

Stand-alone Bluetooth modules



	Bluetooth										
	NORA-B100	NORA-B101	NORA-B106	NINA-B400	NINA-B401	NINA-B406	NINA-B410	NINA-B411	NINA-B416	ANNA-B112	
Grade											
Automotive											
Professional	•	•	•	•	•	•	•	•	•	•	
Standard											
Physical											
Image											
Size [mm]	10.4 × 14.3 × 1.8			10.0 × 15.0 × 2.2						6.5 × 6.5 × 1.2	
Operating temperature [°C]	-40 to +105			-40 to +105						-40 to +85	
Radio											
Chip inside	nRF5340			nRF52833						nRF52832	
Bluetooth qualification	v5.2	v5.2	v5.2	v5.1	v5.1	v5.1	v5.1	v5.1	v5.1	v5.0	
Bluetooth Low Energy	•	•	•	•	•	•	•	•	•	•	
Thread / Zigbee	•	•	•	•	•	•					
NFC	•	•	•	•	•	•	•	•	•	•	
Max range [meters]	700	700	700	1400	1400	1400	1400	1400	1400	160 / 190 *	
Bluetooth output power EIRP [dBm]	8	8	5	10	10	10	10	10	10	5 / 8 *	
Antenna type (see footnotes)	U,FL	pin	pcb	U,FL	pin	pcb	U,FL	pin	pcb	chip / pin	
Application software											
u-connectXpress							•	•	•	•	
Open CPU for embedded applications	•	•	•	•	•	•				•	
Interfaces											
UART	◆	◆	◆	◆	◆	◆	2	2	2	1	◆
SPI	◆	◆	◆	◆	◆	◆					◆
I2C	◆	◆	◆	◆	◆	◆					◆
I2S	◆	◆	◆	◆	◆	◆					◆
USB	◆	◆	◆	◆	◆	◆					◆
PDM and PWM	◆	◆	◆	◆	◆	◆					◆
AD converters [number of bits]	12	12	12	12	12	12					12
GPIO pins	48	48	48	40	40	40	28	28	28	11	25
Features											
Direction finding (AoA/AoD)	◆	◆	◆	◆	◆	◆	•	•	•		
Bluetooth long range	◆	◆	◆	◆	◆	◆	•	•	•		
AT command interface							•	•	•	•	
MCU (see footnotes)	Dual-core Arm® Cortex®-M33			M4F	M4F	M4F					M4F
RAM [kB]	512 / 64 *			128	128	128					64
Flash [kB]	1024 / 256 *			512	512	512					512
Arm TrustZone®	◆	◆	◆								
Arm CryptoCell™-312 and KMU	◆	◆	◆								
Low Energy Serial Port Service							•	•	•	•	
Simultaneous GATT server and client	◆	◆	◆	◆	◆	◆	•	•	•	•	◆
Throughput [Mbit/s]	1.4	1.4	1.4	1.4	1.4	1.4	0.8	0.8	0.8	0.8	1.4
Maximum Bluetooth connections	>20	>20	>20	20	20	20	8	8	8	7	20
Bluetooth mesh	◆	◆	◆	◆	◆	◆					◆
Secure boot	◆	◆	◆	◆	◆	◆	•	•	•		
FOTA	◆	◆	◆	◆	◆	◆					◆

pcb = Internal PCB antenna
pin = Antenna pin
chip = Internal chip antenna

U,FL = U,FL antenna connector
M4F = 64 MHz Arm® Cortex-M4 with FPU
KMU = Key management unit

◆ = Feature enabled by hardware. The actual support depends on the open CPU application software.
* = Application / Network core with 128 or 64 MHz

