



Spartan 3 Lite OEM Manual

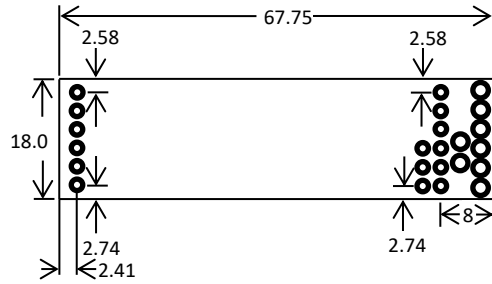
Read First:

There is a calibration resistor inside the LSU 4.9 connector, do not cut the connector off. It is recommended to use 14Point7's [Assembled LSU 4.9 connector](#) for evaluation, it is compatible with both the LSU 4.9 and LSU Adv.

Specifications:

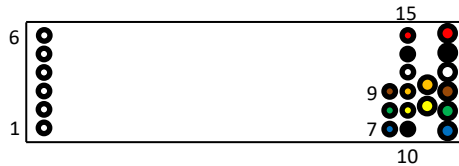
- Dimensions: 68mm x 18mm
- Compatible with Bosch LSU 4.9, Bosch LSU Adv, and clone LSU 4.9 sensors
- Does not require Free Air Calibration but FAC is available. Recommended for clone LSU sensors only.
- Accuracy: 0.01[Lambda]
- Typical Response Time, Free Air to 0.8[Lambda]: 10[ms] in Performance Mode 1, 20[ms] in Performance Mode 0
- Integrated 5v Power Supply with Over-Voltage, Over-Current, and Reverse Polarity Protection
- Outputs: Programmable Linear, Programmable Simulated Narrowband, UART
- Default Linear Output: 0v @ 0.68 Lambda linear to 5v @ 1.36 Lambda
- Default Simulated Narrowband switch point @ 1.00 Lambda
- UART specifications: 5v, 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control
- Operating Voltage 8[V] to 18[V]
- Typical 12[V] Operating Current: 1[A]
- Max 12[V] Operating Current: 3[A]
- Operating Temperature: -40[C] to +105[C]
- Lambda Range: 0.6[Lambda] to 3.4[Lambda]
- %O2 range: 0%O2 to 21%O2
- Lean Burn mode for lean burn applications
- Smart Heatup; Temperature Triggered Heating, Spartan 3 Lite v2 will wait for the Oxygen sensor to be heated to 350C by engine exhaust gases before heating up the sensor
- Output Sequencer provides a dual-level precision voltage signal to the Linear Output during sensor heatup.
- 0.1% tolerance components for all components that affect accuracy

Dimensions:



All dimensions in mm. All pinheader pitch is 2.54mm.

Pinout:



Pin #	Name	Note
1	LSU IA	Connect to Bosch LSU 17025 Terminal #5, for Bosch LSU Adv you can leave connected or disconnected
2	LSU H+	Connect to Bosch LSU 17025/Adv Terminal #4, Grey wire on LSU
3	LSU IP	Connect to Bosch LSU 17025/Adv Terminal #1, Red wire on LSU
4	LSU UN	Connect to Bosch LSU 17025/Adv Terminal #6, Black wire on LSU
5	LSU H-	Connect to Bosch LSU 17025/Adv Terminal #3, White wire on LSU
6	LSU VM	Connect to Bosch LSU 17025/Adv Terminal #2, Yellow wire on LSU
7	Heater Status LED	Heater Status LED output, Slow Blink = too cold, Fast Blink = too hot, LED solid = just right (780[C] +/- 25[C])
8	Linear Output	Default output 0[V] @ 10[AFR] linear to 5[V] @ 20 [AFR], 100 ohm output impedance
9	NB Output	Simulated Narrowband Output. Default switch point @ 1 Lambda
10	E Ground	Electronics ground, 100[mA] max
11	UART Rx	Connect to Tx of interfacing device. 5v, 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control
12	UART Tx	Connect to Rx of interfacing device. 5v, 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control
13	Heater Ground	LSU Heater Ground, 3[A] max
14	E Ground	Electronics ground, 100[mA] max
15	12v	Connects to 8[V] to 18[V] power source capable of supplying 3[A], a 5[A] inline fuse should be used.

