![ModFLEX™ by LS RESEARCH]

Mini Gateway USB for ModFLEX Wireless Networks

FEATURES

- Compatible with all modules in the ModFLEX family.
- USB device interface & power
- Small package size: 2.3" x 4.9"
- External high performance antenna.

APPLICATIONS

- Lighting Control
- Sensor Networks
- Security
- HVAC Control
- Medical
- Smart Energy

DESCRIPTION

The Mini Gateway USB (MGU) is a device that allows you to access your wireless network through a USB Host interface, and supports the use of a ModFLEX module.

Need to get to market quickly? Not an expert in wireless? LS Research design services would be glad to develop a custom hardware or software solution for you. Contact us at sales@lsr.com or call us at 262-375-4400.

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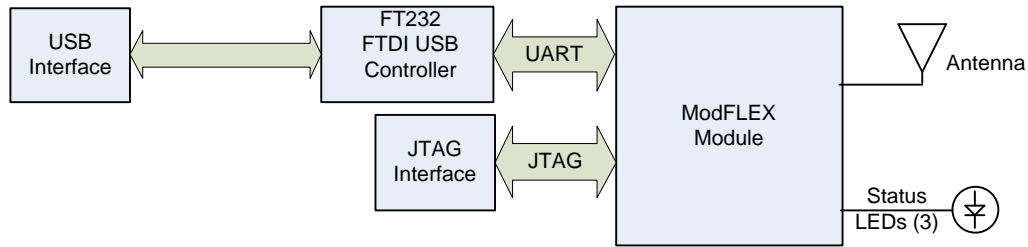
BLOCK DIAGRAM

Figure 1 Mini Gateway USB Block Diagram – High-Level

ORDERING INFORMATION

Order Number	Description
450-0027	ModFLEX MGU with SiFLEX02 Module
450-0102	ModFLEX MGU with ProFLEX01-R2 Module

Table 1 Mini Gateway USB Model Numbers

Mini Gateway USB Contents

- Mini Gateway USB (MGU) with ModFLEX Transceiver Module
- Micro USB Cable

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GATEWAY OVERVIEW

The MGU provides a direct interface to the on-board ModFLEX module through the USB interface. Command and control of the module is achieved through the standard host protocol commands. See the module specific Host Protocol Document for more details. These commands can also be exercised though the ModFLEX Test Tool Suite.

USB Controller

The Mini Gateway USB uses a FTDI FT232 USB-to-Serial bridge. The FT232 is a highly-integrated USB-to-UART bridge controller. The FT232 includes a USB 2.0 full-speed function controller, USB transceiver, oscillator, EEPROM, and UART with full modem control signals. Please refer the FTDI web site for the latest drivers for the FT232 (www.ftdichip.com).

ModFLEX Module

The ModFLEX module can be any one of LSR's radio transceiver modules that are a member of the ModFLEX family of products. This includes the SiFLEX02 and ProFLEX01 modules. All ModFLEX modules are pin compatible and drop into the same PCB footprint to allow maximum flexibility.

There are three LEDs that are used to provide status to the user:

- Green – Indicates that the ModFLEX module is operational (heartbeat).
- Yellow – Indicates that there is activity on the host interface.
- Red – Indicates RF activity.

Antenna

The MGU is equipped with a high performance external antenna that can be arranged in different orientations to accommodate various mounting configurations. The environment the module is placed in will dictate the range performance. The non-ideal characteristics of the environment will result in the transmitted signal being reflected, diffracted, and scattered. All of these factors randomly combine to create extremely complex scenarios that will affect the link range in various ways.

It is also best to keep some clearance between the antenna and nearby objects. This includes how the module is mounted in the product enclosure. Unless the items on the following list of recommendations are met, the radiation pattern can be heavily distorted.

- Keep metal objects as far away from the antenna as possible.
- Do not embed the antenna in a metallic or metalized plastic enclosure.

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ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power supply voltage (VCC)	-0.3	+6.0	V
RF input power, antenna port		Note 1	dBm
RF input power, transmit port		Note 1	dBm
Operating temperature	-40	+85	ºC
Storage temperature	-40	+85	ºC

Table 2 Absolute Maximum Ratings[1]

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Power supply voltage (VCC)	+4.5	5.0	+5.5	Vdc
Ambient temperature range	-40	25	70	ºC

Table 3 Recommended Operating Conditions

Power Consumption

Parameter	Test Conditions	Max	Unit
Transmit mode	+25°C	350	mA
Receive mode	+25°C	140	mA

Table 4 Power Consumption

Note 1: For information that is specific to a certain ModFLEX module, please refer to the individual datasheet for that particular module.

