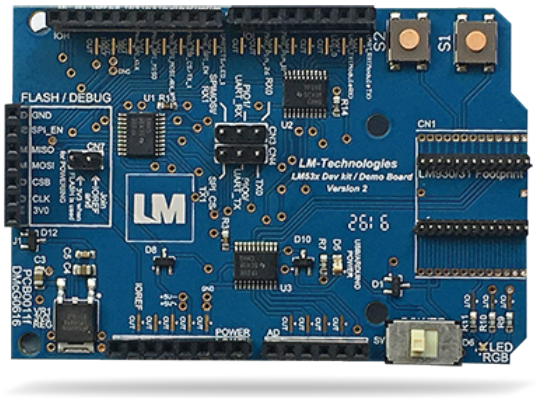
LM53X Development and Evaluation Product Family

For LM930 and LM931 Bluetooth® low energy Modules

Product	LM53X
Part No	See Last Page
Revised	5/APR/2017



Overview

The LM53X is the development and evaluation product family for the LM930 / LM931 Bluetooth® low energy module. A great starting point for developing Bluetooth® low energy applications allowing the developer to either evaluate or program the application. This simplifies the development process and reduce the time to the production phase. LM provide application support which includes assisting the developer to create new applications with the LM930 / LM931 module.

Features

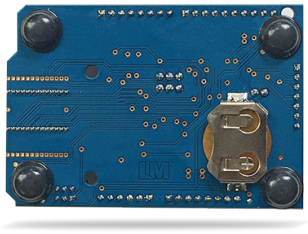
- Application Firmware Support
- GATT Server applications available including Serial over GATT, Eddystone™ URL Beacon and Key Fob
- Hardware design guidelines
- Pin header for easy connection of LM93X modules
- Arduino compatible
- I²C, UART, AIO and PIO interfaces for application-specific peripheral devices
- Onboard user programmable RGB LED and switches
- Onboard coin cell socket
- Voltage level translators from 3.3V module to 5V Arduino values
- 3.3V supply voltage regulator included
- 78mm x 54mm x 16mm
- Mounting holes

Kit Content

- LM530 Evaluation Board
- LM930 / LM931 Bluetooth® low energy module
- Jumpers (x 3)
- CR2032 Coin Cell Battery
- CSR USB-SPI Programmer Board (Not included)

Support Documents

- LM53X User Guide:-http://lm-technologies.com/53x_user_guide
- LM930 Datasheet:- http://goo.gl/hGwnxF
- LM931 Datasheet:- http://goo.gl/4o2Loj
- CSR Support Documentation
  Supplied with CSR µEnergy® SDK



LM53X
Rear view of the board showing the coin-cell power option.

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For LM930 and LM931 Bluetooth® low energy Modules

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Description

The LM53X product family provides a complete set of tools for firmware development, hardware designs and production tests. For developers to produce prototypes with the LM930 / LM931 Bluetooth® module. The LM530 evaluation board enables the developer to evaluate a Bluetooth® low energy application. The LM531 development kit combined with the CSR programmer board allows the developer to both evaluate and program/debug a Bluetooth® low energy application.

The CSR µEnergy® SDK is used with the LM53X for the programming of application firmware or modifying LM application firmware. LM also provide Bluetooth® application support, including assisting the developer and creating new application firmware with the LM930 / LM931 module.

LM provide Bluetooth® low energy applications such as the Eddystone™ URL Beacon. Our applications can be customised for specific embedded systems.

The LM53X is either USB or battery powered for operating a prototype in a “real world” scenario.

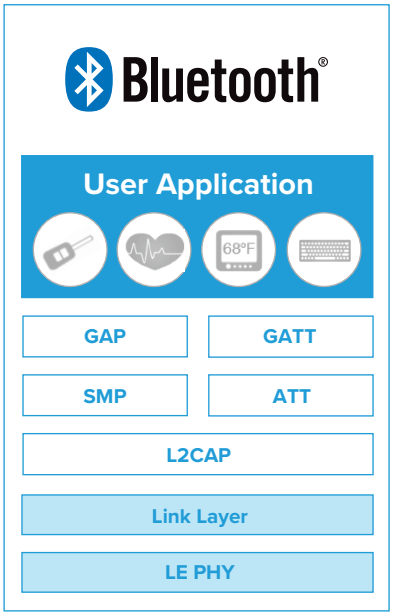
Arduino Compatible

The LM53X is Arduino™ compatible providing the option of connecting the LM930 / LM931 to an Arduino™ Board. The Arduino™ provides the power supply when connected.

