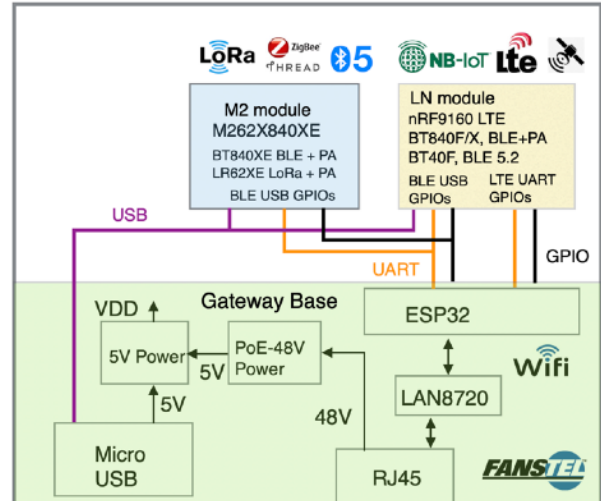


IP65 Edge Computing IoT Gateways

LEW840X Series gateways are for industrial applications. Enclosure has Ingress Protection IP51 or IP65. LTE, WiFi, and Ethernet interfaces are supported simultaneously.

Nordic nRF5340 SoC with dual core Cortex M33, up to 128 MHz, Zephyr RTOS, 16 MB flash, can process and store sensor data before sending to a cloud server.



Demonstration quality source codes for connecting sensors to AWS, Google, or MicroSoft cloud servers are available. They can reduce your development time and cost, allowing shorter time to market.

Miscellaneous

- Size: 107x141x40mm
- Private label available
- Available: POE048, single line PoE power injector. For use with a non-PoE switch.



Multiple Network, Radio Gateways

LEW840X gateway consists of three blocks:

- The Gateway Base (in green shadow) has an ESP32M16 WiFi module to support PoE Ethernet and WiFi interfaces. It has two M.2 connectors for an LN Series module and an M2 Series module.
- LN module (in yellow shadow): [LN60G840F](#) Series module can be LTE and BLE combo, LTE only. When an M2 module is installed, LTE only module shall be used.
- M2 module (in blue shadow): BLE and LoRa combo module, or BLE module. [M262X840XE](#) is the ultimate BLE-LoRa module. Max. BLE TX power is +21 dBm and max. LoRa TX power is +29.2 dBm.

Hardware for Firmware Development

- Nordic nRF9160-DK
- For BT40F/BT40E module: Nordic nRF5340 DK
- PK-LEW840X for programming WiFi module and monitoring LTE traffic data.



MultiNetwork, MultiProtocol Gateways with Ingress Protection

Ingress protect/color	IP51/black	IP51/black	IP51/black	IP65/yellow	IP65/yellow	IP51/black
Gateway	EW840F5P	LEWR840E5P	LEWRX840XE5P	LEWRX840XE6P	LEW40F6P	LEW40E5P
WiFi/Ethernet	ESP32M16	ESP32M16	ESP32M16	ESP32M16	ESP32M16	ESP32M16
LN Module		LN60E	LN60E	LN60E	LN60E40F	LN60E40E
M2 Module	M2840F	M262840E	M262X840XE	M262X840XE		
External antenna	0	3	3	2	0	2
Optional power	USB, not included	USB, not included	USB, not included			
Operating temp.	-40°C to +80°C	-40°C to +80°C	-40°C to +80°C	-40°C to +85°C	-40°C to +85°C	-40°C to +80°C
Certifications	FCC,IC	FCC,IC	FCC,IC	FCC,IC	FCC,IC	FCC,IC
QDID	108621,182626	108621,182626	108621,182626	108621,182626	119517,182626	119517,182626
Availability	Production	Production	Production	Production	Production	Production

LEW840X, OpenSource Multiple Network Gateways

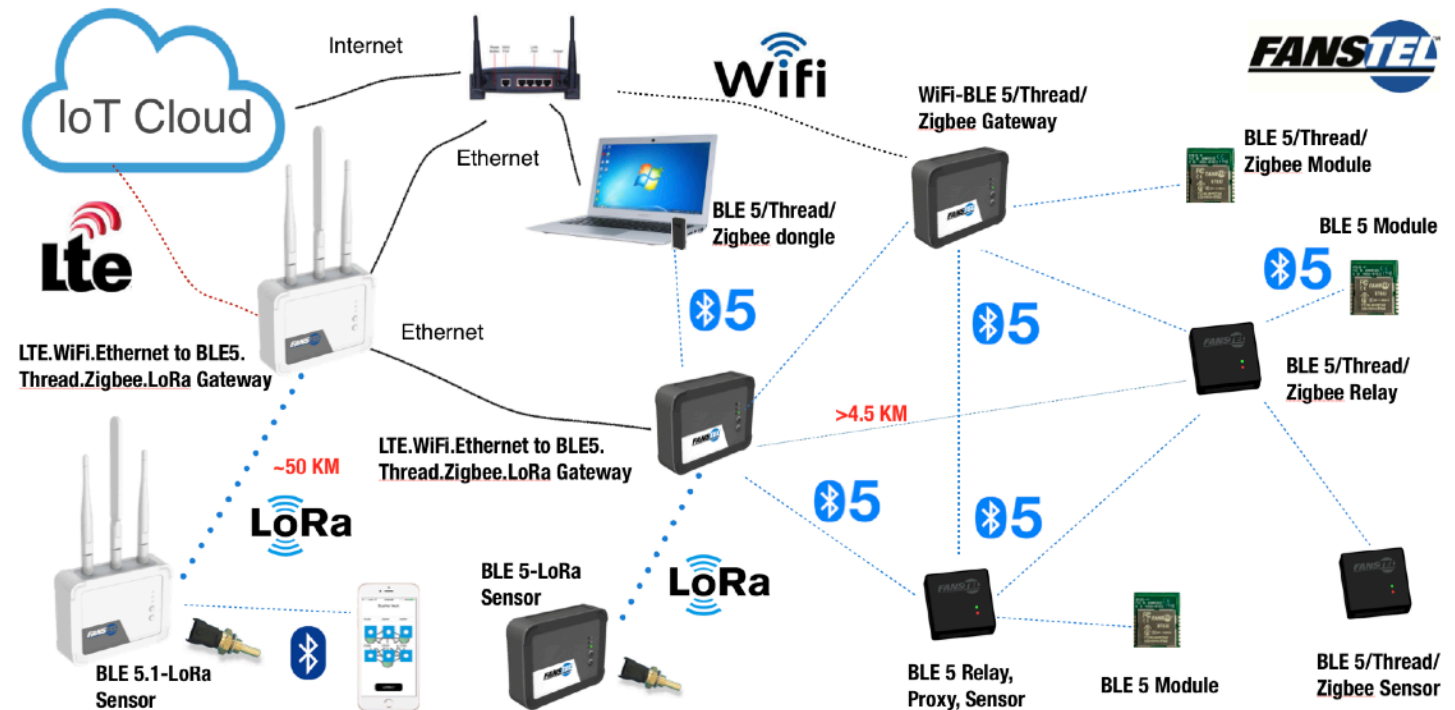
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LEW840X, OpenSource Multiple Network Gateways

1. Introduction

One LEW840X Series gateway can be deployed globally to interface with networks available locally. Operation and maintenance supports are simplified. When multiple networks are available, back-up routing can assure of cloud connection during one or more networks failures.



Alternatively, you can select a single network interface to reduce product cost.

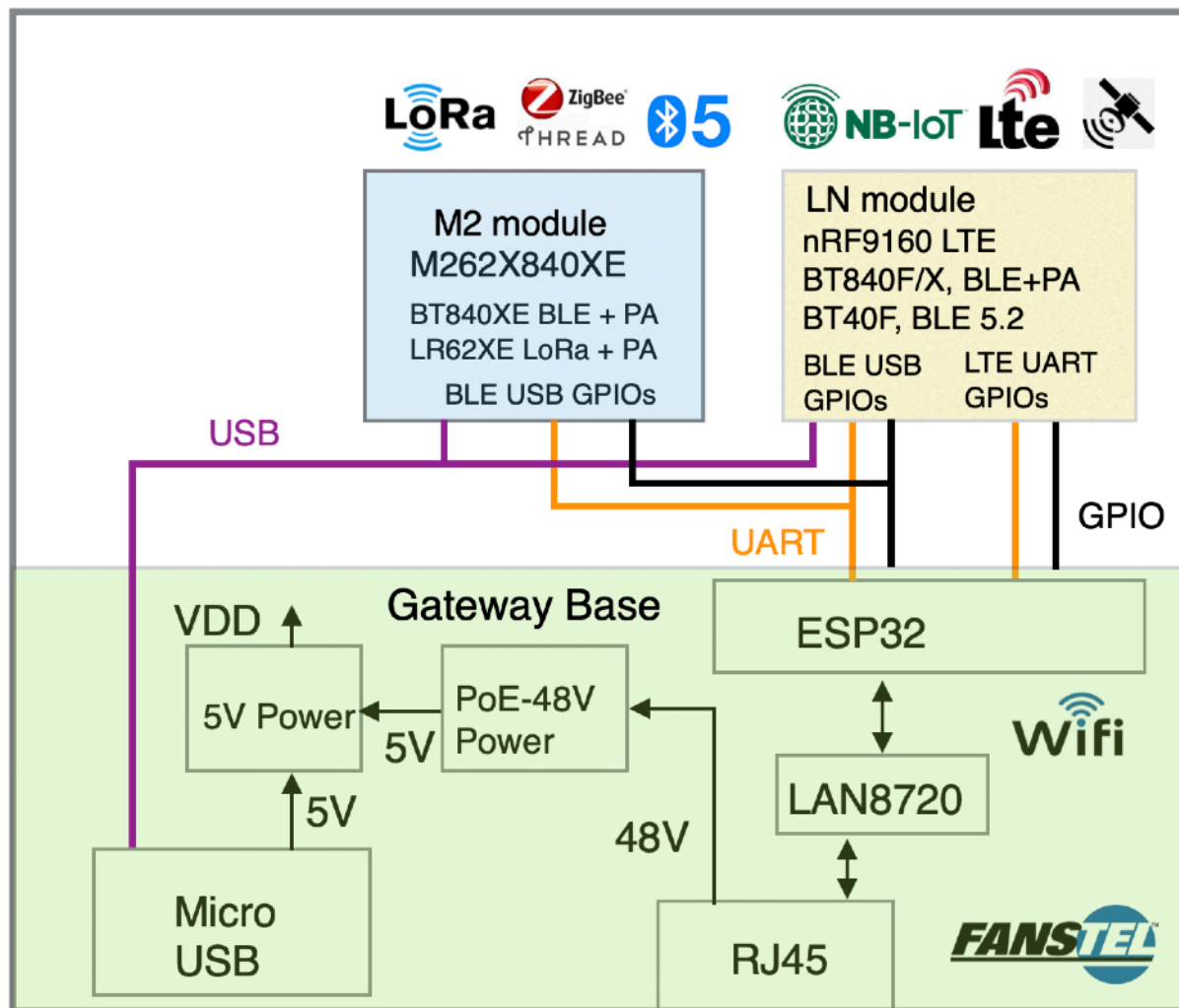
LEW840X Series supports LTE-M, NB-IoT, WiFi, and Ethernet interfaces. It supports Bluetooth 5, 5.1, 5.2 Thread, Zigbee, and LoRa on the device side.

