



## MDEK1001 Quick Start Guide

### Welcome

Thank you for purchasing the MDEK1001: **M**odule **D**evelopment & **E**valuation **K**it for the Decawave DWM1001 (UWB / Bluetooth module using Decawave's DW1000 IC).

This Quick Start Guide is all that is needed to use the MDEK1001 kit to get a DWM1001 Real-Time Location System (DRTLS) up and running quickly. The system can be easily configured and visualised using a tablet running an Android application.

Check the Decawave website regularly for updated firmware releases.

Please follow the links below for more information or contact Decawave via the website if you require assistance.

### Get Started:

- Learn more at: <http://www.decawave.com/products>
- Download the software from: <http://www.decawave.com/support/software>

### Join the community:

- Decawave Tech Forum <http://www.decawave.com/decaforum/>

## IN THE BOX

QUANTITY	ITEM	DESCRIPTION
12	RTLS units	Each RTLS unit contains a DWM1001-DEV development board with a DWM1001 Each RTLS unit can be configured as an anchor, a tag or a listener
1	1 m USB cable	For re-programming the RTLS unit with new / different firmware
4	Right-angled USB connector	Options for power and mounting RTLS units configured as anchors
8	Adhesive Pads	
1	Quick start guide	Get started first!

## ON DECAWAVE'S WEBSITE ([www.decaWave.com](http://www.decaWave.com))

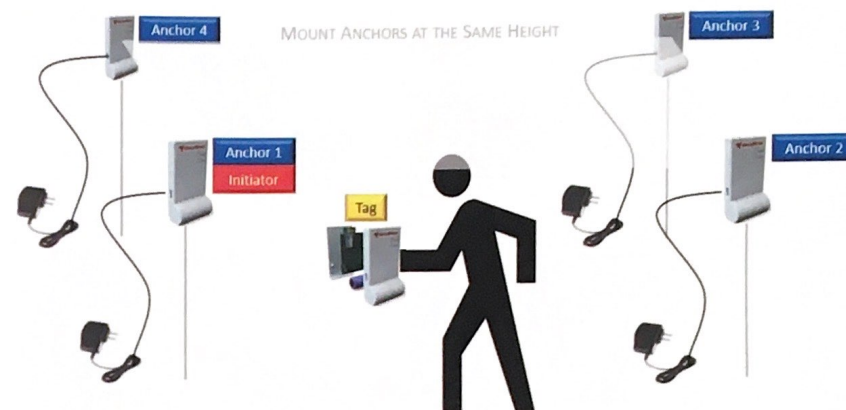
	Decawave DRTLs Manager Android application file (.apk) for configuration and visualisation	Download and install on your Android 6.0 or 7.0 device.
	Documentation for: MDEK1001 evaluation kit DWM1001-DEV development board DWM1001 module	Including: MDEK1001 System User Manual Firmware & API Guides Hardware datasheets

## ALSO REQUIRED (NOT INCLUDED)

Power sources for the RTLS units		RTLS units can be powered via USB mains power supplies or batteries inside the enclosures It is recommended to power anchors by USB mains-powered power supplies or high capacity USB battery packs Battery: 3.7V RCR123a or 16340 rechargeable Note: Some USB battery packs shutdown when connected to the low-current tags. Battery packs with a torch function often stay on when the tag sleeps
Android Tablet		Tablet running Android 6.0 or 7.0 e.g. Samsung Galaxy Tab S2
Tripods / Stands / Sticky Tape		Use tall tripods or wall mountings to mount the anchors high above tags to reduce non-line-of-sight conditions
PC		Optional: Used to directly connect a PC to an RTLS unit to log location data or send commands to that unit

## Prepare the Anchors

1. Select 4 RTLS units to be anchors
2. Mount them high on walls or tripods, preferably above head height
3. Ensure they are all at the same height
4. Arrange them approximately in a rectangular shape
5. Power them using USB mains power supplies or USB battery packs



## Prepare the Tags

1. Select 1 RTLS unit to be a tag
2. Power the tag by either (a) connecting a USB battery pack or (b) opening the enclosure and inserting a rechargeable battery

