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欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

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商斯达工控安防网：<http://www.pc-ps.net/>

商斯达电子元器件网：<http://www.sunstare.com/>

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商斯达实业科技产品网：<http://www.sunstars.cn/> 传感器销售热线：

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-83607652 83376489 83376549 83370250 83370251 82500323

传真：0755-83376182 (0) 13902971329 MSN: SUNS888@hotmail.com

邮编：518033 E-mail: szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场 2583 号 电话：0755-83665529

技术支持：0755-83394033 13501568376



Wireless is



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Delivering M2M Around the World

WIRELESS COMMUNICATIONS

2009 / 2010 SHORT-FORM CATALOG

Revised May 27, 2010



www . RFM . com

Industrial

Commercial

Consumer

Telecom

Medical

Automotive

Military



Wireless is...RFM®

Building on three decades of experience in the design and manufacture of low-power radio frequency (RF) products, today RFM is enabling OEM design engineers to connect and network more devices, equipment, and processes than ever before.

Depth. Founded in 1979 to design and manufacture low-power RF products using surface acoustic wave (SAW) technology, RFM products now include RF communications components, subsystem short-range radios, RF modules and boxed radios for a broad range of industrial, commercial and consumer applications.

Breadth. With the acquisition of modules manufacturer Cirronet in 2006, RFM's product portfolio provides a comprehensive selection of wireless standards and proprietary-based communications and networking products.

M2M. Wireless technology is the key to machine-to-machine (M2M) connectivity. When embedded into original equipment manufacturers (OEM) next-generation products, RFM products enable end-users to connect, communicate, control and monitor wireless-enabled OEM devices over the Internet.

WEBSITE. For complete product offerings with detailed specifications, drawings, photographs, and technical information, please visit our online catalogs or request a printed catalog from our company website: **www.RFM.com**

RF Monolithics, Inc. (RFM)

Corporate Headquarters
4441 Sigma Road
Dallas, TX 75244
Phone: +1 972-233-2903
Fax: +1 972-387-8148
Email: info@rfm.com

Modules Engineering Office
3079 Premiere Parkway, Suite 140
Duluth, GA 30097
Phone: +1 678-684-2000
Fax: +1 678-684-2001

All RF Components and Short Range Radios, and most RF Modules and Boxed Radios comply with Restriction of Hazardous Substances Directive (RoHS).

All RF Modules and Boxed Radios are FCC, IC, and / or ETSI certified. Boxed products are also CE marked.

RFM RF Modules and Short-Range Radios are manufactured in ISO 9001 certified factories.

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Wireless is... RFM!

Whether you are an RF engineering expert or a product designer with little RF engineering background, RFM has the wireless products to meet your needs.

RF MODULES

Choose from a broad selection of pre-certified RF Modules from a single supplier - RFM.



In 2006 through the acquisition of Cirronet, RFM added RF Modules and Boxed Radio products to the company's product portfolio. Since then, RFM has introduced three new product families to its line of RF Module products, making RFM's RF Modules portfolio one of the most extensive in the market.

RF Modules enable original equipment manufacturers (OEMs) to quickly embed wireless communications into their products. They are attractive to OEMs that desire to save time, effort and costs associated with designing, testing, certifying, and manufacturing a radio circuit for an end-product.

RF Modules are highly cost-effective for a wide range of production levels.

See the RF Modules Product Selector Tool on page 4b to select the RF Module that best suits your application.

SAW-BASED and RFIC SHORT-RANGE RADIOS

Select from an assortment of ultra-low-power RF integrated circuits (RFICs) and surface acoustical wave (SAW) subsystem short-range radios from RFM.



RFM has been offering Short-Range Radios since the early 1990s when the company first introduced its patented Amplifier-Sequenced Hybrid (ASH) radio architecture. ASH technology integrates SAW filtering and frequency control components into a single hybrid radio which greatly simplifies and speeds up the RF design task.

In 2005 RFM introduced a line of RFICs featuring an integrated PLL, IF and Baseband circuitry which significantly minimizes external component count and greatly simplifies and speeds up design-in.

RFM Short-Range Radios are attractive to OEMs that design their own RF circuit. OEMs choose RFM Short-Range Radios for their superior performance and cost-effectiveness. They are highly cost-effective in high volume applications.

See the Short-Range Radio Product Selector Tool on page 19 to select the Short-Range Radio that best suits your application.

RF COMPONENTS

Choose from a wide variety of frequencies, bandwidths and packages from RF Components leader - RFM.



In 1979 RFM was founded as a manufacturer of SAW- and Crystal-Based RF Components used in low-power unlicensed communications equipment.

Over 30 years later, RFM continues to introduce innovative RF Component products to meet the rapidly changing needs of customers. OEMs choose RFM RF Components for their superior performance and reliability.

RFM also provides custom-designed filter components for high volume applications.



RFM RF Components come in a variety of packages (see Package Selection Guide page 39).

Should I "make"?

Should I "buy"?

OR

Whether You "Make" or "Buy" -- RFM Has What You Need

RFM is one of very few wireless communications suppliers with a depth of product portfolio that includes RF Components, Subsystem Short-Range Radios **and** RF Modules. As a result, we understand the key issues design engineers consider when making a decision to make an RF circuit from a short-range radio chip-set or to embed a third-party RF module.

Review the Product Selector Guides within this catalog (pages 5 and 19) to identify potentially suitable solutions based on your technical specifications and technology criteria. Then utilize the following as a guide to help determine if making an RF circuit from RFM's portfolio of RF Components, RFICs and SAW-based Short-range Radios is the best choice, or if embedding an RFM RF Module is preferred.

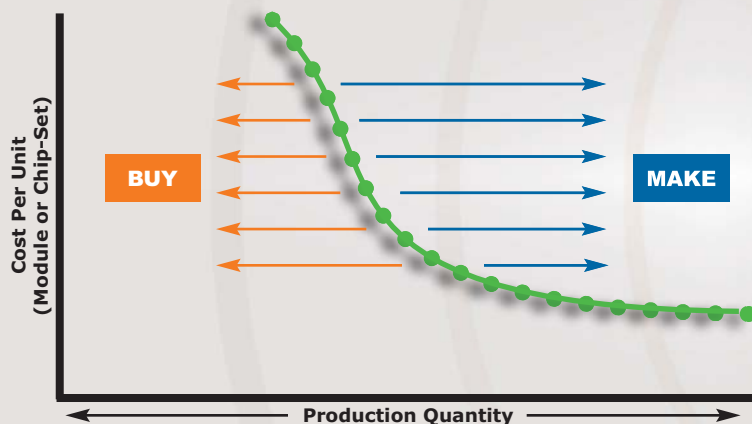
Short-Range Radios and/or RF Components are right for you if the following describes your organization*

- Access to a team experienced in obtaining unlicensed radio band certification from FCC, CI, ETSI or others
- Possess or have access (internally or externally) to expert RF engineering and / or wireless networking expertise for incorporating low-power communications into applications
- Design, engineering and testing facilities and equipment
- Possess reliable RF manufacturing capabilities or outsource to experienced contract manufacturer with RF device manufacturing capabilities that also manages ongoing RF yields in product manufacturing
- Marketing requirements demand a proprietary design, and design processes allows ample time for custom design, testing and certification

RF Modules and/or Boxed Radios are right for you if the following describes your organization*

- Need wireless solution that is pre-certified by FCC, CI, and / or ETSI and that is field-tested
- Do not possess or have access to expert RF engineering and / or wireless networking expertise for incorporating low-power communications into applications
- Lack RF design, engineering and testing facilities and equipment
- Do not want to be concerned with manufacturing RF elements or managing ongoing RF yields in product manufacturing, prefer to leave that to RF modules supplier
- Marketing requirements necessitate faster time-to-market, reduced design engineering timeframe and reduced design costs

MAKE OR BUY*



* These items are meant
to assist RFM customers in their
"Make or Buy" thought processes.

Each company must perform its own analysis
and take into consideration its own unique
situation in determining whether
to MAKE or BUY.



WIRELESS SENSOR NETWORKING



LPR2430 Series 2.4 GHz 802.15.4 Wireless Sensor Networking (page 7). Comprised of the low-power 1 mW RF power LPR2430 / LPR2430A and the extended range 100 mW RF power LPR2430ER / LPR2430ERA, the RFM LPR Series modules provide the flexibility and versatility to serve a variety of applications, from simple cable replacement to remote terminal data collection to sophisticated sensor networks. The LPR Series modules are easy to integrate and provide robust wireless communications in applications where meshing is not needed or desired. **HIGHLIGHTS:** 2.4 GHz; IEEE 802.15.4 standard; peer-to-peer, point-to-point and point-to-multipoint networks; DSSS technology; 250 kb/s data rate, 1 mW / 100 mW RF power; 30 meters / 100 meters indoor range and 100 meters / 1,000 meters outdoor range; Serial, Analog & Digital I/O including Analog & Digital I/O Binding; 0.8 to 1.5 sq. inch footprint with same form factor as RFM ZMN2430, WSN802G and XDM2140 modules.

