GroupGets PureThermal Mini Pro JST-SR

FLIR Lepton® Smart I/O Module

The PureThermal Mini Pro JST-SR Lepton Smart I/O Module is a hackable thermal webcam module for the FLIR Lepton Longwave Infrared (LWIR) camera core. It ships pre-configured to operate as a plug-and-play UVC 1.0 USB thermal webcam using a custom JST-SR cable that will work with standard webcam apps such as VLC Media Player on PC, Linux, Mac, and Android.

For developers, it's reference firmware is open source for customized applications. We have also created an open source software application, GetThermal, to view Lepton data on x86 Linux and macOS platforms. For computers using a Microsoft Windows OS you can use the FLIR Lepton User App on the Lepton Getting Started page under the Downloads section. GetThermal as well as the FLIR Lepton User App with a PureThermal Mini Pro JST-SR (PTMPJST) both support the *radiometric* mode of Lepton 2.5 & 3.5. Stay up to date with resources, video, and software for PTM at its resource page.

FEATURES

- Get Thermal video over USB right out of the box using freeware apps like VLC on Mac, Linux, Windows, or Android
- PTM can do 9 Hz color video over usb using the USB UVC class
- STM32F412 ARM microprocessor. Execute on-board image processing without the need for an external system
- Open source reference firmware is on the GroupGets Github
- Device Firmware Upgrade (DFU) the STM32 ARM MCU over USB using a JST-SR cable
- Powered via USB using a JST-SR to USB cable
  Compatible with all current 2.x and 3.x Lepton cores
- Compact 19.5 x 15.32mm form-factor that can be embedded into other modules or inconspicuously housed as a standalone web, research, or security camera

APPLICATIONS

- Thermal Imaging
- Non-contact temperature measurements
- Motion Sensing
- Night Vision
- Gesture Recognition

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PureThermal Mini Pro JST-SR Specifications

Power Inputs	USB over the JST-SR port, or the through holes
Maximum Input Voltage	5.5v
Lepton Core Support	Lepton 2.x and 3.x
Processor	STM32F412 (1M Flash, 512K RAM)
Thermal Video Outputs	UVC over USB using JST to USB cable
PureThermal Mini Part Number	PURETHERMAL-M-PRO-JST
Link to connector on the PTMini Pro JST-SR	https://www.digikey.com/product-detail/en/jst-sales-america-inc/SM04B-SRSS-TB(LF)(SN)/455-1804-1-ND/926875
RoHS Compliant	Yes
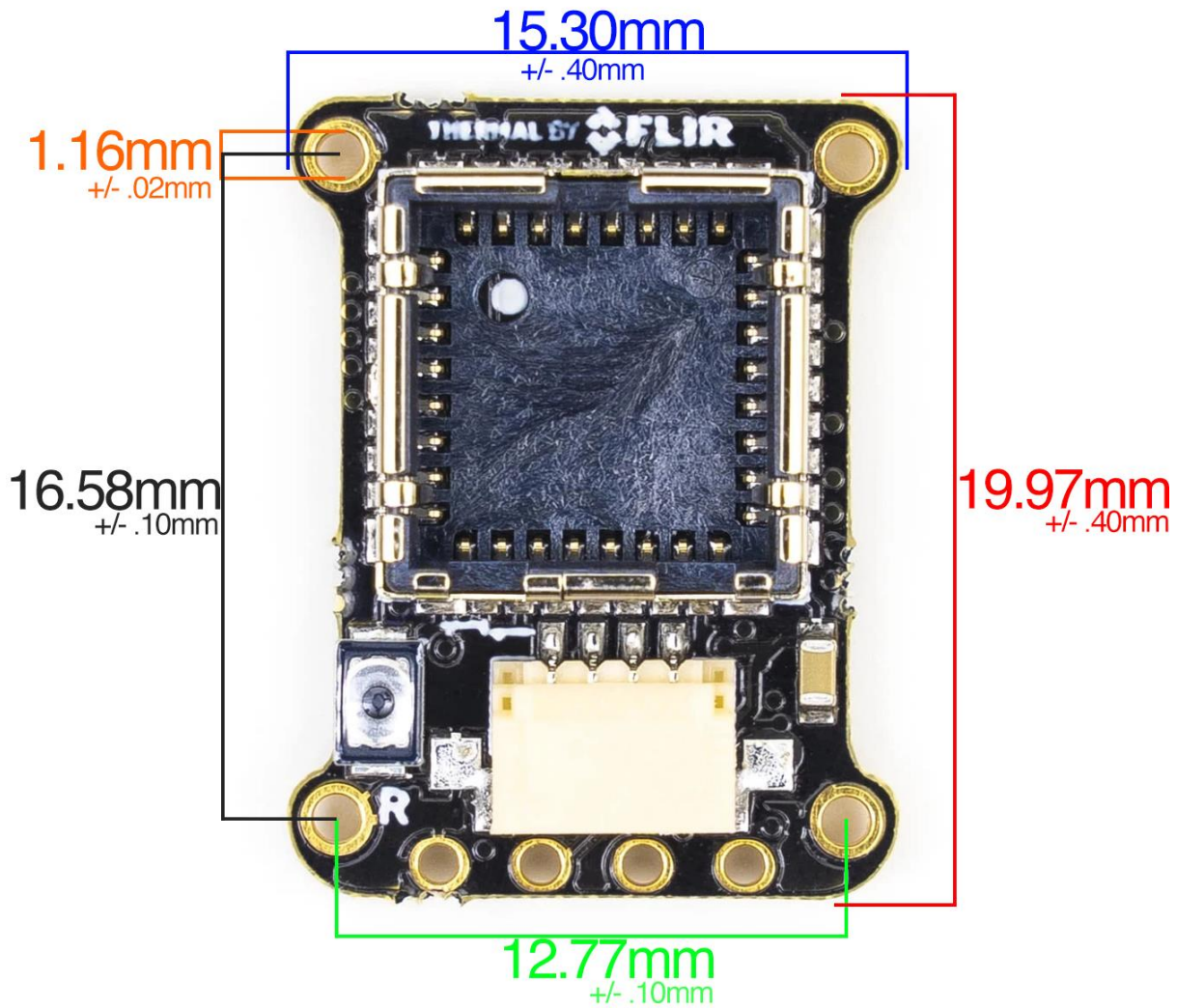
Power Characteristics