## Prepare the Tablet

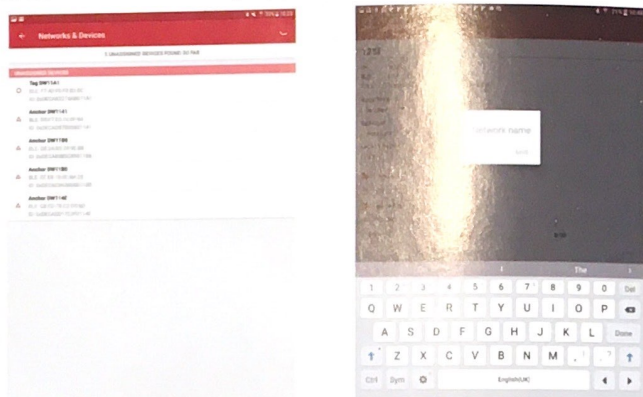
1. Download the .apk Android application file (Decawave DRTLs Manager) from the Decawave website to your tablet
2. Follow the instructions on the tablet to install the application





## Create a Network

1. Open the Decawave DRTLs Manager application
2. Tap 'Start Device Discovery'
3. Tap one of the listed devices and an option will appear to name a network – this device will be added to that network
4. Repeat for the remaining devices to add them to this network (swipe right to remove a device from the list)
5. All RTLS units will initially appear as tags in 'passive' UWB mode



## Configure the RTLS Units as Anchors or Tags

Tap the network name and then tap each device in turn to configure it:

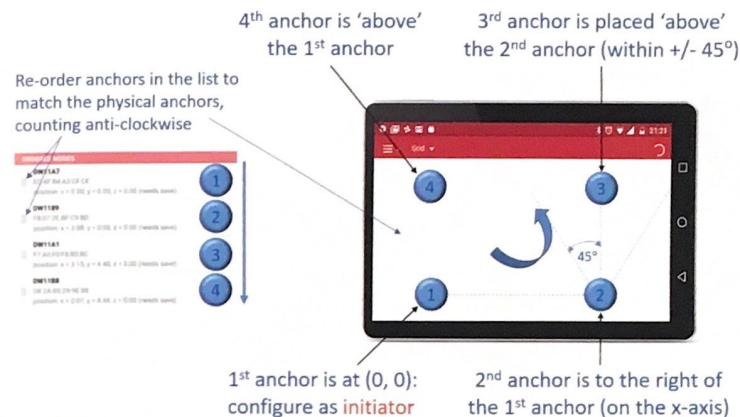
1. First, identify the RTLS unit by unchecking the LED ☒ LED and tap ☒ to save. The LEDs on that device will turn off.
2. To configure the 4 anchors, for each in turn:
  - a. Set the 'Node Type' to 'Anchor'
  - b. Set 'UWB' to 'Active'
  - c. For any one of the anchors, check the 'Initiator' box (there must always be one initiator in the network)
  - d. Tap ☒ to save
3. To configure the tag:
  - a. Set the 'Node Type' to 'Tag'
  - b. Set 'UWB' to 'Active'
  - c. Select 'RESPONSIVE MODE', 'STATIONARY DETECTION' and 'LOCATION ENGINE'
  - d. Tap ☒ to save



## Auto-Position the Anchors (for up to 4 anchors)

**Note 1:** The Auto-Positioning function is a quick setup feature to automatically determine the anchor locations. Note that this feature may result in a small error in anchor location, making reported tag locations less accurate. For best results it is recommended that anchor positions are measured to cm accuracy and manually entered (see below)

**Note 2:** Ensure Line-of-Sight between the anchors during these steps



1. **START**  
On the 'Network Details' screen, tap the "Auto-Position" button in the upper right pull-down menu (anchors within Bluetooth range appear)
2. **RE-ORDER**  
Re-order the anchors in the list to match their locations in the room:
  - a. Order the anchors anti-clockwise in the room (as shown above)
  - b. The 1<sup>st</sup> anchor in the list is the (0,0) co-ordinate
3. **MEASURE** Tap "Measure" to start the auto-positioning
4. **PREVIEW** Tap 'PREVIEW' to check locations before saving
5. **SET HEIGHTS** Enter heights of the anchors by tapping 'Z-AXIS'
6. **SAVE** Save the anchors setup by tapping 'SAVE'

## Manually Position the Anchors

Anchor co-ordinates can be measured manually and entered in the settings screen of each anchor:

1. **START** On 'Network Details' screen, tap to edit each anchor
2. **MEASURE** Enter the x,y,z co-ordinate in the 'POSITION' section
3. **SAVE** Tap ☒ to save

## Track your Tags

1. From the Network Details screen, each device will be listed like this:



- |   |                                 |
|---|---------------------------------|
| Filled circle: Tag. Each tag uses a different color | Do not show on grid             |
| Empty triangle: Anchor                              | Show on grid                    |
| Filled triangle: Initiator Anchor                   | Show on grid with ranging lines |

