embedded
systems

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LogicMachine5 IoT Edge Outdoor

LogicMachine (LM) is your easiest way to program complex logic in KNX, Modbus, BACnet, LoRa and other networks. LM will enable you to efficiently customize building automation processes, easily delivering unlimited flexibility benefit to end users in a cost-effective way.

LM-IoT-Edge is an embedded platform with integrated Ethernet, 4G, Serial interfaces, CAN FT. It is designed to act as a central hub for information gathering from wireless and wired media and send it into the cloud via 4G network. Scripting templates provides user-friendly, flexible configuration interface and integration with cloud/web services, 3rd party devices. LogicMachine application store and external app development possibility allows to extend device functionality and adjust to a specific market segment.

ENG - Data sheet
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www.logicmachine.net

Application

- LTE gateway for Internet access
- Wireless and wired data hub
- Logical functions
- WEB SCADA visualization for PC and touch-devices
- cross-standard gateway
- integration with third party devices over RS485 serial port, Ethernet – AV, IR, HVAC
- Data logger with trends
- Presence monitoring
- Lighting regulation
- Universal controller (lighting, shutter etc.)
- Health/activity monitoring
- Internet-of-Things
- Cloud server/client
- Energy metering
- Tracking
- …
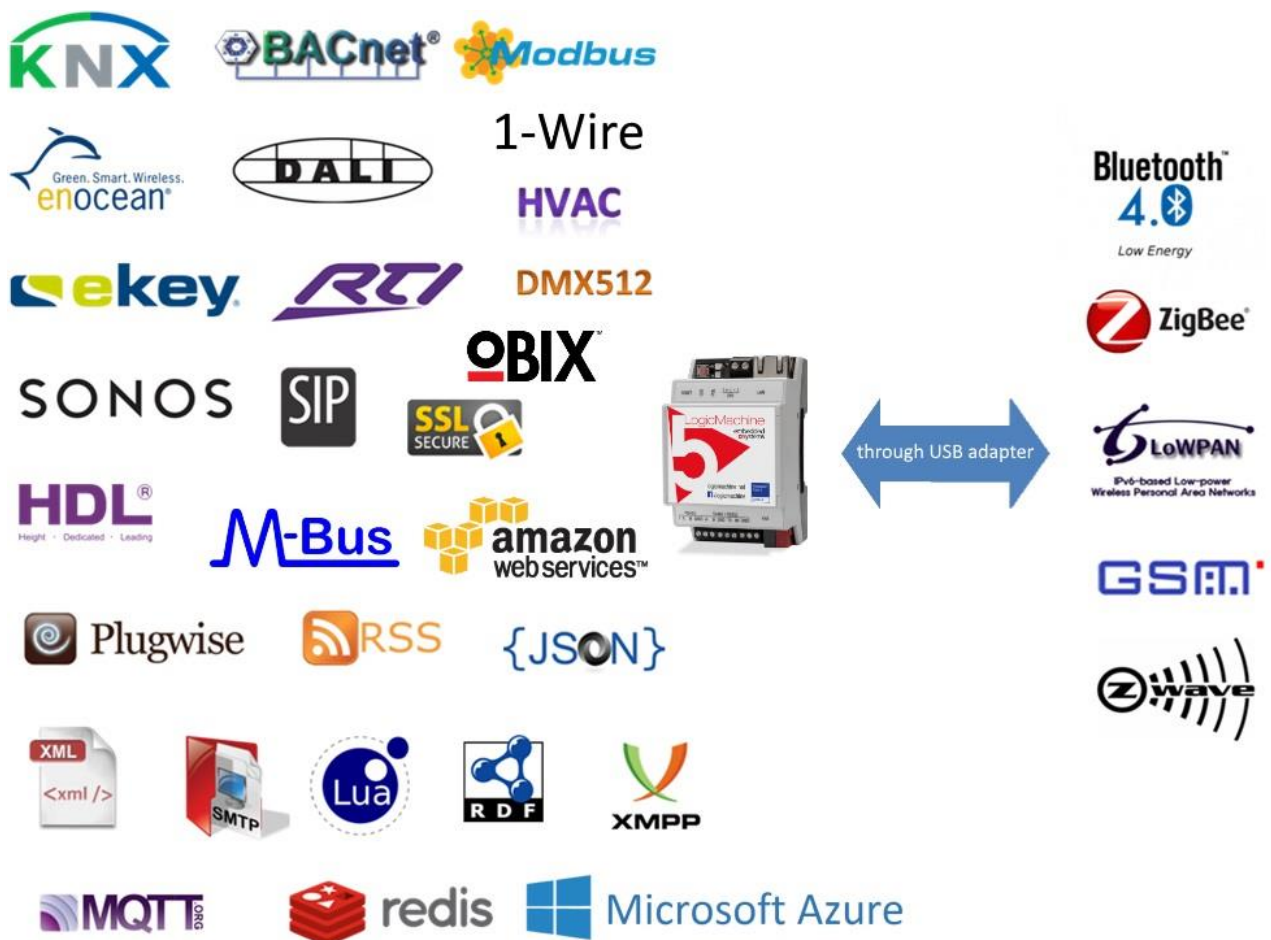
Types of product	
LM-IoT-Edge	LogicMachine IoT Edge Outdoor
LM-IoT-EdgeD	LogicMachine IoT Edge Outdoor Debian
Technical data	
Power supply	12-24V DC over Passive PoE (power adapter included)
Power consumption	1.3 W
DC overvoltage protection:	50 V
Wrong wiring polarity protection	Yes
Interfaces and operating elements	
4G module with antenna	1
RS485	1
CAN FT	1
LED	1 – CPU load, 1 - Error
Programming/reset button	1
4G modem specification	
Simcom A7670E modem	1
Frequencies	Please see table below
LoRa specification	
Power on transmitter	1.6-50 mW (software adjustable)
Frequency range	433-434,750 MHz
Channel bandwidth	125 / 250 / 500 kHz
Carrier frequency step	125 kHz
Spreading factor	7-12
Clamps and enclosure	
CAN FT Terminal	5 mm2
RS485	5 mm2
Color	Black
Dimensions	164(W)x186(H)x64(L) mm
Protection	IP67 according to EN 60529
Usage temperature	-25C … +55C
Storage temperature	-40C … +70C
Net weight	400 g
Gross weight	450g
Standards and norms compliance	
CE conformity	EMBS-CE-190223/13 Electromagnetic compatibility
EMC	EN61000-6-1, EN61000-6-3

