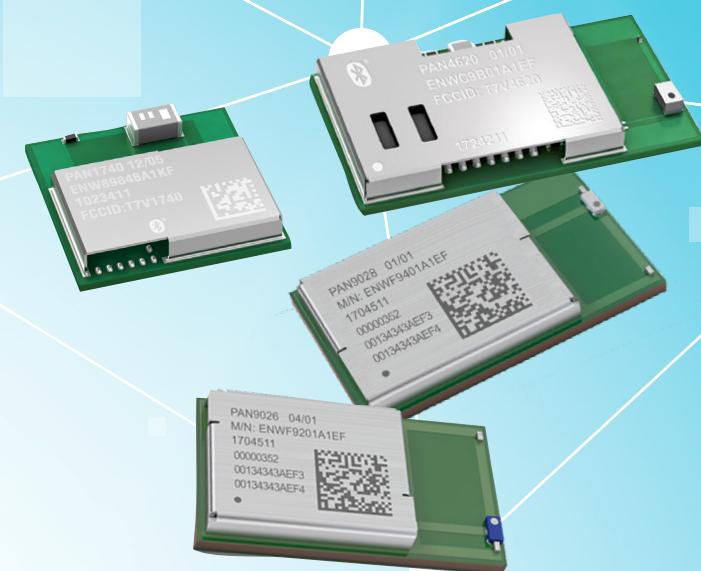


Wireless Connectivity Solutions

**IN Your
Future**



Ready-To-Use Modules with Built-In, Bluetooth Technology



Panasonic's Bluetooth Modules, engineered for challenging RF environments, offer seamless integration into a variety of electronic devices. They feature high data transmission rates, extended communication range, low power consumption (under 4mA), and standardized interfaces. Enhanced by Bluetooth 5.3, they deliver a faster symbol rate of 2 Mbps with the LE 2M PHY or an extended range with the LE Coded PHY at 125 kb/s, optimizing both speed and efficiency.

Bluetooth Low Energy			
Bluetooth Low Energy, Thread, Mesh Networking and NFC			
	PAN1780 Series	PAN1780-AT Series	PAN1770 Series
Part Number	ENW-89854A1KF	ENW-89854A3KF	ENW-89854C1KF
RF Category	Bluetooth® Low Energy v5.4 + Thread + NFC	Bluetooth® Low Energy v5.4 + Thread + NFC + AT Commands	Bluetooth Low Energy v5.3 + Thread + NFC
Controller	nRF52840	nRF52840	nrf52840
Size [mm]	15.6 x 8.7 x 2	15.6 x 8.7 x 2	15.6 mm x 8.7 mm x 2.05 mm
Rx Sensitivity [dBm]	-95 @ 1Mbps -103 @ 125kbps	-95 @ 1Mbps -103 @ 125kbps	-95 dBm @ 1Mbps -103 dBm @ 125 kbps
Tx Power (max.) [dBm]	+8	+8	+8
Power Supply [V]	1.7 to 5.5	1.7 to 5.5	1.7 V to 5.5
Current Consumption	Tx: 4.8mA Rx: 4.8mA Sleep Mode: <1µA	Tx: 4.8mA Rx: 4.8mA Sleep Mode: <1µA	Tx: 4.8 mA Rx: 4.8mA Sleep Mode: <1µA
Interfaces	GPIO, UART, QSPI, I2C, ADC, PDM, PWM, NFC-A, USB2.0	GPIO, UART, QSPI, I2C, ADC, PDM, PWM, NFC-A, USB2.0	GPIO, UART, QSPI, I2C, ADC, PDM, PWM, NFC-A, USB2.0
Microcontroller And Memory	ARM® Cortex®-M4F 256kB RAM, 1MB Flash	ARM® Cortex®-M4F 256kB RAM, 1MB Flash	ARM® Cortex®-M4F 256 kB RAM, 1MB Flash
Type	Autonomous ⁴	Autonomous ⁴	Autonomous
Module Pre-certification	FCC, ISED, CE	FCC, ISED, CE	FCC, ISED, CE RED
Operating Temp. [°C]	-40 to +85	-40 to +85	-40 to +85
Evaluation Kit	Available		