Applications

The LM93X standalone module is capable of running your Bluetooth® low energy application. Requiring no external hardware and supports a wide range of applications such as:

- Alert Tag
- Automotive Key Fob
- Beacon
- Blood Pressure Sensor
- Cycling Speed and Cadence Sensor
- Environment Sensor
- Health Thermometer
- Heart Rate Sensor
- Keyboard & Mouse
- Multifunction Steering Wheel
- Security Tag
- Serial Communication
- Time Client
- Temperature and Pressure
- Weight Scale



LM Technologies offer Bluetooth® v4.1 application support, including assisting the developer and creating new applications. LM provide applications that can be customised to your specification.

Applications available:

- Serial Communication over GATT
- Eddystone™ URL Beacon
- Key Fob with RGB LED controller

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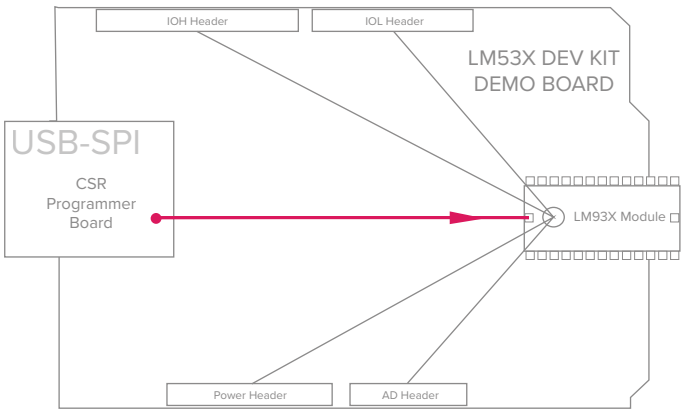
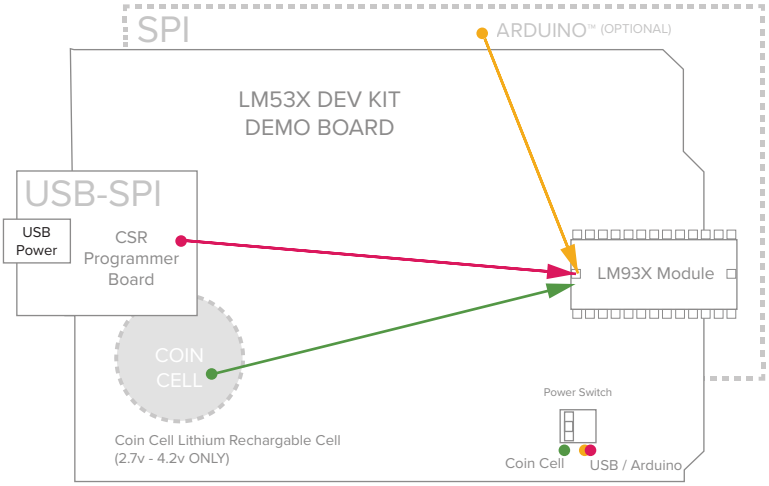
Product Part No: LM53X See Last Page

