



LM740 Bluetooth Multimedia Module

Class 2 Module with CSR BC05 MM Ext Chip

Product: LM740
Part No: 740-0411
Datasheet Rev1.0/21-05-12

1 General Description

LM740 is LM Technologies Ltd Class 2 Bluetooth Multimedia module with external antenna. This module is a CSR Bluecore 5- Multimedia External (BC05 MM-Ext) chip based surface mount module available with Bluetooth Handsfree (HFP), Headset (HSP), Advanced Audio Distribution Profile (A2DP) and Audio Video Remote Control Profile (AVRCP) combo firmware. The firmware can be configured via AT Commands over UART interface or PIO interface via push buttons.

This module is ideal for multimedia applications in vehicle infotainment systems, handsfree kits, headsets, Bluetooth speakers and Bluetooth Stereo Headsets.

This module is available with Bluetooth 2.1+EDR compliant firmware.
Firmware for A2DP Speakers, Stereo Transmitter is available upon request.

2 Features

- Bluetooth v2.1 + EDR compliant firmware
- Class 2 device with up to 25 m range in open space
- AT Command interface available for HFP/HSP/A2DP/AVRCP firmware
- HFP/HSP/A2DP/AVRCP profiles supported. SPP/PBAP firmware under development
- Development kit (LM556) for LM740 available for development
- Application Schematic for LM740 available for development
- Integrated Switched-mode regulator
- Embedded Kalimba DSP Co-processor
- Integrated battery charging option
- Integrated 16-bit Stereo Audio CODEC 95dB SNR for DAC
- UART baud rate upto 921600 bps supported
- Enhanced Audibility and Noise cancellation
- Support UART and USB Host Interface
- Integrated 16 MB flash memory
- CSR Bluecore 05 Multimedia External Flash (BC05-MM Ext) chipset
- Lead free - RoHS compliant
- Small Size : 16 mm x 15 mm x 2.2 mm

3 Applications

- High Quality Stereo Wireless Headsets
- High Quality Mono Headsets
- Vehicle Infotainment Systems
- Wireless Speakers
- VoIP Handsets
- Bluetooth Enabled Automotive Wireless Gateways
- Handsfree kits

4 Packaging Options

Tape and Reel

Part No 740-0413

LM740 with BT2.1 + EDR firmware

Tray Packaging

Part No 740-0412

LM740 with BT2.1 + EDR firmware



5 Electrical Characteristics

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Absolute Maximum Ratings			
Ratings	Min	Max	Unit
Storage Temperature	-40	+85	°C
Supply Voltage (VBAT)	-0.4	+4.4	V
Supply Voltage (VDD_CHG)	-0.4	+6.5	V
Supply Voltage (VDD_PIO, VDD_PADS, VDD_USB)	-0.4	+3.6	V
VREGENABLE_H(POWER_ON)	-0.4	+4.9	V