**1 mW
Low Power**



LPR2430
OR
ZMN2430



LPR2430A OR
ZMN2430A
with Chip Antenna

**100 mW
Extended
Range**



LPR2430ER
OR
ZMN2430HP



LPR2430ERA OR
ZMN2430HPA
with Chip Antenna

ZMN2430 Series 2.4 GHz 802.15.4 ZigBee® Wireless Sensor Networking (page 8). Comprised of the low-power 1 mW RF power ZMN2430 / ZMN2430A and the high power 100 mW ZMN2430HP / LPR2430HPA, the RFM ZMN2430 Series modules are based on the IEEE 802.15.4 wireless standard and the ZigBee protocol stack. The ZMN Series modules are easy to integrate and provide robust wireless mesh networking. **HIGHLIGHTS:** 2.4 GHz; IEEE 802.15.4 / ZigBee standard; point-to-point, point-to-multipoint and MESH networks; DSSS technology; 250 kb/s data rate; 1 mW / 100 mW RF power; 30 meters / 100 meters indoor range and 100 meters / 1,000 meters outdoor range; Analog, Digital and Serial I/O; 0.8 to 1.5 sq. inch footprint with same form factor as RFM LPR2430, WSN802G and XDM2140 modules.

WSN802G 2.4 GHz 802.11b/g Wi-Fi® Wireless Sensor Networking (page 6). Ideal for building battery-powered wireless local area networking (WLAN) and sensor monitoring solutions for the global market, the WSN802G delivers an exceptionally low-power profile with long battery life capabilities in a fully functional certified radio module. RFM's full-function module firmware combined with GainSpan's SoC provide a ready-to-use, extremely low-power 802.11b/g radio at a remarkably low price. **HIGHLIGHTS:** 2.4 GHz; IEEE 802.11b/g standard; multipoint and point-to-point networks; DSSS technology; 1 Mb/s and 2 Mb/s data rates; 10 mW RF power; 30 meters typical indoor and 250 meters typical outdoor transmission ranges; Analog, Digital and Serial I/O; 1.05 sq. inch footprint with same form factor as the RFM LPR2430, ZMN2430 and XDM2140 modules.



WSN802G
PIN and Castellated
Versions Available



DNT900 / DNT2400

DNT900 (900 MHz) and DNT2400 (2.4 GHz) FHSS Multi-Function Wireless Sensor Networking (page 11). The DNT Series is a low-cost, long-range, multi-purpose, multi-function frequency hopping line of RF modules. DNT modules support analog and digital I/O and serial data, and have the ability to auto-report and sleep between reports thereby reducing power consumption. DNT modules provide a selection of over-the-air data rates and transmit power levels, thus allowing one module to work for many products. When using DNT modules, designers can be confident that the radio performance can be adjusted if needed when the design is finished without having to design-in another radio. **HIGHLIGHTS:** 900 MHz (DNT900) and 2.4 GHz (DNT2400); proprietary FHSS technology; multipoint, point-to-point, and peer-to-peer networks with store and forward repeating; configurable data rates from 38 kb/s and 500 kb/s; configurable RF power of 1 mW to 1 W (DNT900) and 1 mW to 100 mW (DNT2400); 40+ mile range (DNT900) and 5+ mile range (DNT2400) with omni-directional antennas (antenna height dependent); Analog, Digital and Serial I/O; 2.8 sq. inch footprint.



DM1810

DM1810 434 MHz and 916 MHz Low Data Rate Mesh Wireless Sensor Networking (page 5).

The DM1810 module is an inexpensive embedded solution for small mesh networking applications needing very low data rates and few nodes. Based on RFM ASH radio technology and a PIC microcontroller, the DM1810 is ideal for applications that require long-life operation on batteries.

HIGHLIGHTS: 434 MHz and 916 MHz; proprietary RFM ASH technology; mesh networks; 4.8 kb/s data rate; 10 mW RF power; 100 meters indoor and 250 meters outdoor transmission ranges; Analog, Digital and Serial I/O; <4 sq. inch footprint.



WIRELESS TELEMETRY



XDM2510H 2.4 GHz 802.15.4 WirelessHART Networking for Process Automation (page 9)

Based on Dust Networks' IA-510™ technology, the RFM XDM2510H module enables OEMs to easily and quickly add WirelessHART capability into their applications for the global process automation market. The XDM2510H combines an IEEE 802.15.4 transceiver with Time Synchronized Mesh Protocol (TSMP) plus the WirelessHART protocol to blend the reliability of self-organizing and self-healing mesh networking with synchronized power duty-cycling to achieve battery life operation of up to 10 years. **HIGHLIGHTS:** 2.4 GHz; WirelessHART-compliant; IEEE 802.15.4 and Dust's proprietary TSMP protocol; mesh networks; channel hopping over DSSS; 250 kb/s data rates; 1 mW and 10 mW RF power; 100 meters typical indoor and 250 meters typical outdoor transmission ranges; Serial I/O; 1.05 sq. inch footprint with same form factor as RFM XDM2140, LPR2430, ZMN2430 and WSN802G modules.



XDM2510H
PIN and Castellated
Versions Available

XDM2140 2.4 GHz 802.15.4 SmartMESH-XD Wireless Sensor Networking (page 10)

Based on Dust Networks' SmartMESH-XD™ technology, the RFM XDM2140 module is designed to provide ultra-reliable communications, and ultra-low-power for ultra-long battery life in a wide range of sensor network applications. The XDM2140 combines an IEEE 802.15.4 transceiver with Time Synchronized Mesh Protocol (TSMP) to blend the reliability of self-organizing and self-healing mesh networking with synchronized power duty-cycling to achieve battery life operation of up to 10 years. **HIGHLIGHTS:** 2.4 GHz; IEEE 802.15.4 and Dust's proprietary TSMP protocol; mesh networks; channel hopping over DSSS; 250 kb/s data rates; 1 mW and 10 mW RF power; 100 meters typical indoor and 250 meters typical outdoor transmission ranges; Serial I/O; 1.05 sq. inch footprint with same form factor as RFM LPR2430, ZMN2430 and WSN802G modules.



XDM2140
PIN and Castellated
Versions Available

WIT Series FHSS Wireless Telemetry (page 12). RFM proprietary FHSS RF modules provide robust wireless telemetry for commercial, industrial and factory environments that require radio transmission that is far more resistant to electrical noise and interference, jamming and multi-path fading than conventional radio transmission. Originally developed for the military, FHSS is widely utilized for industrial and manufacturing applications because it employs a technique to spread a signal over multiple frequencies to ensure reliable over-the-air transmission under adverse conditions. For industrial and SCADA (supervisory control and data acquisition industrial automation systems) applications, FHSS provides ultra-reliable transmission over very long transmission distances. FHSS networking is useful in outdoor applications where nodes may be separated by up to 20 miles, while ensuring fast, error-free delivery of data. The WIT Series includes:

900 MHz*



WIT910 @172.8 kb/s
and
WIT934 @345.6 kb/s
1 W

2.4 GHz



460.8 kb/s
WIT2410 @ 10-100 mW
WIT2450 @ 40-250 mW



921.6 kb/s
WIT2492 @ 10-100 mW



1.23 Mb/s
WIT2411* @ 10-100 mW



WIRELESS TELEMETRY

Boxed Radio Products



HN, HNIO, SNAP, and SEM Series FHSS Boxed Radios. RFM offers 900 MHz and 2.4 GHz Proprietary FHSS boxed radios which are built upon RFM WIT series modules. Whether paired with RFM WIT Series RF modules or used standalone, RFM FHSS boxed radios are ideal for fixed wireless network applications for a wide range of indoor, outdoor, and harsh environments. They are available in 900 MHz and 2.4 GHz versions, support data rates of 172.8 kb/s to 1.23 Mb/s, are Class I Div 2 certified, and support Modbus, DNP3, and DF1 protocols. They come in a variety of enclosures, some including NEMA 4X and IP. 66 rated enclosures with an effective operating temperature range of -30 °C to +70 °C. Most are DIN-rail mountable.

HN Serial Modems (page 13)



900 MHz*
172.8 kb/s
1 W

2.4 GHz
460.8 kb/s
100 mW

2.4 GHz
460.8 kb/s
40 mW / 100 mW /
250 mW

2.4 GHz
1.23 Mb/s
100 mW

HNIO I/O Modems and Relays (page 14)



900 MHz*
172.8 kb/s
1 W

2.4 GHz
460.8 kb/s
100 mW

SNAP Serial-to-Ethernet Access Points and SEM Ethernet Bridges (pages 15 & 16)



SNAP Serial-to-Ethernet Access Points (page 15)

900 MHz*
Used with
WIT910-based
devices

2.4 GHz
Used with
WIT2410-based
devices

2.4 GHz*
Used with
WIT2411-based
devices

SEM Ethernet Bridges (page 16)

900 MHz*
172.8 kb/s
1 W

2.4 GHz
460.8 kb/s
100 mW

2.4 GHz*
1.23 Mb/s
100 mW

*900 MHz products, WIT 2411, SEM2411, and SNAP2411 do not comply with RoHS.



RF MODULES PRODUCT SELECTION TOOL

FHSS Wireless Telemetry for Point-to-Point and Point-to-Multipoint Networks



Consider the seven key questions below matching them to the product selection tables to identify the part number for the module that is most suitable for your application. Then locate the part number in the catalog and select the developer kit part number. Order your developer kit today!

today!