System Block Diagram



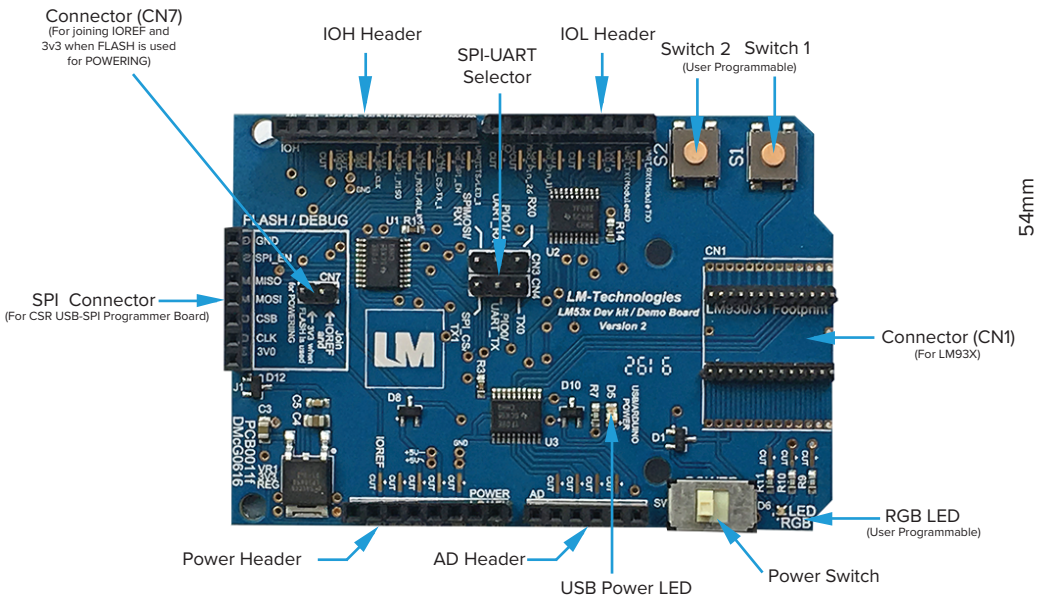
Three Power Options

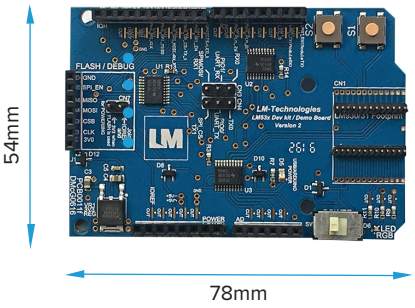


Power via ● USB ● Coin Cell ● Arduino

Note: Only use CR2032 2.7-4.2v for Coin Cell.

Hardware Layout





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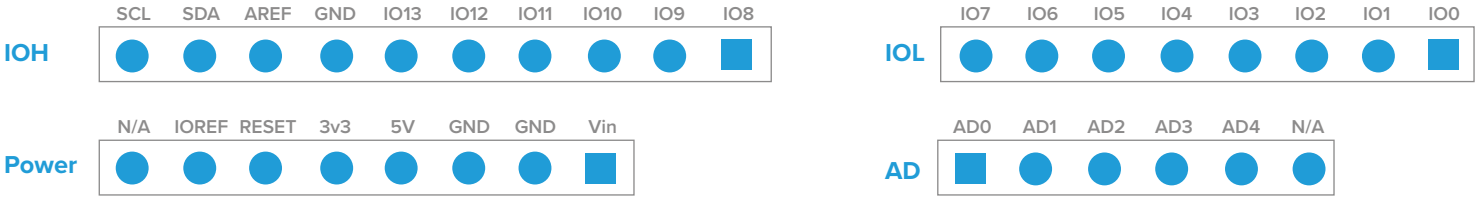
Pin Out Mapping



