DECAWAVE

Frequently Asked Questions

(FAQ's)

FAQ

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Q1. What are all the components you will find in the DecaWave EVK1000?

Ans. 2 x Antenna, 2 x EVB1000 Boards, 2 x power leads, 2 x Micro USB cables, 1 x Quick Start Guide, 2 x Perspex stands.

Q2. How can you supply power to the Boards?

Ans. No power supply units are supplied in the kit but the boards may be powered from a bench power supply using the supplied power supply leads or via a USB power source using the supplied USB cables.

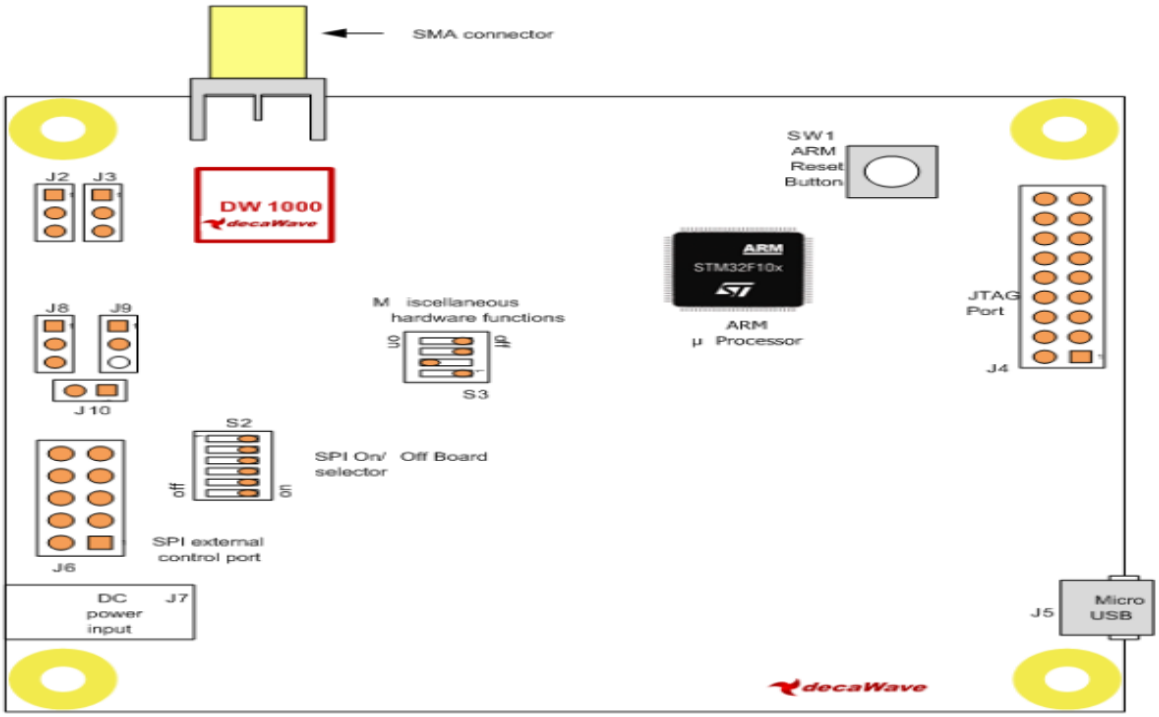
Q3. What are the configurations/settings you change on the boards for actually supplying the Board with power?

Ans. The EVB1000 can be powered either via an external DC Power supply (battery) through J7 using the supplied power cable leads or via a standard 5V 500 mA power supply through J5.To change between the two, jumper J8 is used. So all you have to do is insert the jumper pins.

Power Source	J8 (Insert on pins)	Comment
USB	2 & 3	The USB port to which you connect the EVB1000 should be capable of supplying at least 250 mA
3.6 V to 5.5 V	1 & 2	In this mode the externally applied supply is indirectly connected to the on-board circuitry through an LDO regulator

Q4. Where is the Jumper pin J8 on the Board?