LEW840X, OpenSource Multiple Network Gateways

2. Specifications

At the heart of LEW840X Series gateway is an ESP32M16 module with an ESP32 D0WD SoC. It has an Xtensa dual core 32 bit LX6 microprocessors, up to 600 MIPS. A Microchip LAN8720 is the Ethernet PHY interface.

ESP32 communicates with nRF9160 LTE-M/NB/IoT module using an UART interface. It also communicates with a BLE 5 module using a second UART. A BLE module controls a Semtech SX1262 LoRa module through an SPI interface.



The BLE module, can be an nRF52840 module (BT840F Series), an nRF 5340 module (BT40F Series). They supports 802.15.4 Thread and Zigbee radio protocols. A BLE module control LoRa transceiver module when long range is required.

IP51 gateways can be powered by a 5V micro USB AC adapter or powered through Ethernet cable. IP65 enclosure does not have an external access to the micro USB connector. PCBA can be removed from the enclosure and powered by an USB source during firmware development.

LEW840X, OpenSource Multiple Network Gateways

LEW840X Part Numbers

Possible part numbers of LEW840X Series are listed below.

L E W R 840E 6 P

MultiNetwork, MultiRadio Gateway Part Number

L: LTE-M/NB-IoT, Nordic nRF9160; Missing: not supported

E: Ethernet, ESP32 module/LAN8720 PHY

W: WiFi, ESP32 with integrated antenna; **E:** with External antenna

R: LoRa, LR62E; **RX:** LR62XE with PA. Missing: not supported

840E: BLE module, BT840E ; BT840F; BT840XE; BT840X; BT40F; BT40E; BM833; BM833E.

6: IP65 Ingress Protection, yellow enclosure; **5:** IP51 black enclosure.

P: Power over Ethernet. Missing: not supported.

- LTE-M/NB-IoT interface needs an external antenna. It is an optional feature.
- Ethernet interface is always supported.
- Bluetooth interface is supported by one of 8 BLE 5, 5.1, or 5.2 modules. Module can be with an integrated antenna, with an external antenna, and with an integrated power amplifier to boost TX power to +21 dBm. IEEE 802.15.4 Thread and Zigbee interfaces are supported by BLE modules.
- WiFi interface is supported with an integrated antenna or an external antenna.
- LoRa interface is an optional feature. An external antenna is required.
- Enclosure can be IP65 or IP51 rated.
- Power over Ethernet (PoE) can be supported for all gateways. IP51 gateway without PoE is powered by a micro USB AC adapter. IP65 gateway without PoE is powered by 48V DC.
- Up to 3 external antennas can be supported. LTE and LoRa interfaces need external antennas. Integrated antenna and external antenna can be supported for both BLE and WiFi.

LEW840X Configurations

The following table has a list of gateway bases can be manufactured.

- LEW5P-3 has 3 holes for external antenna mounting. Holes are sealed with silicone rubber plugs. No SMA connector is mounted. No external antenna is included.
- LEW6P-3 has 3 IP67 adapter cable's SMA connectors installed. The u.FL connector sides are un-connected.
- You can build a gateway with a base and an LN module, an M2 module, or both modules. When an M2 module is installed, only LN60G or LN60E can be used.

WiFi, PoE Ethernet Gateway Bases with 2 M.2 Connectors					
Ingress protect/color	IP51/black	IP51/black	IP51/black	IP65/yellow	IP65/yellow
Gateway	LEW5N-0	LEW5P-0	LEW5P-3	LEW6P-0	LEW6P-3
WiFi/Ethernet	ESP32M16	ESP32M16	ESP32M16	ESP32M16	ESP32M16
Ext. antenna, supported	0	0	3	0	3
Ext. antenna included	None	None	None	None	ANT000/030P/015P/060P
Power over Ethernet	No	Yes	Yes	Yes	Yes
Optional power	USB, included	USB, not included	USB, not included		
Operating temp.	0°C to +40°C	-40°C to +80°C	-40°C to +80°C	-40°C to +85°C	-40°C to +85°C

The following table has a list of gateways can be manufactured.

- We keep sample stock of gateway models in **bold**. Others are made to order with MOQ.

MultiNetwork, MultiProtocol Gateways				
Gateway	Base	LN Module	M2 Module	Notes
EW840F5P	LEW5P-0	None	M2840F	BT840F, nRF52840 BLE to PoE, WiFi gateway
EW840F5N	LEW5N-0	None	M2840F	BT840F, BLE to Ethernet, WiFi gateway. Power over Ethernet not supported.
EW840E5N	LEW5N-0	None	M2840E	BT840E, BLE to Ethernet, WiFi gateway. Power over Ethernet not supported.
EW40F5P	LEW5P-0	None	M240F	BT40F, nRF5340 BLE to WiFi gateway
EW840E5P	LEW5P-3	None	M2840E	BT840E to PoE, WiFi gateway. 6 dBi ext. antenna, best BLE receiver sensitivity.
EW840XE5P	LEW5P-3	None	M2840XE	BT840XE to PoE, WiFi gateway. The longest BLE range to another BT840XE.
EW40E5P	LEW5P-3	None	M240E	BT40E BLE to WiFi gateway, external BLE antenna
LEW840F5P	LEW5P-3	LN60E840F	None	BT840F BLE to LTE, PoE, WiFi gateway.
LEW40F5P	LEW5P-3	LN60E40F	None	BT40F BLE to LTE, PoE, WiFi gateway.
LEW840E5P	LEW5P-3	LN60E840E	None	BT840E to LTE, PoE, WiFi gateway. 6 dBi ext. antenna, best BLE receiver sensitivity.
LEW840XE5P	LEW5P-3	LN60E840XE	None	BT840XE to LTE, PoE, WiFi gateway. The longest BLE range to another BT840XE.
LEW40E5P	LEW5P-3	LN60E40E	None	BT40E BLE to LTE, PoE, WiFi gateway. Ext. BLE antenna
EWR840F5P	LEW5P-3	None	M262840F	LR62E-BT840F, LoRa-BLE to PoE, WiFi gateway
EWR8335P	LEW5P-3	None	M262833	LR62E-BM833, LoRa-BLE to PoE, WiFi gateway
EWR840E5P	LEW5P-3	None	M262840E	LR62E-BT840E, LoRa-BLE to PoE, WiFi gateway. Best BLE receiver sensitivity.
EWR840XE5P	LEW5P-3	None	M262840XE	LR62E-BT840XE, LoRa-BLE to PoE, WiFi gateway.
EWRX840XE5P	LEW5P-3	None	M262X840XE	LR62XE-BT840XE, LoRa-BLE to PoE, WiFi gateway. The longest BLE and LoRa ranges.
EWR40E5P	LEW5P-3	None	M240E	LR62E-BT40E, LoRa-BLE to PoE, WiFi gateway
EWR833E5P	LEW5P-3	None	M262833E	LR62E-BM833E, LoRa-BLE to PoE, WiFi gateway
LEWR840F5P	LEW5P-3	LN60E	M262840F	LR62E-BT840F, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR8335P	LEW5P-3	LN60E	M262833	LR62E-BM833, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR840E5P	LEW5P-3	LN60E	M262840E	LR62E-BT840E, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR840XE5P	LEW5P-3	LN60E	M262840XE	LR62E-BT840XE, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWRX840XE5P	LEW5P-3	LN60E	M262X840XE	LR62XE-BT840XE, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR833E5P	LEW5P-3	LN60E	M262833E	LR62E-BM833E, LoRa-BLE to LTE, PoE, WiFi gateway.
EW840F6P	LEW6P-0	None	M2840F	BT840F, nRF52840 BLE to PoE, WiFi gateway

EW40F6P	LEW6P-0	None	M240F	BT40F, nRF5340 BLE to WiFi gateway
EW840E6P	LEW5P-3	None	M2840E	BT840E to PoE, WiFi gateway. 6 dBi ext. antenna, best BLE receiver sensitivity.
EW840XE6P	LEW5P-3	None	M2840XE	BT840XE to PoE, WiFi gateway. The longest BLE range to another BT840XE.
EW40E6P	LEW5P-3	None	M240E	BT40E BLE to WiFi gateway, external BLE antenna
LEW840F6P	LEW5P-3	LN60E840F	None	BT840F BLE to LTE, PoE, WiFi gateway.
LEW40F6P	LEW5P-3	LN60E40F	None	BT40F BLE to LTE, PoE, WiFi gateway.
LEW840E6P	LEW5P-3	LN60E840E	None	BT840E to LTE, PoE, WiFi gateway. 6 dBi ext. antenna, best BLE receiver sensitivity.
LEW840XE6P	LEW5P-3	LN60E840XE	None	BT840XE to LTE, PoE, WiFi gateway. The longest BLE range to another BT840XE.
LEW40E6P	LEW5P-3	LN60E40E	None	BT40E BLE to LTE, PoE, WiFi gateway. Integrated GPS. Ext. BLE antenna
EWR840F6P	LEW5P-3	None	M262840F	LR62E-BT840F, LoRa-BLE to PoE, WiFi gateway
EWR840X6P	LEW5P-3	None	M262840X	LR62E-BT840X, LoRa-BLE to PoE, WiFi gateway
EWRX840X6P	LEW5P-3	None	M262X840X	LR62XE-BT840X, LoRa-BLE to PoE, WiFi gateway
EWR8336P	LEW5P-3	None	M262833	LR62E-BM833, LoRa-BLE to PoE, WiFi gateway
EWR840E6P	LEW5P-3	None	M262840E	LR62E-BT840E, LoRa-BLE to PoE, WiFi gateway. Best BLE receiver sensitivity.
EWR840XE6P	LEW5P-3	None	M262840XE	LR62E-BT840XE, LoRa-BLE to PoE, WiFi gateway.
EWRX840XE6P	LEW5P-3	None	M262X840XE	LR62XE-BT840XE, LoRa-BLE to PoE, WiFi gateway. The longest BLE and LoRa ranges.
EW40E6P	LEW5P-3	None	M240E	LR62E-BT40E, LoRa-BLE to PoE, WiFi gateway
EWR833E6P	LEW5P-3	None	M262833E	LR62E-BM833E, LoRa-BLE to PoE, WiFi gateway
LEWR840F6P	LEW5P-3	LN60E	M262840F	LR62E-BT840F, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR8336P	LEW5P-3	LN60E	M262833	LR62E-BM833, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR840E6P	LEW5P-3	LN60E	M262840E	LR62E-BT840E, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR840XE6P	LEW5P-3	LN60E	M262840XE	LR62E-BT840XE, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWRX840XE6P	LEW5P-3	LN60E	M262X840XE	LR62XE-BT840XE, LoRa-BLE to LTE, PoE, WiFi gateway.
LEWR833E6P	LEW5P-3	LN60E	M262833E	LR62E-BM833E, LoRa-BLE to LTE, PoE, WiFi gateway.

LTE Antennas

The LEW840X Series gateways are certified with ANT032E and ANT032 LTE antennas.

ANT032

- Uses a AVX P822601 LTE antenna certified with nRF9160.
- A cable with u.FL connectors at both ends.
- A 2-sided tape for gluing to the internal wall of an enclosure.
- An ANT032 is installed inside an IP65 LTE gateway.