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[1] Under no circumstances should exceeding the ratings specified in the Absolute Maximum Ratings section be allowed. Stressing the module beyond these limits may result permanent damage to the module that is not covered by the warranty.

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UPDATING FIRMWARE

The firmware on the module may be updating via JTAG using J3.
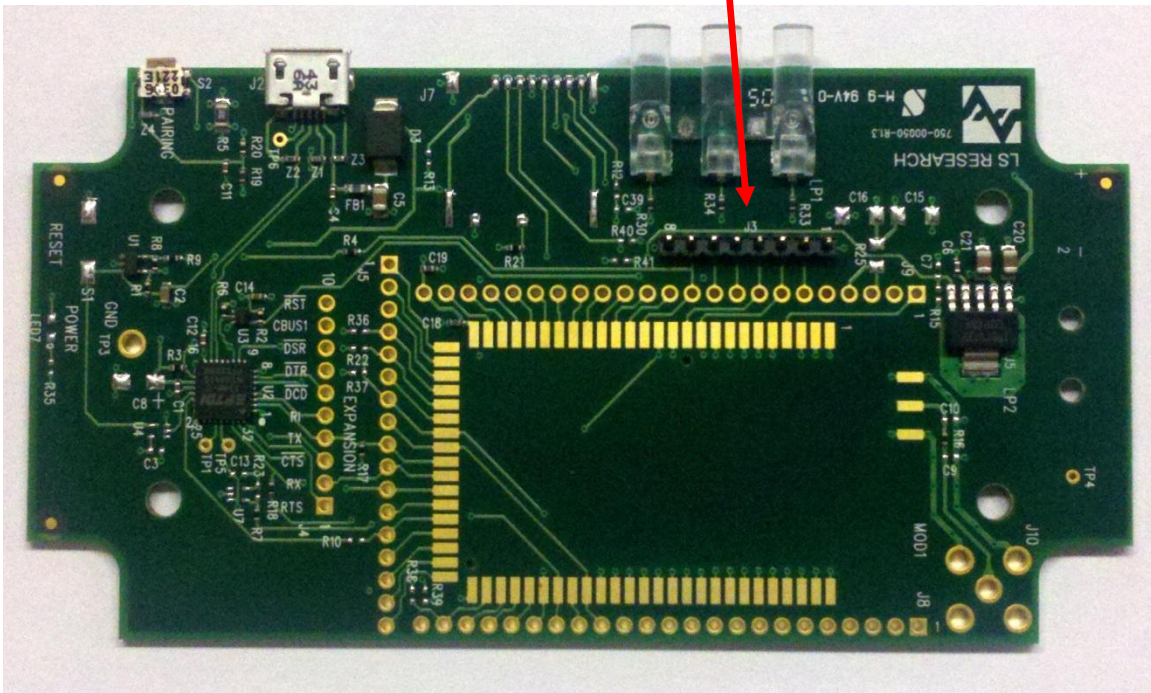
Figure 2 Module Programming Header

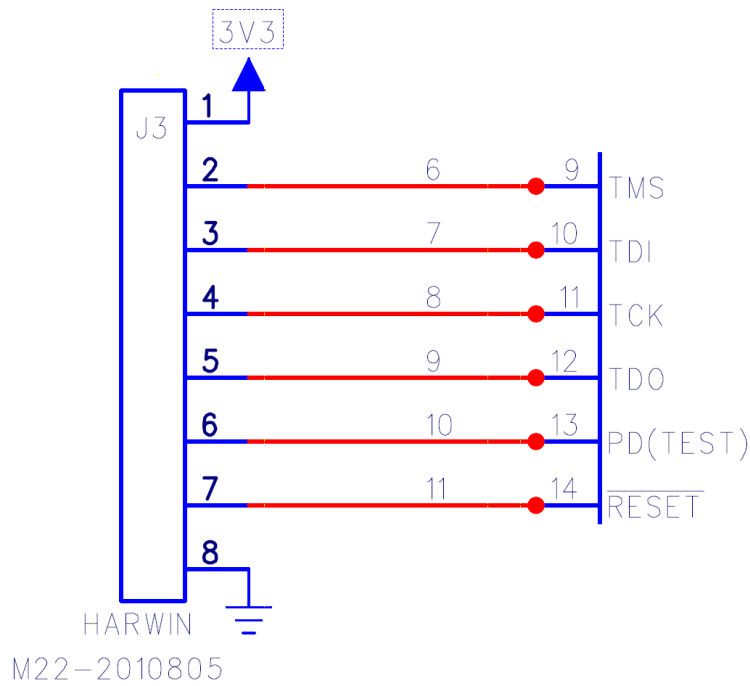**Figure 3 Programming Header Schematic**

