

# Integrated MCU with RF Transmitter on a Single Chip

**PIC12F529T48A/T39A, PIC12LF1840T48A/T39A**

## Summary

Many wireless applications typically operate in highly constrained environments where the available energy resources are scarce and long battery life is highly desirable. Some of the key considerations when selecting a wireless device are power consumption, form factor and cost.

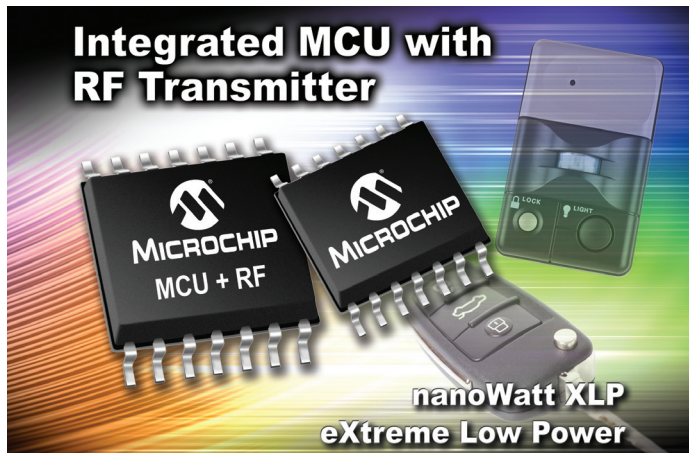
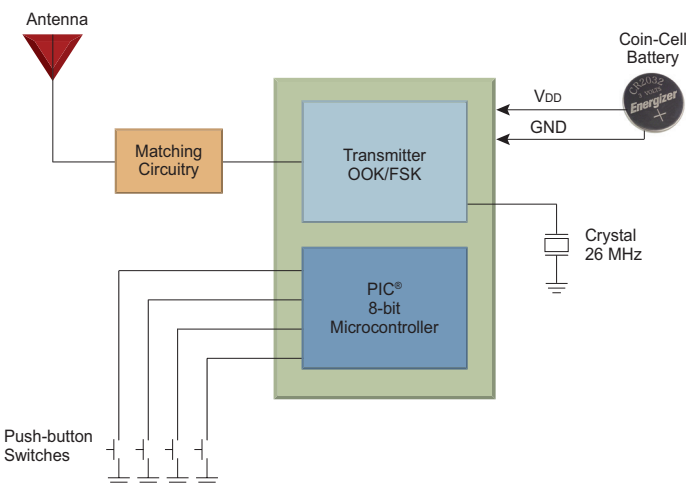
Microchip's nanoWatt XLP MCU + RF Transmitter is aptly suited for such applications and was designed by Microchip with many of these requirements in mind.

This device combines a low power Flash microcontroller with a wireless enabling RF transmitter, into a single 14-pin package. This streamlined packaging helps designers solve both their power consumption and product footprint problems within one feature rich device.

Part Name	Program Memory	Frequency
PIC12F529T48A	2.3K	418–868 MHz
PIC12LF1840T48A	7.1K	418–868 MHz
PIC12F529T39A	2.3K	310–928 MHz
PIC12LF1840T39A	7.1K	310–928 MHz

The above products are ideal for developing low cost and extremely low power wireless applications such as remote keyless entry (automotive, garage doors), security systems (alarm keypads, access control, wireless security sensors) or remote monitoring.

Designers may also add Microchip's proprietary, royalty free KEELoq® code hopping technology, an industry proven technology used worldwide by leading manufacturers, to provide additional security to their applications. The relatively small code size is highly configurable and can easily be scaled to provide secure solutions to various markets.



## Features

- Operating Voltage 1.8V–3.6V\*
- Operating temp –40°C to 85°C: Industrial
- 14-pin TSSOP package
- 6 GPIO pins
- Self read/write Flash\*
- Internal 32 MHz clock\*

## Microcontroller Features

- Up to 7K of program Flash memory
- Up to 256 bytes of RAM memory
- Up to 256 bytes of EEPROM memory

## RF Transmitter Features

- Fully Integrated Transmitter
- Operation in 310–928 MHz
- FSK operation up to 100 kbps
- OOK operation up to 10 kbps

## Applications

- Garage door opener
- Tire pressure monitoring sensors
- Automotive Remote Keyless Entry (RKE) systems
- Automotive alarm system
- Remote key pads
- Security and safety sensors
- Wireless sensors
- Remote control