	PureThermal 2			PureThermal Mini & Pro JST	
	No Lepton	W/ Lepton		No Lepton	W/ Lepton
	24.8	61.5		24	63
	24.5	60.7		23.9	62.5
	24.8	60.7		24	62.2
	24.4	61.5		23.8	62.7
Average	**24.625**	**61.1**		**23.925**	**62.6**
MIN	24.4	60.7		23.8	62.2
MAX	24.8	61.5		24	63
	Shutter				
	Peak (mA)		Rise Time (µS)		
	230 ±15mA		160		

Application Information
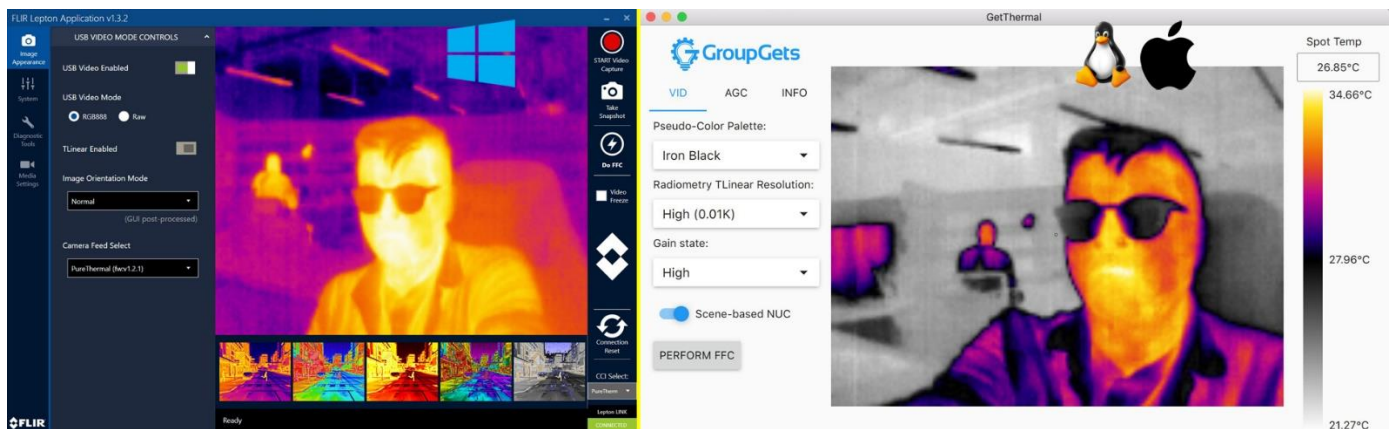
Compatible applications include:

- [FLIR Lepton Application](#) for Windows (above image on left).
- [GetThermal](#) for Mac OS and Linux (above image on right).
- VLC, and many other video players

UVC-Capture Examples

The PureThermal FLIR Lepton development board by GroupGets supports the USB video class (UVC), and this makes it very easy to capture thermal imaging data from a host PC using standard tools and libraries. If you want to prototype quickly, your application demands increasing processing power, or you simply don't want to hack on the firmware, check out these examples to get started.