CSR1012 Pin	CSR1012 Name	LM93X Pin	LM53X Pin	Description	Type
1	VDD_BAT	17	N/A	+3V3 Battery input	Power
2	XTAL_32K_OUT	N/A	N/A	LM93X Onboard 32kHz Crystal	N/A
3	XTAL_32K_IN	N/A	N/A	LM93X Onboard 32kHz Crystal	N/A
4	WAKE	26	IOL IO6	Input to wake LM93X from hibernate or dormant. Use external pull down	Input
5	VDD_CORE	N/A	N/A	Positive supply for digital domain (+3V3)	Power
6	VDD_REG_IN	N/A	N/A	Positive supply for Bluetooth® radio and digital linear regulator	Power
7	RF	N/A	N/A	RF Connection to UFL or Chip Antenna on LM93X	RF
8	VDD_XTAL(VDD_AUX)	N/A	N/A	N/A	N/A
9	XTAL_16MHz_OUT	N/A	N/A	LM93X Onboard 16MHz Crystal	N/A
10	XTAL_16MHz_IN	N/A	N/A	LM93X Onboard 16MHz Crystal	N/A
11	AIO[2]	4	AD AD3	Analogue Input (With internal weak pull up resistor)	Input
12	AIO[1]	5	AD AD2	Analogue Input (With internal weak pull up resistor)	Input
13	AIO[0]	6	AD AD1	Analogue Input (With internal weak pull up resistor)	Input
14	PIO[0]/UART_TX	8	IOL IO0	Programmable I/O line (with the jumper on the right) or UART TX	Input / Output
15	PIO[1]/UART_RX	9	IOL IO1	Programmable I/O line (with the jumper on the right) or UART RX	Input / Output
16	PIO[3]/SF_DIN	10	IOH IO8	Programmable I/O line or SPI serial flash data (SF_DIN) input	Input / Output
17	PIO[4]/SF_CS	11	IOL IO5	Programmable I/O line or SPI serial flash chip select	Input / Output
18	PIO5[5]/DEBUG_CLK	12	IOH IO13	PIO5 or DEBUG_Clock	Input / Output
19	PIO[6]/DEBUG_CS	18	IOH IO10	PIO6 or to reset hold DEBUG_CS# high for two DEBUG_CLK cycles	Input / Output
20	PIO[7]/DEBUG_MOSI	19	IOH IO11	Programmable I/O line or debug SPI MOSI selected by SPI_PIO#	Input / Output
21	VDD_PADS	16	N/A	Tied to VDD. Internal power supply to LM93X I/O Pins	Power
22	PIO[8]/DEBUG_MISO	20	IOH IO12	Programmable I/O line or debug SPI MISO selected by SPI_PIO#.	Input / Output
23	PIO[9]	22	IOL IO2	Programmable I/O line	Input / Output
24	PIO[10]	N/A	N/A	Not Connected	N/A
25	PIO[11]	N/A	N/A	Not Connected	N/A
26	SPI_PION	25	IOH IO9	Selects SPI Debug on PIO[8:5}	Input / Output
27	PIO[2} EEPROM_VCC	N/A	N/A	Internally connected on LM93X to supply power to onboard EEPROM	Power
28	SCL	24	IOH SCL	I2C bus Clock line	Input / Output
29	SDA	23	IOH SDA	I2C bus Data line	Input / Output
30	VDD_CORE	N/A	N/A	Positive supply for digital domain (+3V3)	Power
31	SMPS_LX	N/A	N/A	High-voltage switch-mode regulator output	Power
32	VBAT	17	N/A	+3V3 Module	Power
33	VSS	1, 2, 3, 7, 13, 14, 15, 21, 27	POWER Pin [2:3]	Ground Connections	Power

- The table above presents the signal connections from the CSR1012 chipset pins, to the LM93X edge pins through to the Arduino headers (IOH, IOL, Power and AD).

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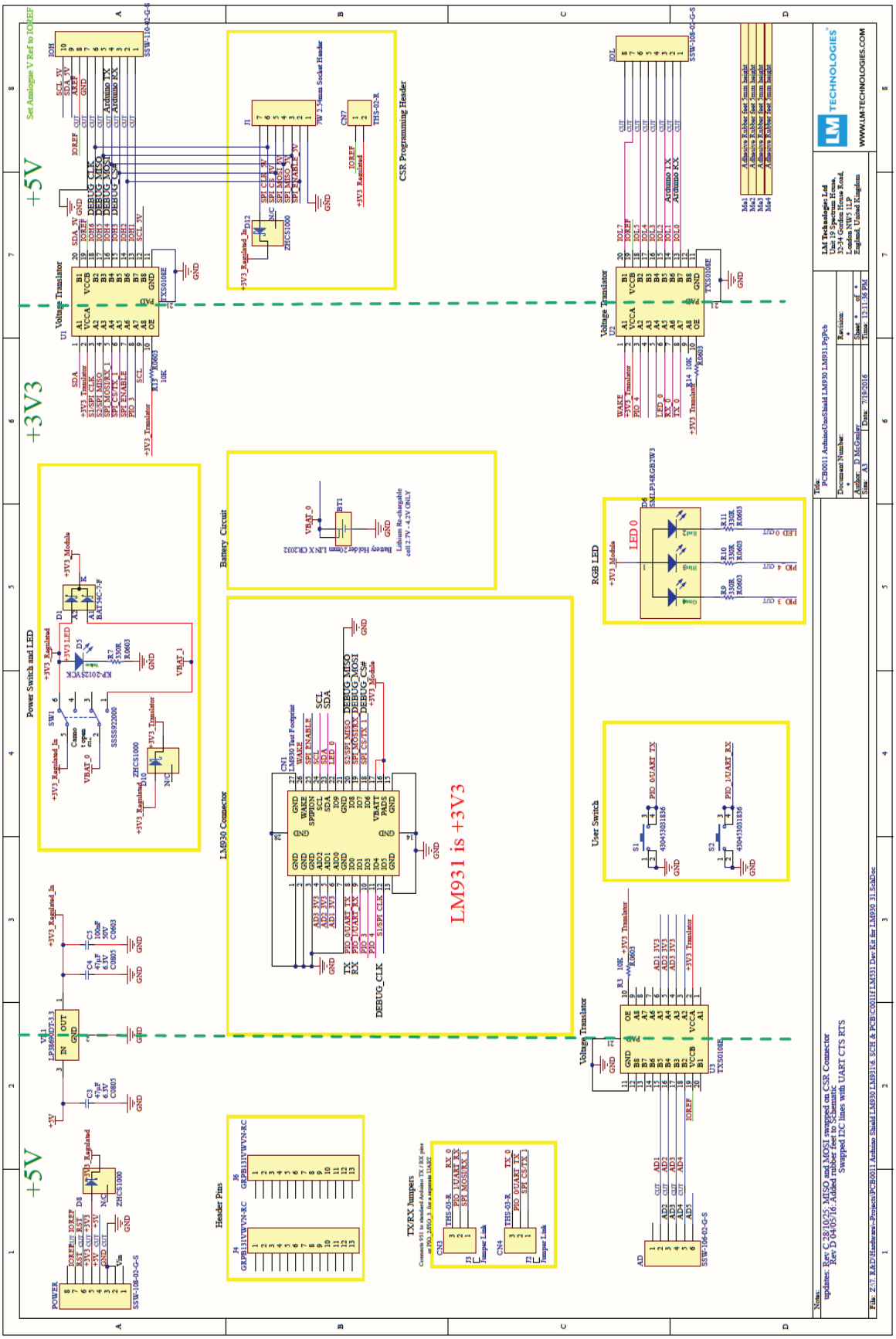