Frequency bands

| Standard	Frequency	A7670C	A7670E	A7670SA
GSM	GSM850MHz			✓
	EGSM900MHz	✓	✓	✓
	DCS1800MHz	✓	✓	✓
	PCS1900MHz			✓
LTE-FDD	LTE-FDD B1	✓	✓	✓
	LTE-FDD B2			✓
	LTE-FDD B3	✓	✓	✓
	LTE-FDD B4			✓
	LTE-FDD B5	✓	✓	✓
	LTE-FDD B7		✓	✓
	LTE-FDD B8	✓	✓	✓
	LTE-FDD B20		✓	
	LTE-FDD B28			✓
	LTE-FDD B66			✓
LTE-TDD	LTE TDD B34	✓		
	LTE TDD B38	✓		
	LTE TDD B39	✓		
	LTE TDD B40	✓		
	LTE TDD B41	✓		
Category		CAT1	CAT1	CAT1

⚠️ **Caution**
Security advice

The installation and assembly of electrical equipment may only be performed by skilled electrician. The devices must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with application that can result danger of people, animals or real value

Electrical connection

The devices are constructed for the operation of protective low voltage (SELV). Grounding of device is not needed. When switching the power supply on or off, power surges must be avoided.
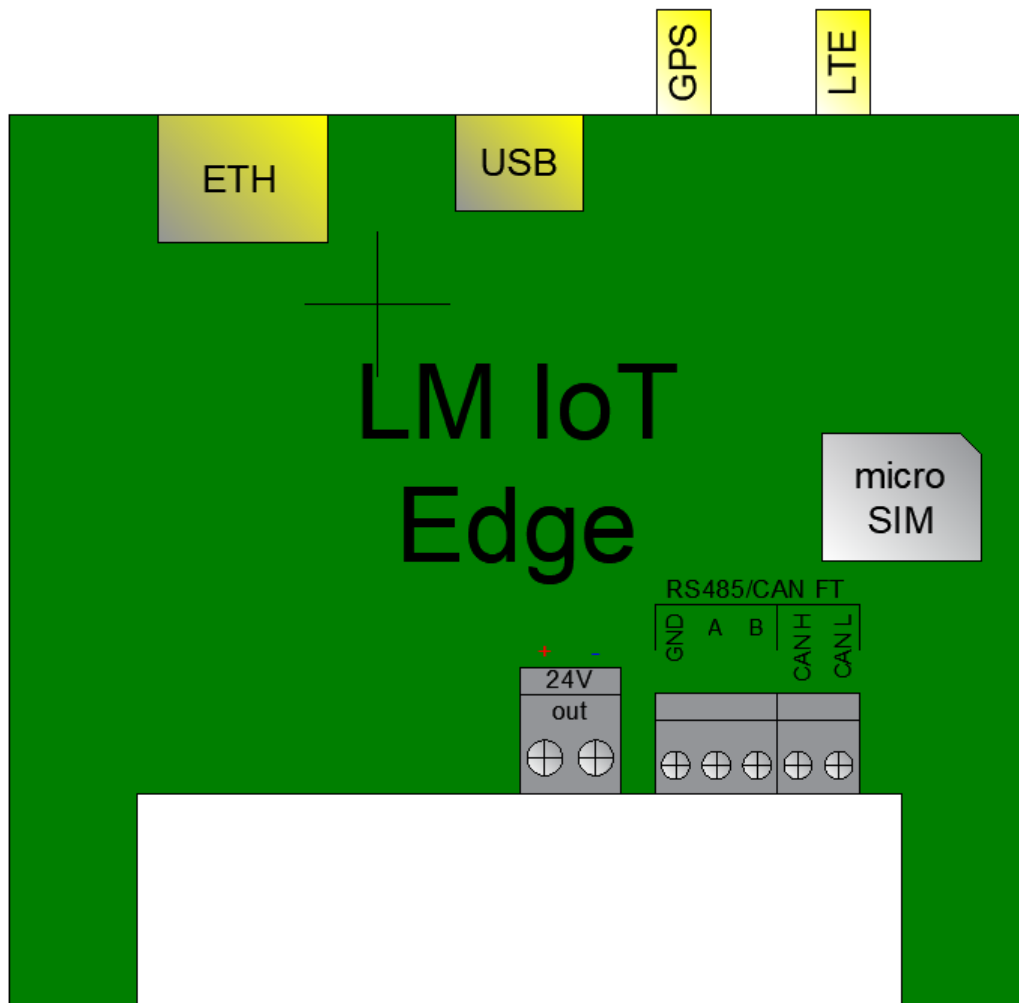
Default IP configuration of the LM software

Login name	admin
Password	admin
IP address	192.168.0.10
Network mask	255.255.255.0

Default IP configuration of the Debian

Login name Mosaic	admin
Password Mosaic	admin
SSH login	root
SSH password	admin
IP address	192.168.1.50
Network mask	255.255.255.0

Reset device

You can either reboot the device by pressing RESET button or reset the configuration to factory defaults:

- *Press and hold for <10 sec* – reboot the device
- *Press and hold for >10 sec* – reset networking with IP to factory default
- *Press and hold for >10 sec and again press and hold for >10 sec* – full reset of configuration to factory defaults