For more information see our purethermal1-uvc-capture examples GitHub repository:
https://github.com/groupgets/purethermal1-uvc-capture

FLIR Lepton Windows SDK

SDK for Windows 10 is provided below. The FLIR Windows Lepton Software Development Kit (SDK) is a software package that you'll include in your project. It is a .NET library for communication over the UVC protocol. These commands allow you to execute commands, pull serial number information, and other useful functions of the camera component. Make sure to visit the Get Started Guide to learn to effectively use the SDK.

https://lepton.flir.com/sdk/
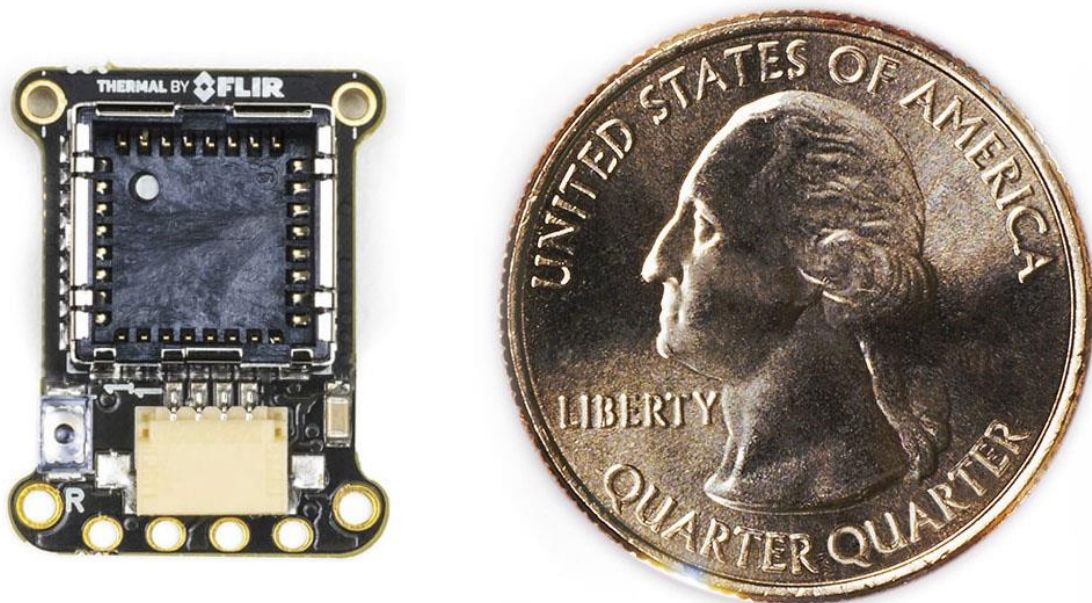
Programming PureThermal Mini Pro JST-SR

You can program the PureThermal Mini Pro JST-SR over USB in DFU-Mode.

If you're not compiling from source you can download the firmware from our PureThermal Firmware releases section here and substitute the .bin file in the .tgz for main.bin in the commands below.

Entering bootloader (DFU) mode

1. Locate the buttons to press on your PureThermal board.
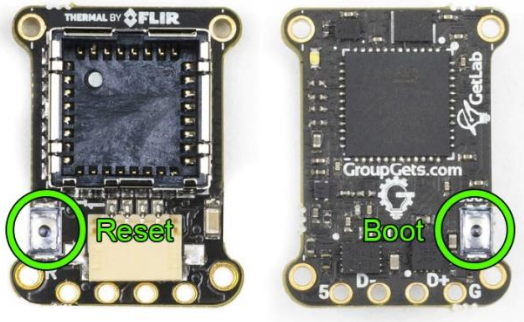
2. Press and hold the BOOT button

3. Without releasing BOOT, press and release RST

4. Release BOOT

5. When you successfully enter DFU mode, the indicator LED will stop blinking and dim to half brightness

Linux / MacOS Flashing

Install dfu-util:

```
sudo apt-get install dfu-util
```
or

```
brew install dfu-util
```
or your system's package manager.