	1			2										3					4				5			6			7																
	FRE- QUENCY			MAX RF DATA RATE										RANGE					RF POWER					STANDARD				NETWORK			TECHNOL- OGY		INTER- FACE												
	434 MHz	900 MHz	2.4 GHz	4.8 kbps	9.6 kbps	172.8 kbps	250 kbps	460.8 kbps	500 kbps	1.23 Mbps	2 Mbps	3 Mbps	11 Mbps	Indoor 30 m	Indoor 100 m	Indoor >100 m	Outdoor 30 m	Outdoor 100 m	Outdoor 250 m	Outdoor 500 m	Outdoor 1,000 m	Outdoor 10,000 m	Outdoor >10,000 m	1 mW	10 mW	100 mW	250 mW	1 W	ZigBee	802.15.4	Proprietary	802.11	WirelessHART	Mesh/S&F	Multipoint	Peer-to-Peer	Narrowband	Frequency Hopping	Direct Sequence	UART Only	I/O and UART				
DM1810	✓	✓		✓										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓				✓					✓	✓				
DNT900		✓							✓*					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓					✓	✓				
DNT2400			✓						✓*					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓						✓	✓			
LPR2430			✓				✓							✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓			✓				✓			✓	✓			
LPR2430A			✓				✓							✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓			✓				✓			✓	✓			
LPR2430ER			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
LPR2430ERA			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
WIT910		✓			✓									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
WIT2410			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
WIT2411			✓							✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
WIT2450			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓			✓	✓		
WSN802G			✓								✓		+	✓			✓								✓										✓								✓	✓	
XDM2140			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓				✓	✓		
XDM2510H			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓				✓				✓	✓	
ZMN2405			✓				✓							✓	✓		✓								✓																✓			✓	✓
ZMN2405HP			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							✓				✓	✓	
ZMN2430			✓				✓							✓	✓		✓								✓																✓			✓	✓
ZMN2430A			✓				✓							✓	✓		✓								✓																✓			✓	✓
ZMN2430HP			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							✓				✓	✓	
ZMN2430HPA			✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							✓				✓	✓	

* Modules can be software configured for lower rates.

+ Coming in Early 2010

1 Frequency: If the product application will be offered in many countries 2.4 GHz modules provide a single solution for all markets. If the product will be marketed in:

- N. or S. America choose 900 MHz or 2.4 GHz
- Europe or China choose 434 MHz or 2.4 GHz
- Japan or Korea choose 2.4 GHz
- Australia or New Zealand choose 434 MHz, 900 MHz, or 2.4 GHz

2 Data rate and range: Does the application require low, medium, or high data through-put? Over what indoor or outdoor distance is data to be transmitted?

3 RF Power: Is long battery life or transmission distance the primary importance? The lower the RF power - the longer the battery life. The longer the transmission range - the higher the RF power required to transmit over extended ranges. Also, is the application to be powered by AC mains or by battery? If battery-powered, then obtaining the lowest RF power is important.

4 Standards: If standards-compatible products or standards-based wireless communications is important for the product application then choose ZigBee, 802.15.4, or 802.11b/g. If lowest power is most important choose mesh. If highest resistance to interference is most important then choose FHSS mesh or proprietary FHSS.

5 Network Topology: If the application requires a decentralized network topology where if a node fails it will dynamically find and re-route the data (like the Internet), then choose mesh. Further, if in a mesh network topology the application requires devices to be mobile, then choose RFM proprietary mesh. Choose point-to-point or point-to-multi-point network topology if a centralized network topology bearing very low attendant overhead costs is most important.

6 Technology: If the product application primarily operates where:

- long-range and/or high data-rate transmission within adverse conditions (e.g., industrial), FHSS provides secure and highly reliable RF transmission that is resistant to interference
- high data-rate transmission, particularly for Ethernet LAN, 802.11b/g provides wireless communications for data rates of 11 Mb/s
- a balance between data rate and power consumption is important, 802.15.4 and ZigBee technology provide rapid synchronization, moderate interference robustness and a good data rate-to-power consumption ratio
- low power consumption is required to support battery operation in sensor networks or low traffic serial communications, the proprietary mesh modules are the best choice

7 Sensors / Serial Connections or UART / I/O Interface:

Does the application need direct connection to sensors, or serial devices, or both?



PROPRIETARY MESH MODULES

Wireless Mesh Networks



DM1810 434 MHz or 916 MHz. The DM1810 is based on the RFM proprietary miniMESH protocol. Characterized by low-latencies, miniMESH supports 15 routers and 1,000 nodes. DM modules provide long battery runtime through their low operating current and the ability to sleep all the nodes in the network, including the routers and base station. DM1810 modules provide serial I/O, a 10-bit ADC input, a digital input and a digital output with 10 mW transmit power and miniMESH protocol with support for up to 15 routers.

- DM1810-434 Modules ETSI certified for European applications
- DM1810-916 Modules FCC certified for US applications and IC certified for Canadian applications



- IM1800: Base station application interface board for DM1810 series modules
- IM1800-1: Field node or router application interface board for DM1810 series modules

DM1810 Series 434MHz / 916MHz 4.8 kb/s						
RFM Part	Frequency	RF Data Rate	Transmit Power	RF Conn./Antenna	Description	I/O
DM1810-434MB	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Base Station	1 Analog, 1 Digital, 1 Serial
DM1810-434MN	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Field Node	1 Analog, 1 Digital, 1 Serial
DM1810-434MN-V	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Field Node	1 Analog, 1 Digital, 1 Serial
DM1810-434MR	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-434MR-PAH	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-434MR-PAV	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-434MR-V	433.92 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-916MB	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Base Station	1 Analog, 1 Digital, 1 Serial
DM1810-916MN	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Field Node	1 Analog, 1 Digital, 1 Serial
DM1810-916MN-V	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Field Node	1 Analog, 1 Digital, 1 Serial
DM1810-916MR	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-916MR-PAH	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-916MR-PAV	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
DM1810-916MR-V	916.50 MHz	4.8 kbps	10 mW	Helical Ant/PCB Pad	Network Router	1 Analog, 1 Digital, 1 Serial
IM1800*		4.8 kbps			Application Interface Module	
IM1800-1		4.8 kbps			Application Interface Module	

*DM1800 is not RoHS compliant.

Developer Kits				
RFM Part	Frequency	RF Data Rate	Transmit Power	Description
DM1810-434-DK \$495	433.92 MHz	4.8 kbps	10 mW	Developer Kit containing 1 Base, 3 Routers, 3 Nodes
DM1810-434-QK \$199	433.92 MHz	4.8 kbps	10 mW	Quick Kit containing 1 Base, 1 Router, 2 Nodes
DM1810-916-DK \$495	916.50 MHz	4.8 kbps	10 mW	Developer Kit containing 1 Base, 3 Routers, 3 Nodes
DM1810-916-QK \$199	916.50 MHz	4.8Kbps	10 mW	Quick Kit 1 Base, 1 Router, 2 Nodes

Fast-track Your Low-Data Rate Mesh Networking Design...
Order Your Quick Kit* or Developer Kit Today!

\$199* / \$495

- (1) DM1810 Base
- (3) Routers
- (3) Nodes
- Antennas
- Program CD with software and manuals
- Quick Start guide



* Quick Kit only includes (1) Base, (1) Router and (2) Nodes

SUNSTAR射频通信 <http://www.rfoc.net/> TEL:0755-83397033 FAX:0755-83376182 E-MAIL:szss20@163.com



WI-FI / 802.11b/g MODULES

Wireless Sensor Networking

Point-to-Point and Point-to-Multipoint Networks

FCC / IC / ETSI
Certified



WSN802G 802.11b/g Low-Power Wi-Fi Modules. Ideal for building battery-powered wireless local area networking (WLAN) and Wi-Fi sensor monitoring solutions for the global market, the WSN802G delivers an exceptionally low-power profile with long battery life capabilities in a fully functional certified radio module. RFM's full-function module firmware combined with GainSpan's SoC provide a ready-to-use, extremely low-power 802.11b/g radio at a remarkably low price.



WSN802G
PIN and Castellated
Versions Available

- **Leverage existing Wi-Fi 802.11b/g infrastructure** — Ensures interoperability with other 802.11b/g compatible devices and existing WLAN networks
- **1 Mb/s and 2 Mb/s data rate** — Appropriate for most commercial and industrial sensing applications
- **WPA2 Security** — Allows the most sensitive data to be sent securely
- **Up to 5 year battery life** — Enabled by ability to sleep between active periods, <8 uA sleep current, <200 mA active power current
- **Configurable automatic I/O reporting** — Interval timer, interrupt and ADC level triggers
- **Available in two versions** — Pinned and Castellated

802.11b/g Low-Power Wi-Fi Modules

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/Antenna	Description	I/O
WSN802GC	2.4 GHz	1 or 2 Mbps	10 mW	U.FL	Low Power 802.11b/g Module with Sleep, Auto-Report, and Transparent Serial, Castellated	2 UART, SPI, 3 Analog, 4 Digital
WSN802GP	2.4 GHz	1 or 2 Mbps	10 mW	U.FL	Low Power 802.11b/g Module with Sleep, Auto-Report, and Transparent Serial, Pinned	2 UART, SPI, 3 Analog, 4 Digital

802.11b/g Developer Kits

WSN802GDK \$139	Contains: 1 WSN802G module, 1 WSN802G development board, Serial and USB Cables, 9 V Battery and Wall-mount Power Supply, Antenna, Program CD with software and manuals, Quick Start Guide
WSN802GDK-A \$199	Contains: 1 WSN802G module, 1 WSN802G development board, Pre-configured Wireless Router, Serial and USB Cables, 9 V Battery and Wall-mount Power Supply, Antenna, Program CD with software and manuals, Quick Start Guide

\$139 / \$199*

**Fast-track Your Wi-Fi Networking Design...
Order WSN802GDK Developer Kit Today!**

- (1) WSN802G module
- (1) WSN802G development board
- Serial and USB Cables
- 9 V Battery and Wall-mount power supply
- Antenna
- Program CD with software and manuals
- Quick Start guide
- ***WSN802GDK-A** also contains pre-configured wireless router



WSN802G Module
Installed on the
Development Board



802.15.4 MODULES and MODEMS

Peer-to-Peer, Point-to-Point, and Point-to-Multipoint Networks



LPR Series 802.15.4 RF Modules. For 2.4 GHz applications that need cost and power savings but do not require mesh networking with its attendant overhead, RFM LPR Series 802.15.4 modules provide excellent peer-to-peer and star topology wireless networking in residential, office and commercial applications. Each RFM 802.15.4 LPR module can be installed like an integrated circuit with reflow soldering to the host PCBs. The RFM Networking Layer eases integration and adds support for sophisticated networks through a simple-to-use command language.