ANT032E

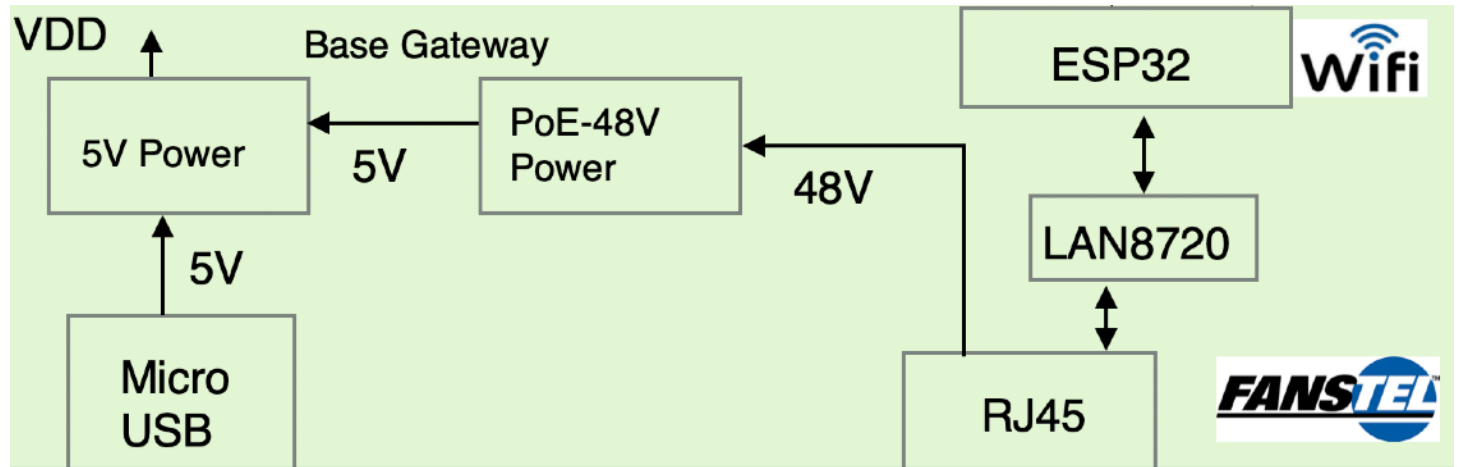
- Uses a AVX P822601 LTE antenna certified with nRF9160.
- An enclosure with an SMA connector.
- A 100mm long u.FL to SMA adapter cable. SMA side with panel mounting hardware.
- An ANT032E is included in an IP51 LTE gateway.



LEW840X, OpenSource Multiple Network Gateways

Gateway Bases with PoE Ethernet and WiFi

The gateway base (in green shadow) consists of power supply circuit receiving nominally 48V DC power from the Ethernet cable, an ESP32M16 module with Ethernet PHY LAN8720 to provide Ethernet and WiFi interfaces. IP51 gateway base has a micro USB connector for 5V DC power as below.



All gateway bases support PoE (Power over Ethernet).

ESP32M16 WiFi module with an Expressif ESP32 D0WD, dual core Xtensa 32 bit processor establishes and maintains connection to a cloud server.

Mongoose OS OpenSource codes for connecting to Fanstel development server and to **Google Cloud IoT Core, AWS, and Microsoft** cloud servers are available. They can be used as a base to develop interfaces with other servers.

Link to download additional document and source codes:

<http://www.fanstel.com/download-opensource/>

Brief descriptions of WiFi module ESP32M16:

- Expressif ESP32 D0WD, Xtensa dual core 32 bit LX6 microprocessors, up to 600 MIPS.
- 448KB ROM, 520KB SRAM, 16 MB flash
- 16KB SRAM in RTC
- 802.11 b/g/n, 802.11n (2.4 GHz), up to 150 Mbps

M.2 Modules

The gateway base has two B-key M.2 connectors for up to 30x42mm size modules. One connector for an **Lte-Nbiot LTE-BLE LN module**. The second connector for an M2 Series BLE-LoRa **M2 module**.

All LN or M2 modules with an nRF5340 are embedded with a 16 MB flash memory for local storage of sensor and control data.

LN Module with LTE-M/NB-IoT and Bluetooth Interfaces

An M2 module is always with a BLE module. When an M2 module is installed in an LEW840X gateway, the LN module must be without a BLE features (LN60G or LN60E).

The following table has a list of available LN Series modules.

- Size of LN Series module is 30x42mm, for M.2 connector, B key.
- nRF9160 SICA is a Nordic LTE-M/NB-IoT module with GPS receiver.
- All modules have an u.FL connector for an external LTE antenna.
- LN60G Series module has a GPS receiver amplifier and a GPS antenna integrated on board.
- LN60E Series module has an u.FL connector for an external GPS antenna with amplifier.
- nRF52840 module can be BT840F, BT840E, BT840X, or BT840XE.
- nRF5340 module can be BT40F or BT40E. It is connected is a QSPI flash memory on board.

LN Module	LTE module	GPS antenna	BLE module	Description
LN60G	nRF9160 SICA	Integrated	None	nRF9160 LTE module with an integrated GPS antenna.
LN60E	nRF9160 SICA	u.FL	None	nRF9160 LTE module with an u.fl for an external GPS antenna.
LN60E840F	nRF9160 SICA	u.FL	BT840F	nRF9160-BT840F, LTE-BLE module, integrated BLE antenna.
LN60E840E	nRF9160 SICA	u.FL	BT840E	nRF9160-BT840E, LTE-BLE module, u.FL for external BLE antenna.
LN60E840X	nRF9160 SICA	u.FL	BT840X	nRF9160-BT840X, LTE-BLE+PA module, integrated BLE antenna.
LN60E840XE	nRF9160 SICA	u.FL	BT840XE	nRF9160-BT840XE, LTE-BLE+PA module, u.FL for external BLE antenna.
LN60E40E	nRF9160 SICA	u.FL	BT40E	nRF9160-BT40E, LTE-BLE module, u.FL for external BLE antenna. GPS, 16 MB flash
LN60E40F	nRF9160 SICA	u.FL	BT40F	nRF9160-BT40F, LTE-BLE module, integrated BLE antenna, 16 MB flash

Nordic nRF9160 SICA Modules

Brief specifications of nRF9160 SICA are below. Full [nRF9160 product specifications](#) are available online.

Microcontroller:

- ARM® Cortex® -M33
- 1 MB flash, 256 kB low leakage RAM
- ARM® Trustzone®
- ARM® Cryptocell 310
- Up to 4x SPI master/slave
- Up to 4x I2C compatible two-wire master/slave.
- Up to 4x UART (CTS/RTS)
- I2S
- Digital microphone interface (PDM)
- 4x pulse width modulator (PWM) unit
- 12-bit, 200 ksps ADC - 8 configurable channels with programmable gain
- 3x 32-bit timer with counter mode
- 2x real-time counter (RTC)
- Programmable peripheral interconnect (PPI)
- 32 general purpose I/O pins

LEW840X, OpenSource Multiple Network Gateways

LTE modem:

- Transceiver and baseband
- 3GPP LTE release 13 Cat-M1 and Cat-NB1 compliant
 - 3GPP release 13 coverage enhancement
- 3GPP LTE release 14 Cat-NB2 compliant
- GPS receiver
 - GPS L1 C/A supported
 - GPS antenna and amplifier integrated
- RF transceiver for global coverage
 - Up to 23 dBm output power
 - -108 dBm sensitivity (LTE-M) for low band, -107 dBm for mid band
 - An u.FL connector for external LTE antenna
- LTE band support in hardware:
 - Cat-M1: B1, B2, B3, B4, B5, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B66
 - Cat-NB1/NB2: B1, B2, B3, B4, B5, B8, B12, B13, B17, B18, B20, B25, B26, B28, B66
- Nano SIM card connector on-board.
- Power saving features: DRX, eDRX, PSM
- IP v4/v6 stack
- Secure socket (TLS/DTLS) API

LEW840X, OpenSource Multiple Network Gateways

nRF52840 Bluetooth 5.2 Modules

nRF52840 Bluetooth 5.2 module supports Bluetooth 5.2, Thread, and Zigbee radio interfaces. One of four Bluetooth 5.2 modules can be installed.

- BT840F, an nRF52840 module. It is FCC certified with max. TX power of +8.46 dBm.
- BT840E, an nRF52840 module with an u.FL connector, panel mounted SMA connector for an external antenna. It passes FCC certification testing with ANT060, a 6 dBi antenna.
- BT840X, an nRF52840 module with SKY66112 power amplifier. It passes FCC testings at +21 dBm TX.
- BT840XE, an nRF52840 + SKY66112 module with an u.FL connector, panel mounted SMA connector for an external antenna. It passes FCC testings with ANT000, a 0 dBi antenna.

Maximum TX power of BT840X is about 13.8 dB higher than that of BT840F. The receiver gain of SKY66112 is measured at 1.5 dB. Comparing to BT840F, BT840X has 15 dB more link budget. In free space (antenna high above ground and without obstruction), 15 dB link budget can more than quadruple range. Or, it is enough to penetrate 2 dry walls in typical house in the U.S.A.

If you are developing a mesh network or sensor using BT840X/XE, a gateway with BT840X/XE will provide the longest possible Bluetooth, Thread or Zigbee range.

If this gateway is to receive data from various (Fanstel and non Fanstel) sensors, beacons, BT840E with ANT060 antenna will provide the best receiver sensitivity if antennas are deployed in parallel (horizontal polarization).



Full product specifications of [nRF52840](#) and [BT840F Series modules](#) are available online.

Brief specifications of BT840F Series modules.

- nRF52840 QIAA, ARM Cortex M4F, 64 MHz
- ARM® TrustZone® Cryptocell-310 co-processor
- BLE 5 data rate: 2Mbps, 1Mbps, 500kbps, 125kbps.
- IEEE 802.15.4 Thread and Zigbee data rate: 250 Kbps
- 2.4 GHz proprietary data rate: 2 Mbps, 1 Mbps
- Serial Wire Debug (SWD)
- Nordic SoftDevice Ready
- Over-the-Air (OTA) firmware update
- Flash/RAM: 1MB/256KB.
- 48 General purpose I/O pins
- Integrated PCB trace antenna or u.FL connector

module	BT840F	BT840E	BT840X	BT840XE
SoC	nRF52840-QIAA	nRF52840-QIAA	nRF52840-QIAA	nRF52840-QIAA
Size	15x20.8x1.9mm	14x16x1.9mm	15x28.0x1.9mm	15x28.0x1.9mm
BT Antenna	PCB trace	ANT060	PCB trace + PA	PA+ANT000
Max TX includes antenna gain	+8.8dBm	+14.4 dBm	+22.6 dBm	+21.0 dBm
32.768 sleep crystal	External	External	Integrated	Integrated
BT range, 1 Mbps, LMPI	1000 meters		1170 meters	1170 meters
BT range, 1Mbps, 1.52m	390 meters		900 meters	1170 meters
BT range, 125 Kbps, LMPI.	2300 meters	3400 meters, est.	>4500 meters	>4500 meters
BT range, 125 kbps, 1.52m	640 meters		1240 meters	1920 meters
FCC ID	X8WBT840F	X8WBT840F	X8WBT840X	X8WBT840X
IC ID	4100A-BT840F	4100A-BT840F	4100A-BT840X	4100A-BT840X
CE	Certified	Certified	Certified	Certified
RCM	Certified	Certified	Certified	Certified
TELEC	201-190710/00	201-190710/00		
Availability	Production	Production	Production	Production

LEW840X, OpenSource Multiple Network Gateways

nRF5340 Bluetooth 5.2 Modules for Basic Edge Computing

Bluetooth 5.2 module supports Bluetooth 5.2, Thread, and Zigbee radio interfaces. One of Bluetooth 5.2 modules can be installed.

