

## HTPAd Application Shield (WiFi) Arduino Based WiFi Software Development Kit (SDK)

This WiFi Application Shield is designed to facilitate remote access from our thermopile arrays. The Shield enables a fast way to get a thermal image stream from the sensors. It can be used with an ESP32 development board and thus offers WiFi connectivity to our ArraySoft v2 GUI. This allows the highest degree of flexibility to evaluate the sensors for various applications.



The full code is provided and completely open source. It includes all required steps from reading the EEPROM to the calculation of the thermal image.

The C++ code can be viewed and modified via the Arduino IDE. The PCB is designed as an ESP32-DevkitC-32 extension.

### Supported Sensor Types

	TO-46	TO-39	TO-8
IPC	8x8d	16x16d 32x32d	
SPI	/	60x40d	80x64d

The provided source code offers two options for interacting with the sensor:

- **WiFi mode:** Stream thermal images to the GUI.
- **Serial monitor mode:** View sensor data as text output.

Both modes are included within the same code and either one or both can be enabled by defining the corresponding option.

### Required Hard- & Software

Included:

- HTPAd Application Shield
- GUI „Heimann Sensor ArraySoft v2“
- User manual
- Access to all supplementary development data

Additionally required:

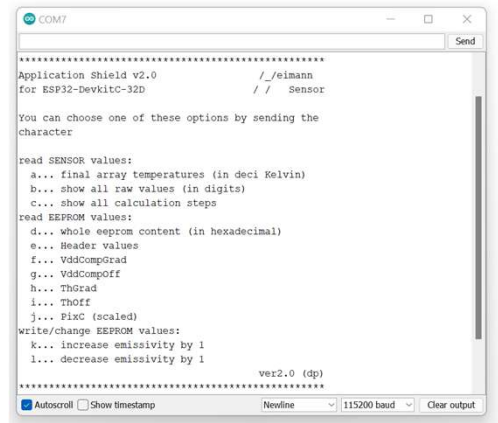
- ESP32 development board: ESP32-DevkitC-32D or newer
- Arduino IDE
- USB micro-B cable (for power supply & serial monitor)

### Serial Monitor

This mode prints all results in the serial monitor of the Arduino IDE. Here the EEPROM/Flash content and sensor voltages can be visualized. Interacting with the sensor is straightforward: simply send the corresponding characters for the desired menu function.

Benefits:

- Show EEPROM/Flash content in hexadecimal or associated data type (float, short, long, ...)
- Print results after each calculation step
- Understand the calculation from raw pixel voltages to the final calibrated thermal image



```

COM7
-----
Application Shield v2.0      //heimann
for ESP32-DevkitC-32D      // Sensor

You can choose one of these options by sending the
character

read SENSOR values:
a... final array temperatures (in deci Kelvin)
b... show all raw values (in digits)
c... show all calculation steps
read EEPROM values:
d... whole eeprom content (in hexadecimal)
e... Header values
f... VddCompGrad
g... VddCompOff
h... ThGrad
i... ThOff
j... PiXC (scaled)
write/change EEPROM values:
k... increase emissivity by 1
l... decrease emissivity by 1

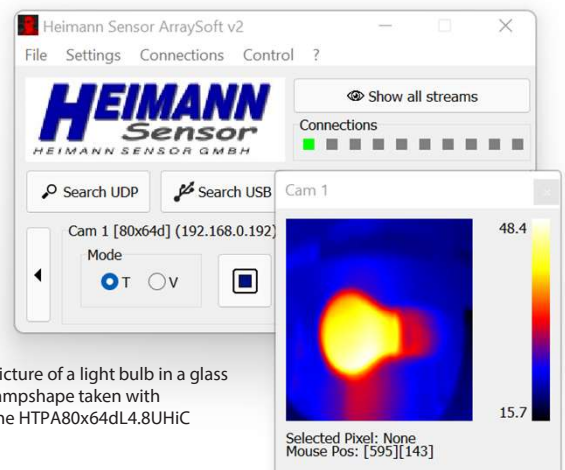
ver2.0 (dp)
Autoscroll Show timestamp Newline 115200 baud Clear output
  
```

### WiFi

In WiFi mode, the thermopile can be connected to the Heimann Sensor GUI for continuous data streaming. The GUI enables visualization of sensor data in both temperature and voltage modes. At the same time, various sensor settings such as clock, ADC resolution and emissivity factor can be adjusted, while all advanced features of the user interface remain available.

Benefits:

- False color visualization and post-processing of thermal images
- Continuous streaming
- Switching between temperature and voltage mode
- Record/replay of thermal images and videos
- Change sensor settings



Picture of a light bulb in a glass lampshade taken with the HTPA80x64dL4.8UHIC