Adjust APN settings on Debian

```
root@imx6-buster:/etc/chatscripts# cat 3g.chat
ABORT    BUSY
ABORT    'NO CARRIER'
ABORT    ERROR
REPORT   CONNECT
TIMEOUT  10
""       "AT&F"
OK       "ATE1"
OK       'AT+CGDCONT=1,"IP","iot.1nce.net"'
SAY      "Calling UMTS/GPRS"
TIMEOUT  30
OK       "ATD*99***1#"
CONNECT  ' '
```

Use **ip addr** to see if the connection is successful to 3G network

```
root@imx6-buster:~# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
2: can0: <NOARP,ECHO> mtu 16 qdisc noop state DOWN group default qlen 10
    link/can
3: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:1b:c5:00:42:22 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.50/24 brd 192.168.1.255 scope global eth0
       valid_lft forever preferred_lft forever
4: ppp0: <POINTOPOINT,MULTICAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN group default qlen 3
    link/ppp
    inet 100.114.120.3 peer 10.64.64.64/32 scope global ppp0
       valid_lft forever preferred_lft forever
root@imx6-buster:~#
```

Use this init procedure to power up the modem:
echo 8 > /sys/class/gpio/export
echo 71 > /sys/class/gpio/export

echo high > /sys/class/gpio/gpio8/direction

sleep 1
echo low > /sys/class/gpio/gpio8/direction

echo high > /sys/class/gpio/gpio71/direction

After a short while several ttyUSB* interfaces will appear in the system. ttyUSB2 is for AT commands and ttyUSB3 is the point-to-point interface.

GPS antenna

GPS can be used for time synchronization. You can install gpsd and configure it to use the ttyUSB1 port. Then ntpd can use GPS data as a time source.