- BT40F, an nRF5340 module.
- BT40E, an nRF5340 module with an u.FL connector. BT40E is certified with ANT060, a 6dBi antenna for all regions. It has the best receiver sensitivities in the global market.

Nordic nRF5340 SoC has a dual core ARM Cortex™ M33 MCU. The application core ARM Cortex™ M33 can operate at 128 MHz. It has a Floating Point Unit (FPU) and hardware DSP instruction sets. Sensor data can be processed before sending to a cloud server. A 16 MB flash memory on the M.2 module provides local storage for sensor and control data.

Full product specifications of Nordic [nRF5340 SoC](#) and [BT40F](#) Series modules are available online.

Brief Specifications BT40F Series modules.

- nRF5340 QKAA, dual core ARM® Cortex M33
- Application Core
 - 128/64 MHz Cortex M33 with FPU and DSP instructions
 - 1MB flash, 512KB RAM
 - 8KB 2-way set associate cache
 - ARM® TrustZone® Cryptocell-312 co-processor
- Network core:
 - 64 MHz Cortex M33 with 2KB instruction cache
 - 256KB flash, 64KB RAM
 - 2.6 mA in RX and 3.2 mA in 0dBm TX
 - Receiver Sensitivity: -97.5 dBm at 1Mbps
 - TX power: programmable +3dBm to -20dBm
 - BLE 5.1 data rate: 2Mbps, 1Mbps, 500kbps, 125kbps.
 - IEEE 802.15.4 data rate: 250 Kbps
 - 2.4 GHz proprietary data rate: 2 Mbps, 1 Mbps
- Serial Wire Debug (SWD)
- Over-the-Air (OTA) firmware update

module	BT40F	BT40	BT40E
SoC	nRF5340 QKAA	nRF5340 QKAA	nRF5340 QKAA
Size	15x20.8x1.9mm	14x16x1.9mm	14x16x1.9mm
32 MHz and 32.768 kHz crystals	Integrated	Integrated	Integrated
DC converter inductors, VDD,VDDH	Integrated	Integrated	Integrated
BT Antenna	PCB trace	PCB trace	u.FL
Max TX	+3.41 dBm	+3.41 dBm	+3.41 dBm
Operating temp.	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C
FCC ID	X8WBT40F	X8WBT40F	X8WBT40F
ISED ID	4100A-BT40F	4100A-BT40F	4100A-BT40F
CE	Compliant	Compliant	Compliant
RCM	Compliant	Compliant	Compliant
TELEC	201-210217	201-210217	201-210217
Evaluation board	EV-BT40F	EV-BT40	EV-BT40E
Availability	Production	Production	Production

M2 Module:

There are a few M2 module designs. Size can be 22x42mm or 30x42mm.

- M262X840XE is a high TX power BLE-LoRa combo module. Both BLE and LoRa modules can be with Power Amplifier (PA). Module size is 30x42mm.
- M262833 is a low cost nRF52833 BLE 5.1 and LoRa combo module. Module size is 22x42mm.

M262X840XE Series High Power Bluetooth and LoRa Modules

The following table has a list of modules available in the M262X840XE high power Bluetooth and LoRa modules.

- Size of M262X840XE Series module is 30x42mm, for M.2 connector, B key.
- LoRa module LR62E is a Semtech SX1262 module.
- LR62XE is a Semtech SX1262 module with a Power Amplifier (PA).
- Bluetooth module manages LoRa module and must be on board.
- When an M262X840XE module is installed in the gateway, LN module must be without Bluetooth feature, LN60G or LN60E only,
- nRF52840 module can be BT840F, BT840E, BT840X, or BT840XE.
- nRF5340 module can be BT40F or BT40E. It is connected is a QSPI 16MB Flash memory on board.

M2 Module	LoRa module	BLE module	M262X840XE High Power Series
M262840F	LR62E	BT840F	LoRa - BLE module
M262840E	LR62E	BT840E	LoRa-BLE module, u.FL
M262840X	LR62E	BT840X	LoRa-BLE+PA module
M262840XE	LR62E	BT840XE	LoRa-BLE+PA module, u.FL
M262X840F	LR62XE	BT840F	LoRa+PA-BLE module
M262X840E	LR62XE	BT840E	LoRa+PA-BLE module, u.FL
M262X840X	LR62XE	BT840X	LoRa+PA-BLE+PA module
M262X840XE	LR62XE	BT840XE	LoRa+PA-BLE+PA module, u.FL

LR62E specifications:

- LR62E module with Semtech SX1262 transceiver and an u.FL connector.
- Max. TX power is +20.31 dBm (USA version) at 902 to 928 MHz.
- LoRa stacks for cloud connection are managed by a BT840F Series or a BT40F series module.

LR62XE specifications:

- LR62XE module with Semtech SX1262 transceiver, a power amplifier, and and.FL connector.
- Max. TX power is +29.22 dBm (USA version) at 902 to 928 MHz.
- LoRa stacks for cloud connection are managed by a BT840F Series or a BT40F series module.

LEW840X, OpenSource Multiple Network Gateways

M262833 Series Low Cost BLE 5.2 and LoRa Modules

M262833 integrates a low cost Nordic nRF52833 module, BM833 with LoRa module LR62E.

- Size of M26833 Series module is 22x42mm, for M.2 connector, B key.
- LoRa module LR62E is a Semtech SX1262 module.
- Bluetooth module manages LoRa module and must be on board.
- When an M262833 module is installed in the gateway, LN module must be without Bluetooth feature, LN60G or LN60E only,
- nRF52833 module can be BM833 or BM833E.

M2 Module	LoRa module	BLE module	M262833 Low Cost Series
M262833	LR62E	BM833	LoRa - BLE module
M262833E	LR62E	BM833E	LoRa-BLE module, u.FL

Full product specifications of [nRF52833](#) and [BM833](#) Series modules are available online.

Brief **BM833** specifications:

- Nordic nRF52833 with ARM Cortex M4F at 64 MHz, 512KB flash and 128KB RAM.
- Supported data rate:
 - ◆ BLE 5.2: 2Mbps, 1Mbps, 500kbps, 125kbps
 - ◆ IEEE 802.15.4-2006: 250 kbps
 - ◆ Proprietary 2.4 GHz: 2 Mbps, 1Mbps
- Angle-of-Arrival (AoA) and Angle-of-Departure (AoD) direction finding using Bluetooth.
- RSSI, 1 dB resolution
- Serial Wire Debug (SWD)
- NFC A tag for OOB pairing.
- Nordic SoftDevice Ready
- Over-the-Air (OTA) firmware update
- Secure boot ready
- USB2.0 full speed controller.
- 42 General purpose I/O pins
- 12 bit/200KSPS ADC, 8 configurable channels with programmable gain.
- 2X SPI Master/Slave (8Mbps)
- 4-channel pulse width modulator (PWM)
- Low power comparator
- 2-wire Master/Slave (I²C compatible)
- Digital microphone interface (PDM)
- UART (with CTS/RTS and DMA)
- 20 channel CPU independent Programmable Peripheral Interconnect (PPI).
- Quadrature Demodulator (QDEC)
- AES HW encryption
- 3 x 32 bit timer with counter mode
- 2x realtime counter
- SoC receiver Sensitivity: -97 dBm at 1Mbps; -104 dBm at 125 kbps
- SoC TX power: +/- 0 dBm; programmable 4 dBm to -20dBm in 4 dB steps.
- Operation voltage: 1.7V to 5.5V
- 4.6 mA peak current at RX or +0dBm TX.
- Integrated DC-DC converter.
- Embedded inductors for DCDC converter



module	BM833	BM833E
SoC	nRF52833 QIAA	nRF52833 QIAA
Flash/RAM	512KB/128KB	512KB/128KB
Size	10.2x15x1.9mm	10.2x15x1.9mm
GPIO		42
Operating temp.	-40°C to +105°C	-40°C to +105°C
Max. TX, FCC	+8.16 dBm	+8.16 dBm
Antenna	PCB trace	u.FL
Est. BLE Range	1400M at 125 Kbps	3400M at 125 Kbps
FCC ID	X8WBM833F	X8WBM833F
ISED	4100A-BM833F	4100A-BM833F
TELEC	201-19838/00	201-19838/00
CE, RCM	Certified	Certified
QDID		138767

LEW840X, OpenSource Multiple Network Gateways

Edge Computing

The nRF5340 SoC has a dual core Cortex M33 processor. The network processor is clocked at 64 MHz and is optimized for low power and efficiency (101 CoreMark/mA). It has 256 KB Flash and 64 KB RAM.

The application processor is optimized for performance and can be clocked at either 128 or 64 MHz, using voltage-frequency scaling. It has 1 MB Flash, 512 KB RAM, a floating-point unit (FPU), an 8 KB 2-way associative cache and DSP instruction capabilities.

Using Zephyr RTOS, it performs basic edge computing function before sending sensor data to a cloud server. An external 16 MB flash memory provides local storage of sensor and control data. It can reduce network traffic and in case of network failure, hold data till reconnection.

Power Supply and Power over Ethernet

- A gateway with PoE can be powered by a PoE switch from up to 328 feet or 100 meters away.
- Fanstel single line PoE power injector, POE048 can power a gateway from 100 meters or 328 feet away.
- An IP51 gateway can be Powered over Ethernet or by using a micro-USB AC adapter.
- There is no external access to micro USB connector for IP65 enclosure. The only power source is from the Ethernet cable.

Operating Temperature

- Operating temperature of gateway electronics is -40°C to +85°C.
- AC adapters have operating temperature range of 0°C to +40°C. This will limit operating temperature of gateway if an AC adapter is used.
- When an IP51 gateway is powered by an AC adapter (not included), operating temperature of AC adapter is the operating temperature of the gateway.
- When an IP51 gateway is powered over Ethernet, operating temperature of gateway is -40°C to +80°C. It is limited by the enclosure material.
- Operating temperature of the IP65 gateway is -40°C to +85°C.

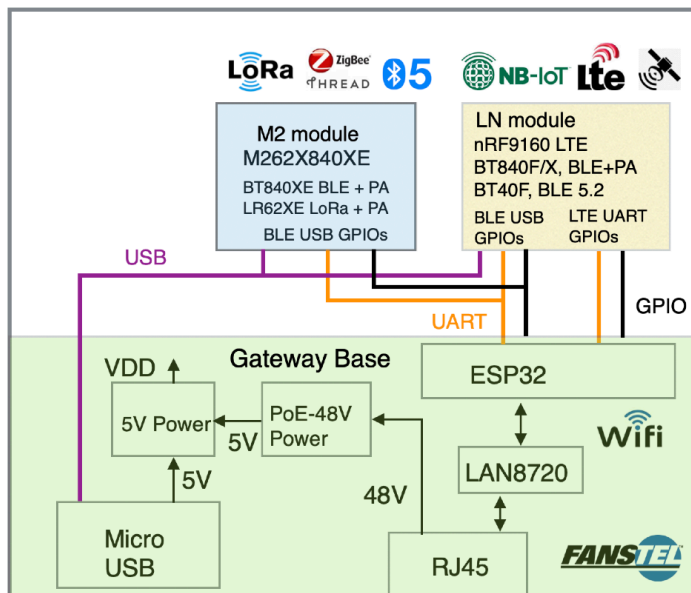
Ingress Protection IP65 and IP51

The second to the last character of gateway part number indicates the level of ingress protection. For example:

- LEW40E**5**P, the number **5** indicates this gateway has **IP51** ingress protection.
- LEW40E**6**P, the number **6** indicates this gateway has **IP65** ingress protection.