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	Bluetooth										
	NINA-B301	NINA-B302	NINA-B306	NINA-B311	NINA-B312	NINA-B316	NINA-B221	NINA-B222	NINA-B111	NINA-B112	
Grade											
Automotive											
Professional	•	•	•	•	•	•	•	•	•	•	
Standard											
Physical											
Image											
Size [mm]	10.0 x 11.6 x 2.2 / 10.0 x 15.0 x 3.8 / 10.0 x 15.0 x 2.2						10 x 10.6 x 2.2 / 10 x 14.0 x 3.8				
Operating temperature [°C]	-40 to +85						-40 to +85				
Radio											
Chip inside	nRF52840						ESP32		nRF52832		
Bluetooth qualification	v5.0	v5.0	v5.0	v5.0	v5.0	v5.0	v4.2	v5.0	v5.0	v5.0	
Bluetooth Low Energy	•	•	•	•	•	•	•	•	•	•	
Bluetooth BR/EDR							•	•			
Thread / Zigbee	•	•	•								
NFC	•	•	•	•	•	•			•	•	
Max range [meters]	1400	1400	1400	1400	1400	1400	200	200	350	350	
Bluetooth output power EIRP [dBm]	10	10	10	10	10	10	8	8	7	6	
Antenna type (see footnotes)	pin	metal	pcb	pin	metal	pcb	pin	metal	pin	metal	
Application software											
u-connectXpress				•	•	•	•	•	•	•	
Open CPU for embedded applications	•	•	•							•	•
Interfaces											
UART	◆	◆	◆	2	2	2	1	1	1	◆	
SPI	◆	◆	◆							1	1
I2C	◆	◆	◆								
I2S	◆	◆	◆								
USB	◆	◆	◆								
PDM and PWM	◆	◆	◆								
AD converters [number of bits]	12	12	12								
GPIO pins	38	38	38	28	28	28	16	16	7	19	
Features											
AT command interface				•	•	•	•	•	•	•	
MCU (see footnotes)	M4F	M4F	M4F							M4F	M4F
RAM [kB]	256	256	256							64	64
Flash [kB]	1024	1024	1024							512	512
Low Energy Serial Port Service							•	•	•	•	
Simultaneous GATT server and client	◆	◆	◆	•	•	•	•	•	•	◆	
Throughput [Mbit/s]	1.4	1.4	1.4	0.8	0.8	0.8	1.0	1.0	0.8	1.4	
Maximum Bluetooth connections	20	20	20	8	8	8	8	8	7	20	
Bluetooth mesh	◆	◆	◆	•	•	•			◆	◆	
Secure boot	◆	◆	◆	•	•	•	•	•			
FOTA	◆	◆	◆							◆	◆

pin = Antenna pin
pcb = Internal PCB antenna

metal = Internal metal PIFA antenna
M4F = 64 MHz Arm® Cortex-M4 with FPU

◆ = Feature enabled by hardware. The actual support depends on the open CPU application software.

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Stand-alone Bluetooth modules



	Bluetooth									
	BMD-360	BMD-380	BMD-340	BMD-341	BMD-345	BMD-350	BMD-301	BMD-300	BMD-330	R41Z
Grade										
Automotive										
Professional										
Standard	•	•	•	•	•	•	•	•	•	•
Physical										
Image										
Size [mm]	9.8 x 14.0 x 1.9	7.5 x 9.5 x 1.5	10.2 x 15.0 x 1.9			6.4 x 8.6 x 1.5	9.8 x 14.0 x 1.9			10.6 x 16.2 x 2.1
Operating temperature [°C]	-40 to +85									
Radio										
Chip inside	nRF52811	nRF52840				nRF52832			nRF52810	KW41Z
Bluetooth qualification	v5.1	v5.1	v5.0	v5.0	v5.0	v5.0	v5.0	v5.0	v5.0	v4.2
Bluetooth Low Energy	•	•	•	•	•	•	•	•	•	•
Thread / Zigbee	•	•	•	•	•					•
NFC		•	•	•	•	•	•	•		
Max range [meters]	200	500	500	750	1000	190	400	200	200	150
Bluetooth output power EIRP [dBm]	3	7	7	11	18	5	9	3	3	3
Antenna type (see footnotes)	pcb	chip	pcb	U.FL	U.FL	chip	U.FL	pcb	pcb	pcb
Application software										
u-connectXpress										
Open CPU for embedded applications	•	•	•	•	•	•	•	•	•	•
Interfaces										
UART	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
SPI	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
I2C	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
I2S		◆	◆	◆	◆	◆	◆	◆		
USB		◆	◆	◆	◆					◆
PDM and PWM	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
AD converters [number of bits]	12	12	12	12	12	12	12	12	12	16
GPIO pins	32	44	48	48	44	32	32	32	32	25
Features										
Direction finding (AoA/AoD)	◆									
Bluetooth long range	◆	◆	◆	◆	◆					
AT command interface										
MCU (see footnotes)	M4	M4F	M4F	M4F	M4F	M4F	M4F	M4F	M4	M0+
RAM [kB]	24	256	256	256	256	64	64	64	24	128
Flash [kB]	192	1024	1024	1024	1024	512	512	512	192	512
Low Energy Serial Port Service										
Simultaneous GATT server and client	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Throughput [Mbit/s]	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Maximum Bluetooth connections	4	20	20	20	20	20	20	20	4	2
Bluetooth mesh		◆	◆	◆	◆	◆	◆	◆		
Secure boot		◆	◆	◆	◆					
FOTA	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

pin = Antenna pin

pcb = Internal PCB antenna

* = Different values for use with internal or external antenna

chip = Internal PCB antenna

metal = Internal metal PIFA antenna

U.FL = U.FL antenna connector

M0+ = 48 MHz Arm® Cortex-M0+

M4 = 64 MHz Arm® Cortex-M4

M4F = 64 MHz Arm® Cortex-M4 with FPU

◆ = Feature enabled by hardware. Actual support depends on the open CPU application software.