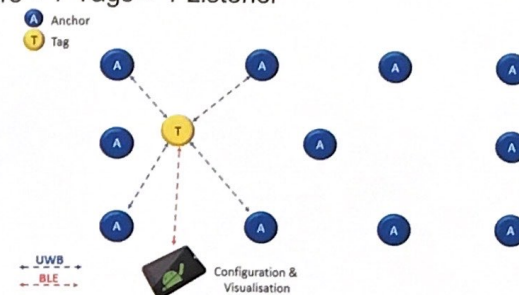
2. Tap the tag ranging circle to change to or to show it on the grid
3. Ranging starts automatically
4. Tap the "Grid" option at the top of the screen to see the grid
5. Pinch to zoom
6. Tags automatically select 4 anchors to range with
7. A floorplan can be uploaded into the application from the tablet's gallery



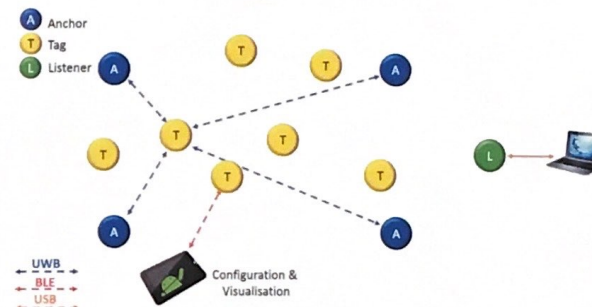
## Other Configurations and Options

MDEK1001 can be used to evaluate many configuration options e.g.

- 11 Anchors + 1 Tag
- 4 Anchors + 8 Tags
- 4 Anchors + 7 Tags + 1 Listener



A listener can be used to collate location information from many tags to (a) display on the DecaWave DRTLs Manager or (b) send to a PC.



A PC can be used to connect directly via USB to a tag or to an RTLS unit configured as a listener in order to collect and log the location data from the tags. This can be done using a terminal interface.

Finally, the DWM1001 firmware can be modified and re-programmed by the user to create a custom RTLS solution.

For these, and other details and instructions, see the MDEK1001 System User Manual and module Firmware User & API Guides (available at [www.decawave.com](http://www.decawave.com))





## DOCUMENT INFORMATION

### Disclaimer

Decawave reserves the right to change product specifications without notice. As far as possible changes to functionality and specifications will be issued in product specific errata sheets or in new versions of this document. Customers are advised to check with Decawave for the most recent updates on this product.

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## LIFE SUPPORT POLICY

Decawave products are not authorized for use in safety-critical applications (such as life support) where a failure of the Decawave product would reasonably be expected to cause severe personal injury or death. Decawave customers using or selling Decawave products in such a manner do so entirely at their own risk and agree to fully indemnify Decawave and its representatives against any damages arising out of the use of Decawave products in such safety-critical applications.



**Caution!** ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

## REGULATORY COMPLIANCE

This MDEK1001 is supplied by Decawave. Decawave's DW1000 IC & DWM1001 module is intended solely for use by developers to evaluate the use of Decawave's DW1000 IC & DWM1001 module in location and communications systems.

The MDEK1001, as supplied by Decawave, has not been certified for use in any particular geographic region by any regulatory body governing radio emissions in such regions.

The MDEK1001 is supplied under the following conditions: -

- The distribution and sale of the MDEK1001 is intended solely for use in future development of devices which may be subject to regulations or other authority governing radio emission.
- This MDEK1001 may not be resold by users for any purpose.
- The MDEK1001 as supplied by Decawave may not be incorporated directly into user devices or products unless such products undergo the appropriate certification.
- Operation of the MDEK1001 in the development of future devices is at the discretion of the user and the user bears all responsibility for any compliance with regulations laid down by the authority governing radio emissions in the user's jurisdiction.

All products developed by the user incorporating the DW1000 or DWM1001 must be approved by the relevant authority governing radio emissions in a jurisdiction prior to the marketing or sale of such products in that jurisdiction. User bears all responsibility for obtaining such approval.

If the user has obtained the MDEK1001 for any purpose other than those listed above the user should return the MDEK1001 to the supplier immediately.

**FCC NOTICE:** This kit is designed to allow (i) product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and (ii) software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the conditions that this device not cause harmful interference to licensed radio stations and that this device accept harmful interference. Unless the assembled kit is designed to operate under Part 15, Part 18 or Part 95 of the FCC Rules, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under Part 5 of the FCC Rules.