3. Hardware Description

The green shadow area is the gateway base. It has:



- An ESP32M16 WiFi module with 16MB flash memory as the main controller. It is connected to the LN module and the M2 module using UART interfaces
- A Microchip LAN8720 as the Ethernet PHY.
- A PoE power switch regulator with 5V DC output.
- A micro USB connector receiving 5V DC power. It also has USB data pin connection to Bluetooth module on either LN or M2 module.

LEW5P-3 Gateway Base

Features:

- LEW5P-3 has 3 mounting holes for 3 external antennas. SMA connectors are **not** pre-installed.
- External antenna is not included.
- A micro USB connector for an external micro USB, 5V power supply. Power supply is not included.
- The micro USB connector data pins are connected to the USB port of Bluetooth module on one of M.2 modules for monitoring during development.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector.
- Ethernet interface
- WiFi interface
- 2 M.2 connectors.
- Enclosure color: black
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +80°C when using PoE power.

LEW6P-3 IP65 Gateway Base

LEW6P-3 is an IP65 gateway base.

Features:

- LEW6P-3 has 3 mounting holes for external antennas. SMA connectors of three adapter cables are mounted.
- Includes IP67 antennas: ANT000 (BLE), ANT060P(BLE), ANT025P (LoRa), ANT032 (LTE)
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector.

LEW840X, OpenSource Multiple Network Gateways

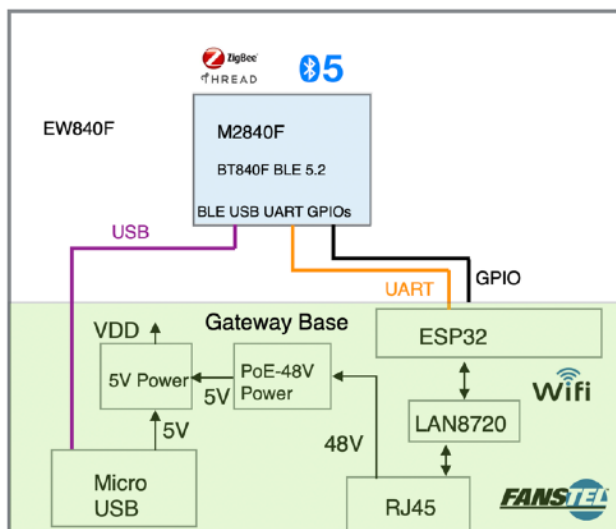
- Micro USB connector is inside the enclosure. Powered by an AC adapter is not possible.
- The micro USB connector data pins are connected to the USB port of Bluetooth module on one of M.2 modules for debugging during development.
- Ethernet interface
- WiFi interface
- 2 M.2 connectors.
- Enclosure color: yellow.
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +85°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

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EW840F5P, BLE to WiFi PoE Gateway

EW840F5P is a LEW5P-0 with a basic BLE module, M2840F installed.

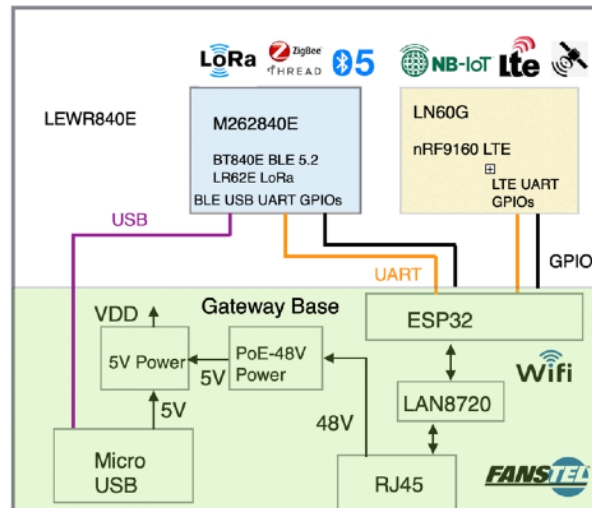


Features:

- LEW5P-0 base without a mounting hole for an external antenna.
- A micro USB connector for an external micro USB, 5V power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector.
- Ethernet interface
- WiFi interface
- **M2 Connector:** M280F with BT840F is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- **LN Connector:** Empty. Upgrade is not possible because of no external antenna mounting hole.
- Enclosure color: black
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +80°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

LEWR840E5P, BLE-LoRa to LTE, WiFi, PoE Gateway



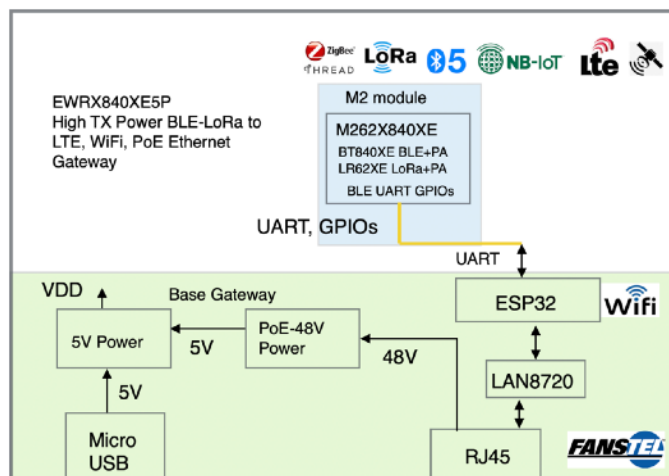
Features:

- LEW5P-3 base with three mounting holes for up to three external antennas.
- A micro USB connector for an external micro USB, 5V power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector. Ethernet interface
- WiFi interface
- **M2 Connector:** M262840E with BT840E BLE 5.2 module and LR62E LoRa module is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- Include an ANT060, a 6 dBi external BLE antenna.
- Includes an ANT025, a LoRa antenna.
- **LN Connector:** An LN60G LTE module is installed.
- A nano SIM card connector on LN60G module. SIM card is not included.
- Supports LTE-M and NB-IoT.
- Integrated GPS receiver amplifier and antenna.
- Enclosure color: black
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +80°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

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EWRX840XE5P, High Power BLE-LoRa to WiFi, PoE Gateway



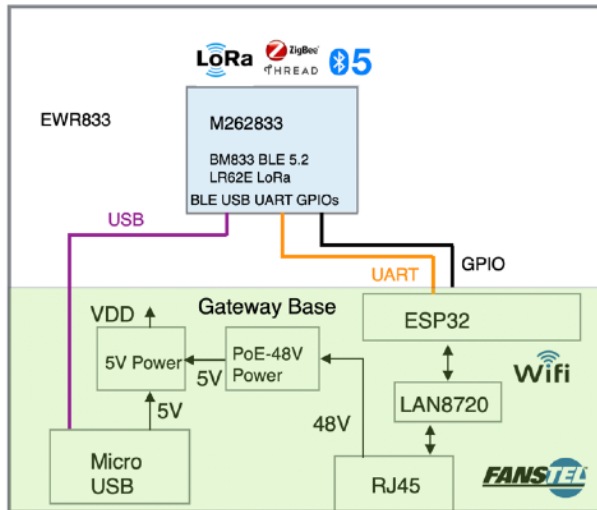
Features:

- LEW5P-3 base with three mounting holes for up to three external antennas.
- A micro USB connector for an external micro USB, 5V power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector. Ethernet interface
- WiFi interface
- **M2 Connector:** M262X840XE with BT840XE BLE 5.2 module with a PA and LR62XE LoRa module with a PA is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- Include an ANT000, a 0 dBi external BLE antenna.
- Includes an ANT015P, a LoRa antenna.
- **LN Connector:** Empty. Upgrade is possible by installing an LN60G or an LN60E LTE module.
- Enclosure color: black
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +80°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

Ver 1.00 Jan. 2023

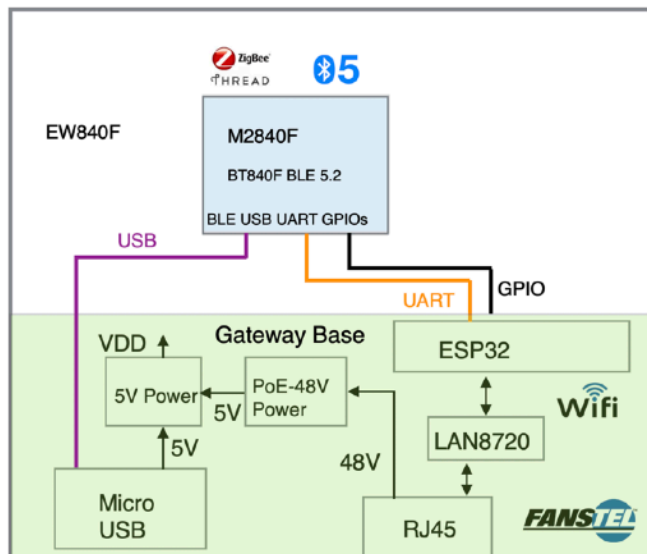
EWR8335P, Low Cost BLE-LoRa to WiFi, PoE Gateway



Features:

- LEW5P-3 base with three mounting holes for up to three external antennas.
- A micro USB connector for an external micro USB, 5V power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector.
- Ethernet interface
- WiFi interface
- **M2 Connector:** M262833 with BM833 BLE 5.2 module and LR62E LoRa module is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- Includes an ANT025, a LoRa antenna.
- **LN Connector:** Empty. Upgrade is possible by installing an LN60G or an LN60E LTE module.
- Enclosure color: black
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +80°C when using PoE power.

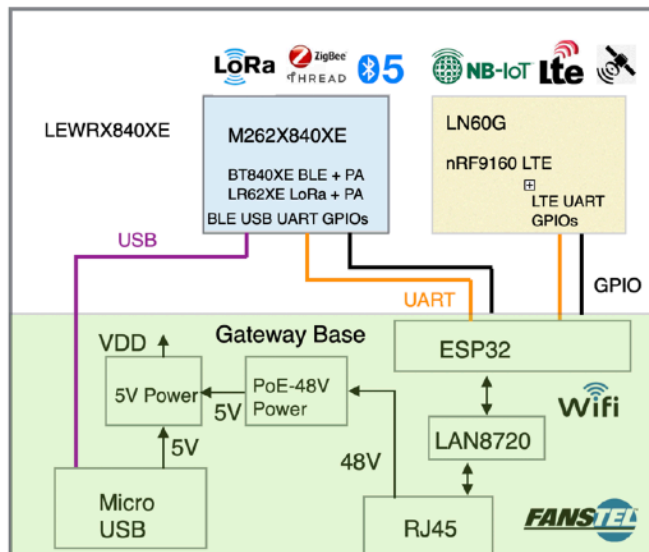
EW840F6P, IP65 BLE to WiFi, PoE Gateway



Features:

- LEW6P-0 base without a mounting hole for an external antenna.
- A barrel type DC jack for an external 48V DC power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector. Ethernet interface
- WiFi interface
- **M2 Connector:** M2840F with BT840F, BLE 5.2 module is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- **LN Connector:** Empty. Upgrade is not possible because of no mounting hole for an external antenna.
- Enclosure color: yellow.
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +85°C when using PoE power.