- **Peer-to-peer and star topology networking** — Use as simple cable replacement or a sophisticated network
- **RFM Networking Layer** — Eases integration and network configuration
- **Low cost** — Extends wireless to virtually any sensor
- **Low power consumption** — Ideal for battery operation
- **Small size, light weight** — Easy to integrate
- **Direct sequence spread spectrum** — Fast acquisition time
- **Sleep modes and auto reporting** — Simplifies sensor monitoring
- **I/O Binding** — Automates I/O replication

**1 mW
Low Power**



LPR2430



LPR2430A
with Chip Antenna

**100 mW
Extended
Range**



LPR2430ER



LPR2430ERA
with Chip Antenna

802.15.4 Modules

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Description	I/O
LPR2430	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power, Point-to-Point, Multipoint, & Peer-to-Peer, Sleep, Auto-Report, Castellated	UART, SPI, 5 Analog, 6 Digital
LPR2430A	2.4 GHz	250 kbps	1 mW	Chip Antenna	Low-Power, Point-to-Point, Multipoint, & Peer-to-Peer, Sleep, Auto-Report, Castellated	UART, SPI, 5 Analog, 6 Digital
LPR2430ER	2.4 GHz	250 kbps	10 mW to 100 mW	Module Pin	Extended Range, Point-to-Point, Multipoint, & Peer-to-Peer, Sleep, Auto-Report, Castellated	UART, SPI, 5 Analog, 6 Digital
LPR2430ERA	2.4 GHz	250 kbps	10 mW to 100 mW	Chip Antenna	Extended Range, Point-to-Point, Multipoint, & Peer-to-Peer, Sleep, Auto-Report, Castellated	UART, SPI, 5 Analog, 6 Digital

802.15.4 Developer Kits (See Page 17 for Developer Kit Product Image)

LPR2430DK \$299	2.4 GHz	Contains: 4 LPR2430 modules (2 installed on developer boards labeled Base and Remote), 2 patch antennas, 2 dipole antennas with MMCX to SMA-R adapter cables, 2 9 V wall-plug power suppliers (120/240 VAC plus 2 9 V batteries), 2 RS-232 cables, 2 USB Serial cables, Documentation and Software CD				
LPR2430ADK \$299	2.4 GHz	Contains: 4 LPR2430A modules (2 installed on developer boards labeled Base and Remote), 2 9 V wall-plug power suppliers (120/240 VAC plus 2 9 V batteries), 2 RS-232 cables, 2 USB Serial cables, Documentation and Software CD				
LPR2430ERDK \$299	2.4 GHz	Contains: 4 LPR2430ER modules (2 installed on developer boards labeled Base and Remote), 2 patch antennas, 2 dipole antennas with MMCX to SMA-R adapter cables, 2 9 V wall-plug power suppliers (120/240 VAC plus 2 9 V batteries), 2 RS-232 cables, 2 USB Serial cables, Documentation and Software CD				
LPR2430ERADK \$299	2.4 GHz	Contains: 4 LPR2430ERA modules (2 installed on developer boards labeled Base and Remote), 2 9 V wall-plug power suppliers (120/240 VAC plus 2 9 V batteries), 2 RS-232 cables, 2 USB Serial cables, Documentation and Software CD				

802.15.4 Wireless Serial Data Modem

Wireless Series Data Modems. The RFM 802.15.4 wireless data modem can provide an auto-configured, wireless replacement for RS-232 cable in office environments, and can also serve as a platform for multi-drop RS-485 networks in industrial settings.

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Description
ZN-241G	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	Standalone RS-232 Serial 802.15.4 Modem with DB9 Connector, Antenna, Power Supply, and Serial Cable
ZN-241GOEM	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	10 Pack of the ZN-241G without Antenna, Power Supply, or Serial Cable
ZN-241GI	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	Standalone Half-duplex RS-485/RS-232 Serial 802.15.4 Modem with Screw Terminal Connector, Antenna, and Power Supply
ZN-241GIOEM	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	10 Pack of the ZN-241GM without Antenna or Power Supply
ZN-241GSK	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	Starter kit including 2 ZN-241Gs, 2 2 dBi Antennas, 2 Power Supplies, 2 Serial Cables and Windows-based Configuration Utility
ZN-241GU	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	Standalone USB Serial 802.15.4 Modem, Antenna, Power Supply, and USB Cable (Can be powered from USB port)
ZN-241GUOEM	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	10 Pack of the ZN-241GU without Antenna, Power Supply, or USB Cable



ZIGBEE MODULES and GATEWAYS

Wireless Mesh Networks

FCC/IC/ETSI
 Certified


ZMN Series ZigBee modules from RFM are ideal for low-cost, low-power, low data rate wireless applications including sensor monitoring, building and home automation, and any other applications requiring low-power consumption. These 2.4 GHz OEM modules come in 1 mW (ZMN2405/ZMN2430) transmit power versions for short-range applications and in 100 mW (ZMN2405HP/ZMN2430HP) versions for applications needing extended range. RFM ZigBee modules can be installed like integrated circuits. Even though they are complete OEM modules, they are reflow soldered to the host PCBs. With its small footprint, there is no size penalty associated with the convenience of a module. RFM has relied on its experience in helping hundreds of OEMs integrate RFM modules to create a full set of development and configuration tools.

1 mW
Low Power


ZMN2430

ZMN2430A
with Chip Antenna
100 mW
High Power


ZMN2430HP

ZMN2430HPA
with Chip Antenna

ZigBee Modules

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Description	I/O
ZMN2405-C	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee Coordinator, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405-E	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee End Device, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405-R	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee Router, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HP-C	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee Coordinator, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HP-E	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee End Device, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HP-R	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee Router, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HPA-C	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee Coordinator, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HPA-E	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee End Device, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2405HPA-R	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee Router, Solder Bump	UART, 5 Analog, 6 Digital
ZMN2430-C	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee Coordinator, Castellated	UART, 5 Analog, 6 Digital
ZMN2430-E	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee End Device, Castellated	UART, 5 Analog, 6 Digital
ZMN2430-R	2.4 GHz	250 kbps	1 mW	Module Pin	Low-Power ZigBee Router, Castellated	UART, 5 Analog, 6 Digital
ZMN2430A-C	2.4 GHz	250 kbps	1 mW	Chip Antenna	Low-Power ZigBee Coordinator, Castellated	UART, 5 Analog, 6 Digital
ZMN2430A-E	2.4 GHz	250 kbps	1 mW	Chip Antenna	Low-Power ZigBee End Device, Castellated	UART, 5 Analog, 6 Digital
ZMN2430A-R	2.4 GHz	250 kbps	1 mW	Chip Antenna	Low-Power ZigBee Router, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HP-C	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee Coordinator, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HP-E	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee End Device, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HP-R	2.4 GHz	250 kbps	1 mW to 100 mW	Module Pin	High-Power ZigBee Router, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HPA-C	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee Coordinator, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HPA-E	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee End Device, Castellated	UART, 5 Analog, 6 Digital
ZMN2430HPA-R	2.4 GHz	250 kbps	1 mW to 100 mW	Chip Antenna	High-Power ZigBee Router, Castellated	UART, 5 Analog, 6 Digital

ZigBee Developer Kits (See Page 17 for Developer Kit Product Image)

ZMN2405DK \$299	2.4 GHz	Contains: 2 ZMN2405 ZigBee evaluation boards (high-power serial interface boards built around the 1 mW ZigBee ZMN2405 module), 2 AC power adapters and cords, 2 patch antennas, 2 USB cables, 2 Serial cables, 2 RF cables, 2 omni antennas, 2 9 V batteries, 1 Software CD				
ZMN2405HPDK \$299	2.4 GHz	Contains: 2 ZMN2405HP evaluation boards (high-power serial interface boards built around the 100 mW ZigBee ZMN2405HP module), 2 AC power adapters and cords, 2 patch antennas, 2 USB cables, 2 Serial cables, 2 RF cables, 2 omni antennas, 2 9 V batteries, 1 Software CD				
ZMN2430ADK \$299	2.4 GHz	Contains: 2 ZMN2430A evaluation boards (high-power serial interface boards built around the 1 mW ZigBee ZMN2430A module), 2 AC power adapters and cords, 2 patch antennas, 2 USB cables, 2 Serial cables, 2 RF cables, 2 omni antennas, 2 9 V batteries, 1 Software CD				
ZMN2430HPADK \$299	2.4 GHz	Contains: 2 ZMN2430HPA evaluation boards (high-power serial interface boards built around the 100 mW ZigBee ZMN2430HPA module), 2 AC power adapters and cords, 2 patch antennas, 2 USB cables, 2 Serial cables, 2 RF cables, 2 omni antennas, 2 9 V batteries, 1 Software CD				
ZMN24HPDK-B \$199	2.4 GHz	Contains: 1 serial / sensor evaluation board configured as a Router, 1 ZN-241Z serial radio modem built around the ZigBee ZMN2405HP module configured as a Coordinator, 1 patch antenna, 1 USB cable, 2 Serial cables, 1 RF cable, 2 omni antennas, 1 9 V battery, 1 Software CD				

ZigBee Gateways

ZigBee Gateways. Allowing seamless integration of ZigBee networked sensors and devices into existing industrial networks, the ZG-2400E combines a 2.4GHz 100mW ZigBee module and a TCP/IP-to-ZigBee translation engine in a Class I Div 2 certified DIN-rail mount product. The ZG-2400E operates over a -40 °C to +70 °C temperature range and accepts a +9 Vdc to +24 Vdc supply voltage.

