



Description

A DWETH is an Ultra-Wideband (UWB) transceiver intended for use with the **Ciholas** UWB (CUWB) Real Time Location Systems (RTLS). In a typical CUWB RTLS the DWETH operates as a static, or anchored, device providing reference locations for the system. DWETH111 uses Ethernet to provide reliable, high-bandwidth data connectivity, and has a comprehensive set of on board sensors. DWETH111 anchors are Powered over Ethernet (PoE) and are PoE standard compliant.

DWETH111 devices are FCC certified in the United States, and have CE marking in the European Union.



1 Features

- 32-bit ARM Cortex-M7 RISC processor with FPU
 - 300MHz Maximum Speed
 - 2048kB Flash
 - 16kB Cache
 - 384kB SRAM
- **Decawave** DW1000 Ultra-Wideband transceiver
 - IEEE802.15.4-2011 Compliant
 - 6 RF bands from 3.5GHz to 6.5GHz
 - Data rates 110kbps-6.8Mbps
 - Up to 1023-byte packet length
- Integrated Omni-directional UWB antenna
- Motion Processing Unit (MPU)
 - 16-bit 3-Axis Gyroscope 250-2000°/S
 - 16-bit 3-axis Accelerometer $\pm 2g$ up to $\pm 16g$
 - 14-bit 3-axis Magnetometer $\pm 4800T$
 - Digital Motion Processing including low-power quaternion
- MEMS High Resolution Barometric Altimeter
 - 24-bit 0.01hPa RMS
 - 260-1260hPa absolute pressure range
 - 16-bit temperature $\pm 2^{\circ}C$ absolute accuracy
- Temperature and Humidity
 - $\pm 4\%$ (max) Relative Humidity from 0 to 80%
 - $\pm 0.4\%$ (max) Temperature from -10 to 125°C
- Tri-Color LED Indicator
- 10BASE-T/100BASE-TX IEEE 802.3 compliant Ethernet transceiver
- Compliant with PoE power standards
- FCC Certified in the United States under 47 CFR 15.250
- CE marking in the European Union under EN 302 065-1

Note: Not all hardware features are supported by CUWB System software. See CUWB.io documentation for specific feature support.

2 Ordering

Model	Part Number	Color	Description
DWETH111	E00683-00694	White	Single Port PoE 802.3af
DWETH111	E00684-00696	Black	Single Port PoE 802.3af