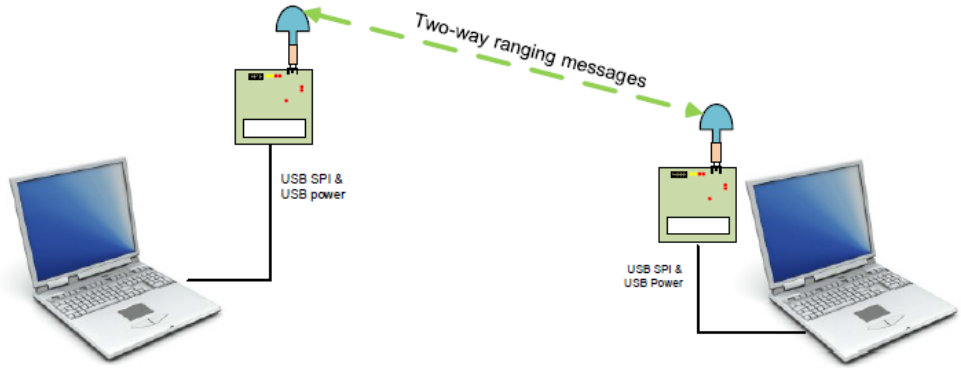
Ans**.** On the Back side of the EVB Boards, you can see the side with all the Jumper pins as shown below. J8 pin is clearly visible on the extreme left side of the board.



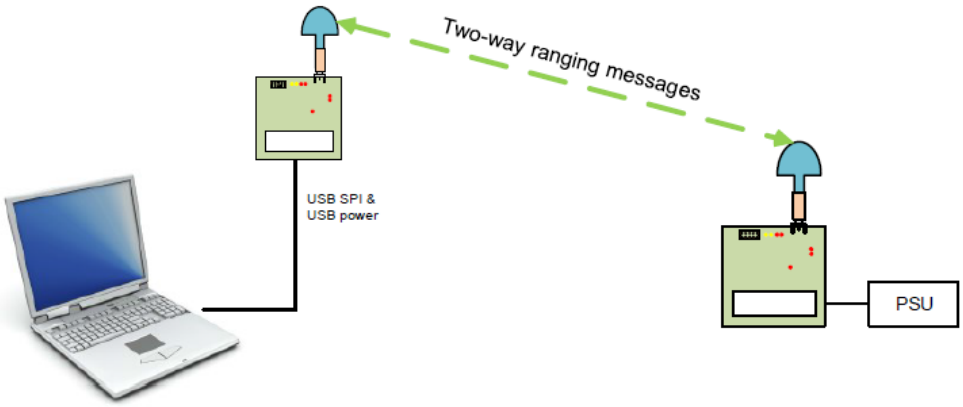
Q5. What are the different ways we can demonstrate the working of the DecaWave EVK1000 kit?

Ans. So the 3 different ways of demonstrating the kit is –

a. Just using the Board to Board configuration where all we do is connect the boards to power supply sources and then run them to show the distances between them on the display screen.
b. Using the external application to control both EVB1000 units.



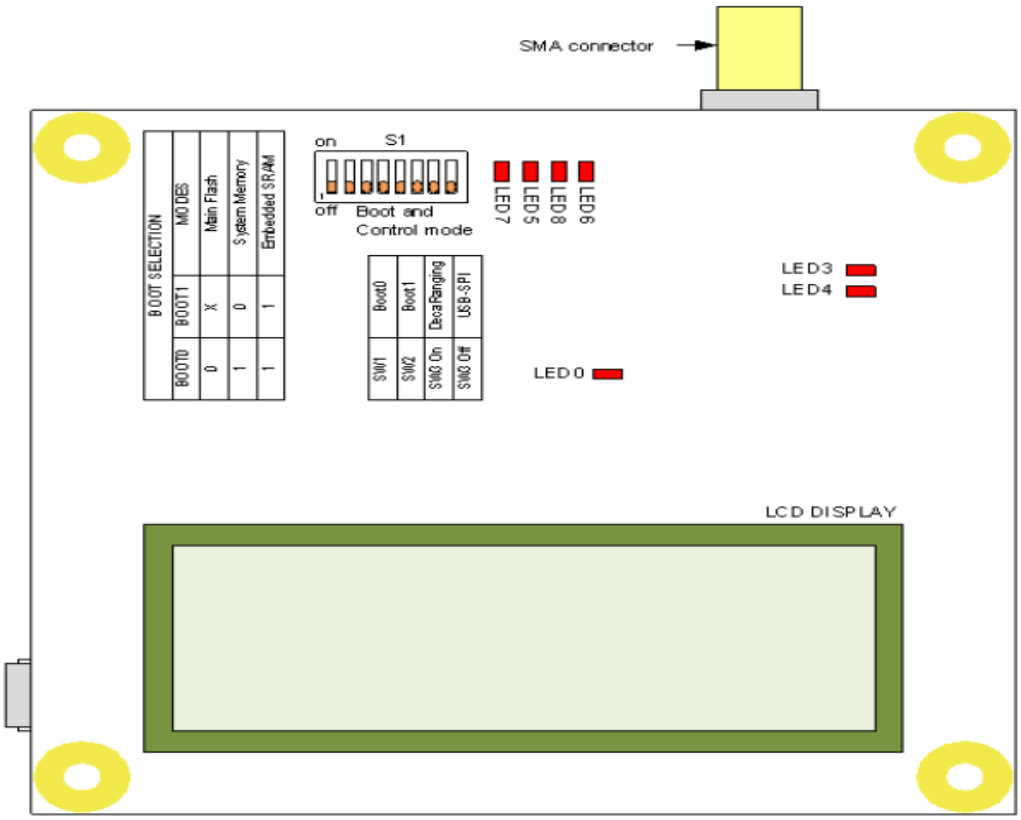
c. Using the external application to control one of the pair of the EVB1000 units.