ZG-2400E	2.4 GHz	250 kbps	10 mW to 100 mW	Reverse SMA	10/100Base-T ZigBee to Ethernet Gateway
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WirelessHART MODULES

Wireless Networking in Process Automation



XDM2510H 2.4 GHz WirelessHART Transceiver Module. Based on DUST Networks'IA-510(H) WirelessHART™ technology, RFM's XDM2510H0 module enables OEMs to easily and quickly add WirelessHART capability in their applications for the global process automation market. It is the second module released in a family of ultra reliable RF modules using technology from Dust Networks. The XDM2150H module combines the Dust Networks WirelessHART System-on-Chip (SoC) with RFM's easy-to-deploy module technology.

The XDM2140's combination of an IEEE 802.15.4 transceiver and Time Synchronized Mesh Protocol (TSMP) plus the WirelessHART protocol blends the reliability of self-organizing and self-healing mesh networking with synchronized power duty cycling to achieve very long battery life operation.

The XDM2510H delivers exceptional network reliability and long battery life in a fully functional, certified radio module that is easily interfaced to existing WirelessHART infrastructure for a wide variety of industrial applications.

WirelessHART Compliant

The XDM2510H provides a simple way to add WirelessHART functionality to process control field devices. This capability allows the field devices to join existing WirelessHART networks. The interface to the module is through a UART port utilizing a straightforward API.

Ultra Reliable Networking

The XDM2510H network is time-synchronized so that all nodes can be battery powered and achieve over a decade of battery life. The XDM2510H offers substantially lower current consumption than competing WirelessHART modules.

Easy Integration

The XDM2510H networks are self-organizing and self-healing. Just power-up the modules and they are ready to join a WirelessHART mesh network and start reporting data. All of the XDM2510H nodes are the same; there are no end-nodes or router-nodes.

- XDM2510H provides all the module functionality with no embedded programming or complex configuration requirements
- XDM510H interface is well designed and multi-functional
- XDM2510HP version for plug in installation, XDM2510HC version for solder reflow



XDM2510H
PIN and Castellated
Versions Available



Front



Back

XG-2510H-E
Network Manager
Gateway for
SmartMesh-XD-based
devices

SmartMesh-XD 2.4 GHz 250 kbps						
RFM Part	Frequency Band	RF Data Rate	Transmit Power	RF Conn./Antenna	Description	I/O
XDM2510HC	2.4 GHz	250 kbps	10 mW	U.FL	Routing Node	UART
XDM2510hP	2.4 GHz	250 kbps	10 mW	U.FL	Routing Node	UART

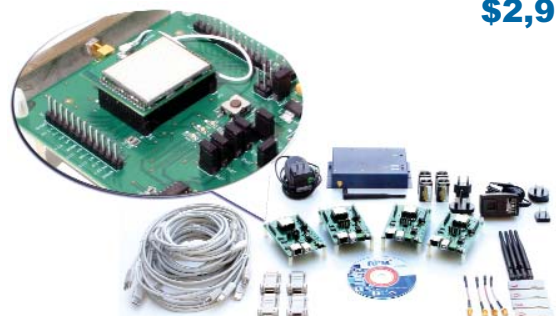
Developer Kit					Description
RFM Part	Frequency Band	RF Data Rate	Transmit Power		
XDM2510HDK \$2,995	2.4 GHz	250 kbps	10 mW		Contains 4 XDM2510H modules, 4 XDM2510H development boards, 1 XG22510HE gateway, 1 Ethernet and 5 Serial cables, 9 V batteries and wall-mount power supplies, Antennas and RF cables, Program CD with software and manuals, Quick Start Guide

SmartMesh-XD Network Manager / Gateway	
The XG22510HE gateway and network manager is multi-functional, combining Ethernet gateway functions with sophisticated networking, data, and security management capabilities for a network of XDM2510H modules. It includes a standard WirelessHART compliant, 2.4 GHz radio with a power amplifier, processor and memory, embedded networking software, and interfaces to host systems. The XG2510HE is only sold in tandem with XDM2510H networking products.	
XG2400E	10/100Base-T Ethernet/Serial Network Manager/Gateway for WirelessHART based devices

**Fast-track Your Ultra-Reliable Mesh Networking Design...
Order XDM2510HDK Developer Kit Today!**

\$2,995

- (4) XDM2510H modules
- (4) XDM2510H development boards
- (1) XG2510HE gateway
- (1) Ethernet and 5 Serial cables
- 9 V batteries and wall-mount power supplies
- Antennas and RF cables
- Program CD with software and manuals
- Quick Start Guide





ULTRA-RELIABLE MESH MODULES

Wireless Mesh Networks



XDM2140 2.4 GHz Ultra-Low-Power Mesh Transceiver Module. Based on DUST Networks' SmartMesh-XD™ technology, RFM's XDM2140 module is designed to provide excellent communications reliability and long battery life in a wide range of sensor network applications. The XDM2140's combination of an IEEE 802.15.4 transceiver and Time Synchronized Mesh Protocol (TSMP) blends the reliability of self-organizing and self-healing mesh networking with synchronized power duty cycling to achieve very long battery life operation. The multifunctional interface of the XDM2140 gives it the flexibility to be used in a wide variety of applications, from energy management to building control to machine health monitoring. The XDM2140 requires no embedded programming which greatly reduces development time and cost of a wireless sensor network application.

Ultra Low Power Consumption

- Innovative radio design consumes 80% less power in receive mode than competing solutions
- Ultra-efficient power usage, enabled through SmartMesh Intelligent Network management, delivers over a decade of network operation on two AA batteries
- Automatic network-wide coordination for efficient power usage

Ultra Reliable Networking

- SmartMesh-XD™ protocol delivers greater than 99.9% typical network reliability
- Frequency hopping provides interference rejection and minimizes multi-path fading
- Mesh networking provides built-in redundancy
- Every XDM2140 acts as both an end-point and a router thereby increasing network reliability with Mesh-to-the Edge™
- Automatic self-organizing mesh networking capability built in

Easy Integration

- XDM2140 provides all the module functionality with no embedded programming or complex configuration requirements
- XDM2140 interface is well designed and multi-functional
- XDM2140P version for plug in installation, XDM2140C version for solder reflow



XDM2140
PIN and Castellated
Versions Available



Front



Back

XG-2400-E
Network Manager
Gateway for
SmartMesh-XD-based
devices

SmartMesh-XD 2.4 GHz 250 kbps						
RFM Part	Frequency Band	RF Data Rate	Transmit Power	RF Conn./Antenna	Description	I/O
XDM2140C	2.4 GHz	250 kbps	10 mW	U.FL	Routing Node	UART
XDM2140P	2.4 GHz	250 kbps	10 mW	U.FL	Routing Node	UART

Developer Kit				
RFM Part	Frequency Band	RF Data Rate	Transmit Power	Description
XDM2140DK \$2,995	2.4 GHz	250 kbps	10 mW	Contains 4 XDM2140 modules, 4 XDM2140 development boards, 1 XG2400E gateway, 1 Ethernet and 5 Serial cables, 9 V batteries and wall-mount power supplies, Antennas and RF cables, Program CD with software and manuals, Quick Start Guide

SmartMesh-XD Network Manager / Gateway	
The XG2400E gateway and network manager is multi-functional, combining Ethernet gateway functions with sophisticated networking, data, and security management capabilities for a network of XDM2140 modules. It includes a standard IEEE 802.15.4 compliant, 2.4 GHz radio with a power amplifier, processor and memory, embedded networking software, and interfaces to host systems. The XG2400E is only sold in tandem with XDM2140 networking products.	
XG2400E	10/100Base-T Ethernet/Serial Network Manager/Gateway for SmartMesh-XD based devices

Fast-track Your Ultra-Reliable Mesh Networking Design...
Order XDM2140DK Developer Kit Today!

