Anchor 1.3
Reference static device for RTLS

Features

- Real-Time Location Based on UWB and TDoA Technique
- Decawave UWB Radio, 3-7GHz
- Manageable via web browser and RTLS Studio
- Ethernet backhaul
- Firmware upgrade via Ethernet

UWB UWB Location

Ethernet Backhaul

Anchor is a reference device with a known position. Set of Anchors creates location infrastructure where Tags are being located.

The primary goal of the device is to gather radio signals from mobile locators called Tags and forward them to RTLS Studio where the position is being estimated. Moreover, Anchors can also receive data from sensors equipped within the Tag such as acceleration, orientation, button event or custom data payload. Data are further exposed to the user via open API.

Generally, the Anchor is an IP network device equipped with an Ethernet interface for both data backhaul and power supply. Anchors are configured and managed via RTLS Studio software. They are delivered with holders to simplify the installation in any premises. They are usually mounted above Tags which ensures maximum coverage and minimizes obstacles blocking its communication line.

USB   RESET   ETHERNET

DIMENSIONS	70x74x25 mm
WEIGHT	28g
POWER SUPPLY	USB or Passive PoE
POWER	1.3W
REQUIREMENTS	USB DC 5V, ≈ 250mA
	Passive PoE 48V, ≈ 30mA
TEMPERATURE	0 – 50 °C
RADIO RANGE	15-50m*
UWB ANTENNA	Omnidirectional
WARM-UP TIME	20 minutes
PLACEMENT	For Indoor Use Only
	Office, Warehouse, and Light industry environment.

*DEPENDS ON LINE OF SIGHT CONDITIONS, RADIO SETTINGS AND ENVIRONMENT

1 Power Supply

There are two options to power the Anchor. It can be powered either via USB or Passive PoE. Only one interface can be used at one time, never connect both.

- **Power Supply from USB – DC 5V, 500mA – mobile battery pack or USB Adapter with maximum cable length 1.8m.**

   Do not use longer USB cables, since cable voltage drop can cause instability of the device.

- **Power from Passive PoE Injector. DC voltage 24V/48V injected into the unused Ethernet pairs.** (Pairs 4,5 positive terminal, 7,8 negative terminal)

⚠ **Always use galvanic isolated ▣ power adaptor with short circuit protection.** Verified PN are: GS36E24-P1J, GS36E48-P1J Meanwell.

   Please note that Passive PoE is not compliant with PoE IEEE 802.3af / Cisco. Anchor v1.3 cannot be powered from those PoE ports.

Single-port Injector

Contains DC Jack, PoE Port and Lan port.
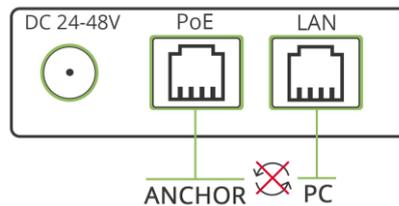
Multi-port Injector for 19" rack

"Data LAN" ports are connected to the network Switch, "Power+Data" ports are connected to the Anchors. Never connect "Power+Data" ports to the computer or other network devices.

After connecting the Anchors to a power supply, let the Anchors warm up properly for at least 20 minutes. This period is required for correct Anchors' synchronization.

2   Default IP Settings

Connect Anchor to PC via Ethernet. Anchor has implicit static IP configuration
- address 192.168.225.200
- mask 255.255.255.0

Set computer to the same address scope and point web browser to 192.168.225.200.

3   RF Profiles

There are several UWB RF Profiles available giving user optimal performance for desired application. RF profile selection is a tradeoff between energy consumption, range and channel utilization.

Profiles RF0 or RF3 are recommended for Anchors Sync.

Here is a brief RF Profiles comparison, ordered from best to worst:

Order	Signal Robustness and Range
Best	RF3
	RF0
	RF4
	RF1
	RF5
Worst	RF2

Table 1 RF Profiles Comparison

3.1   Sync and Blink Layer Separation

Good synchronization between the Master Anchor and neighboring Anchors must be achieved to get precise location performance. Synchronization is carried via SYNC UWB signal, the same medium is used also for the Blink signal from Tag. The Tag transmits randomly within given refresh rate.
If Sync and Blink are sent in the same time, collision can occur. Thus, Anchors synchronization can be interrupted for a while, which will have negative impact on position accuracy.