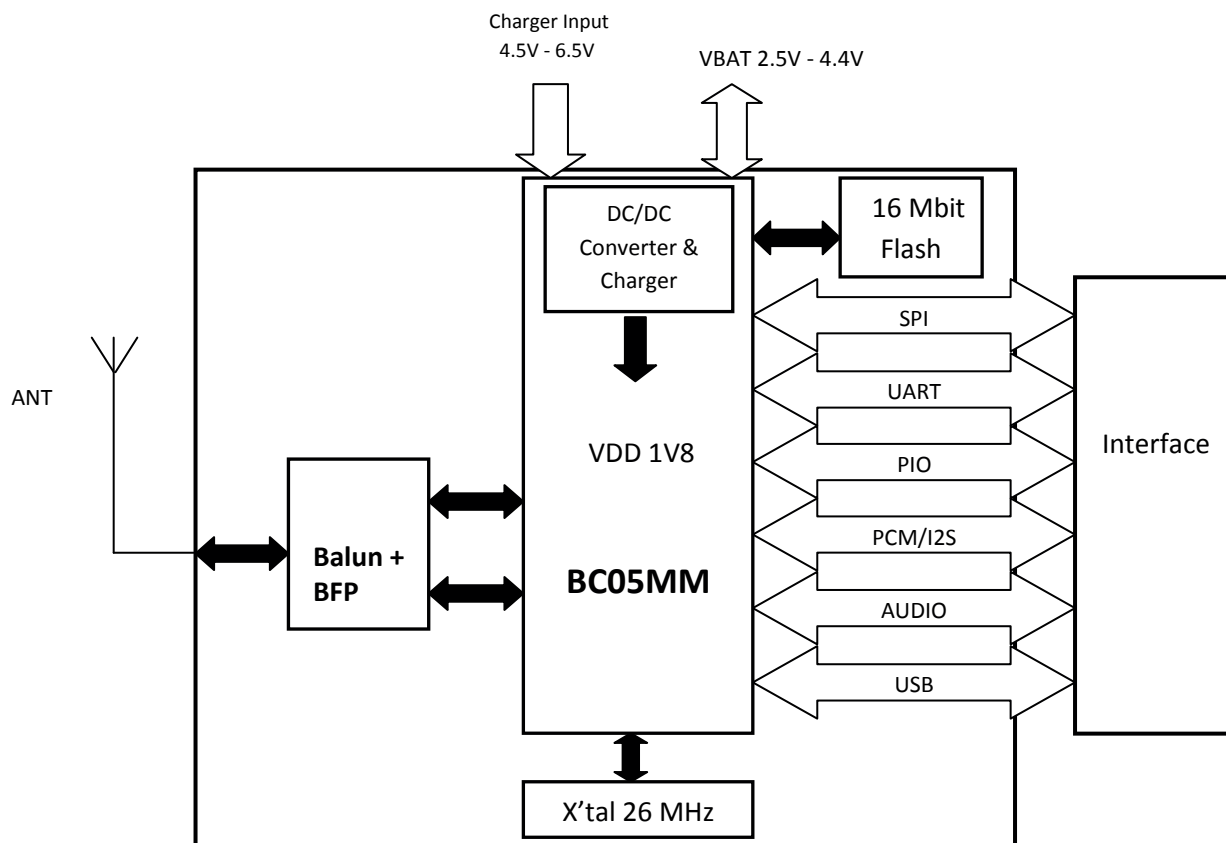
Recommended Operating Conditions			
Operating Condition	Min	Max	Unit
Operating Temperature Range	-20	+70	°C
Supply Voltage (VBAT)	+2.5	+4.4	V
Supply Voltage(VDD_CHG)	+4.5	+6.5	V
Supply Voltage(VDD_PIO, VDD_PADS, VDD_USB)*	+1.8	+3.6	V
*For UART Application, Supply Voltage (VDD_USB) is 1.8V~3.6V			
*For USB Application, Supply Voltage (VDD_USB) is 3.3V			

Power Consumption (16 MHz operation)					
Role	Connection	Audio Packet Type	Description	Current	Unit
-	Stand-by	-	Host Connection	0.06	mA
-	Page Scan	-	Interval = 1280 ms	0.45	mA
-	Inquiry and Page Scan	-	Inquiry Scan = 1280 ms Page Scan = 1280 ms	0.84	mA
Master	ACL	-	No Traffic	4.4	mA
Master	ACL	-	File Transfer Tx	9.1	mA
Master	ACL	-	Sniff = 40 ms	1.8	mA
Master	ACL	-	Sniff = 1280 ms	0.19	mA
Master	eSCO	EV3	-	22	mA
Master	eSCO	EV3	Setting S1	24	mA
Master	eSCO	2 EV3	Setting S2	22	mA
Master	eSCO	2 EV3	Setting S3	17	mA
Master	eSCO	EV5	-	16	mA
Master	SCO	HV1	-	40	mA
Master	SCO	HV3	-	22	mA
Master	SCO	HV3	Sniff = 30 ms	21	mA
Slave	ACL	-	No Traffic	15	mA
Slave	ACL	-	File Transfer Rx	21	mA
Slave	ACL	-	Sniff = 40 ms	1.6	mA
Slave	ACL	-	Sniff = 1280 ms	0.26	mA
Slave	eSCO	EV3	-	25	mA
Slave	eSCO	EV3	Setting S1	27	mA
Slave	eSCO	2 EV3	Setting S2	27	mA
Slave	eSCO	2 EV3	Setting S3	24	mA
Slave	eSCO	EV5	-	22	mA
Slave	SCO	HV1	-	39	mA
Slave	SCO	HV3	-	26	mA
Slave	SCO	HV3	Sniff = 30 ms	22	mA



6 Block Diagram

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7 Pin Assignments

Pin Number	Name	Type	Description
1	AGND	AGND	Analog Ground
2	SPKR_B_P	Analogue	Speaker output positive, right
3	SPKR_B_N	Analogue	Speaker output negative, right
4	SPKR_A_P	Analogue	Speaker output positive, left
5	SPKR_A_N	Analogue	Speaker output negative, left
6	VDD_PIO/ VDD_PADS	VDD	Positive supply for PIO, AUX DAC and all other digital Input/ Output ports
7	GND	GND	Common Ground
8	ANT	Analogue	Connect to 50 ohm antenna (RF signal)
9	GND	GND	Common Ground
10	AUX_DAC	Analogue	8 bit voltage output DAC
11	PIO 0	I/O	Programmable Input/ Output Line
12	PIO 1	I/O	Programmable Input/ Output Line
13	PIO 3	I/O	Programmable Input/ Output Line
14	PIO 2	I/O	Programmable Input/ Output Line