Q6. How do we know if the board has been really powered up by battery?

Ans. LED 0 will illuminate to indicate that power is applied.

The snap shot below is of the front side of the board with the LED 0.



Q7. What do you mean by the different operational modes?

Ans. The different operational modes enable us to demonstrate the DW1000's performance in high speed short range and lower speed longer range.

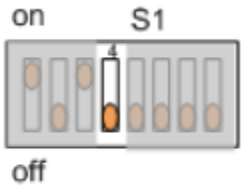
Q8. How do you set these different modes on the board?

Ans. So in order to set the different modes on the Board, you just have to change the switches S1-5, S1-6 and S1-7 on board. The configuration of the switches is given below.

S1-5	S1-6	S1-7	Mode	Channel	Data Rate	PRF	Preamble	Preamble Code	Non standard SFD
OFF	OFF	OFF	1	2	110 kbps	16	1024	3	Yes
ON	OFF	OFF	2	2	6.8 Mbps	16	128	3	No
OFF	ON	OFF	3	2	110 kbps	64	1024	9	Yes
ON	ON	OFF	4	2	6.8 Mbps	64	128	9	No
OFF	OFF	ON	5	5	110 kbps	16	1024	3	Yes
ON	OFF	ON	6	5	6.8 Mbps	16	128	3	No
OFF	ON	ON	7	5	110 kbps	64	1024	9	Yes
ON	ON	ON	8	5	6.8 Mbps	64	128	9	No

Q9. How do you know if the switches are in ON or OFF position?

Ans. So if the switch is in the position which is "down" which is shown in the figure below, it means it is OFF and if the switch is in position "upward", then it is ON. Basically if the yellow circle on the switch is shifted right at the bottom, it is OFF and vice versa.



Q10. Which board is the Anchor and which one is the Tag?

Ans. The ON-Board "Deca-Ranging" application requires one unit to be configured as an Anchor and the other as a Tag. You can configure any one of them as an Anchor or Tag but just make sure that it is controlled with a switch S1-4. The configuration of the switch S1-4 is given below.

1. **S1-4** to **ON.** EVB1000 configured as an "Anchor".
2. **S1-4** to **OFF.** EVB1000 configured as a "Tag".

Q11. What are the precautions you should take while powering up your board?

Ans. Changes to jumper setting should only be made with the board powered down. Under no circumstances should jumper settings be changed while the power is applied to the board via any of the possible off board connectors, or damage to the board may result.

Q12. What are the modes that have to configured on the Tag and the Anchor for demonstrating just the Board - Board configuration?

Ans**.** So when we are just using the Board to Board configuration, all that happens is that both the boards display the last measured distance between the boards and also the average of last 8 readings. We can use any of the features of the PC since we have not interfaced the PC to the board. So to use this configuration, just make sure that the switches S1-5, S1-6 and S1-7 on both the Boards are exactly in the same positions. They can operate in any mode but they both have to be in the same mode.

Q13. What is another way of differentiating between a Tag and a Anchor?

Ans. LED 5 will illuminate in Anchor mode whereas LED 6 will illuminate in Tag mode.

Q14. What to do if the Range on the LCD display screen read 0.00 m?

Ans. Press the reset button or disconnect and reconnect power.

Q15. What to do if the LCD shows "ERROR INIT FAIL" message?

Ans**.** Check that all the switches in S2 are in the ON position.