Notes: 1. All BlueTooth Special Interest Group LE profiles 2. Place And Play – Integrated Microcontroller, API And Bluetooth Controller 3. Host Controlled Interface – Microcontroller And Bluetooth Stack Are Required

4. Autonomous – Stand Alone Operation 5. BRSP-Blue Radios Serial Port

Plug-and-Play Modules Featuring Integrated Bluetooth Technology



Bluetooth Low Energy v5.3 is equipped with advanced direction-finding capabilities, including Angle of Arrival (AoA) and Angle of Departure (AoD), making it ideal for use in challenging RF environments. Panasonic's Bluetooth Modules, compatible with this technology, are versatile enough to be integrated into various electronic devices. They offer several key advantages, such as high data transfer speeds, extended operational range, and low power usage, while maintaining standard hardware and software interfaces for easy interchangeability.

Bluetooth Low Energy				
Bluetooth Low Energy, Thread, Mesh Networking and NFC				
	PAN1781 Series *	PAN1782 Series	PAN1783 Series	PANB511-1x Series +
Part Number	ENW-89857A1KF	ENW-89858A1KF	ENW-89860A1KF	
RF Category	Bluetooth® Low Energy v5.4 + Thread	Bluetooth® Low Energy v5.4 + Thread + NFC	Bluetooth® Low Energy v5.4 + Thread + NFC	Bluetooth® Low Energy 6.0 + Thread
Controller	nRF52820	nrf52833	nrf5340	nRF54L15
Size [mm]	15.6 x 8.7 x 2	15.6 mm x 8.7 mm x 2 mm	15.6 mm x 8.7 mm x 2 mm	10.35mm x 9.6mm
Rx Sensitivity [dBm]	-95 @ 1Mbps -103 @ 125kbps	-96 dBm @ 1Mbps -103 dBm @ 125 kbps	-97 dBm @ 1Mbps -103 dBm @ 125 kbps	-98 dBm
Tx Power (max.) [dBm]	+8	+8	+3	+8 dBm
Power Supply [V]	1.7 to 5.5	1.7 V to 5.5	1.7 V to 5.5	1.7 to 2.7
Current Consumption	Tx: 4.9mA Rx: 4.7mA Sleep Mode: <1µA	Tx: 4.9 mA Rx: 4.7mA Sleep Mode: <1µA	Tx: 3.4 mA Rx: 2.7mA Sleep Mode: <1µA	TBD
Interfaces	GPIO, UART, SPI, I2C, USB2.0, QDEC	GPIO, UART, QSPI, I2C, ADC, PDM, PWM, NFC-A, USB2.0	GPIO, UART, QSPI, I2C, ADC, PDM, PWM, NFC-A	SPI, I ² C, UART, PWM, ADC (up to 14-bit), NFC, QSPI
Microcontroller And Memory	ARM® Cortex®-M4 32kB RAM, 256kB Flash	ARM® Cortex®-M4F 128 kB RAM, 512kB Flash	Dual Core ARM® Cortex®-M33 512kB RAM, 1MB Flash 64kB RAM, 256kB Flash	ARM® Cortex®-M33 1.5MB RRAM, 256 kB RAM
Type	Autonomous ⁴	Autonomous	Autonomous	Autonomous
Module Pre-certification	FCC, ISED, CE	FCC, ISED, CE RED, MIC, KCC, RSM	FCC, ISED, CE RED	FCC, ISED, CE RED
Operating Temp. [°C]	-40 to +85	-40 to +85	-40 to +85	-40 to +85
Evaluation Kit	Available			

Notes: 1. All BlueTooth Special Interest Group LE profiles 2. Place And Play – Integrated Microcontroller, API And Bluetooth Controller 3. Host Controlled Interface – Microcontroller And Bluetooth Stack Are Required

4. Autonomous – Stand Alone Operation 5. BRSP-Blue Radios Serial Port

*PAN1781AoA will be available with AoA software from IOSEA for asset tracking

+All specifications are tentative to change

Accelerate Speed-to-Market with Innovative Wireless Technology



Panasonic's Wireless Connectivity solutions are set to transform the industry by simplifying and accelerating product development. Their comprehensive range of RF Modules supports all key communication protocols, offering easy-to-use devices for Bluetooth Low Energy, Dual Mode, and Mesh Networking. These advanced solutions enable design engineers to seamlessly integrate wireless communication into their projects, regardless of their expertise in wireless design, marking a significant advancement in the field.

