



LMX9820A
Bluetooth™ Serial Port Module



Introduction

The purpose of this manual is to explain correct way how to integrate module LMX9820A to the end product. It includes procedures that shall assist you to avoid unforeseen problems.

This manual presents information that shows how module and OEM product, where module integrated, complies with regulations in certain regions. Any modifications, not expressly approved by the manufacture could void the authority to operate in these regions.

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1.General

This Bluetooth Serial Port Module has to be installed and used in accordance with the technical description/installation instructions provided by the manufacturer.

This Bluetooth Serial Port Module is intent to be placed on the market in all States, where the Bluetooth technology and the used frequency band is released. For detail information concerning type approval of this module (eg. Where this module is already pre-approved) please contact the authorized local distributor or the manufacture. The system may only be implemented in the configuration that was authorized. Note that any changes or modifications to this equipment not expressly approved by that manufacture could void the user's authority to operate this equipment.

2.Module design application

2.1 Model Number

LMX9820A

2.2 Features and Specifications

- 1) Bluetooth Version 1.1 Qualified.
- 2) Temperature Range: -40C to +85C
- 3) Small form factor (10.1mm x 14mm x 1.9mm)
- 4) Implemented in CMOS technology on FR4 Substrate
- 5) Operating Frequency Band: 2.402GHz to 2.480GHz
- 6) Sensitivity: -80dBm typical
- 7) Output Power: +4dBm maximum (measured at RFinout of LMX5452 micro module)
- 8) Operating Temperature: -40 to 85 degree C

9) Storage Temperature: -60 to 150 degree C

10) Operating Voltage: VCC 2.85V ~ 3.6V

11) Power Consumption:

- TX burst (peak) is 50mA max
- RX burst (peak) is 40mA max

12) Data rate:

- Asynchronous: 723kbp/57.6kbps
- Synchronous: 433.9kbps/433.9kbps

2.3 Applications area.

PDA, POS Terminals, Data Logging Systems, Audio Gateway applications, other application.

2.4 Terminal Functions

Table-1

Pad Name	Pad Location	Direction	Description
Clk-	B8	Input	Xtal g or Negative Clock Input. Typically connected along with XTAL_D to an external surface mount AT cut crystal. Can also be configured as a frequency input when using an external crystal oscillator. When configured as a frequency input, typically connected to Ground with a 10 pF capacitor.
Clk+	B9	Input	Xtal d or Positive Clock Input. Typically connected along with XTAL_G to an external surface mount AT cut crystal. Can also be configured as a frequency input when using an external crystal oscillator. When configured as a frequency input, is typically connected to an external Temperature Compensated Crystal Oscillator (TCXO) through an Alternating Current (AC) coupling capacitor.
32kHz_CLKI	B13	Input	32 kHz Clock input. Used for low power modes. ¹
32kHz_CLKO	C13	Output	32 kHz Clock Output. Used for low power modes. ²
RF_inout	H8	Input/Output	RF Antenna Port. 50Ω nominal impedance. Typically connected to an antenna through a 6.8pF capacitor.
ISEL2	H13	Input	Module Interface Select Input Bit 1.
ISEL1	J13	Input	Module Interface Select Input Bit 0.

1. Connect to GND if not used.

2. Treat as NC if not used. Pad required for mechanical stability.

Table-2

Pad Name	Pad Location	Direction	Description
USB_VCC	F12	Input	USB Transceiver Power Supply + ¹
USB_D+	E11	Input/Output	USB Data Positive ¹
USB_D-	E12	Input/Output	USB Data Negative ¹
USB_Gnd	G12	Input	USB Transceiver Ground ¹

1. Treat as No Connect, Pad required for mechanical stability.

Table-3

Pad Name	Pad Location	Direction	Description
Uart_tx	D9	Output	UART Host Control Interface Transport, Transmit Data.
Uart_rx	C9	Input	UART Host Control Interface Transport, Receive Data.
Uart_rts#	C10	Output	UART Host Control Interface Transport, Request to Send. ¹
Uart_cts#	D10	Input	UART Host Control Interface Transport, Clear to Send. ²

1. Treat as No Connect if not used, Pad required for mechanical stability.

2. Connect GND if not used,

Table-4

Pad Name	Pad Location	Direction	Description
IOVCC	H12	Input	2.85V to 3.6V Logic Threshold Program Input.
Reset_b#	G8	Input	Reset Input for Smart Radio. Normally connected to Reset_5100.
Reset_5100#	D11	Input	Reset for Baseband and Link Management Processors. Active low.
Lstat_0	E8	Output	Link Status Bit 0.
Lstat_1	F8	Output	Link Status Bit 1.
Host_wu	F9	Output	Host Wakeup
Env0	E9	Input	Module Operating Environment Bit 0.
Env1	B11	Input	Module Operating Environment Bit 1.
TX_Switch_P	H3	Output	Transceiver Status, 0 = Receive; 1 = Transmit.

