Walabot (vMaker) Environment Sensor User Manual

Models:

Walabot Starter, Walabot Maker, Walabot Pro

FCC and CE regulatory models

Draft version – for FCC and CE evaluation

April 2016

Contents

Introduction

Walabot is a programmable 3D sensor that looks into objects using radio frequency technology that breaks through known barriers, bringing highly sophisticated sensing capabilities to your fingertips.

Walabot models

Walabot comes in several models. See the table below for details on the differences in the models.

TABLE TO BE UPDATED

Capability \ Model	Walabot Starter	Walabot Maker	Walabot Pro
Physical			
Number of antennas	3	15	18
Board size	72 mm * 48 mm	72 mm * 140 mm	72 mm * 140 mm
External powering option	No	Yes	Yes
Software API capabilities			
Basic API functions	Yes	Yes	Yes
2D acquisition	No	Yes	Yes
3D acquisition	No	No	Yes
Multiport recorder (raw data)	No	No	Yes
Software application capabilities			
Breathing detection	Yes	Yes	Yes
Object detection application	No	Yes	Yes
Object tracking application	No	No	Yes

Regulatory domains

Walabot models have been manufactured in accordance with the regulatory domains in which they are to be operated. Currently FCC (for operation in the US) models and CE (for operation in EU and other countries using CE certification) models are available. If in doubt, consult your local experts before ordering.

The FCC model is restricted in its operation to the 3.1-10.6 GHz range of frequencies.

The CE model is restricted to 6-8.5 GHz band and to stricter out-of-band emissions.

Operating Walabot in conjunction with other wireless devices

In some cases your projects may contain both Walabot module and an additional wireless device for communications in proximity to each other. It is best to configure the devices such that their frequencies of operation do not overlap. For example, if the FCC model of Walabot is used in conjunction with a WiFi module, it is the safest to configure WiFi to operate in the 2.4 GHz band, rather than in the 5 GHz band. If you configure Walabot to use 3.3-4.8 GHz subband or the 6.3-8.3 GHz subband (as in CE models), both 2.4 and 5 GHz bands of WiFi are safe to use. Bluetooth, Zigbee and cellular bands are all below 3 GHz and should pose no mutual interference challenges. We recommend trying to locate the modules far away from each other.

If you have any issues, feel free to contact us at support@walabot.com

Accessories

Walabot has several optional accessories:

- Case (included with the Pro model)
- [Ferrite-loaded USB cable for a power supply. This accessory is recommended for uninterrupted operation when Walabot is powered by an external power supply and the mains voltage is prone to surges.](#)
-

Technology

The Walabot products are multi-antenna sensors that characterize the environment in the vicinity of the sensor. It is done by collecting and analyzing propagation information between the antennas, which is affected by the environment. The propagation response information is collected by Walabot and processed at the hosting device to obtain spatial information about the environment.
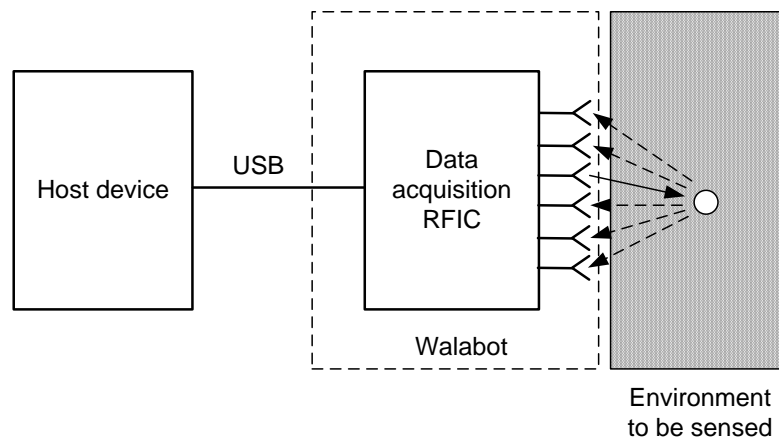

Installation

Installation of Walabot includes the following steps

- Selecting a powering option
- Mechanical placement
- Connecting
- Software installation