Bluetooth Low Energy		Bluetooth Dual Mode:		Mesh Networking
Robust Low Data Rate, Low Power Consumption		Bluetooth Classic, Bluetooth Low Energy		Bluetooth Mesh
	PAN1740 Series	PAN1740A Series	PAN1326C2 Series	PAN4620 Series
				
Part Number	ENW-89846A1KF	ENW-89852A1KF	ENW-89823xxKF	ENW-C9B01A1EF
RF Category	Bluetooth® Low Energy v4.2	Bluetooth® Low Energy v5.0	Bluetooth® v4.2 Dual Mode (BR, EDR, LE)	Bluetooth® Low Energy v4.2 + Thread
Controller	DA14580	DA14585	CC2564C	NXP KW41Z
Size [mm]	9.0 x 9.5 x 1.8	9.0 x 9.5 x 1.8	9.0 x 9.5 x 1.8	15.6 x 8.7 x 1.9
Rx Sensitivity [dBm]	-93 dBm	-93 @ 1MB/s	-93 dBm	BLE: -95 @ 1Mbps 802.15.4: -100 @ 250kbps
Tx Power (max.) [dBm]	+0	+0	+10/+8	+3.5
Power Supply [V]	2.35 to 3.3	2.35 to 3.3	1.8 to 4.8	1.8 to 4.2
Current Consumption	Tx: 4.9mA Rx: 4.9mA Sleep Mode: <1µA	Tx: 4.9mA Rx: 4.9mA Sleep Mode: <1µA	Tx, EDR: 40mA Sleep Mode: 135µA	Tx: 7.6mA Rx: 8.5mA Low power mode: <250µA
Interfaces	GPIO, UART, SPI, I ² C, 3-axis QD, ADC	GPIO, UART, SPI, I ² C, 3-axis QD, ADC	GPIO, PCM, UART	GPIO, UART, SPI, I ² C, ADC, DAC, TSI
Microcontroller And Memory	ARM® Cortex®-M0 42kB SRAM, 32kB Flash	ARM® Cortex®-M0 96kB SRAM, 64kB OTP	N/A	ARM® Cortex® M0+ 128kB SRAM, 512kB Flash
Host Controlled Interface	Autonomous ⁴	Autonomous ⁴	Autonomous ⁴	Autonomous ⁴
Module Pre-certification	FCC, ISED, CE, ETA, MIC	FCC, ISED, CE	FCC, ISED, CE for C2 version only	FCC, ISED, CE
Operating Temp. [°C]	-40 to +85	-40 to +85	-40 to +85	-40 to +85
Evaluation Kit	Available			

Notes: 1. All BlueTooth Special Interest Group LE profiles 2. Place And Play – Integrated Microcontroller, API And Bluetooth Controller 3. Host Controlled Interface – Microcontroller And Bluetooth Stack Are Required
4. Autonomous – Stand Alone Operation 5. BRSP-Blue Radios Serial Port

Long Range, High Data Rates, Secure Connections with Panasonic Wi-Fi Modules

Adding Wi-Fi connectivity to a design has never been easier. Panasonic Wi-Fi Modules provide fast implementation of 802.11 bgn and combo Wi-Fi plus Bluetooth Dual Mode in your designs. Panasonic Wi-Fi Modules are cost effective and flexible system-on-chip (SoC) designs, with an optional integrated webserver, certificate based security and simultaneous access point and infrastructure modes. Panasonic Wi-Fi Modules offer the perfect blend of long life, reliability and performance.