Bootloader

When Spartan 3 Lite OEM is powered up without the LSU Heater Ground (Pin 13) connected, it will enter bootloader mode. In Bootloader mode the Spartan 3 Lite OEM will be waiting for a firmware update, normal wideband functions and serial communications will not be available.

Serial Configuration Commands

Serial Command	Usage Note	Purpose	Example	Factory Default
GETHW		Gets Hardware Version		
GETFW		Gets Firmware version		
SETTYPEx	If x is 0 then Bosch LSU 4.9 If x is 1 then Bosch LSU ADV		SETTYPE1	X=0, LSU 4.9
GETTYPE		Gets LSU sensor type		
SETPERFx	If x is 0 then standard performance of 20ms. If x is 1 then high performance of 10ms. If x is 2 then optimize for lean operation.		SETPERF1	x=0, standard performance
GETPERFx		Gets performance		
SETLAMFIVEVx.xx	x.xx is a decimal exactly 4 characters long including decimal point. Minimum value is 0.60, maximum value is 3.40	Sets Lambda at 5[v] for the linear output	SETLAMFIVEV1.36	x=1.36[Lambda]
GETLAMFIVEV		Gets Lambda at 5[v]		
SETLAMZEROVx.xx	x.xx is a decimal exactly 4 characters long including decimal point. Minimum value is 0.60, maximum value is 3.40	Sets Lambda at 0[v] for the linear output	SETLAMZEROV0.68	x=0.68[Lambda]
GETLAMZEROV		Gets Lambda at 0[v]		
SETNBSWLAMx.xxx	x.xxx is a decimal exactly 5 characters long including decimal point.	Sets the Simulated Narrowband Switch Point in Lambda	SETNBSWLAM1.005	x.xxx=1.000
GETNBSWLAM		Gets the Simulated Narrowband switch point in Lambda		
SETLINOUTx.xxx	Where x.xxx is a decimal exactly 5 characters long including decimal point, greater than 0.000 and less than 5.00. Linear Output will resume normal operation on reboot.	Allows the user to set the High Perf Linear Output to a specific voltage	SETLINOUT2.500	
SETSLOWHEATx	If x is 0 then sensor is heated at normal rate during initial power up. If x is 1 then sensor is heated at 1/3 the normal rate during initial power up. If x is 3 then wait, a max of 10 min, for exhaust gas to heat sensor to 350C before heating		SETSLOWHEAT1	X=0, normal sensor heatup rate
GETSLOWHEAT		Gets slowheat setting		
DOCAL	Pull sensor out of the exhaust. Power on wideband controller with sensor connected for about 5 minutes then issue the DOCAL command. If you have the temperature LED installed, please make sure the LED is steady (not blinking) before issuing the DOCAL command.	Do Free Air Calibration and display the value. Recommended for clone sensors only.		
GETCAL		Gets Free Air Calibration value		
RESETCAL		Resets Free Air Calibration value to 1.00		
SETCANFORMAT0		Sets Linear Output to Lambda		SETCANFORMAT0
SETCANFORMAT4		Sets Linear Output to %O2: 0v@0%O2 linear to 5v@21%O2		SETCANFORMAT0
GETCANFORMAT		Gets CAN format		
SETAFRMxx.x	xx.x is a decimal exactly 4 characters long including decimal point	Sets AFR Multiplier for Android Torque app	SETAFM14.7 SETAFM1.00	xx.x=14.7
GETAFRM		Gets AFR Multiplier for Android Torque app		
MEMRESET		Reset to factory settings.		

*All commands are in ASCII, upper/lower case does not matter.

Real Time Datalogging

Send in ASCII "G" (without quotes, upper or lower case does not matter) via UART to Spartan 3 Lite OEM.

Spartan 3 Lite OEM will respond with something similar to the following in ASCII:

0:a:50.0 (50.0 is AFR, default AFR Multiplier is 14.7, you can change the multiplier by using the "SETAFRMxx.x" serial command)

1:a:780 (780 is LSU Temperature in Celsius)

2:a:3000 (To be disclosed)

3:a:129 (To be disclosed)

Each row is terminated with ASCII LF (Line Feed). If there are spaces in the response, ignore them.