Base board IO connections

24V		RS485			CAN/FT	
+	-	GND	A	B	H	L

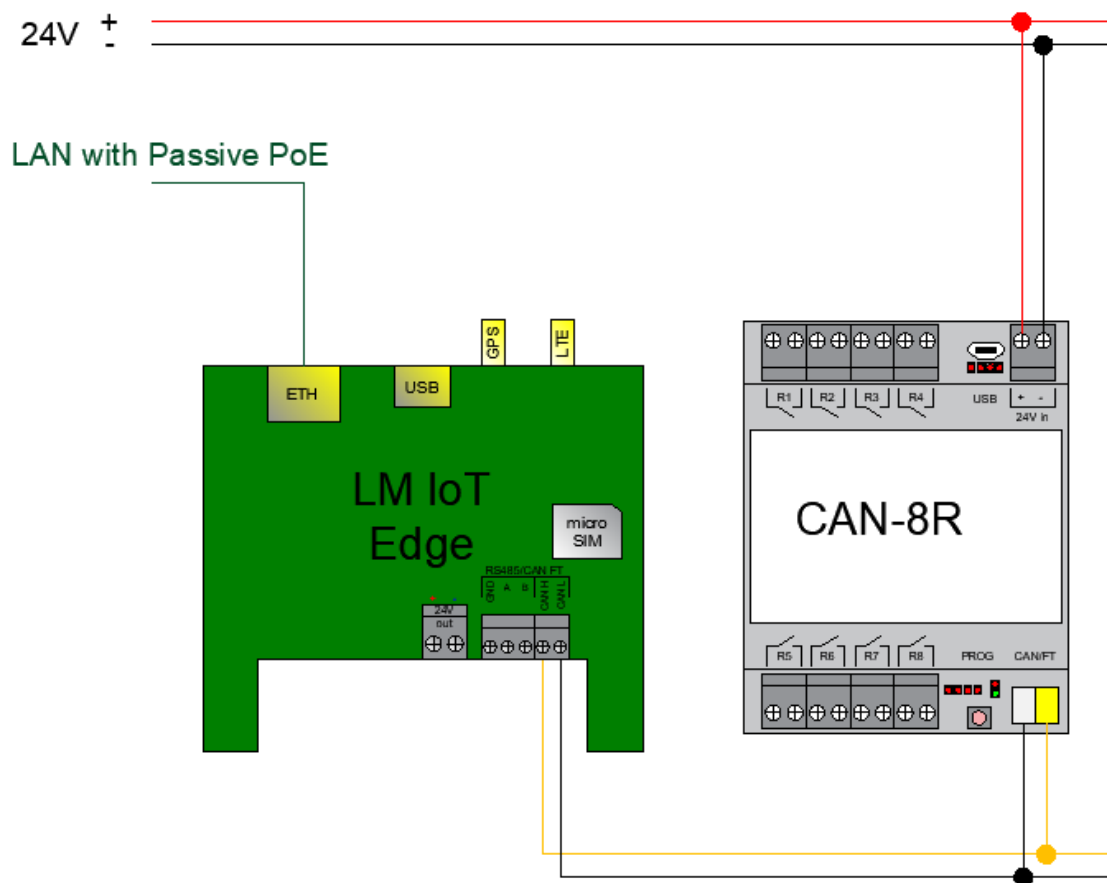# Connection diagrams

Power over Passive PoE.

Please note that there are two PoE types of PoE switches/adapters – passive and active (802.3af). In passive mode 4 Ethernet cable wires are used for data and 4 are used for power. In active PoE mode data and power goes together.

NB! when using active PoE 48V the product will be damaged!
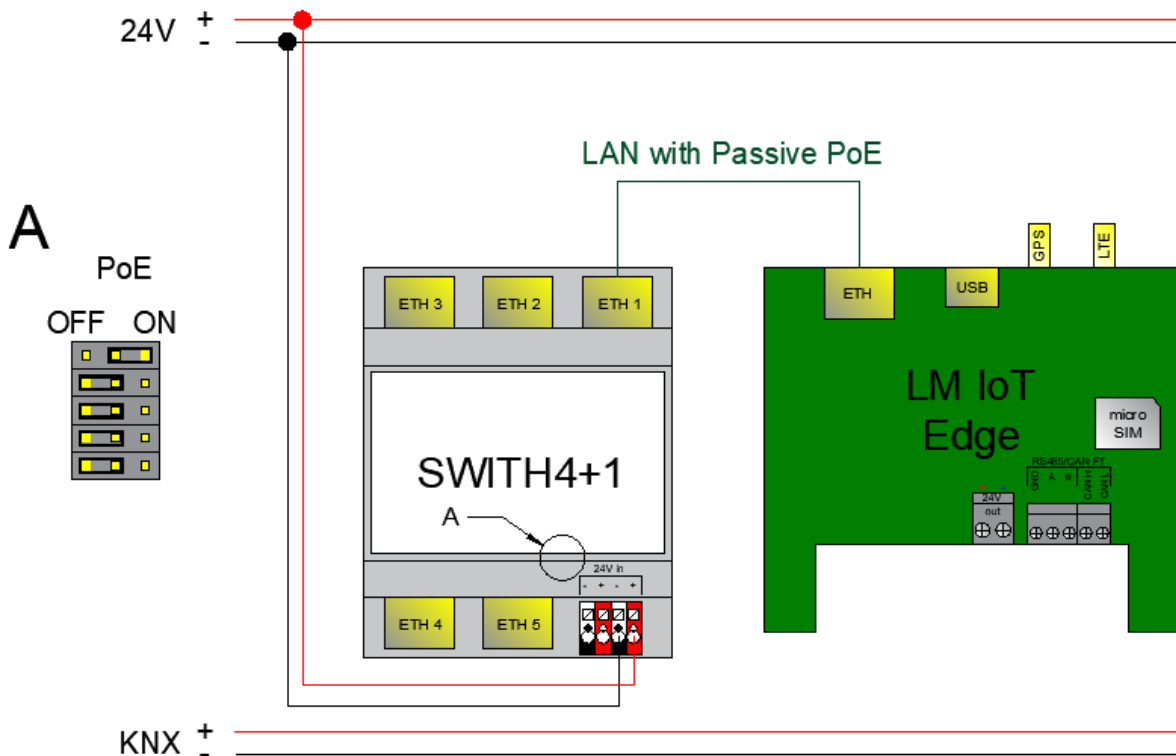
CAN FT connection

RS485 serial connection