- (4) XDM2140 modules
- (4) XDM2140 development boards
- (1) XG2400E gateway
- (1) Ethernet and 5 Serial cables
- 9 V batteries and wall-mount power supplies
- Antennas and RF cables
- Program CD with software and manuals
- Quick Start Guide



\$2,995



LOW-COST FREQUENCY HOPPING MODULES

Multi-function Wireless Sensor Networking & Telemetry for
Peer-to-Peer, Point-to-Point, and Point-to-Multipoint Networks



DNT900 / DNT2400

DNT Series FHSS Multi-Function Wireless Sensor Networking Modules.

Comprised of the 900 MHz DNT900 and the 2.4 GHz DNT2400, the DNT series is a low-cost, long-range, multi-purpose, multi-function frequency hopping line of RF modules. DNT modules support Analog and Digital I/O and Serial data, and have the ability to auto-report and sleep between reports thereby reducing power consumption. DNT modules support all standard serial data rates for host communications from 1.2 to 460.8 kb/s. On-board data buffering and an error-correcting air protocol provide smooth data flow and simplify the task of integration with existing applications.

900 MHz DNT900. The 900 MHz ISM band allows license-free use in the US, Canada, South America, Australia and New Zealand.

2.4 GHz DNT2400. 2.4 GHz ISM band allows the DNT2400 to be used license-free world-wide.

Highly Reliable and Secure FHSS Capabilities at Very Low Cost

- RFM proprietary frequency hopping technology provides both robust communications reliability and interference rejection while minimizing multi-path fading
- 40+ mile range (DNT900) and 5+ mile range (DNT2400) with omni-directional antennas (antenna height dependent)
- AES-128 Encryption allows the most sensitive data to be securely sent wirelessly
- Support for point-to-point, point-to-multipoint, and peer-to-peer applications
- Low cost provides substantial cost savings over existing long-range radios without compromising features or radio performance
- Non-volatile memory stores DNT module configuration when powered off
- Dynamic TDMA slot assignment that maximizes throughput and CSMA modes that maximizes network size
- Transparent ARQ protocol with data buffering ensures data integrity
- Simple serial interface handles both data and control at up to 460.8 kb/s

Highly Configurable Including RF Data Rate and RF Transmit Power. The DNT Series modules provide a selection of over-the-air data rates and transmit power levels thus allowing one module to work for many products. When using the DNT Series, designers can be confident that the radio performance can be modified if needed when the design is finished without having to design-in another radio.

- Configurable RF Data Rates from 38 kb/s and 500 kb/s
- DNT900 configurable RF Transmit Power of 1 mW to 1W
- DNT2400 configurable RF Transmit Power of 1 mW to 100 mW
- 40+ mile range DNT900, 5+ mile DNT2400 with omni-directional antennas
- Co-Located Network Support
- Multi-point, point-to-point, peer-to-peer and store & forward repeating
- Bandwidth Allocation
- Configurable Frequency Hopping Rate
- Analog and Digital I/O
- Sleep Modes

FHSS Modules Configurable						
RFM Part	Frequency	RF Data Rate	Transmit Power	RF Conn/ Antenna	Description	I/O
DNT900C	900 MHz	38.4 to 500 kbps	1mW to 1W	U.FL	Frequency hopping, star, peer-to-peer, store and forward repeating, castellated	2 UART, SPI, 5 Analog, 6 Digital
DNT900P	900 MHz	38.4 to 500 kbps	1mW to 1W	U.FL	Frequency hopping, star, peer-to-peer, store and forward repeating, pinned	2 UART, SPI, 5 Analog, 6 Digital
DNT2400C	2.4 GHz	38.4 to 500 kbps	1mW to 100mW	U.FL	Frequency hopping, star, peer-to-peer, store and forward repeating, castellated	2 UART, SPI, 5 Analog, 6 Digital
DNT2400P	2.4 GHz	38.4 to 500 kbps	1mW to 100 mW	U.FL	Frequency hopping, star, peer-to-peer, store and forward repeating, pinned	2 UART, SPI, 5 Analog, 6 Digital

FHSS Developer Kits	
DNT900DK \$359	Contains: 2 DNT900P radios, 2 DNT900 development boards, 2 2 dBi dipole antennas, 2 - 120/240 VAC 9 V wall-plug power suppliers, 2 9 V batteries, 2 RJ-45/DB-9F cable assemblies, 1 RJ-11/DB-9F cable assembly, 2 A/B USB cables, DNT900DK documentation and software CD
DNT2400DK \$359	Contains: 2 DNT2400P radios, 2 DNT2400 development boards, 2 2 dBi dipole antennas, 2 120/240 VAC 9 V wall-plug power suppliers, 2 9 V batteries, 2 RJ-45/DB-9F cable assemblies, 1 RJ-11/DB-9F cable assembly, 2 A/B USB cables, DNT2400DK documentation and software CD

Fast-track Your FHSS Networking Design...
Order DNT900DK or DNT2400DK Developer Kit Today!

- (2) DNT modules with pins
- (2) DNT development boards
- (2) USB and 2 Serial Cables
- 9 V Batteries and Wall-mount Power Supplies
- Antennas and RF Cables
- Program CD with software and manuals
- Quick Start Guide



\$359



ULTRA-RELIABLE FREQUENCY HOPPING MODULES

Wireless Telemetry for Point-to-Point and Point-to-Multipoint Networks

FCC/IC/ETSI
Certified



WIT Series FHSS Wireless Telemetry Modules. Especially well-suited to commercial, industrial and factory settings, RFM's WIT modules ensure long-range data throughput even in the presence of electrical noise and multi-path fading. They can be configured in point-to-point and point-to-multipoint network topologies. WIT modules operate in either a TDMA mode with dynamic, automatic bandwidth allocation which support up to 62 remotes or a CSMA mode that supports up to 1024 remotes. The TDMA mode is used where guaranteed bandwidth and latency are required. The CSMA mode is used where large numbers of remotes are needed. Latencies of the TDMA mode are as low as 5 ms. WIT modules consume a sufficiently low amount of power to allow 8+ hours of battery operation. Error-less data reception is further assured by CRC error checking and ARQ (automatic repeat-request) schemes for auto-retransmission of bad packets.

900 MHz*



WIT910* @172.8 kb/s
and
WIT934* @345.6 kb/s
1W

- **License-free** use in US, Canada, South America, Australia and New Zealand
- **High-speed wireless data:** Up to 172.8 kb/s for extended range applications such as SCADA
- **Superior transmission range:** 1000 foot indoors; 20+ miles outdoors with omnidirectional antennas
- **Store-and-forward repeating:** forwards data meant for another mode while also acting as an end device

2.4 GHz



460.8 kb/s
WIT2410 @ 10-100mW
WIT2450 @ 40-250mW



921.6 kb/s
WIT2492 @ 10-100mW



1.23 Mb/s
WIT2411* @ 10-100mW

- **License-free use world-wide**
- **High-speed wireless data:** Up to 1.23 Mb/s throughput serves virtually any data need
- **Superior transmission range:** 900 foot indoors; over 5 miles outdoors with gain antennas
- **WIT2450 offers store-and-forward repeating** to extend range and enable transmission around barriers without expensive dedicated repeaters.

FHSS Modules

RFM Part	Frequency Band	RF Data Rate	Transmit Power	RF Conn/ Antenna	Description	I/O
WIT910M*	900 MHz	172.8 kbps	1 W	MMCX	Frequency hopping star, TDMA only, pins down	UART
WIT910M2*	900 MHz	172.8 kbps	1 W	MMCX	Frequency hopping, star, CSMA & TDMA, pins down	UART
WIT910S*	900 MHz	172.8 kbps	1 W	MMCX	Frequency hopping star, TDMA only, pins up	UART
WIT934M*	900 MHz	345.6 kbps	10 mW to 100 mW	MMCX	Frequency hopping star, TDMA only, pins down	UART
WIT2410M4G	2.4 GHz	460.8 kbps	10 mW to 100 mW	MMCX	Frequency hopping star, TDMA only, pins down	UART
WIT2410S4G	2.4 GHz	460.8 kbps	10 mW to 100 mW	MMCX	Frequency hopping star, TDMA only, pins up	UART
WIT2411D*	2.4 GHz	1.23 Mbps	10 mW to 100 mW	MMCX	Frequency hopping star, on-demand, pins down	UART
WIT2411F*	2.4 GHz	1.23 Mbps	11 mW to 100 mW	MMCX	Frequency hopping star, on-demand, socket	UART
WIT2450FG	2.4 GHz	460.8 kbps	40 mW to 250 mW	MMCX	Frequency hopping star, TDMA only, socket	UART
WIT2450M2	2.4 GHz	460.8 kbps	40 mW to 250 mW	MMCX	Frequency hopping, star, CSMA & TDMA, socket	UART
WIT2492M	2.4 GHz	921.6 kbps	10 mW to 100 mW	MMCX	Frequency hopping star, TDMA only, pins down	UART

WIT910-, WIT934-, and WIT2411-series products are not RoHS compliant.