Table-5

Pad Name	Pad Location	Direction	Description
AAI_srd	B10	Input	Advanced Audio Interface Receive Data Input. ¹
AAI_std	B12	Output	Advanced Audio Interface Transmit Data Output. ¹
AAI_sfs	C11	Input/Output	Advanced Audio Interface Frame Synchronization. ¹
AAI_sclk	C12	Input/Output	Advanced Audio Interface Clock. ¹

1. Treat as No Connect if not used, Pad required for mechanical stability.

Table-6

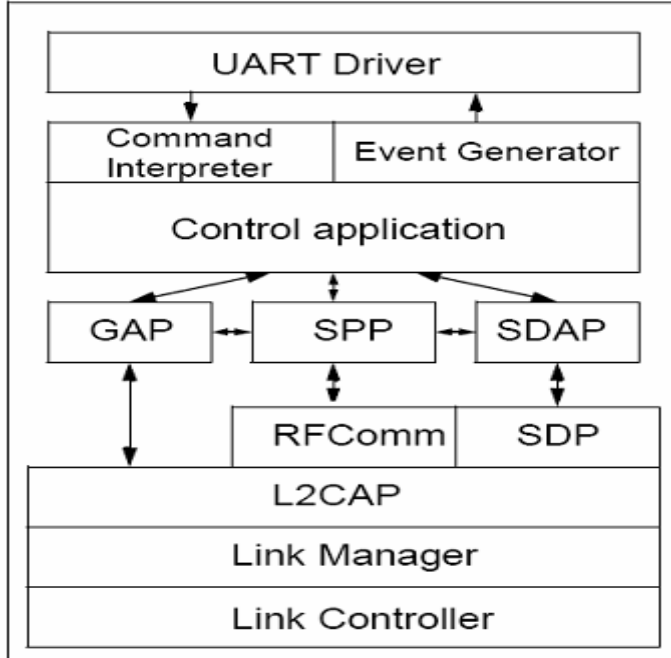
Pad Name	Pad Location	Direction	Description
J_rdy	E10	Output	JTAG Ready. ¹
J_tdi	F10	Input	JTAG Test Data. ¹
J_tdo	F11	Input/Output	JTAG Test Data. ¹
J_tms	G9	Input/Output	JTAG Test Mode Select. ¹
J_tck	G10	Input	JTAG Test Clock. ¹
PI1_RFCE_TP1 1	A8	Testpin	Module Test Point. ¹
PI2_TP12	A13	Testpin	Module Test Point. ¹
Tx_rx_data	C8	Testpin	Module Test Point. ¹
Tx_rx_synch	A10	Testpin	Module Test Point. ¹
CCB_Clock	A11	Testpin	Module Test Point. ¹
CCB_data	D8	Testpin	Module Test Point. ¹
CCB_latch	J12	Testpin	Module Test Point. ¹
BBCLK	A12	Testpin	Module Test Point. ¹
PH3_TP9	F13	Testpin	Module Test Point. ¹

Table-7

Pad Name	Pad Location	Direction	Description
NC	A1, A2, A3, A4, A5, A6, A7, A9, B1, C1, D1, D13, E1, E13, F1, G1, G7, H1, H4, J1, J3, J6, J7, J9, J10, J11	not connected	No Connect. Must have pad for mechanical stability.
RF GND ¹	B2, B3, B4, B5, B6, B7, C2, C3, C4, C5, C6, C7, D2, D3, D4, D5, D6, D7, E2, E3, E4, E5, E6, E7, F2, F3, F4, F5, F6, F7, G2, G3, G4, G5, G6, H5, H6, H7, H9, H10, H11	Input	Radio System Ground. Must be connected to RF Ground plane. Thermal relief required for proper soldering.
Dig_gnd_1 ¹	D12	Input	Digital Ground.
Dig_gnd_2 ¹	G11	Input	Digital Ground.
VCC	H2	Input	2.85V to 3.6V Input for the Internal Power Supply Regulators.
VDD_ANA_OUT	J2	Output	Voltage Regulator Output/Power Supply for Analog Circuitry. If not used, place pad and do not connect to VCC or Ground.
VDD_DIG_OUT	J5	Output	Voltage Regulator Output/Power Supply for Digital Circuitry. If not used, place pad and do not connect to VCC or Ground.
VDD_DIG_PWR_D#	J4	Input	Power Down for the Internal Power Supply Regulator for the Digital Circuitry. Place pad and do not connect to VCC or Ground.