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Stand-alone short range radio modules



	Multiradio (Wi-Fi and Bluetooth)									Wi-Fi		
	ODIN-W260	ODIN-W262 ODIN-W263	NINA-W151	NINA-W152	NINA-W156	NINA-W101	NINA-W102	NINA-W106	NINA-W131	NINA-W132		
Grade												
Automotive												
Professional	•	•	•	•	•	•	•	•	•	•	•	•
Standard												
Physical												
Image												
Size [mm]	14.8 x 22.3 x 3.2 / 4.7			10.0 x 10.6 x 2.2 / 10.0 x 14.0 x 3.8 / 10.0 x 14.0 x 2.2								
Operating temperature [°C]	-40 to +85											
Radio												
Chip inside	WL1837		ESP32			ESP32			ESP32			
Bluetooth qualification	v4.2		v4.2			v4.2						
Bluetooth Low Energy	•	•	•	•	•	•	•	•				
Bluetooth BR/EDR	•	•	•	•	•	•	•	•				
Bluetooth output power EIRP [dBm]	14	11	8	8	8	8	8	8				
Wi-Fi 2.4 / 5 [GHz]	2.4 and 5	2.4 and 5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
Wi-Fi IEEE 802.11 standards	a/b/g/n	a/b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n
Wi-Fi output power EIRP [dBm]	18	15	18	18	18	18	18	18	18	18		
Max Wi-Fi range [meters]	300	250	500	400	400	500	400	400	500	400		
Antenna type (see footnotes)	U.FL	metal	pin	metal	pcb	pin	metal	pcb	pin	metal		
Application software												
u-connectXpress	•	•	•	•	•						•	•
Open CPU for embedded apps						•	•	•				
Interfaces												
UART	1	1	1	1	1	◆	◆	◆	1	1		
SPI			1	1	1	◆	◆	◆	1	1		
I2C						◆	◆	◆				
I2S						◆	◆	◆				
RMII	1	1	1	1	1	◆	◆	◆	1	1		
GPIO pins	23	23	16	16	18	24	24	26	16	16		
AD converters [number of bits]						12	12	12				
Features												
AT command interface	•	•	•	•	•						•	•
Point-to-Point Protocol	•	•	•	•	•	◆	◆	◆	•	•		
Low Energy Serial Port Service	•	•	•	•	•	◆	◆	◆				
MCU (see footnotes)						LX6	LX6	LX6				
RAM [kB]						520	520	520				
Flash [kB]						2048	2048	4096				
Wi-Fi throughput [Mbit/s]	20	20	13	13	13 *	25	25	25 *	16	16		
Maximum Bluetooth connections	7	7	8	8	8	8	8	8				
Micro Access Point [max stations]	10	10	10	10	10	10	10	10	10	10		
Wi-Fi enterprise security	•	•	•	•	•	◆	◆	◆	•	•		
End-to-end security (TLS)	•	•	•	•	•	◆	◆	◆	•	•		
Secure boot			•	•	•	◆	◆	◆	•	•		
WPA3			•	•	•	◆	◆	◆	•	•		

U.FL = U.FL connector(s) for external antenna
pin = Antenna pin
metal = internal metal PIFA antenna
pcb = Internal PCB antenna

LX6 = 240 MHz dual-core Xtensa LX6
* = Limited to 8 Mbit/s in Wi-Fi receive

◆ = Feature enabled by hardware. The actual support depends on the open CPU application software.

Host-based short range radio modules



	Wi-Fi			Multiradio (Wi-Fi and Bluetooth)		
	LILY-W131	LILY-W132	LILY-W133	MAYA-W160	MAYA-W161	MAYA-W166
Grade						
Automotive						
Professional	•	•	•	•	•	•
Standard						
Physical						