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SHIPPING, HANDLING, AND STORAGE

Shipping

The MGU is shipped in individual packages.

Handling

This product contains highly sensitive electronic circuitry. Handling without proper ESD protection may damage the unit permanently.

Storage

Do not store in salty air or in an environment with a high concentration of corrosive gas, such as Cl2, H2S, NH3, SO2, or NOX.

Do not store in direct sunlight.

The product should not be subject to excessive mechanical shock.

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AGENCY STATEMENTS

See the appropriate Module Datasheet for detailed information regarding agency approvals.

SiFLEX02

"**Contains Transmitter Module FCC ID: TFB-SIFLEX2**"

"**Contains Transmitter Module IC: 5969A-SIFLEX2**"

The OEM of the SiFLEX02 Module must only use the approved antenna(s) listed above, which have been certified with this module.

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

ProFLEX02-R2

"**Contains Transmitter Module FCC ID: TFB-PROFLEX1**"

"**Contains Transmitter Module IC: 5969A-PROFLEX1**"

The OEM of the ProFLEX01 Module must only use the approved antenna(s) listed above, which have been certified with this module.

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

AGENCY CERTIFICATIONS

This device is FCC and IC certified; see the appropriate module (ProFLEX01-R2 or SiFLEX02) for specifics.

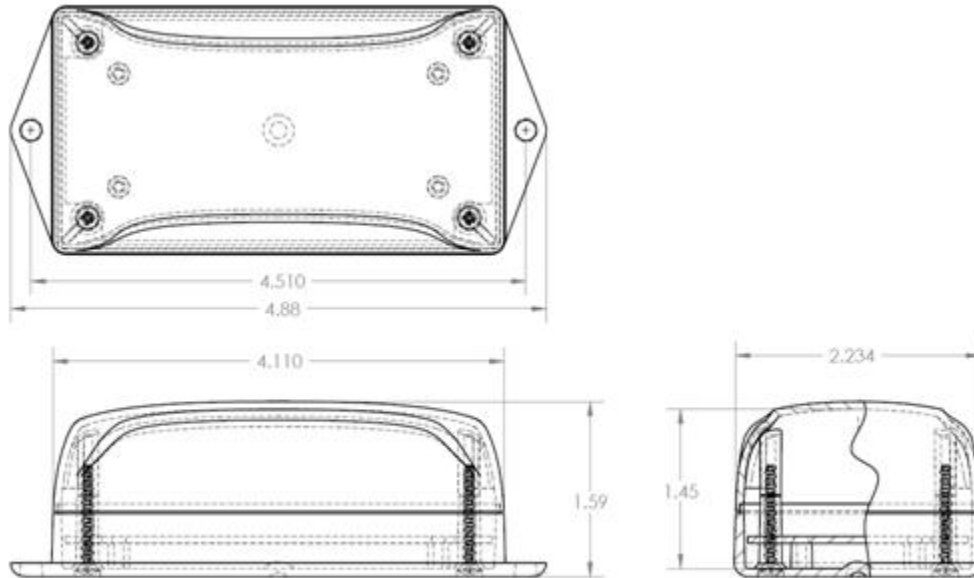This device is CE certified with the ProFLEX01-R2 module.