7 Pin Assignments (Contd..)

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Pin Number	Name	Type	Description
15	AIO 1	I/O	Analogue Programmable Input/ Output Line
16	AIO 0	I/O	Analogue Programmable Input/ Output Line
17	USB_DN	I/O	USB Data Minus
18	USB_DP	I/O	USB Data Plus
19	VDD_USB	VDD	Positive Supply for UART/USB Ports
20	UART_RX	CMOS Input	UART Rx Data
21	UART_TX	CMOS Output	UART Tx Data
22	UART_RTS	CMOS Output	UART Request to Send, Active Low
23	UART_CTS	CMOS Input	UART Clear to Send, Active Low
24	PIO 10	I/O	Programmable Input/ Output Line
25	PIO 9	I/O	Programmable Input/ Output Line
26	PIO 11	I/O	Programmable Input/ Output Line
27	PIO 12	I/O	Programmable Input/ Output Line
28	GND	GND	Common Ground
29	PIO 8	I/O	Programmable Input/ Output Line
30	PIO 7	I/O	Programmable Input/ Output Line
31	PIO 4	I/O	Programmable Input/ Output Line
32	PIO 5	I/O	Programmable Input/ Output Line
33	PIO 6	I/O	Programmable Input/ Output Line
34	RESET#	CMOS Input	Reset if low. Input debounced so must be low for >5ms to cause a reset
35	PCM_CLK	I/O	Synchronous Data Clock
36	PCM_IN	CMOS Input	Synchronous Data input
37	PCM_SYNC	I/O	Synchronous Data Sync
38	PCM_OUT	CMOS Output	Synchronous Data Output
39	SPI_MOSI	CMOS Input	SPI Data Input
40	SPI_CS#	CMOS Input	Chip Select for Serial Peripheral Interface(SPI), active low
41	SPI_CLK	CMOS Input	SPI Clock
42	SPI_MISO	CMOS Output	SPI Data Output
43	GND	GND	Common Ground
44	LED 1	Open Drain Output	LED Driver
45	LED 0	Open Drain Output	LED Driver
46	1V8	VDD	1V8 Input
47	LX	Switch Mode power regulator output	Switch mode power regulator output
48	VDD_CHG	Charger Input	Lithium Ion/Polymer battery charger input
49	VBAT	Battery Terminal Positive	Lithium Ion/ Polymer battery positive terminal. Battery charger output and input to switch mode regulator



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7 Pin Assignments (Contd..)

Pin Number	Name	Type	Description
50	VREGENABLE_H (POWER_ON)	Analogue	Take high to enable high-voltage linear regulator and switch-mode regulator
51	MIC_BIAS	Analogue	Microphone Bias
52	MIC_B_P	Analogue	Microphone Bias positive, right
53	MIC_B_N	Analogue	Microphone Bias negative, right
54	MIC_A_P	Analogue	Microphone Bias positive, left
55	MIC_A_N	Analogue	Microphone Bias negative, left

8 RF Characteristics

Transmitter : VDD=1.8V, Temperature = +20°C

Characteristic	Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF Transmit Power	-	1	-	-6 to +4	dBm
RF power control range	-	35	-	>=16	dB
RF power range control resolution	-	0.5	-	-	dB
20dB Bandwidth for modulated carrier	-	916	-	<=1000	kHz
Adjacent channel transmit power F=F0 ±2MHz	-	-30	-	<=-20	dBm
Adjacent channel transmit power F=F0 ±3 MHz	-	-50	-	<=-40	dBm
Adjacent channel transmit power F=F0± > 3 MHz	-	<=-50	-	<=-40	dBm
Δf1 avg Maximum Modulation	-	166	-	140<f1avg<175	kHz
Δf2 max Minimum Modulation	-	154	-	115	kHz
Δf1 avg/ Δf2 avg	-	0.92	-	>=0.80	
Initial Carrier Tolerance	-	10	-	+/-75	kHz
Drift Rate	-	8	-	<=20	kHz/50μ
Drift(Single Slot Packet)	-	8	-	<=25	kHz
Drift(five slot packet)	-	10	-	<=40	kHz
2 nd Harmonic Content	-	-50	-	<=-30	dBm
3 rd Harmonic Content	-	-55	-	<=-30	dBm



