Yes

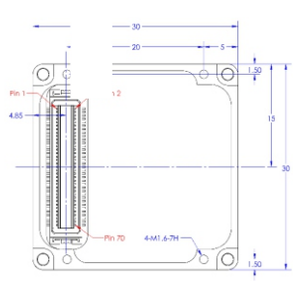
Interfaces

Video output Analog (PAL), Digital (BT.656, Custom-1, Custom -2,CUstom-3,CameraLink)
Control: text based (UART, RS232); packet based (SPI, QuadSPI, USB)





Astir2 bare core

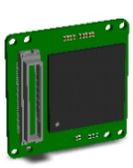


Astir2 bare core mechanical drawing

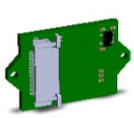
EXTENSION BOARDS:

We have designed a set of extension PCBs to be connected to the core to add a fully customizable graphical user interface, video compression/recording capability and more. Some of the extension boards feature GPIOs, UART, SPI, I2C interfaces which can be used to expand functionality by adding GPS receiver, digital compass, laser range finder, etc. All extension boards are stacked onto the thermal core which makes the cross-ection of all assembled electronics in the direction perpendicular to optical axis no greater than 30x30mm regardless of the number of boards added. This feature enables design of small portable devices which are to be held and operated using only one hand.

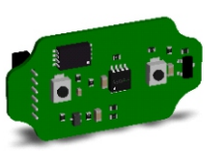
Specification	AST 7C	AST 7D	AST 7F	AST 7H	AST 7R	AST U	AST 7A/8A
Operating voltage	3÷ 14VDC ± 10% Supplied from External or Camera link con	•5VDC ± 5% •5VDC ± 5%(USB) •3÷ 14VDC ± 10% •5VDC ± 5%(USB)	3÷ 14VDC ± 10%	3÷ 14VDC ± 10%	3÷ 14VDC ± 10%	5VDC ± 5% (over flat 20pin cable)	3÷ 10VDC ± 10%
Power consumption (with core)	=1.3W	=1.4W	=1.4W	=1.4W	=1.2W	=1.2W	=1.5W
Video interface	Camera Link	PAL	PAL BT.656 Custom-1, Custom-2, Custom-3	PAL, HDMI, USB2.0 HS	PAL	BT.656, Custom-1, Custom-2, Custom-3	PAL BT.656 Custom-1, Custom-2, Custom-3 USB2.0 HS
Comunication/ Control interface	Camera Link control	USB2.0 FS RS232 UART (3.3V)	USB, GPIOs	USB	RS232 UART (3.3V)	UART (3.3V)	I2C USB2.0 HS UART (3.3V) SPI (3.3V) GPIOs
Graphic overlay	None	None	Yes	None	None	None	Yes



AST-6E
PCB board with DSP processor used for video compression in H.264 format



AST-9B / AST-9M
Display drivers used to interface the core with Oligtech's Microoled microdisplays respectively



AST-9K
Simple button board that connects to AST 7A/8A boards used to control user interface

POWER SUPPLY:

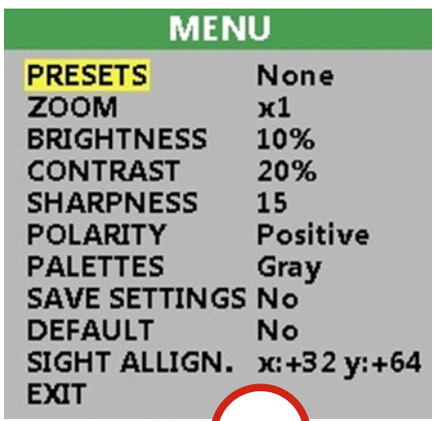
The system supports wide range of power supplies and can be configured to be powered from single or multiple CR123, 18650, AA, AAA and other types of batteries connected in series or in parallel. It will be able to monitor the remaining battery capacity. In addition, it supports automatic switching to external power supply once the electronics detects it is connected.

HIGHLY CUSTOMIZABLE MENU & SETTINGS:

Depending on the requirements we have extension boards to provide user interfaces ranging from simple text based ones to full-color modern looking ones with multilevel menus and advanced GUI elements. Supported user controls range from simple push buttons to rotary encoders.

After hardware requirements are determined and the right extension boards are picked or missing ones are designed we will implement all required firmware features and have fully functional "internals" of the thermal device ready based on your exact requirements. Because the final solution will use many of our already developed and tested hardware modules the whole design process will not only take less time but will be much more cost effective compared to a design from scratch approach.

ZOOM:	from 1x to 25.5x in 34 steps;
BRIGHTNESS:	-120 : 120, steps of 8;
CONTRAST:	-20 to 12, steps of 1;
SHARPNESS:	0 to 15, steps of 1;
ADJUST:	**Zoom, Bright., Contrast** and **Sharpness** can be adjusted by turining encoder button, when MENU not shown.
POLARITY:	**Neg** - inverted colors, **Pos** - non inverting image.
PALETTES:	10 paletes (**B/W, Sepia, Thermal, Hi-Lit, Bone, Copper, Earth, HSV, Pink, Temp**);
SIGHT ALLIGN.	to zero up the device through **X:** and **Y:** directions;
SAVE:	for saving setting adjustments;
PRESETS:	6 factory preset settings (**Default, Forest, City, Indoors, Identif, Custom**);
BAD PIXEL:	automatically detect and mask defective pixels on thermal imaging sensor;
ABOUT:	device information (**FPGA FW, MCU FW, Sensor type, Sensor temp**.);
EXIT:	for exiting Menu.
OTHER:	**Customized Menu and Settings can be developed** for different control and communication interfaces, with unique and custom user interface design.



VIDEO OUTPUT:

Digital video output to the display with a maximum resolution of 1024x768 @ 50 Hz and RGB888 color sub-sampling ensures that all graphical elements overlaid on top of the thermal image are as sharp as they can be. If desired micro-display is not supported by our existing custom display drivers we can design a new driver for a specific micro-display. Display together with the display driver can be placed in the device anywhere relativeto the thermal core as they are interconnected using a flat flex cable.

Availability of analog video output from the core enables to have a device with analog video output on its external connector which is active at the same time as the device's micro-display. Additionally, external connector can have a USB interface which is supported for device's configuration, control, access to recorded images/videos stored in the on-board flash memory.

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