EUROPE – PROFLEX01-R2

CE Notice

This device has been tested and certified for use in the European Union. See the Declaration of Conformity (DOC) for specifics.
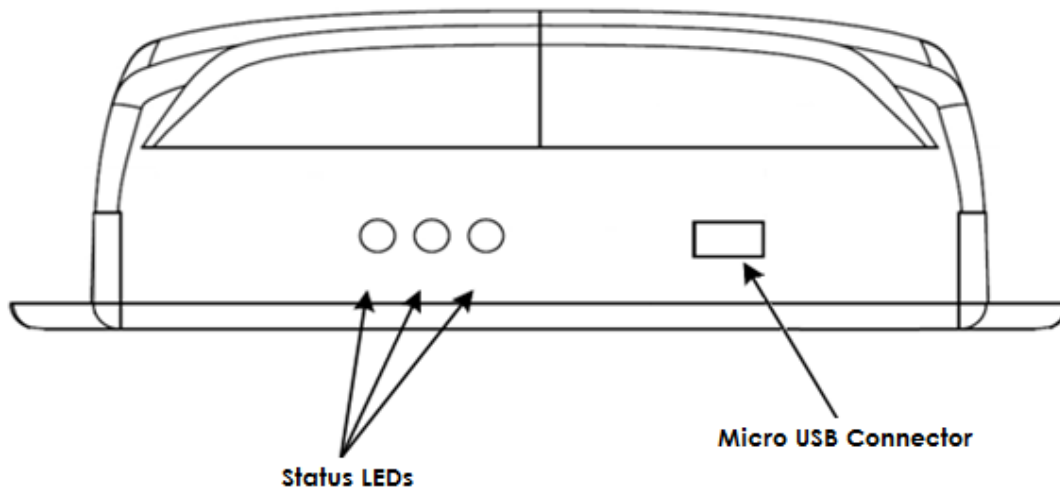
Declaration of Conformity (DOC)
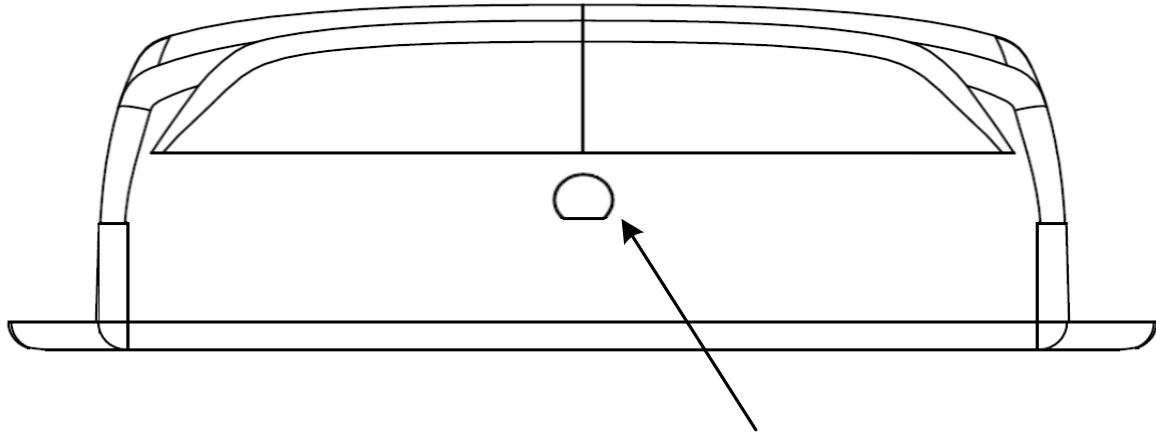
The DOC can be downloaded from the LSR Wiki.

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MECHANICAL DATA

Figure 4 Enclosure Envelope

Status LEDs

Micro USB Connector

Figure 5 Mini Gateway USB Front Port Identification

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Antenna Port

Figure 6 Mini Gateway USB Rear Port Identification

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PRODUCT REVISION HISTORY

450-0027 SiFLEX02 MGU

- Rev 3: Initial production release.

450-0102 ProFLEX01-R2 MGU

- Rev 1: Initial production release.

- Rev 1.1: Added the "CE" mark to the label.
  Previous versions are also CE certified, although they don't have the CE Mark on the label.

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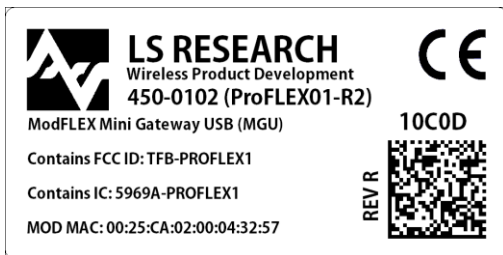
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