Available from the **Ciholas Webshop**



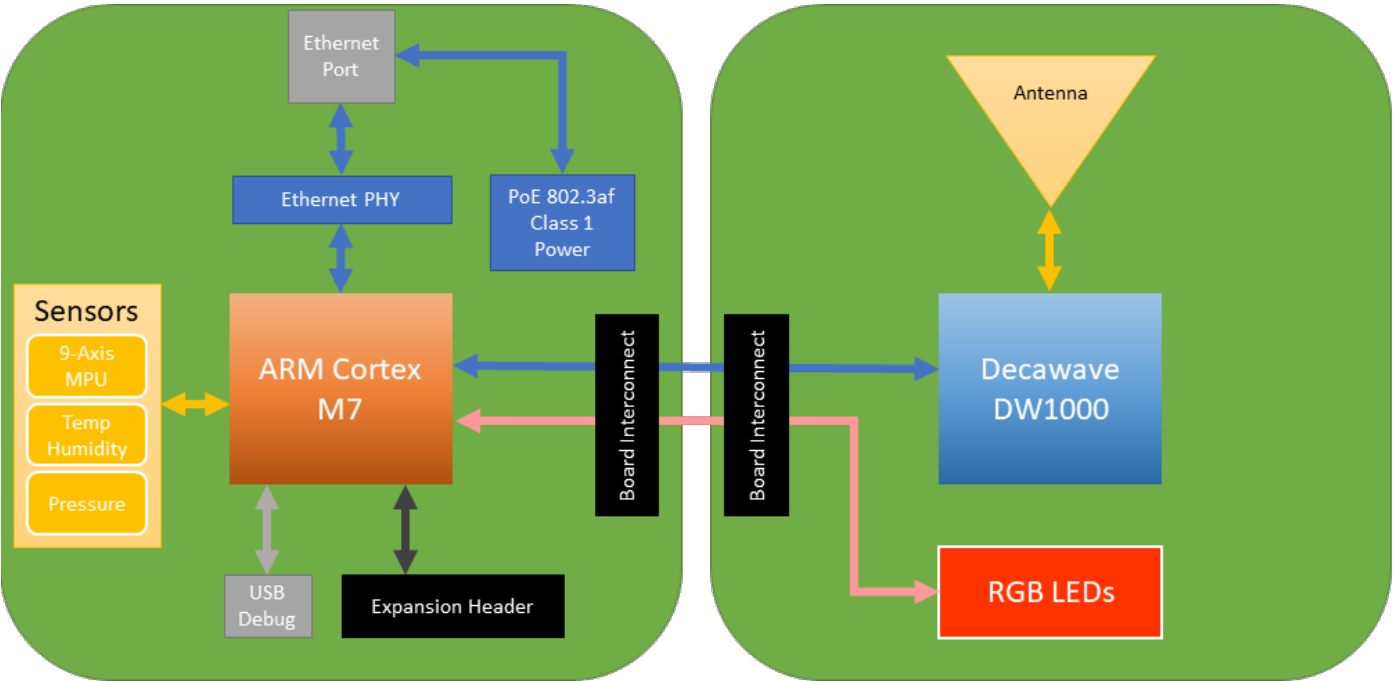
3 Electrical

3.1 Ratings

Parameter	Description	Min.	Typ.	Max	Units
V_{in}	DWETH111	30	48	57	V
P	Nominal Operating Power ¹		2	3.84	W
T_o	Operational Temperature	-20		60	°C

1. Device will classify as PoE 802.3af class 1 device

3.2 Block Diagram

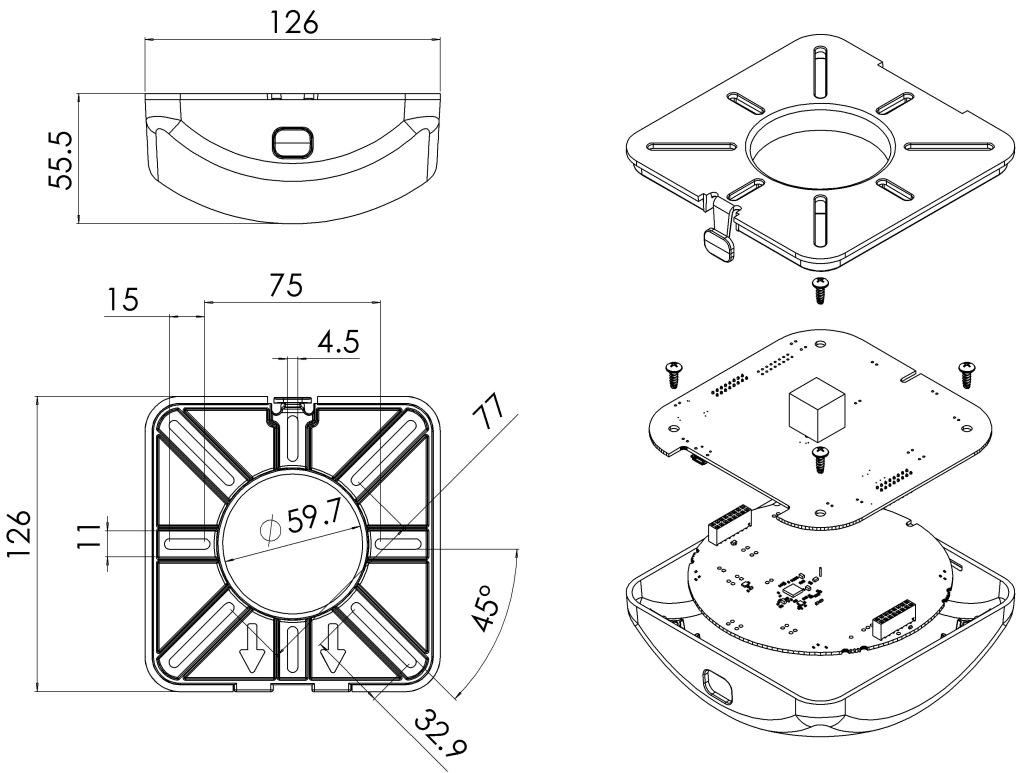


4 Mechanical

Parameter	Description	Min.	Typ.	Max	Units
Mass	Typical Unit Mass	240	245	250	g

Ingress Protection

IP10, not protected against contact and ingress of objects, no protection against liquids



Dimension unit: millimeter

5 Operation

5.1 Power and Communication

The DWETH111 is compliant with PoE 802.3af standards and can be plugged directly into PoE compliant Power Sourcing Equipment (PSE) devices to receive both power and communications. The DWETH111 will negotiate with the PSE as a class 1 device with a maximum allowable power draw of 3.84 Watts.