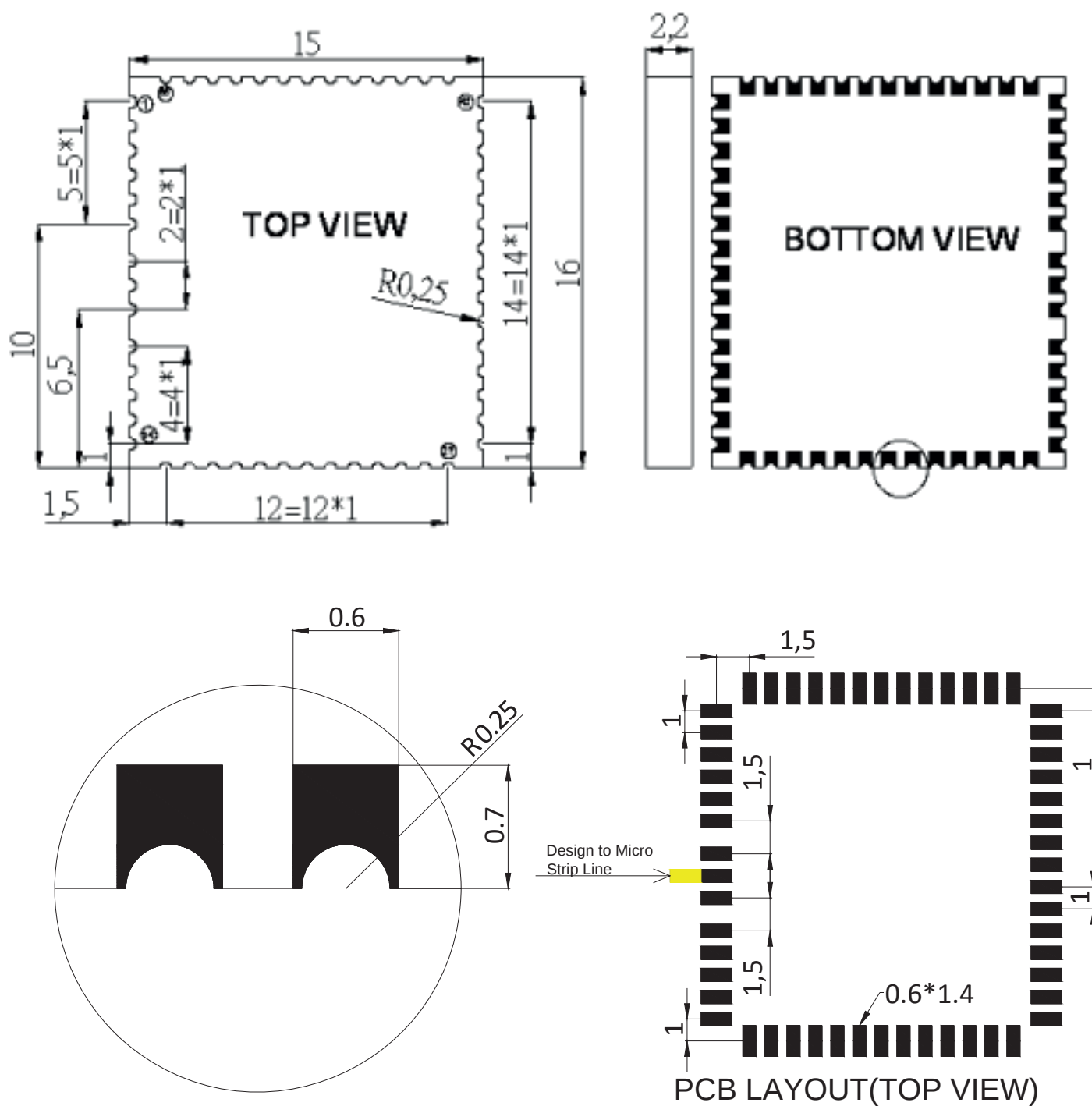
8 RF Characteristics (Contd..)