LEWRX840XE6P, IP65 High Power BLE-LoRa to LTE WiFi PoE Gateway



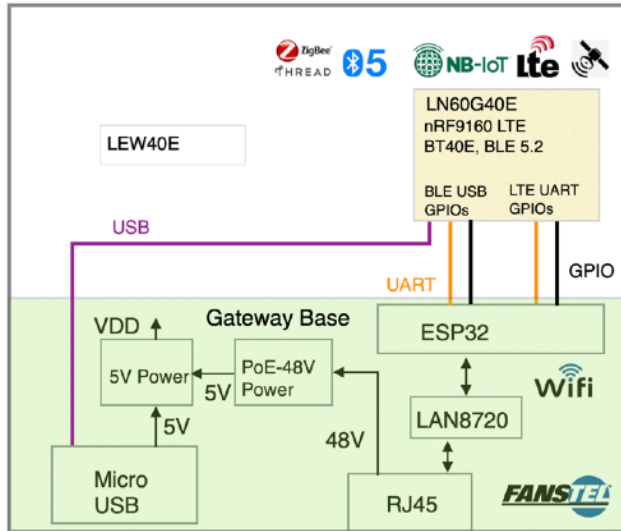
Features:

- LEW6P-3 base with three mounting holes for up to three external antennas.
- A barrel type DC jack for an external 48V DC power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector. Ethernet interface
- WiFi interface
- **M2 Connector:** M262X840XE with BT840XE BLE 5.2 module with a PA and LR62XE LoRa module with a PA is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- Include an ANT000, a 0 dBi external BLE antenna.
- Includes an ANT015P, a LoRa antenna.
- **LN Connector:** An LN60G LTE module is installed.
- A nano SIM card connector on LN60G module. SIM card is not included.
- Supports LTE-M and NB-IoT.
- Integrated GPS receiver amplifier and antenna.
- Enclosure color: yellow.
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +85°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

Ver 1.00 Jan. 2023

LEW40E6P, IP65 BLE to LTE, WiFi, PoE Gateway



Features:

- LEW6P-3 base with three mounting holes for up to three external antennas.
- A barrel type DC jack for an external 48V DC power supply. Power supply is not included.
- Powered by an PoE (Power-over-Ethernet) switch, or by a POE048, a single line PoE power injector. Ethernet interface
- WiFi interface
- **M2 Connector**: M240E with BT40E, nRF5340, dual core Cortex M33, BLE 5.2 module is installed.
- Supports BLE 5.2, Thread, and Zigbee radio interfaces.
- Include an ???, a ??? dBi external BLE antenna.
- **LN Connector**: An LN60E LTE module is installed.
- A nano SIM card connector on LN60E module. SIM card is not included.
- Supports LTE-M and NB-IoT.
- Needs an external GPS antenna with amplifier, not included.
- Enclosure color: yellow.
- Enclosure size: 107x141x40mm
- Gateway can be desk, wall, ceiling, or pole mounted.
- Includes a piece of 2-sided type for mounting.
- Operating temperature: -40°C to +85°C when using PoE power.

LEW840X, OpenSource Multiple Network Gateways

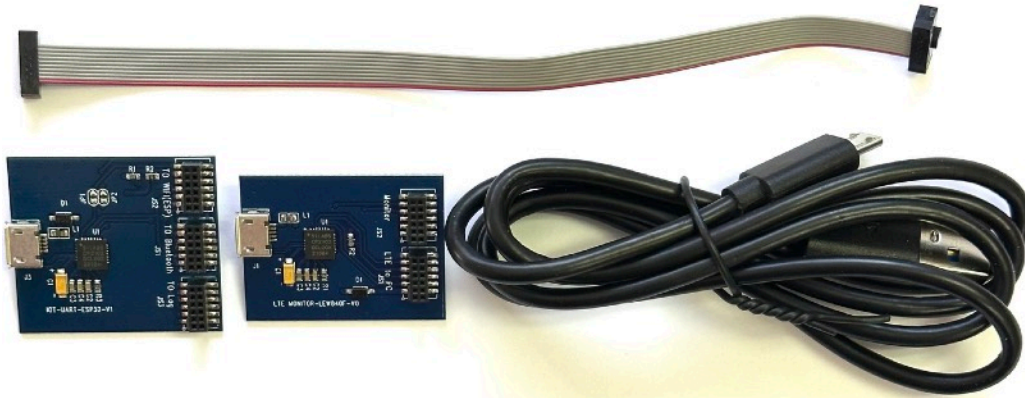
Private Label and Custom Hardware

Logo and button names are printed on a membrane. They can be customized with 1000 pcs MOQ.

Custom enclosure design and electronic hardware are available. Please contact [Fanstel](#).

PK-LEW840X Programming Kit

To load firmware into LEW840X Series gateway, a Programming Kit PK-LEW840X is required.



In addition, you need the following hardware:

- nRF52840-DK, Development Kit for nRF52840 modules.
- nRF5340-DK, Development Kit for nRF5340 modules.
- nRF9160-DK if you have LTE interface

LEW840X, OpenSource Multiple Network Gateways

4. Firmware Development and Programming

LEW840X gateways is pre-loaded with WiFi+Ethernet+LTE M (Optional) demonstration codes.

When connected to internet, LEW840X gateway sends temperature and humidity sensor data to Fanstel MQTT server. You can use Fanstel MQTT PC tool or mobile APP to monitor data.

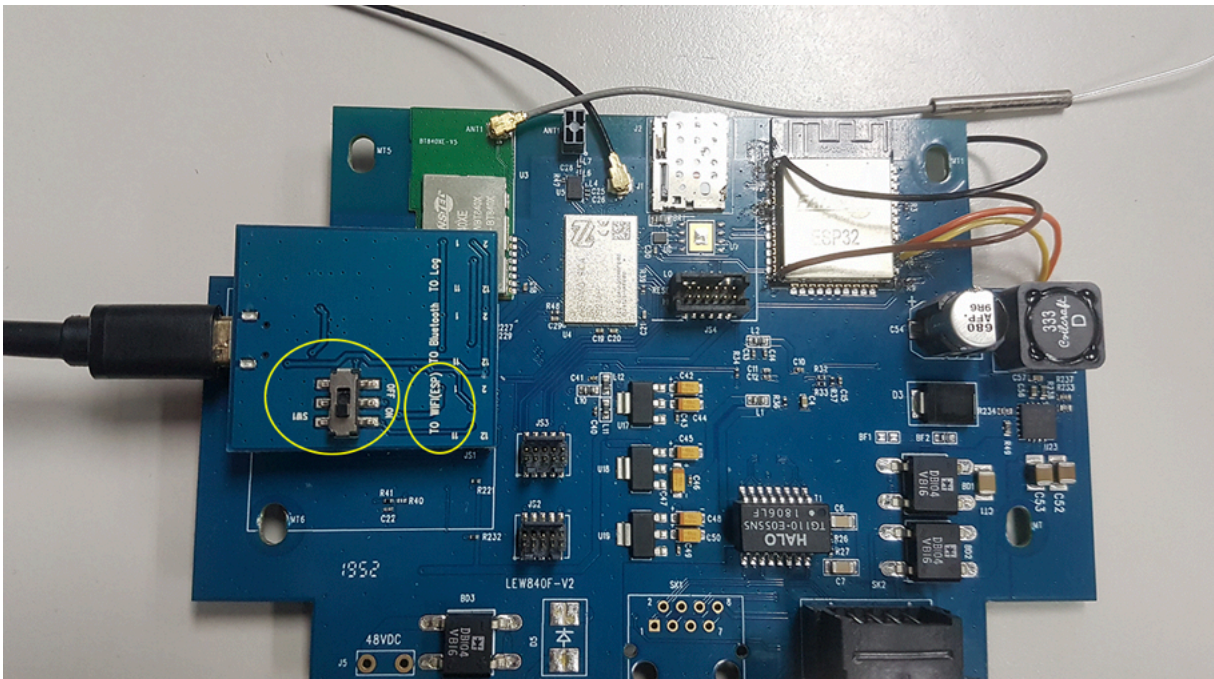
MQTT tool or MQTT APP<->MQTT broker <->LEW840F<->BLE Sensor

It is easier to test gateway and load firmware by removing gateway PCBA from enclosure.

Ethernet and WiFi

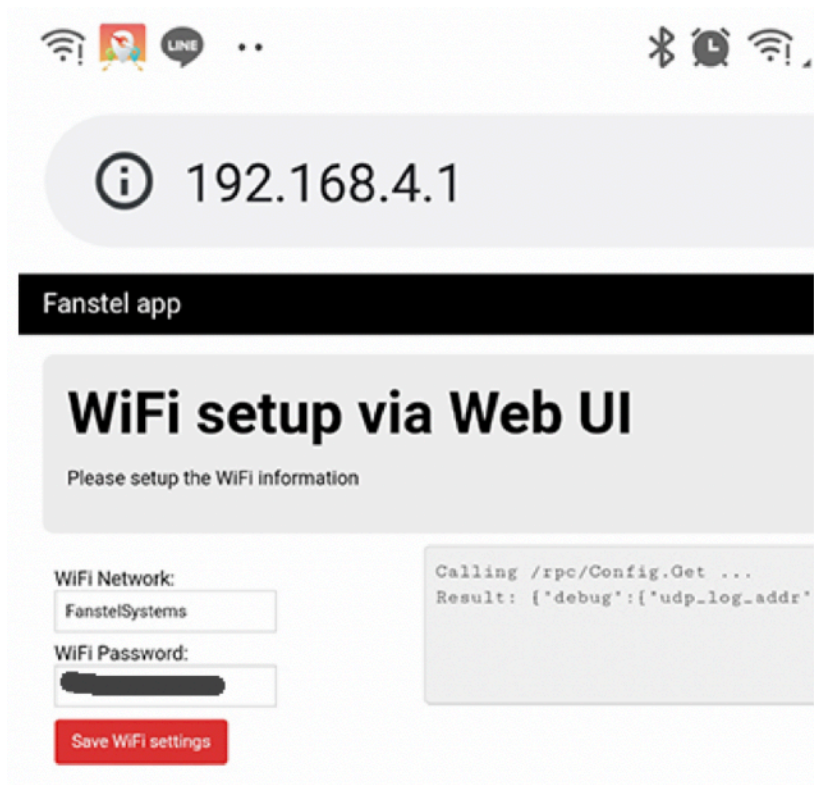
Check the Ethernet.

- Connect UART_Bridge Board "TO WIFI(ESP)" into the JS1 of LEW840X PCBA.
- Make sure the switch on Bridge board is turn off.
- Connect micro USB to PC and open the terminal tool.



LEW840X, OpenSource Multiple Network Gateways

Setup the SSID and password for your router.



LEW840X, OpenSource Multiple Network Gateways

Check the log.