Schematic

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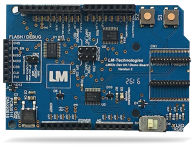
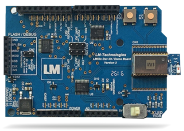
LM53X Packaging Options



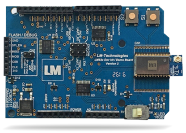
530-0657

LM530 EVALUATION BOARD
1 x LM530 Evaluation Board



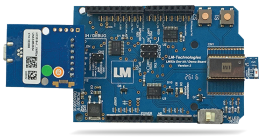
530-0653

LM530 EVALUATION KIT
1 x LM530 Evaluation Board
1 x LM931 Plug & Play IC Ant Module
1 x CR2032 Coin Cell Battery
IC



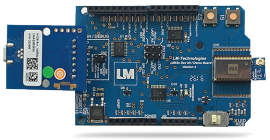
530-0654

LM530 EVALUATION KIT
1 x LM530 Evaluation Board
1 x LM930 Plug & Play IPEX Ant Module
1 x CR2032 Coin Cell Battery
IPEX



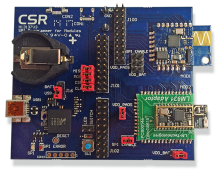
531-0642

LM531 PROGRAMMING DEVELOPMENT KIT
1 x LM530 Evaluation Board
1 x LM931 Plug & Play IC Ant Module
1 x CR2032 Coin Cell Battery
Refer to Note 2 and 3
IC



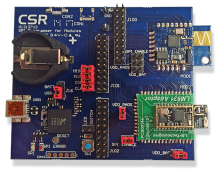
531-0644

LM531 PROGRAMMING DEVELOPMENT KIT
1 x LM530 Evaluation Board
1 x LM930 Plug & Play IPEX Ant Module
1 x CR2032 Coin Cell Battery
Refer to Note 2 and 3
IPEX



532-1013

LM532 SPI PROGRAMMER FOR MODULES
1 x LM93x Pin Header (Soldered to board)
1 x LM931 Plug & Play IC Ant Module (Soldered to board)
IC



532-1014

LM532 SPI PROGRAMMER FOR MODULES
1 x LM93x Pin Header (Soldered to board)
1 x LM930 Plug & Play IPEX Ant Module (Soldered to board)
IPEX

- **Note 1:** Product User Guides, Manuals and Configuration Software can be downloaded via our website - http://www.lm-technologies.com/downloads
- **Note 2**: Download the latest version of the CSR µEnergy™ SDK from the CSR support website - https://www.csrsupport.com/
- **Note 3:** CSR µEnergy™ USB-SPI Programmer Board (Part Number: DK-USB-SPI-10225-1A) are sold separately from third-party distributors and resellers.

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