Normally this is not an issue, however once the number of tags is high or very frequent refresh rates are needed, one might need to separate radio communication between Sync and Blink layer. This can be done with either selection of non-interfering RF profiles or different channel per Sync and Blink.

3.2   Separation by RF Profiles

RF0, RF1, RF2 interfere between each other while, they do not interfere with RF profiles RF3, RF4, RF5.

RF profile	RF0	RF1	RF2	RF3	RF4	RF5
RF0	✗	✗	✗	✓	✓	✓
RF1	✗	✗	✗	✓	✓	✓
RF2	✗	✗	✗	✓	✓	✓
RF3	✓	✓	✓	✗	✗	✗
RF4	✓	✓	✓	✗	✗	✗
RF5	✓	✓	✓	✗	✗	✗
✓	Without Interferences					
✗	Interferences occurs					

Example: Sync layer set to RF0 and blink layer set to RF3 both on the same Channel 5. Communication will not interfere even if the transmissions occurs exactly at the same time.

3.3   Separation by Channels

Channels can also help with a communication separation between layers. Neighbor UWB channels can interfere between each other, because of very broad bandwidth. Therefore, one should skip adjacent channel if possible.

Example: Sync layer set to Channel 5 and Blink layer set to Channel 3 will not interfere.

4   UWB Channels

Channel	Center Frequency (MHz)	Band (MHz)	Bandwidth (MHz)
1	3494.4	3244.8 – 3744	499.2
2	3993.6	3774 – 4243.2	499.2
3	4492.8	4243.2 – 4742.4	499.2
4	3993.6	3328 – 4659.2	1331.2 (real approx. 900)
5	6489.6	6240 – 6739.2	499.2
7	6489.6	5980.3 – 6998.9	1081.6 (real approx. 900)

Table 2 UWB Radio Channels

5   Reset to Defaults

1) Power up the device
2) Press the RESET button and hold for 3s
3) Magenta LED indicator blinks once and the Anchor is in its default settings.

Default configuration is *:
- Blink Channel: CH5 / RF Profile Blink: RF3
- Sync Channel: CH5 / RF Profile Sync: RF3

*Default configuration could be changed please read the news on partner portal regarding the default configuration.

6   Firmware Update

Firmware is uploaded to Anchor via Ethernet interface. Firmware upgrade is done over UDP messaging on L2 layer. Therefore, computer must be connected directly to anchor or on the same L2 segment (no router on the path).

⚠️ **Always make sure that the power supply is stable during the firmware update. You may need to disable all other interfaces in the Network and Sharing Center (Wi-Fi, Bluetooth etc.). Right-click on the interfaces and select "Disable". Please also disable Firewall in case of troubles.**

1) Connect the Anchor directly into your computer by an Ethernet cable.

2) Download and install the LM Flash Programmer.

3) Go to Windows' Network and Sharing Center and change your Ethernet IP address like this:
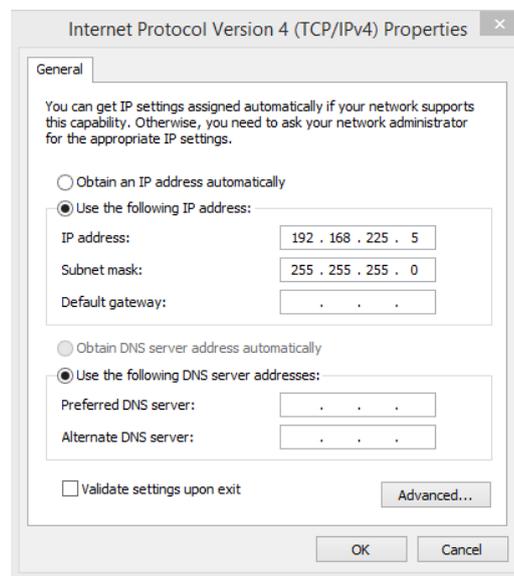
4) Run the LM Flash Programmer as an Administrator