Once plugged in the DWETH will attempt to gather network parameters using the DHCP protocol. If successful it will announce its presence to the CUWB network server on the subnet provided by DHCP. If the DWETH111 fails to connect to the DHCP server it will fall back on auto-IP parameters and announce its presence using those parameters.

5.2 Configuration

Details regarding DWETH setup and configuration for the CUWB RTLS can be found on the [CUWB Documentation Site](#).

5.3 Sensor Data Reporting

DWETH111 has a variety of sensors and can be configured to transmit data from those sensors. Sensor data received by the CUWB server is broadcast via the [Ciholas Data Protocol \(CDP\)](#) providing access to users.

Sensor scaling and data rates can be configured for the following types of data:

Sensor Type	Measurement Standard
3-Axis Accelerometer	standard gravity (g)
3-Axis Gyroscope	°/Second
3-Axis Magnetometer	μTesla
Absolute Pressure	hPascal
Temperature	°C
Quaternions	Unit Coefficients

5.4 LED Indication

The DWETH111 has tri-color (RGB) LEDs for conveying device state to users. In normal¹ operation the device state can be determined using the table below:

Network Status	Color	ON Time	Period
ON Network	Green	10mS	1.0S
OFF Network	Green	10mS	10.0S
Power On Reset ²	Blue	500mS	N/A

- This table denotes normal LED operation. The CUWB network can be configured to show different patterns on the LEDs*
- Power On Reset (POR) occurs only on system reset. This will happen when charging a dead battery, on reboot after firmware update, and when the device resets due to system watchdog.*

The RGB LED also conveys error states to the user. An error is indicated by a 500mS red flash followed by a color sequence. The following color sequences are used to decode error states:

Color Sequence	Code	Description
Red — White-White-White	7	DW1000 communication error

5.5 Error Handling

5.5.1 [CODE 7] - DW1000 communication error

This indicates that the DWETH firmware is unable to communicate with the UWB transceiver. To clear this error reset the device by removing and reapplying power. If the problem persists please contact [Ciholas](#) for support.

5.6 Regulatory Compliance

- FCC Certified in the United States under 47 CFR 15.250
- CE marking in the European Union under EN 302 065-1

5.6.1 Federal Communications Commission

FCC Notice (For US Customers):

FCC ID: 2ALIR-DWETH111

Model: DWETH111

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician to help.

Changes and modifications not expressly approved by Ciholas, Inc. can void your authority to operate this equipment under Federal Communications Commissions rules.

5.6.2 European Conformity

Hereby, Ciholas declares that this device is in compliance with the essential requirements and other provisions of Directive 2014/53/EU and Directive 2014/30/EU.

The full text of the EU declaration of conformity is available at the following internet address:

- [DWETH111 Declaration of Conformity](#)



5.7 Product Warnings



- Before working or installing electrical equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents



- Usage of this product outside the parameters outlined in the user manual can result in bodily injury and damage to this and other equipment. To prevent this, please follow all instructions in the user manual.
- Installation of this equipment must comply with all local and national electrical codes.
- Do not operate any wireless network devices near unshielded blasting caps or in an explosive environment unless the devices have been modified to be especially qualified for such use.

5.8 Ciholas Standard Software License and Warranty

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6 More Information

Please visit the following links for more information and documentation regarding **Ciholas** UWB systems and products:

- Documentation, installation, and usage instructions visit **CUWB.io**
- To purchase **Ciholas** UWB products, please visit the **Ciholas Shop**
- Ask other users questions and find community information in the **Community Forum**
- Learn more about Ciholas services at **www.ciholas.com**

7 DWETH111 Datasheet Change Log

Version	Date	Change Description
1.0	2018-05-10	Initial Public Release
1.1	2018-06-04	Added Product Warnings Added Warranty Disclaimer Added IP Rating Added UE Conformity Notes Modified Operation Temperature Range
1.2	2018-08-06	Added block diagram to electrical section