The WiFi should be got ID and connected.

```
(1219) wifi: pm source type: 0<LF>
<LF>
mgos_aws_shadow.c:571 MQTT is not configured for AWS, not initialising shadow<LF>
mgos_mongoose.c:66 New heap free LWM: 49080<LF>
mgos_ota_core.c:1308 UID: 0fdc9367f3c35a3a, license: none<LF>
esp32_bt_gap.c:100 BT device name esp32_ED5509, addr 64:c3:47:68:ef:6e,2<LF>
esp32_bt_gatts.c:394 Starting BT service 5f6d4f53-5f44-4247-5f53-56435f49445f<LF>
esp32_bt_gap.c:280 BLE advertising started<LF>
esp32_bt_gatts.c:394 Starting BT service 5f6d4f53-5f52-5043-5f53-56435f49445f<LF>
mgos_wifi.c:136 WiFi STA: Connected, BSSID 00:1e:58:36:e3:c3 ch 4 RSSI -42<LF>
mgos_net.c:85 WiFi STA: connecting<LF>
== Net event: 1313166337 WiFi CONNECTING <LF>
mgos_provision_state:18 Current State: 0 -> 1<LF>
mgos_provision_state:72 Setting provisioning timeout for 300 seconds<LF>
mgos_net.c:89 WiFi STA: connected<LF>
== Net event: 1313166338 WiFi CONNECTED <LF>
<ESC>+[0;32mI (2579) event: sta ip: 192.168.0.189, mask: 255.255.255.0, gw: 192.168.0.1<ESC>+[0m<LF>
mgos_net.c:101 WiFi STA: ready, IP 192.168.0.189, GW 192.168.0.1, DNS 192.168.0.1<LF>
== Net event: 1313166339 WiFi GOT_IP <LF>
mgos_provision_state:18 Current State: 1 -> 0<LF>
esp32_bt.c:82 Network is up, disabling Bluetooth<LF>
mgos_sys_config.c:174 Saved to conf9.json<LF>
mgos_mqtt.c:427 MQTT connecting to 59.124.228.194:1883<LF>
mgos_mqtt.c:141 MQTT TCP connect ok (0)<LF>
mgos_mqtt.c:182 MQTT CONNACK 0<LF>
online =true <LF>
```

Check MQTT

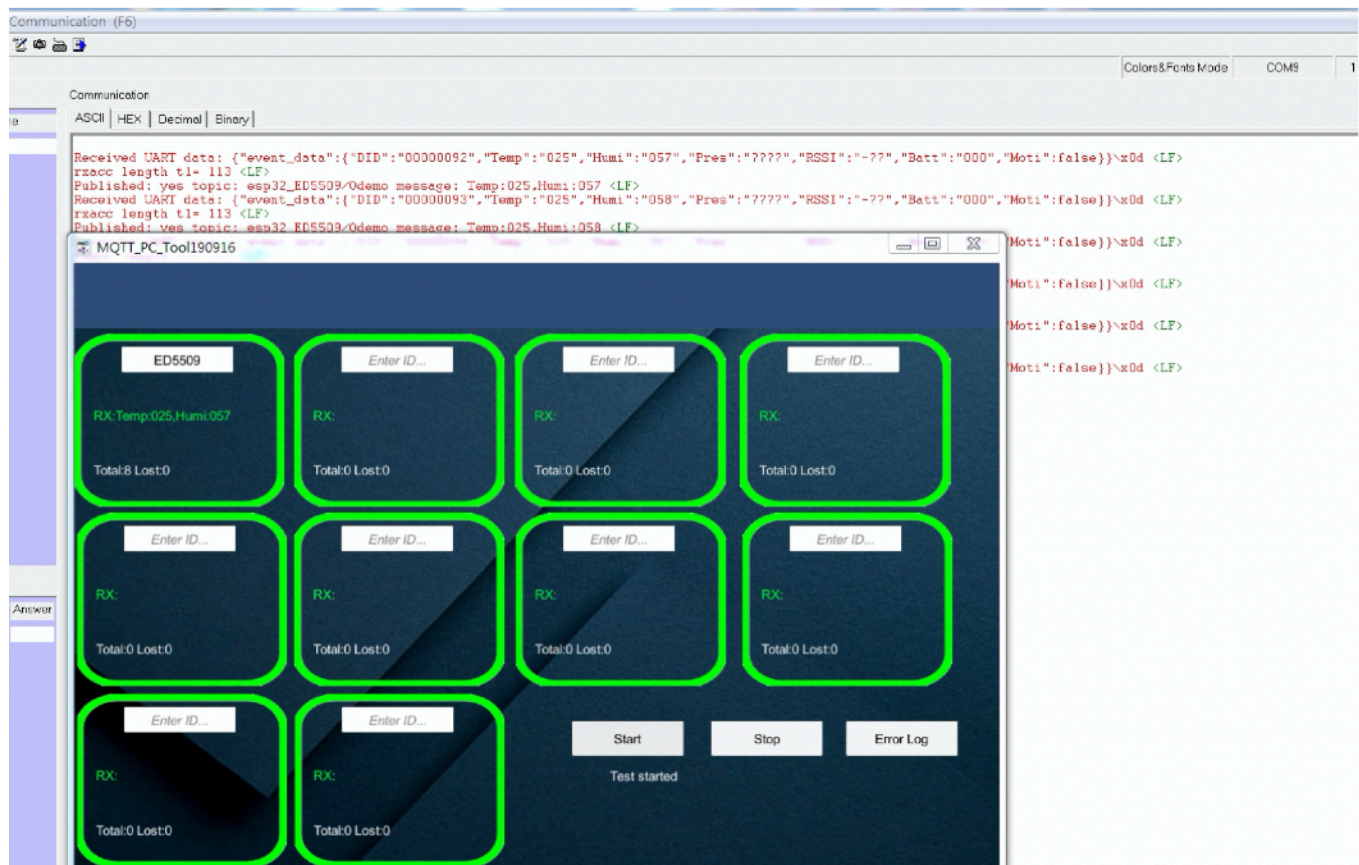
Connect UART_Bridge Board "To Log" into the JS1.

Open the MQTT PC tool and type the ID.

The ID is esp32_XXXXXX and same as AP name.

You should able see the ID in the log.

The temperature and humidity was send to MQTT broker and publish to PC tool.



Build and programming ESP32 firmware.
 Open mos.yml in folder mqtt_sensorWiFi_Ethernet_esp32
 Change the SSID and password to match your router.
 - ["wifi.sta.ssid", "FanstelSystems"]
 - ["wifi.sta.pass", "1234567890"]
 Save the file and go to command line tool.
 use command "mos build - -platform esp32"

```
C:\mos\mqtt_sensorWiFi_Ethernet_esp32>mos build --platform esp32
Connecting to https://mongoose.cloud, user test
Uploading sources (17866 bytes)
Firmware saved to C:\mos\mqtt_sensorWiFi_Ethernet_esp32\build\fw.zip
```


LEW840X, OpenSource Multiple Network Gateways

Programming the ESP32.

Connect UART_Bridge Board "TO WIFI(ESP)" into the JS1.

Make sure the switch on Bridge board is turn on.

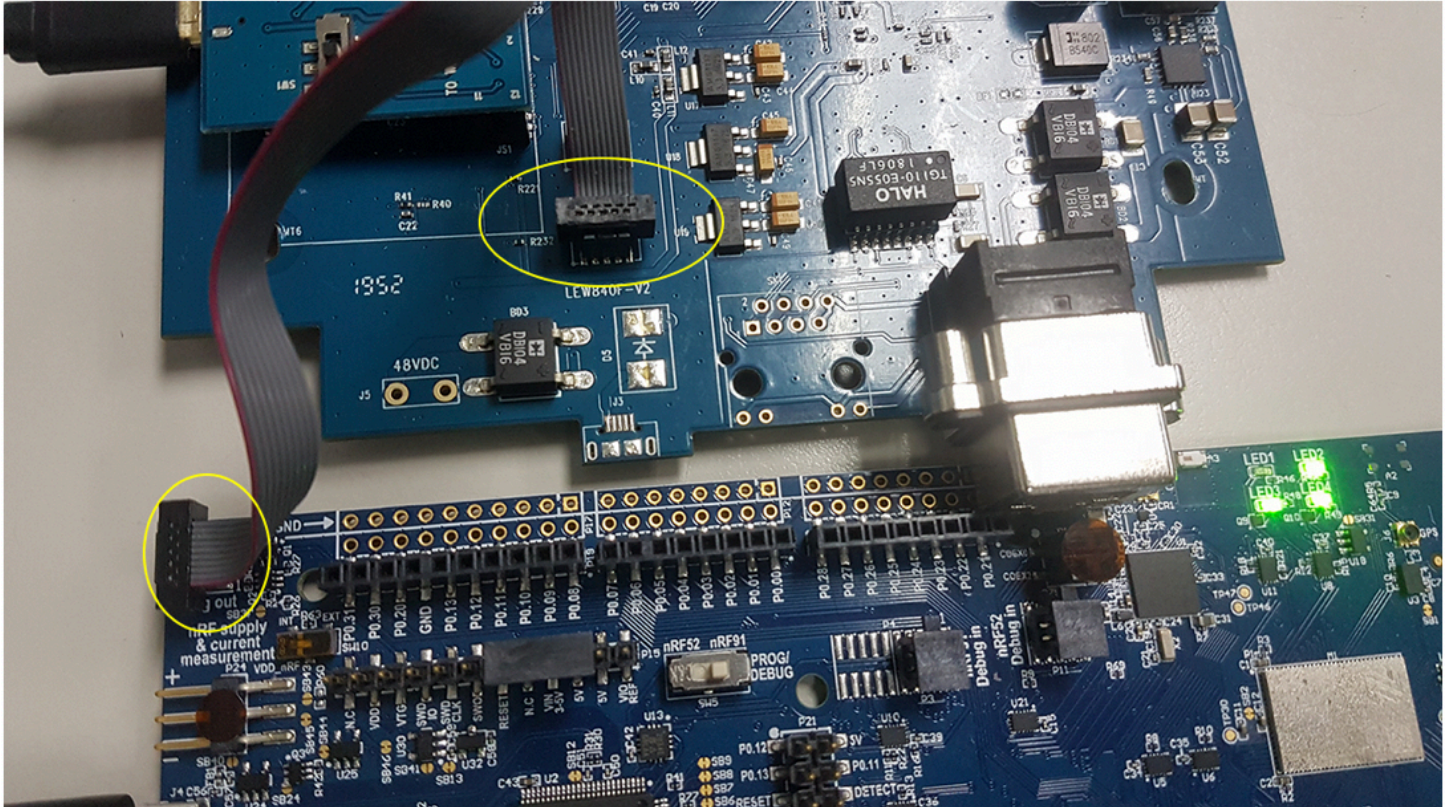
Type command "mos flash - -port COM9"

The port number is up to your PC.

```
C:\mos\mqtt_sensorWiFi_Ethernet_esp32>mos flash --port COM9
Loaded mqtt_sensorWiFi_Ethernet_esp32/esp32 version 1.0 (20190916-061723)
Opening COM9 @ 115200...
Connecting to ESP32 ROM, attempt 1 of 10...
  Connected, chip: ESP32D0WDQ6 R1
Running flasher @ 921600...
  Flasher is running
Flash size: 16777216, params: 0x024f (dio,128m,80m)
Flash encryption: disabled, scheme: None
Secure boot: disabled
Deduping...
  22848 @ 0x1000 -> 0
  3072 @ 0x8000 -> 0
  16384 @ 0x9000 -> 12288
  8192 @ 0xd000 -> 0
  1559408 @ 0x10000 -> 0
  262144 @ 0x190000 -> 110592
Writing...
  12288 @ 0x9000
  12288 @ 0x190000
  4096 @ 0x194000
  8192 @ 0x19a000
  8192 @ 0x1ae000
  16384 @ 0x1b5000
  61440 @ 0x1ba000
Wrote 122880 bytes in 1.58 seconds (609.14 KBit/sec)
Verifying...
  22848 @ 0x1000
  3072 @ 0x8000
  16384 @ 0x9000
  8192 @ 0xd000
  1559408 @ 0x10000
  262144 @ 0x190000
Booting firmware...
All done!
```

Programming the nRF52840 Module.