5) On the first page, select Manual Configuration, select the Ethernet Interface and type in the IP and MAC addresses of the Anchor that you wish to update:
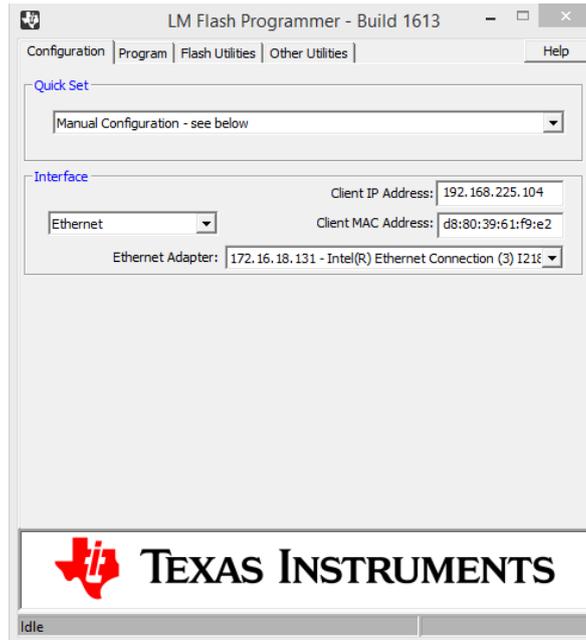
You can find the addresses from RTLS Manager, for example from the Anchors Summary tab.

Go to the "Program" tab and find the configuration file by clicking "Browse" and select path to a new anchor firmware file. Please double check Anchor's hardware revision to match to the firmware before further step.

The latest firmware can be obtained through Sewio Partner Portal.
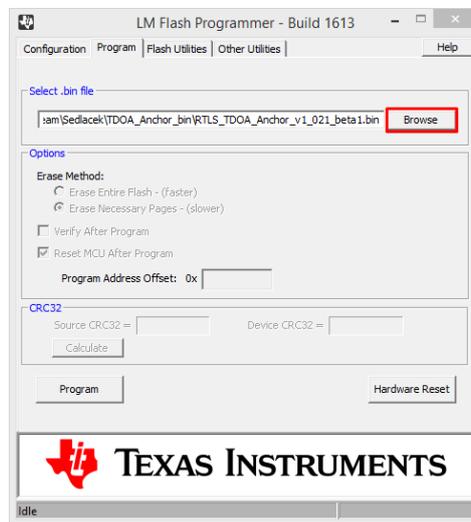
6) Then click on "Program":
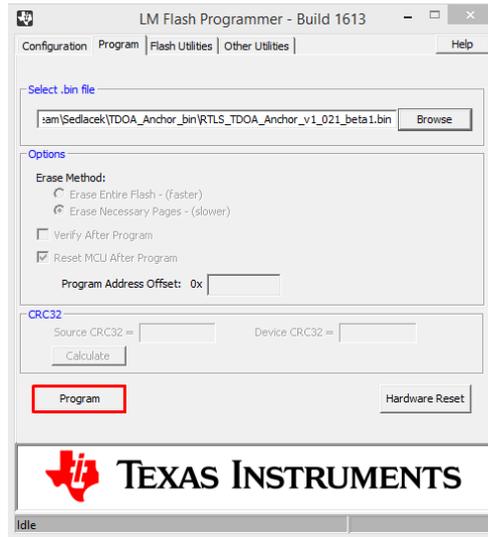
You should see the progress in the lower bar. If there is no progress at all, **make sure that all interfaces besides Ethernet are disabled!**

7) After the upload is finished it will be signalized by the "Done!" message.

8) You can check the new configuration in RTLS Manager on the Anchors Summary.

7   Orderable Device Information

Name	status
Anchor Router Cube 1.3	Discontinued

Sewio Networks, s.r.o
 www.sewio.net, email:info@sewio.net