Then run:

```
dfu-util -a 0 -D main.bin -s 0x08000000
```
or use:

```
scripts/flash.sh
```

Windows Flashing

DfuSe USB
drivers. http://www.st.com/web/en/catalog/tools/FM147/CL1794/SC961/SS1533/PF257916
#

win32 DFU tools https://files.groupgets.com/purethermal/win32_dfu.zip

To install DFU drivers, may need to use the device manager to select the st drivers
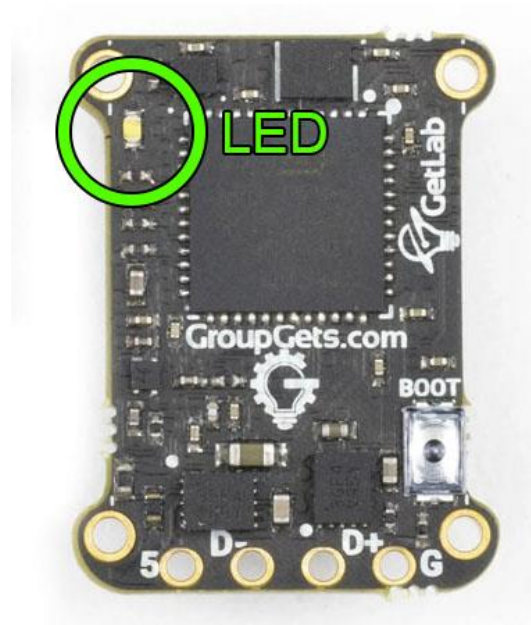
extract win32_dfu.zip to the current folder.
win32_dfu\bin2dfu --i main.bin --a 0x08000000 --o main.dfu
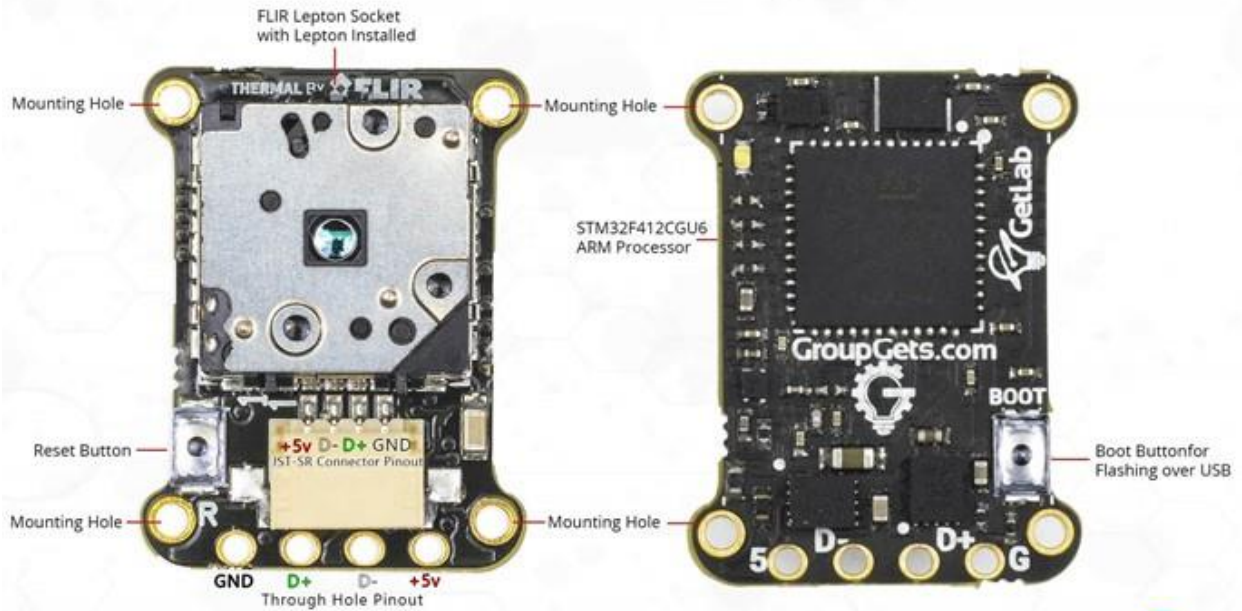win32_dfu\DfuSeCommand -c -d --fn main.dfu
or use:

scripts/make_and_flash.bat

Functions

LED: When plugged in to power and a Lepton is inserted in the socket LED will flash slowly.
When video is being transmitted to the viewing program, LED will flash more rapidly.

PureThermal Mini Pro JST-SR

FLIR Lepton Socket
with Lepton Installed

Mounting Hole

Mounting Hole

Mounting Hole

STM32F412CGU6
ARM Processor

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BOOT

Reset Button

+5v D- D+ GND
JST-SR Connector Pinout

Boot Buttonfor
Flashing over USB

Mounting Hole

R

Mounting Hole

5   D-   D+   G

GND   D+   D-   +5v
Through Hole Pinout

*PureThermal Mini Pro JST-SR supports all FLIR Lepton
2.x - 3.x cores with and without radiometry

GetLab