Connected nRF52840DK or nRF9160DK Debug out to LEW840F JS2. If an nRF9160DK is used, set PROG/DEBUG switch to nRF52.



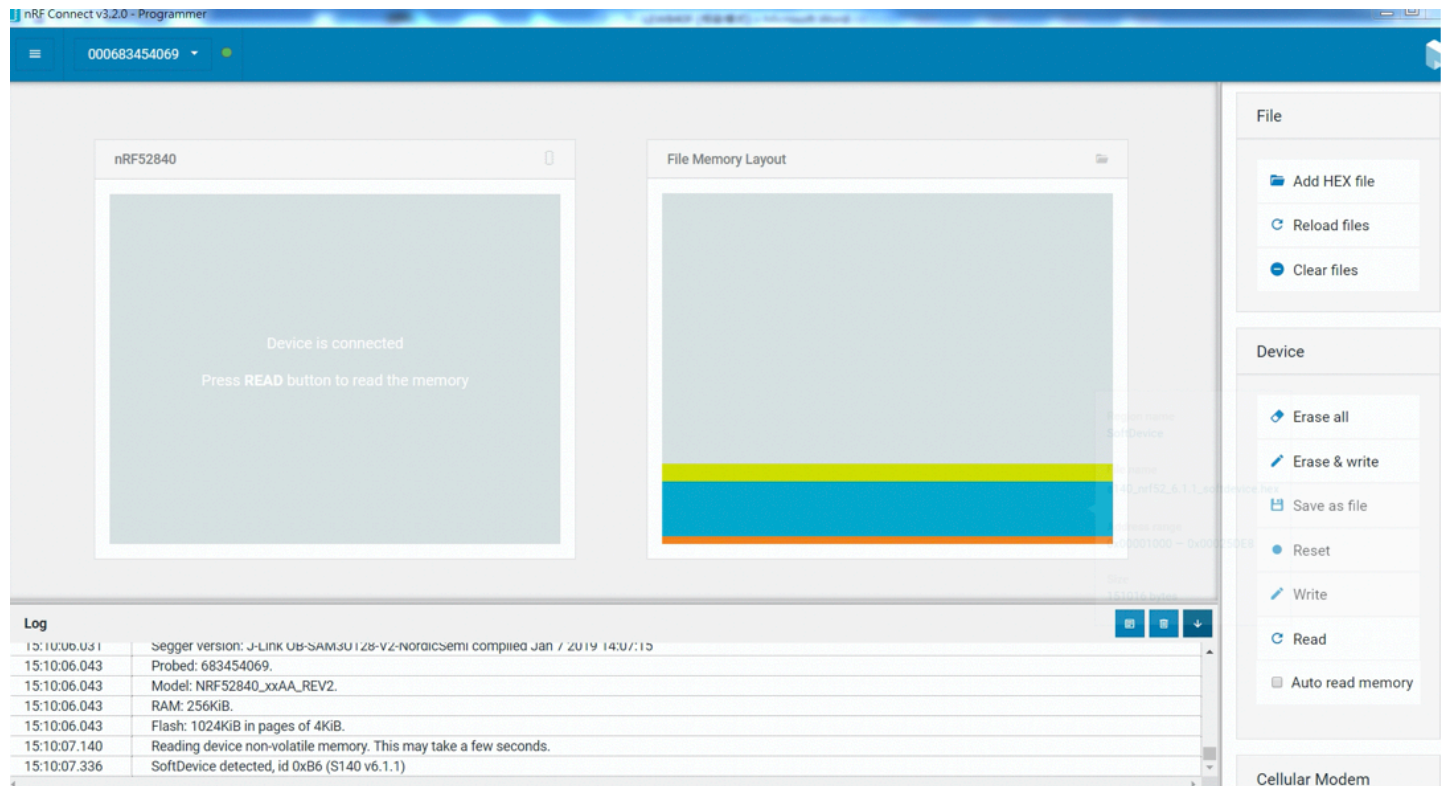
Download and install Nrf5x-Command-Line Tools

<https://www.nordicsemi.com/Software-and-Tools/Development-Tools/nRF5-Command-Line-Tools>

Download the nRF Connect desk top version

<https://www.nordicsemi.com/Software-and-Tools/Development-Tools/nRF-Connect-for-desktop>

Open nRF connect /programmer and load the softdevice and application.
Erase and write.



Nordic Development Environment

Nordic Semiconductor provides a complete range of hardware and software development tools for the nRF52 Series devices. nRF52840 DK board is recommended for firmware development. Document and Software development tools can be downloaded by the following links.

Get start with Nordic chip and all online documents.

http://infocenter.nordicsemi.com/index.jsp?topic=/com.nordic.infocenter.nrf52/dita/nrf52/development/nrf52_dev_kit.html&cp=1_1

Nordic SDK with many example projects.

https://developer.nordicsemi.com/nRF5_SDK/

Nordic development zone. You can search or ask a question there.

<https://devzone.nordicsemi.com/tutorials/b/getting-started/posts/development-with-gcc-and-eclipse>

Programming the Nordic chip

Download and install Nrf5x-Command-Line Tools

<https://www.nordicsemi.com/eng/nordic/Products/nRF52840/nRF5x-Command-Line-Tools-Win32/58850>

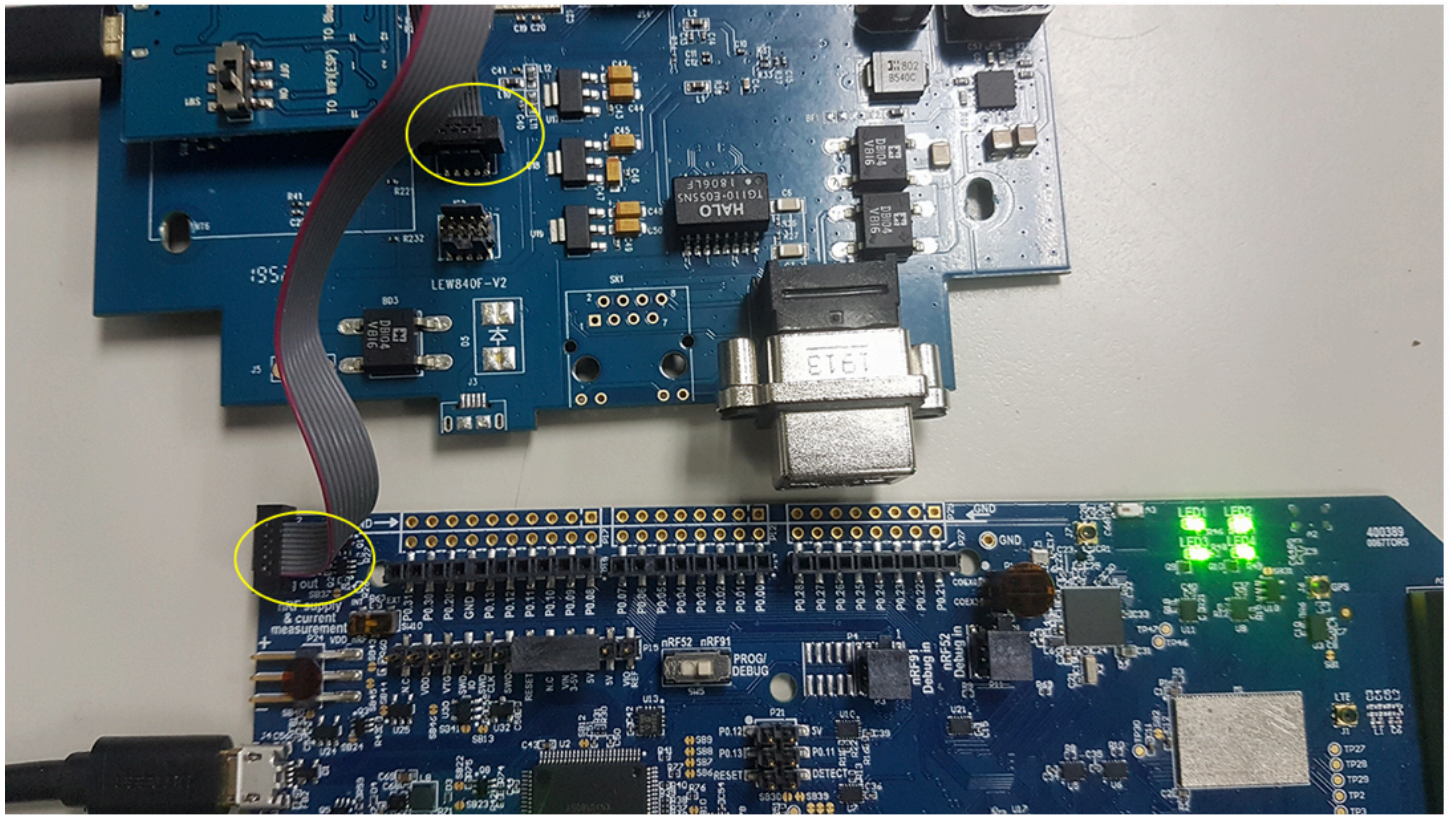
LEW840X, OpenSource Multiple Network Gateways

Download and install nRF Connect

https://www.nordicsemi.com/?sc_itemid={B935528E-8BFA-42D9-8BB5-83E2A5E1FF5C}

Programming the nRF9160 Module

Connected nRF9160 DK debug out to LEW840F JS3



Open nRF connect /programmer and load the softdevice and application.

Erase and write.

The MQTT ID for nRF9160 is always started at "91".

LEW840X, OpenSource Multiple Network Gateways

For example the ESP32 ID is 6CA674
The Nrf9160 ID is 91A674.



Arduino ESP32 driver

<https://github.com/espressif/arduino-esp32/blob/master/docs/arduino-ide/windows.md>

Mongoose quick start guide.

<https://mongoose-os.com/docs/mongoose-os/quickstart/setup.md>

<https://mongoose-os.com/docs/mongoose-os/quickstart/develop-in-c.md>

Mongoose forum

<https://community.mongoose-os.com/>

Nordic online document.

https://infocenter.nordicsemi.com/index.jsp?topic=/com.nordic.infocenter.nrf52/dita/nrf52/development/nrf52_dev_kit.html&cp=1_1

Nordic SDK

https://developer.nordicsemi.com/nRF5_SDK/nRF5_SDK_v15.x.x/

Nordic development zone

<https://devzone.nordicsemi.com/>

All pre-loaded and test tools .

<https://www.dropbox.com/sh/i5i3iluw2mkexs7/AADYfNmQ2eC7gmI3f7gU6Npla?dl=0>

LEW840X, OpenSource Multiple Network Gateways

Revision History

- Jan. 2020, Ver. 0.10: Initial draft release
- Feb. 2020, Ver. 0.20: Add draft programming information
- Mar. 2020, Ver 0.21: Update sample stock table
- Feb. 2021, Ver. 0.90: Hardware revision to use M.2 modules.
- May 2021, Ver. 0.92: Draft revision.
- June 2021, Ver. 0.93: Draft revision.
- Oct. 2021, Ver. 0.94: Draft revision.
- Aug. 2022, Ver. 0.97: Draft revision.
- Jan. 2023, Ver. 1.00: Add FCC and ISED certifications. Initial release.

LEW840X, OpenSource Multiple Network Gateways

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