Selecting a powering option

The Walabot Pro and Maker have two USB connectors – one is used for data transfer and possibly powering the Walabot, and the other USB connector is for power only. [describe here the criteria for deciding how to power Walabot]. Select your power source for Walabot using the jumper on the back side of Walabot board. In the figures below you can see the jumper position for powering through the main (blue) or the auxiliary (green) USB port.
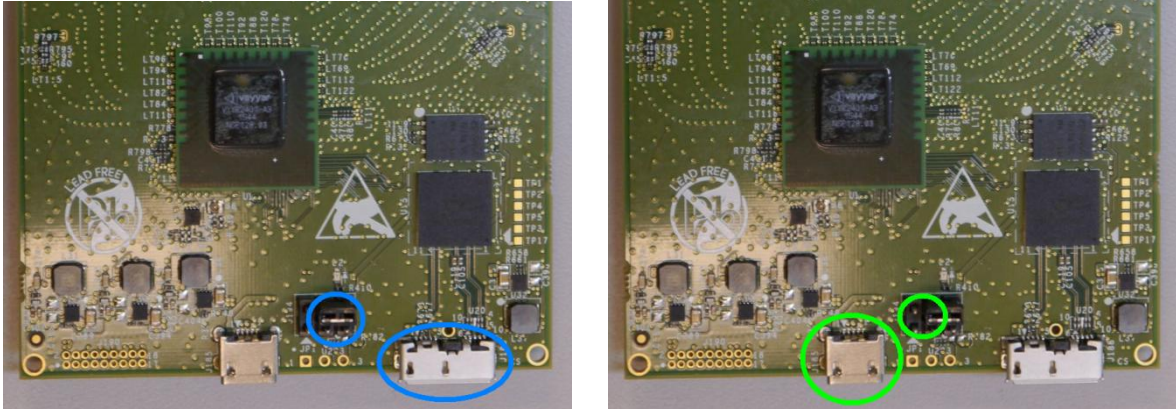
When you are at the point in your project where you would like to place the board in a case, you will need to experiment with the powering option and place the jumper accordingly.   By default, the board is configured to provide power using the main USB port.

Mechanical placement

Eventually, as your Walabot board becomes part of your project, you'll want to secure it in a safe and convenient place. Several options are possible.

- We supply an optional protective case, which can be used to host the Walabot board. This case comprises a magnetic mount on its back, which enables it to attach to iron surfaces. We supply a stick-on metallic ring which can be placed on your cellphone, or your robot, or the wall of your lab, so that you can attach and detach Walabot easily.
- You can fix Walabot to the surface of your project, or to its cover. Make sure that the front cover is nonmetallic (e.g. plastic) and preferably thin (not exceeding 2 mm).
- You can temporarily use the board as is, but be aware that it can get damaged, and the USB connectors may degrade due to repeated strain. In the case of temporary use of bare board, be sure to lay it on a non-conducting surface, to prevent an electric short.

Mounting Walabot in the case
(explanation how to lay Walabot board in the case and snap the back part of the case; how to use the magnetic mount)

Mounting Walabot for your project
(explanation how to mount Walabot to back surface (including recommended min gap of 8 mm to accommodate the jumper); how to attach it to cover (incl. min gap of 5 mm between the PCB and he cover); including side view drawings for recommended spacing or and front view for 68 mm * 136 mm screw positions)

Connecting your Walabot

The Walabot board needs to connect to a hosting device. In most cases it will be a computer, laptop or desktop, a tablet or a cellphone. The board connects to the hosting device through a USB cable. Walabot

is supplied with a short USB cable suitable primarily for attaching the Walabot to a cellphone or a tablet. Alternate cables can be used.

If you prefer to use the auxiliary port for powering the board, you may attach the board to the additional power source, such as a power pack or a charger. If a wall charger is used, it is advised to use a ferrite-loaded cable [refer to exemplary model type].

Connect the data USB to a hosting device. If needed, connect the auxiliary USB port to the external power source.

Software installation

Walabot is operated by application software that needs to be installed on your host device. A variety of applications and software resources for developing your own applications are found on the Walabot web site at the address [ADDRESS COMES HERE]. Download the relevant applications, according to the type of your host device and its operating system (Windows, Android etc.).

If relevant, download the appropriate software to begin developing your own applications.
- The software contains a driver through which the application software communicates with Walabot device.
- The driver translates your commands into Walabot's actions.
- Moreover, the driver is in charge of enforcing certain regulatory restrictions.
- <u>Be sure to communicate with the Walabot device only through the driver using the provided API</u>.
- The documentation of the API is found at [ADDRESS COMES HERE].

Safety

Legal Information

Disclaimers

Trademarks and patents

Regulatory Information

Regulatory Conformance

The Walabot device has been designed to be in compliance with the FCC regulations governing UWB hand-held systems (Part 15.519) also known as "battery powered devices" or "mobile devices." This means that the device can be incorporated in a wide variety of products including educational robots, pipe locators, breathing monitors, etc. Note that there are other applications which are specifically forbidden, such as use of the devices in toys. See FCC Parts 15.519 and 15.521 for more details.

Certain models of the Walabot device have been designed and tested to be in compliance with CE requirements, and in particular to conform to ETSI standards EN 302 065-1, EN 301 489-33 and EN 301 489-1. In particular, the CE compliant devices are restricted to operation in the 6-8.5 GHz band. **Make sure that if you use the device outside US, that you order the appropriate model number.**

FCC regulatory statements

This device complies with 47 CFR Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

The use of this device mounted on outdoor structures, e.g., on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited.

Moreover, the following statements apply:

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/TV technician for help.

FCC ID Labels

The Walabot products have a FCC ID of 2AHIS-VMAKER. The FCC ID marking is found on the right lower front side of the printed circuit board.

When you use the Walabot board in your project, with our optional case or with your own case, you are advised to put an external marking saying "Contains FCC ID: 2AHIS-VMAKER". For your convenience, a sticker with this text is attached.

The FCC ID is also accessible by software API, and when you create your application, you are advised to allow access to this information, for example within the "Help/About" text, or on your opening splash screen.