Size [mm]	10.0 x 14.0 x 2.2 / 3.8			10.4 x 14.3 x 2.5		
Operating temperature [°C]	-40 to +85			-40 to +85		
Radio						
Chip inside	NXP 88W8801			NXP IW416		
Bluetooth qualification				v5.0		
Bluetooth profiles				HCI		
Bluetooth BR/EDR				•	•	•
Bluetooth Low Energy				•	•	•
Bluetooth output power conducted [dBm]				10	10	10
Wi-Fi output power conducted [dBm]				18	18	18
Wi-Fi IEEE 802.11 standards	b/g/n	b/g/n	b/g/n	a/b/g/n		
Wi-Fi 2.4 / 5 [GHz]	2.4	2.4	2.4	2.4 and 5		
LTE filter	•					
Antenna type (see footnotes)	pin	metal	metal	2 U.FL	2 pins	pcb
Channel width [MHz]	20	20	20			
OS support						
Android / Linux drivers	Android and Linux			•	•	•
RTOS (via NXP i.MX RT MCUs)				•	•	•
Interfaces						
High-speed UART ^a				1	1	1
PCIe ^w				1	1	1
SDIO [version] ^w	v2	v2	v2	v3	v3	v3
USB 2.0	1	1	1			
PCM (Bluetooth audio)				1	1	1
Features						
Bluetooth long range				•	•	•
Micro Access Point [max connects]	8	8	8	8	8	8
AES hardware support	•	•	•			
Wi-Fi direct	•	•	•	•	•	•
Wi-Fi 802.11mc				•	•	•
WPA3	•	•	•	•	•	•
Factory-assigned MAC address in OTP	•	•	•	•	•	•
Factory calibrated RF in OTP	•	•	•	•	•	•

B = Bluetooth only
W = Wi-Fi only

pin = pin for external antenna
metal = Metal PIFA antenna

U.FL = U.FL connector(s) for external antenna
pcb = Internal PCB antenna

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Host-based short range radio modules



	Multiradio (Wi-Fi and Bluetooth)								
	JODY-W374	JODY-W377	JODY-W263	JODY-W163	JODY-W164	JODY-W167	EMMY-W161	EMMY-W163	EMMY-W165
Grade									
Automotive	•	•	*	•	•	•	•	•	•
Professional	•	•	•				•	•	•
Standard									
Physical									



Size [mm]	13.8 x 19.8 x 2.5						13.8 x 19.8 x 2.5		
Operating temperature [°C]	-40 to +85						-40 to +85		
Radio									
Chip inside	NXP 88Q9098 / NXP 88W9098		NXP 88W8987	CYW 89359			NXP 88W8887A		
Bluetooth qualification	v5.1		v5.0	v5.0 (without optional features)			v4.2		
Bluetooth profiles	HCI		HCI	HCI			HCI		
Bluetooth BR/EDR	•	•	•	•	•	•	•	•	•
Bluetooth Low Energy	•	•	•	•	•	•	•	•	•
Wi-Fi IEEE 802.11 standards	a/b/g/n/ac/ax		a/b/g/n/ac	a/b/g/n/ac			a/b/g/n/ac		
Wi-Fi 2.4 / 5 [GHz]	2.4 and 5		2.4 and 5	2.4 and 5			2.4 and 5		
LTE filter	o	o	o	o	o		•		
Bluetooth output power conducted [dBm]	10	10	10	10	10	10	10	10	10
Wi-Fi output power conducted [dBm]	18	18	18	18	18	18	18	18	18
Antenna type (see footnotes)	2p	3p	2p	2p	2p	3p	pin	2p	pin
OS support									
Android / Linux drivers	•	•	•	•	•	•	•	•	•
QNX (via third party)				•	•	•	•	•	•
Interfaces									
High-speed UART ^B	1	1	1	1	1	1	1	1	1
PCIe ^W	1	1			1	1			
SDIO [version] ^W	v3	v3	v3	v3			v3	v3	v3
PCM (Bluetooth audio)	1	1	1	1	1	1	1	1	1
Features									
Bluetooth long range	•	•							
Micro Access Point [max connects]	32	32	8	10	10	10	10	10	10
AES hardware support	•	•	•	•	•	•	•	•	•
Wi-Fi direct	•	•	•	•	•	•	•	•	•
Wi-Fi 802.11 mc	•	•							
WPA3	•	•	•						
Factory-assigned MAC address in OTP	•	•	•	•	•	•	•	•	•
Factory calibrated RF in OTP	•	•	•	•	•	•	•	•	•
Simultaneous STA/AP roles	DRCS	DRCS		•	•	•	DRCS	DRCS	DRCS
Concurrent dual band	•	•		•	•	•			

B = Bluetooth only
W = Wi-Fi only

pin = 1 antenna pin for combined Bluetooth and Wi-Fi
2p = 2 antenna pins, one each for Bluetooth and Wi-Fi
3p = 3 pins, 2 for Wi-Fi and 1 for Bluetooth antenna

* = Operating temperature -40 °C to +105 °C
DRCS = Dynamic Rapid Channel Switching

o = On request

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