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Receiver : VDD=1.8V, Temperature = +20°C

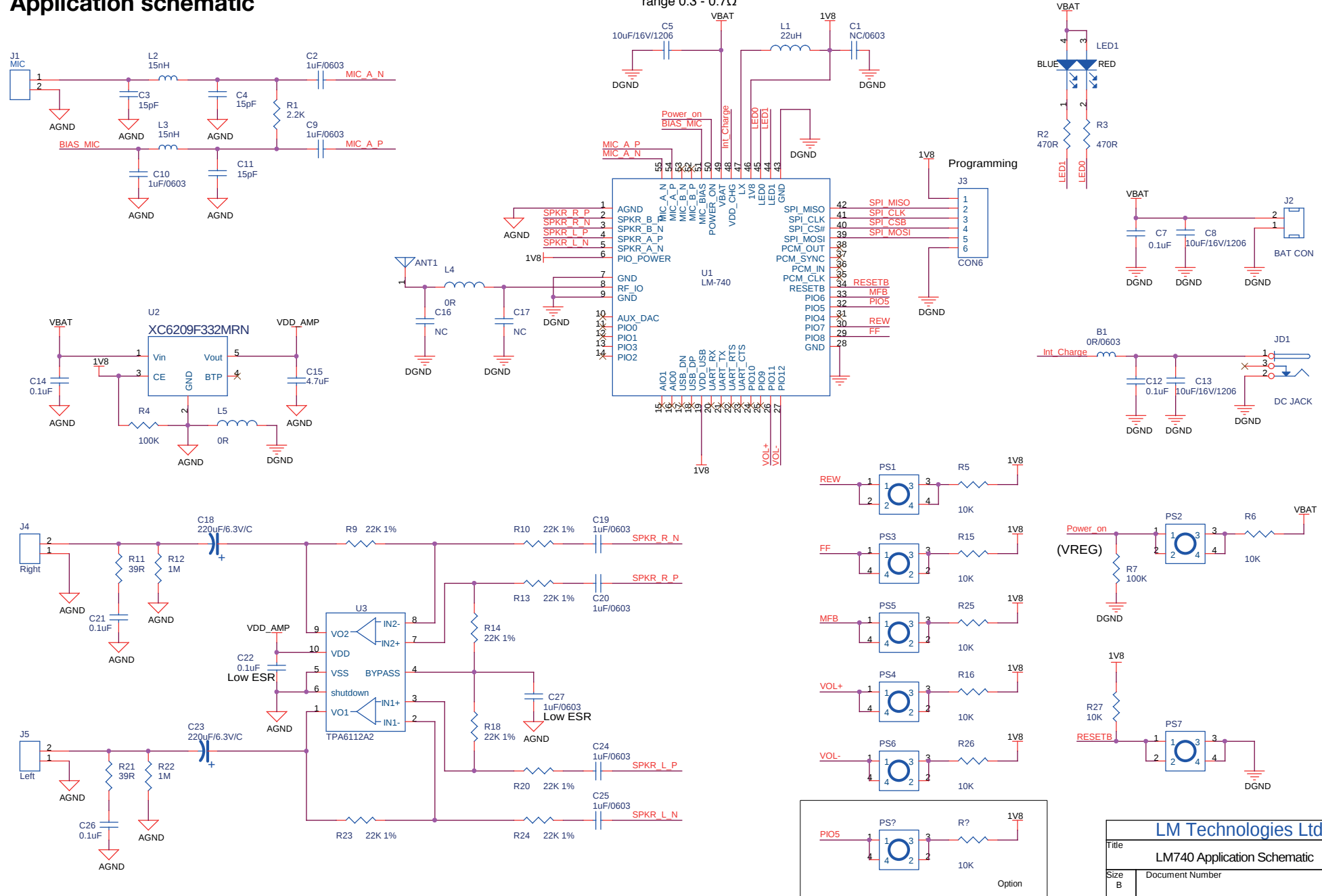
Characteristic	Frequency	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-	-82	-	<=-70	dBm
	2.441	-	-82	-		
	2.480	-	-82	-		
Maximum received signal at 0.1% BER		-	>=-10	-	>=-20	dBm
C/I co-channel		-	7	-	<=11	dB
Adjacent channel selectivity C/I F=F0+1 MHz		-	-6	-	<=0	dB
Adjacent channel selectivity C/I F=F0-1 MHz		-	-7	-	<=0	dB
Adjacent channel selectivity C/I F=F0+2 MHz		-	-21	-	<=-20	dB
Adjacent channel selectivity C/I F=F0-2 MHz		-	-39	-	<=-30	dB
Adjacent channel selectivity C/I F=F0-3MHz		-	-43	-	<=-40	dB
Adjacent channel selectivity C/I F=F0+5 MHz		-	-47	-	<=-40	dB
Adjacent channel selectivity C/I F=FImage		-	-17	-	<=-9	dB
Maximum Level of inter-modulation interferers		-	-30	-	>=-39	dBm
Spurious output level		-	-156	-		dBm/Hz

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Application schematic

The external inductor (L1) must have an ESR in the range 0.3 - 0.7Ω



LM Technologies Ltd			
Title			
LM740 Application Schematic			
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