FHSS Developer Kits (See Page 18 for Developer Kit Image)

WIT910DK* \$795	Contains: 2 HN-591 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, 2 WIT910M modules, RF cables, antennas and programming software
WIT910SDK* \$1,795	SNAP910 Developer Kit containing 2 HN-591 serial modems with flow control indicators, RS-232 interface, battery, dipole antenna, 1 SNAP910 10/100BaseT access point, 2 WIT910 modules, RF cables, antennas and programming software
WIT2410DK* \$795	Contains: 2 HN-510 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, 2 WIT2410M modules, RF cables, antennas and programming software
WIT2410SDK* \$1,795	SNAP2410 Developer Kit containing 2 HN-510 serial modems with flow control indicators, RS-232 interface, battery, dipole antenna, 1 SNAP2410 10/100BaseT access point, 2 WIT2410 modules, RF cable, antennas and programming software
WIT2411DK* \$995	Contains: 2 HN-211 serial modems with flow control indicators, RS-232 and USB interfaces, battery, dipole antenna, 2 WIT2411 modules, and programming software
WIT2411SDK* \$1,995	SNAP2411 Developer Kit containing 2 HN-211 serial modems with flow control indicators, RS-232 and USB interfaces, battery, dipole antenna, 1 SNAP2411 10/100BaseT access point, 2 WIT2411 modules, RF cables and dipole antennas and programming software
WIT2450DK* \$495	Contains: 2 HN-550 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, 2 WIT2450 modules, RF cables, antennas and programming software



FREQUENCY HOPPING SERIAL MODEMS

Wireless Telemetry for Point-to-Point and Point-to-Multipoint Networks



HN Series Wireless Modems (900 MHz – 2.4 GHz). Built on the RFM WIT Series RF modules, the versatile RFM HN series wireless modems employ the RFM proprietary FHSS and are well-suited for any industrial or commercial application needing complete, reliable, long-range, serial modems. Whether paired with RFM WIT series RF modules or used standalone, HN wireless modems are ideal for fixed wireless network applications in a range of indoor, outdoor, and harsh environments. They are available in 900 MHz and 2.4 GHz versions, support data rates of 172.8 kb/s to 1.23 Mb/s, are Class I Div 2 certified, and support Modbus, DNP3, and DF1 protocols. HN wireless modems come in a variety of enclosures including NEMA 4X and IP 66 rated enclosures with an effective operating temperature range of -30 °C to +70 °C.

900 MHz Modems. The HN-591 desktop wireless modems are right at home in the relative comfort of a plant foreman's office, while the HN-291 modems deliver indoor / outdoor SCADA flexibility.

2.4 GHz Modem. The HN-510 and HN-550 are suitable for desktop use while the HN-1510 is a rugged indoor unit suitable for factory floor environments. The HN-21x, HN-1010, HN2010, and HN-3010 are rugged enclosures designed for outdoor and wash-down environments. Each HN-D Series is a DIN rail mount, low-cost modem with a remote mounted radio in a NEMA 4X/ IP 66 enclosure with either an internal 6 dBi patch antenna or a reverse TNC antenna connector. A standard RS-232 interface connects to the device to be networked. The 2.4 GHz HN-series radios have over-the-air data rates of 460.8 kb/s or 1.23 Mb/s.

Combining HN-series Wireless Modems with SNAP Serial to Ethernet Access Point. Add SNAP Wireless Serial to Ethernet Access Points as a base station for both WIT OEM modules and HN modems, which allow non-Ethernet serial devices to operate as nodes on an Ethernet network.

900MHz Long Range HN-91 Series Standalone Wireless Modems

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Interface
HN-291*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	RS-232 DB9, 50 foot cable
HN-291X*	900 MHz	172.8 kbps	1 W	Reverse TNC	RS-232 DB9, 50 foot cable
HN-291U*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	USB, 50 foot cable
HN-291UX*	900 MHz	172.8 kbps	1 W	Reverse TNC	USB, 50 foot cable
HN-294*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	RS-232 DB9, 4 foot cable
HN-294X*	900 MHz	172.8 kbps	1 W	Reverse TNC	RS-232 DB9, 4 foot cable
HN-294U*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	USB, 4 foot cable
HN-294UX*	900 MHz	172.8 kbps	1 W	Reverse TNC	USB, 4 foot cable
HN-591*	900 MHz	172.6 kbps	1 W	Reverse SMA	RS-232 DB9

2.4GHz Low Cost HN-50 Series Standalone Wireless Modems

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Interface
HN-250	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	RS-232 DB9, 50 foot cable
HN-250X	2.4 GHz	460.8 kbps	40 mW to 250 mW	Reverse TNC	RS-232 DB9, 50 foot cable
HN-250-100	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	RS-232 DB9, 100 foot cable
HN-250U	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	USB, 50 foot cable
HN-250UX	2.4 GHz	460.8 kbps	40 mW to 250 mW	Reverse TNC	USB, 50 foot cable
HN-250U-100	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	USB, 100 foot cable
HN-254	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	RS-232 DB9, 4 foot cable
HN-254X	2.4 GHz	460.8 kbps	40 mW to 250 mW	Reverse TNC	RS-232 DB9, 4 foot cable
HN-254U	2.4 GHz	460.8 kbps	40 mW to 250 mW	Internal 6 dBi Patch	USB, 4 foot cable
HN-254UX	2.4 GHz	460.8 kbps	40 mW to 250 mW	Reverse TNC	USB, 4 foot cable
HN-550	2.4 GHz	460.8 kbps	40 mW to 250 mW	Reverse SMA	RS-232 DB9 Desktop Version

2.4GHz HN-10/HN-11 Series Standalone Wireless Modems

RFM Part	Frequency Band	Data Rate	Transmit Power	RF Conn/ Antenna	Interface
HN-210	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	RS-232 DB9, 50 foot cable
HN-210D	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	DIN-Rail mount, RS-232, DB9, 50 foot cable
HN-210DX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	DIN-Rail mount, RS-232, DB9, 50 foot cable
HN-210X	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	RS-232 DB9, 50 foot cable
HN-211R	2.4 GHz	1.23 Mbps	100 mW	Internal 6 dBi Patch	RS-232 DB9, 50 foot cable
HN-211RX	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	RS-232 DB9, 50 foot cable
HN-211U	2.4 GHz	1.23 Mbps	100 mW	Internal 6 dBi Patch	RS-232 DB9, 50 foot cable
HN-211UX	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	RS-232 DB9, 50 foot cable
HN-214	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	RS-232 DB9, 4 foot cable
HN-214D	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	DIN-Rail mount RS-232 DB9, 4 foot cable
HN-214DX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	DIN-Rail mount, RS-232 DB9, 4 foot cable
HN-214X	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	RS-232 DB9, 4 foot cable
HN-214U	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	USB, 4 foot cable
HN-214UX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	USB, 4 foot cable
HN-510	2.4 GHz	460.8 kbps	100 mW	Reverse SMA	RS-232 DB9 Desktop Version
HN-511	2.4 GHz	1.23 Mbps	100 mW	Reverse SMA	RS-232 DB9 Desktop Version
HN-1010	2.4 GHz	460.8 kbps	100 mW	TNC	RS-232 Connexall
HN-1510	2.4 GHz	460.8 kbps	100 mW	TNC	RS-232 DB9
HN-2010	2.4 GHz	460.8 kbps	100 mW	2 TNC	N/A
HN-3010	2.4 GHz	460.8 kbps	100 mW	TNC	RS-232 Connexall



FREQUENCY HOPPING I/O Modems

Wireless Telemetry for Point-to-Point and Point-to-Multipoint Networks

FCC/IC/ETSI
Certified



HNIO Series I/O Modems (900 MHz – 2.4 GHz). RFM HNIO modems feature bidirectional transmission and the company's patented FHSS technology. The product line includes the HNIO-091R and HNIO-241R relay modems, which operate at 900 MHz and 2.4 GHz respectively, and two analog/digital modems, the 900 MHz HNIO-091A and 2.4 GHz HNIO-241A. The relay modems provide four 250 VAC 5 A relays, and the analog/digital modems provide two 4-20mA receivers and transmitters along with two digital I/O channels.

Unlike wireless data transceivers, which transmit serial data streams, wireless I/O modems transmit voltage or digital signals. Analog/digital models are typically used to relay key levels of sensor data, while relay units control the state of such equipment as light fixtures, alarms, and locks. Line of sight range extends beyond 20 miles for the 900 MHz I/O modems and up to seven miles for the 2.4 GHz units, depending upon the antenna used. The modems can operate over an input voltage range of +9 Vdc to +30 Vdc, making them suitable for battery and solar power sources. Class I Div 2 certification allows the modems to be deployed in hazardous locations. All are DIN-rail mountable.

I/O modems and Relays for Analog / Relay Input / Output

RFM Part	Frequency Band	RF Data Rate	Transmit Power	RF Conn/ Antenna	Description
HNIO-091A*	900 MHz	172.8 kbps	1 W	Reverse TNC	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Integral Radio
HNIO-091AR*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-091AX*	900 MHz	172.8 kbps	1 W	Reverse TNC	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-091R*	900 MHz	172.8 kbps	1 W	Reverse TNC	4 Digital Inputs, 4 Form C Relay Outputs, Internal Radio
HNIO-091RR*	900 MHz	172.8 kbps	1 W	Internal 3 dBi Patch	4 Digital Inputs, 4 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-091RX*	900 MHz	172.8 kbps	1 W	Reverse TNC	4 Digital Inputs, 4 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-241A	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Internal Radio
HNIO-241AR	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-241AX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	2, 4 - 20 mA Inputs, 2, 4 - 20 mA Transmitters, 2 Digital Inputs, 2 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-241R	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	4 Digital Inputs, 4 Form C Relay Outputs, Internal Radio
HNIO-241RR	2.4 GHz	460.8 kbps	100 mW	Internal 6 dBi Patch	4 Digital Inputs, 4 Form C Relay Outputs, Remote Radio with 50 foot cable
HNIO-241RX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	4 Digital Inputs, 4 Form C Relay Outputs, Remote Radio with 50 foot cable

HN Serial Modems

← (page 13)



900 MHz*
172.8 kb/s
1 W

2.4 GHz
460.8 kb/s
100 mW

2.4 GHz
460.8 kb/s
40 mW / 100 mW /
250 mW

2.4 GHz
1.23* Mb/s
100 mW

HNIO I/O Modems & Relays

(this page - see above) ↑



900 MHz*
172.8 kb/s
1 W

2.4 GHz
460.8 kb/s
100 mW

*Boxed products based on WIT910-, WIT934- and WIT2411-series modules (1.23 Mb/s data rate) are not RoHS compliant.