\* PIC12LF1840TXXA parts only



## Transmitters

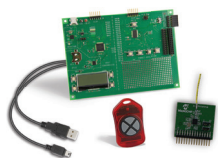
Product	Frequency	Modulation	Program Flash	Pins	Data Rate	Output Power	Tx Power Consumption	Standard Operating Voltage
PIC12F529T48A	418, 434, 868 MHz	OOK/FSK	2.3 KB	14	100 kbps	+10 dBm	16.67 mA @ 10 dBm	2V–3.7V
PIC12LF1840T48A	418, 434, 868 MHz	OOK/FSK	7.1 KB	14	100 kbps	+10 dBm	16.5 mA @ 10 dBm	1.8V–3.6V
PIC12F529T39A	310–928 MHz	OOK/FSK	2.3 KB	14	100 kbps	+10 dBm	15.17 mA @ 10 dBm	2V–3.7V
PIC12LF1840T39A	310–928 MHz	OOK/FSK	7.1 KB	14	100 kbps	+10 dBm	16.5 mA @ 10 dBm	1.8V–3.6V
rfPIC12F675K	290–350 MHz	ASK/FSK	1.7 KB	20	40 kbps	+10 dBm	14 mA @ 6 dBm	2V–5.5V
rfPIC12F675F	380–450 MHz	ASK/FSK	1.7 KB	20	40 kbps	+10 dBm	14 mA @ 6 dBm	2V–5.5V
rfPIC12F675H	850–930 MHz	ASK/FSK	1.7 KB	20	40 kbps	+10 dBm	14 mA @ 6 dBm	2V–5.5V

## Transceivers and Modules

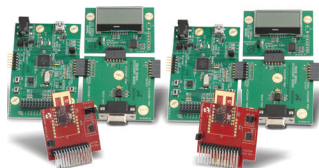
Product	Agency Certification	Frequency	Sensitivity	Output Power	Tx Power Consumption	Rx Power Consumption	Interface	MAC/Sleep/TSSI	Encryption	Antenna	Standard Operating Voltage
MRF24J40MA	FCC/ETSI/IC	2.4 GHz	–94 dBm	0 dBm	23 mA	19 mA	4 wire SPI	Yes	AES-128	PCB	2.4V–3.6V
MRF24J40MB	FCC/ETSI/IC	2.4 GHz	–102 dBm	20 dBm	120 mA	25 mA	4 wire SPI	Yes	AES-128	Chip	2.4V–3.6V
MRF24J40MC	FCC/ETSI/IC	2.4 GHz	–108 dBm	20 dBm	120 mA	85 mA	4 wire SPI	Yes	AES-128	External	2.4V–3.6V
MRF24WB0MA	FCC/ETSI/IC	2.4 GHz	–91 dBm	10 dBm	154 mA	85 mA	4 wire SPI	Yes	AES-128	PCB	2.7V–3.6V
MRF24WB0MB	FCC/ETSI/IC	2.4 GHz	–91 dBm	10 dBm	154 mA	85 mA	4 wire SPI	Yes	AES-128	External	2.7V–3.6V
MRF89XAM8A	ETSI	868 MHz	–113 dBm	10 dBm	25 mA	3 mA	4 wire SPI	Yes	–	PCB	2.4V–3.6V
MRF89XAM9A	FCC/IC	915 MHz	–113 dBm	10 dBm	25 mA	3 mA	4 wire SPI	Yes	–	PCB	2.4V–3.6V

## Wireless Development Tools from Microchip

Part Number	Development Tool	Description
DM182017-1	Wireless Security Remote Control Development Kit: 433.92 MHz	RF one-way applications: 433.92 MHz
DM182017-2	Wireless Security Remote Control Development Kit: 868 MHz	RF one-way applications: 868 MHz
DM182017-3	Wireless Security Remote Control Development Kit: 915 MHz	RF one-way applications: 915 MHz
AC164134-1	MRF24J40MA PICtail™/PICtail Plus 2.4 GHz RF Card	MiWi™/ZigBee® board for 2.4 GHz applications
AC164134-2	MRF24J40MB PICtail/PICtail Plus 2.4 GHz RF Card	MiWi/ZigBee board for 2.4 GHz applications
AC164136-4	MRF24WB0MA WiFi PICtail/PICtail Plus Boards	Wi-Fi® Daughter board
AC164138-1	MRF89XAM8A PICtail/PICtail Plus Daughter Board	Daughter board for 868 MHz applications
AC134138-2	MRF89XAM9A PICtail/PICtail Plus Daughter Board	Daughter board for 915 MHz applications
DM182015	8-bit Wireless Development Kit	Wireless Application Development Kit
AC182015	ZENA™ Wireless Adapter	USB wireless adapter for connecting/analyzing Microchip wireless networks



**Wireless Security Remote Control Development Kit**  
433.92 MHz  
(DM182017-1)



**8-bit Wireless Development Kit**  
2.4 GHz MRF24J40  
(DM182015-1)



**ZENA™ Wireless Adapter**  
2.4 GHz MRF24J40  
(AC182015-1)



**MRF24J40MB PICtail™/PICtail Plus Daughter Board**  
(AC164134-2)



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