Host Controlled Wi-Fi Modules			
Wi-Fi Combo BT Dual Band Enabling Simultaneous Multi-Protocol Data Communication			
	PAN9026 Series	PAN9028 Series	PAN9019/PAN9019A Series
			 NEW!
Part Number	ENW-F9202A1EF (EU) ENW-F9201A1EF (US) ENW-F9203A1EF (CA) ENW-F9208A1EF (Multi-region)	ENW-F9408A1EF (With PMIC) ENW-F9408A2EF (Without PMIC)	ENW-F9501C1KF (PAN9019) ENW-F9511C1KF (PAN9019A)
RF Category	Wi-Fi® Radio 2.4 GHz & 5.0 GHz 802.11 a/b/g/n And Bluetooth® 5.0 (BR, EDR, LE)	Wi-Fi® Radio 2.4 GHz & 5.0 GHz 802.11 a/b/g/n/ac And Bluetooth® 5.2 (BR, EDR, LE)	Wifi Radio 2.4GHz & 5 GHz 802.11 a/b/g/n/ac/ax + Bluetooth® 5.2 (BR, EDR, LE) + (802.15.4, A version only)
Used ICs	88W8977	88W8987	IW611 (PAN9019) / IW612 (PAN9019A)
Size [mm]	17.5 x 10.0 x 2.6	24.0 x 12.0 x 2.8	15.3 mm x 12 mm x 2.5 mm
Rx Sensitivity [dBm]	-98 @ 1M-DSSS	-98 @ 1M-DSSS	-98 dBm @ 802.11.b 1Mbps
Tx Power (max.) [dBm]	+17 @ IEEE 802.11b	+16 @ IEEE 802.11b	+18 dBm 802.11b
Power Supply [V]	1.8 to 3.3	3.3 with PMIC 1.1, 1.8, 2.2, 3.3 without PMIC	1.8 to 3.3
Interfaces	SDIO 3.0, HS UART, PCM	GPIO, SDIO 3.0, HS UART, PCM	GPIO, SDIO 3.0, HS UART, I2C/PCM, PDN
Microcontroller And Memory	N/A	N/A	N/A
Centre Frequency [MHz]	2,400 And 5,000	2,400 And 5,000	2,400 and 5,000
Module Pre-certification	FCC, ISED, CE	FCC, ISED, CE	FCC, ISED, CE RED
Operating Temp. [°C]	-30 to +85	-30 to +85	-40 to +85
Evaluation Kit	Available		

The Latest Wi-Fi Modules with Extended Range, Enhanced Data Speeds and Secure Connectivity

Integrating Wi-Fi into your projects is now more straightforward than ever, thanks to the cost-effective and versatile system-on-chip (SoC) solutions provided by Panasonic Wi-Fi Modules. These modules boast an optional integrated webserver and certificate-based security, simultaneously supporting access points and infrastructure modes. With Panasonic Wi-Fi Modules, you're guaranteed an ideal mix of durability, reliability, and high performance.

Host Controlled Wi-Fi Modules		Embedded Wi-Fi
Wi-Fi Combo BT Dual Band Enabling Simultaneous Multi-Protocol Data Communication		
	PANW601-1B Series ⁺  Coming Soon	PANW602-1x Series ⁺  Coming Soon
Part Number		PAN9520 Series 
RF Category	Wi-Fi® Radio 2.4 GHz, 5.0 GHz, & 6.0 GHz 802.11 a/b/g/n/ac/ax And Bluetooth® 5.3 (BR, EDR, LE)	Wi-Fi® Radio 2.4 GHz 802.11 a/b/g/n/ac/ax and BLE 5.4
Used ICs	SYN43711	CC3301
Size [mm]	12.2 x 9.9 x 2.55	8.8 x 10
Rx Sensitivity [dBm]	TBD	-98 dB @ 802.11b 2 Mbit/s DSSS
Tx Power (max.) [dBm]	TBD	+20
Power Supply [V]	TBD	1.8 to 3.3
Interfaces	SDIO 3.0, PCIe 3.0, HS UART	SDIO 3.0, HSUART
Microcontroller And Memory	N/A	N/A
Frequency Band [MHz]	2,400, 5,000, and 6,000	2,400
Module Pre-certification	FCC, ISED, CE RED, UKCA, MIC, RCM	FCC, ISED, CE RED, UKCA, MIC, RCM
Operating Temp. [°C]	-40 to +85	-40 to +85

⁺All specifications are tentative to change

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