Q16. What if the channel configuration settings are the same but the Anchor does not report any TX frames?

Ans**.** probably a longer response time may be needed.

Q17. What is the precaution to be taken when using “DecaRanging” PC application with one EVB1000 and ARM application on the other EVB1000?

Ans**.** Make sure that the channel configuration settings in the “DecaRanging” PC application are identical to the mode used on the other EVB1000 Board.

Q18. If I need a bigger monitored area than 40ft (no line of sight) or 100 (line of site) can I deploy 2 Anchors, and would that double the range?

Ans. I believe yes. But to explain this better, when you have multiple anchors and Tags, the range of an anchor or a tag does not increase. The range of each of these still remains the same but by installing multiple anchors and tags, you will definitely increase the overall coverage area. That’s how designers will be using multiple Anchors separated at some distance apart in a shopping mall to cover a larger area for tags spread around.

Q19. Is there a separate user manual for DWM1000?

Ans19. The user manual that DecaWave offers is the same for DW1000 and DWM1000.

Q20. Do you use the same radio module DWM1000 for the Tags and as an Anchor in a RTLS system?

Ans. Yes

Q21. “What is the cost of one anchor and one tag?”

Ans. Symmetry doesn’t sell anchors and Tags separately. At the moment they come in a kit called EVK kit which has 1 of each, anchor and tag.

Q22. What is the battery life of the tag?

Ans. The battery life depends on your application, blink rate, time of sleep of the devices, time its active etc. Please go through the page 26 and page 24 of the presentation pdf (DecaWave Training Symmetry). If you do not have this, please get in touch with symmetry regarding this.

Q23. The .C files that the API document refers to, I would like to know if it is possible to have a copy of these files in order to test the DWM1000 with ARM microcontrollers. I think with these files we could port the functionality to the microcontrollers we want to use (PIC32). This files are listed at the "DecaRanging_ARM_Source_Code_Guide_rev1p6.pdf" document, page 11.?

Ans. To have access to these files, the customer must fill out and sign the royalty-free software license agreement (fill in pages 1 and 8, initial each page, and sign on page 8.). Then we can release the source code files (.C files).

Q24. Where can we get the Royalty–free software license agreement form to release the source files from DecaWave?

Ans. This form would be available with symmetry. Please get in touch with the applications engineer at symmetry.

Q25. As we are using TOF (Time of flight) to do the location measure, and also a system which prioritizes range and precision, the table in the page 193 DW1000 User Manual can be used?

Ans. Yes.

Q26. The time spent in a TOF location system is worse (greater) than TDOA systems?

Ans. Yes the time spend in Time of flight (unsynchronized transmitter and receiver) will be way higher (worse) because it is unsynchronized and hence a 2 way ranging process which includes processing delays and lag time, clock drift etc. In TDOA systems, the tag only blinks once each cycle and all of the anchors hear that same blink and use only it to compute location. In TOF every tag must exchange a minimum of three messages with each anchor. In a four anchor set, for example, that means the message traffic increases by 12, plus each messages must be longer to include the timestamps, so it is actually greater than 12x.

Q27. “We are having a problem writing and reading from the Sub-Register 26:08 (GPIO_DIR). According to the user manual, the way we change the direction of the GPIO port is to set the GDMX mask to “1” and then change the GDPX port to “1” for input, or “0” for output. Also, when we read the register 26:08, the GDMX field should always read as ”0”. As we are trying to read and write to this register, we actually can read a “1” in some of the GDMX fields (i.e. GDM3, GDM2, GDM1, GDM0). We can’t seem to write the correct values we want into this specific register. Is it possible that the user manual, section 7.2.39.3 of Sub-Register 0x26:08 have errors in its description? Is there anyone else having problems with the GPIO registers?”

REG:26:08 – GPIO_DIR – GPIO Direction control register																													
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	-	-	-	GDM8	-	-	-	GDP8	GDM7	GDM6	GDM5	GDM4	GDP7	GDP6	GDP5	GDP4	GDM3	GDM2	GDM1	GDM0	GDP3	GDP2	GDP1	GDP0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1

Ans. It turns out that the user manual is incorrect in its description of the register. The mask bits are not readable at all and the GDP0 - 8 bits are packed into the first 9 bits of the register - i.e. bit 0 is GDP0, bit 1

is GDP1 and so on. Only these 9 bits are relevant when the register is read. Hopefully that clarifies that problem - we will update the definition of the register in the user manual to reflect this.