1. Connect RF GND, Dig_gnd_1, and Dig_gnd_2 to single Ground plane.

2.5 Software Stack for module and customer side example



3. Declaration about the performed tests.

The National Semiconductor module LMX9820A is wireless data transmission system. This "Bluetooth" module can be integrated into various end products. National Semiconductor declares that The LMX9820A complies to Part 15 of the FCC Rules.

4. FCC regulatory Information.

The Federal Communication Commission Radio Frequency Interference Statement includes the following paragraph: This equipment has been tested and found to comply with the limits pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication.

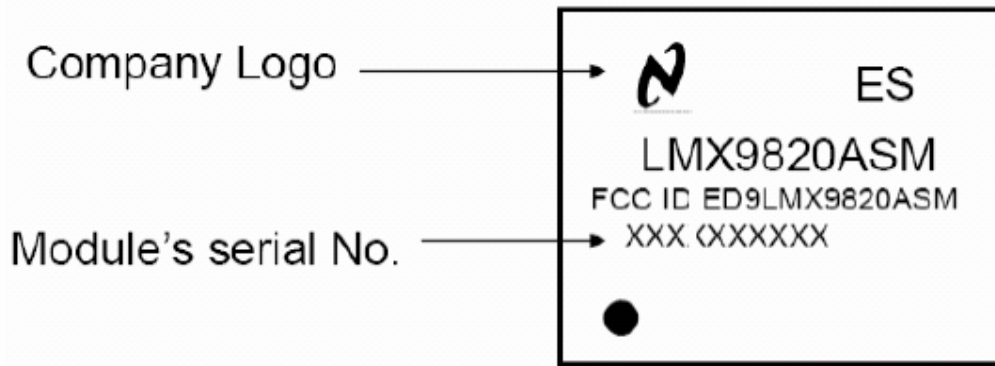
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

4.1 Labeling.

The FCC ID will be placed on top of the product as shown below:



End-products into which the RF module will be installed must wear the auxiliary label ("Contains FCC ID: XXXXYYYY" or "Contains Transmitter Module LMX9820A FCC ID ED9LMX9820ASM")

When end-product into which RF module is integrated exceeds size of a PCMCIA card (approx. 8 x 10 cm) than the FCC Statement must be placed onto the device:

**This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received,
including interference that may cause undesired operation.**

The physical size of the label and font size of the lettering will be dependant on the size of the final product, but in any case will always be clearly visible to all persons exposed to the transmitter.

Otherwise this statement can be placed into the users manual of the end-product.

4.2 Antenna implementation notes.

This transmitter was tested and FCC approved for antenna with maximum gain 0 dBi.

Recommended external antennas are described as following.

Manufacture	SN	Gain	Frequency Range	Temp.
Fractus	FR05-S1-N-0-104	0dBi	2400~2500MHz	-40C~85C
WPI	WPSMLANT001A	0dBi	2400~2500MHz	-40C~85C
Murata	ANCW12G45SAA110TT1	0dBi	2400~2500MHz	-40C~85C

4.3 Other regulatory notes for OEM.

Modular transmitters save manufacturers the time and any related expenses that would be incurred if a new equipment authorization were needed for the same transmitter when it is installed in a new device. This means that it can be integrated into end products without further testing or approval listing. The manufacturer must state the National Semiconductors part number and product reference in his literature in order to meet the requirements of the Bluetooth and regulatory. This should be clearly indicated in the OEM manuals.

The purchaser / integrator (developer) must satisfy all relevant FCC, SAR, EMC and Radio regulations which apply to their final product. We believe such parties have the technical competence to ensure that the systems they deploy continue to comply with all those rules.

Further information and guidance on this subject and other equipment authorization matters can be found under

-Regarding FCC regulatory information on the FCC's website at:
www.fcc.gov/oet/info/database/letters/.

5. A separate approval.

A separate approval of the device into which the module is incorporated is only required when it cannot be insured that the conditions on the module grant will be met. The purchaser must satisfy all relevant FCC, directives which apply to their final product.