FHSS SERIAL-TO-ETHERNET ACCESS POINTS

Ethernet Connectivity for Serial Devices



SNAP Wireless Serial-to-Ethernet Access Points (900 MHz – 2.4 GHz). As the base station for WIT series 900 MHz and 2.4 GHz OEM modules (WIT910, WIT2410, and WIT2411) and HN series modems, SNAP access points provide seamless Serial-to-Ethernet connectivity with remote wireless nodes transmitting unformatted data to a server-based application running on the SNAP Ethernet network. SNAP devices remove the need for the remote devices to handle the TCP/IP protocol. Certified by the FCC and CE marked on 2.4 GHz products, the SNAP family offers license-free use.

- **RFM FHSS technology** — Patented FHSS technology provides reliable communications in high noise floor environments, superior jamming and interference immunity. CRC checking and automatic repeat request (ARQ) deliver error-free data.
- **Serial to Ethernet connectivity** — Allows transparent communication with remote devices and network-based applications. Allows limited intelligence and legacy serial devices to appear as nodes on an Ethernet network.
- **Customizable operation** — All parameters are configurable under software control. Even transmit power can be selected through a straightforward command set.
- **Suited to tough environments** — All SNAPS are available in "D" DIN rail mount versions and "X" remote radio versions for harsh and outdoor use.

SNAP Wireless Access Points for Ethernet Network

RFM Part	Frequency	RF Data Rate	Transmit Power	RF Conn/Antenna	Description
SNAP910*	900 MHz	172.8 kbps	1 W	Reverse TNC	Serial-to-Ethernet Access Point for WIT910 and Series 91-based devices, Internal Radio
SNAP910D*	900 MHz	172.8 kbps	1 W	Reverse TNC	DIN-Rail Mount Serial-to-Ethernet Access Point for WIT910 and Series 91-based devices, Internal Radio
SNAP910DX*	900 MHz	172.8 kbps	1 W	Reverse TNC	DIN-Rail Mount Serial-to-Ethernet Access Point for WIT910 and Series 91-based devices, Remote Radio with up to 500 foot cable
SNAP910X*	900 MHz	172.8 kbps	1 W	Reverse TNC	Serial-to-Ethernet Access Point for WIT910 and Series 91-based devices, Remote Radio with up to 500 foot cable
SNAP2410	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	Serial-to-Ethernet Access Point for WIT2410 and Series 10-based devices, Internal Radio
SNAP2410D	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	DIN-Rail Mount, Serial-to-Ethernet Access Point for WIT2410 and Series 10-based devices, Internal Radio
SNAP2410DX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	DIN-Rail Mount Serial-to-Ethernet Access Point for WIT2410 and Series 10-based devices, Remote Radio with up to 500 foot cable
SNAP2410X	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	Serial-to-Ethernet Access Point for WIT2410 and Series 10-based devices, Remote Radio with up to 500 foot cable
SNAP2411*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	Serial-to-Ethernet Access Point for WIT2411 and Series 11-based devices, Internal Radio
SNAP2411D*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	DIN-Rail Mount, Serial-to-Ethernet Access Point for WIT2411 and Series 11-based devices, Internal Radio
SNAP2411DX*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	DIN-Rail Mount Serial-to-Ethernet Access Point for WIT2411 and Series 11-based devices, Remote Radio with up to 500 foot cable
SNAP2411X*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	Serial-to-Ethernet Access Point for WIT2411 and Series 11-based devices, Remote Radio with up to 500 foot cable



SNAP Serial-to-Ethernet Access Points
(this page - see above) ↑

900 MHz*	2.4 GHz	2.4 GHz
SNAP910*	SNAP2410	SNAP2411*
Used with WIT910-based devices	Used with WIT2410-based devices	Used with WIT2411-based devices

SEM Ethernet Bridges
(page 16) →

900 MHz*	2.4 GHz	2.4 GHz
172.8 kb/s	460.8 kb/s	1.23* Mb/s
1 W	100 mW	100 mW

*Boxed products based on WIT910, WIT934, and WIT2411-series modules (1.23 Mb/s data rate) are not RoHS compliant.



FHSS ETHERNET BRIDGES

Ethernet Connectivity for Point-to-Point and Point-to-Multipoint Networks



SEM Wireless Spread Spectrum Ethernet Bridges (900 MHz – 2.4 GHz). RFM SEM series wireless Ethernet bridges provide high-speed wireless connectivity between distant Ethernet nodes where cable runs are impractical. All SEMs feature the company's patented FHSS technology for robust RF performance. Typical SEM uses include Ethernet bridging, SCADA networking, PLC networking, and other industrial automation or data collection applications. SEMs can function as a high speed bridge between two 10/100 Base-T Ethernet networks; they can also provide wireless connectivity between an Ethernet network and multiple remote Ethernet network segments. Highly complex networks and extended coverage can be achieved by combining point-to-point or point-to-multipoint configurations with RFM repeaters.

The RFM SEM Ethernet Bridges are Class I, Div. 2 certified in both the 900 MHz and 2.4 GHz bands. SEM bridges include a standard 10/100 Base-T Ethernet port, antenna, and power connectors. Five LEDs indicate power status and data activity. Class I Div 1 versions are available by special order.

The SEM "D" model Ethernet radio is a DIN rail mount version, and the SEM "X" models use a remote, weatherproof, wireless Ethernet radio housed in a NEMA 4X / I.P. 66 enclosure.

900 MHz SEM Ethernet Bridges*. RFM SEM wireless 900 MHz Ethernet bridge is a high speed/long range wireless networking product that provides 172.8 kb/s over-the-air data rate and over 20 miles demonstrated communications range with 3 dB omni-directional antenna. Uses for a SEM wireless 900 MHz Ethernet bridge include SCADA networks, PLC networking, and other industrial automation or data collection applications.

2.4 GHz SEM Ethernet Bridges. The SEM2410 and SEM2411 link Ethernet nodes in an industrial communication hierarchy up to 5 miles apart (with gain antennas). The over-the-air data rate for the SEM2410 is 460 Kb/s and 1.23 Mb/s for the SEM2411. RFM patented FHSS assures reliable performance even in high-multi-path and noisy RF environments.

Ethernet Radio Security. RFM SEM wireless Ethernet bridges provide multiple levels of security. First, their communications use RFM proprietary frequency hopping spread spectrum (FHSS) protocol, which is understood only by other SEM Ethernet radio devices configured to use the same hopping pattern (out of 64 possibilities). To ensure that the SEM master communicates only with its intended SEM slaves, the SEM master can be configured to define the precise number of slaves (up to 62) that can register on the network, and can also be configured to authenticate an ID and password from each SEM slave prior to granting registration. Finally, SEM Ethernet radios include password protection for both console port and Telnet sessions, and can be configured to allow the opening of Telnet sessions only from specified IP addresses.

SEM: Spread Spectrum Wireless Ethernet Bridge

RFM Part	Frequency Band	RF Data Rate	Transmit Power	RF Conn/ Antenna	Description
SEM910*	900 MHz	172.8 kbps	1 W	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio
SEM910D*	900 MHz	172.8 kbps	1 W	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Internal Radio
SEM910DX*	900 MHz	172.8 kbps	1 W	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Remote Radio with up to 500 foot cable
SEM910-HL*	900 MHz	172.8 kbps	1 W	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio, Explosion-proof enclosure
SEM910X*	900 MHz	172.8 kbps	1 W	Reverse TNC	10/100Base-T Ethernet bridge, Remote Radio with up to 500 foot cable
SEM2410	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio
SEM2410D	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Internal Radio
SEM2410DX	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Remote Radio with up to 500 foot cable
SEM2410HL	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio, Explosion-proof enclosure
SEM2410X	2.4 GHz	460.8 kbps	100 mW	Reverse TNC	10/100Base-T Ethernet bridge, Remote Radio with up to 500 foot cable
SEM2411*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio
SEM2411D*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Internal Radio
SEM2411DX*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	10/100Base-T DIN-Rail mount Ethernet bridge, Remote Radio with up to 500 foot cable
SEM2411HL*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	10/100Base-T Ethernet Bridge, Internal Radio, Explosion-proof enclosure
SEM2411LC*	2.4 GHz	1.23 Mbps	100 mW	Internal 12 dBi Patch	10/100Base-T Ethernet Bridge Client, Remote Radio with 50 foot cable
SEM2411X*	2.4 GHz	1.23 Mbps	100 mW	Reverse TNC	10/100Base-T Ethernet bridge, Remote Radio with up to 500 foot cable



RF MODULES DEVELOPER KITS

Manufacturer's Suggested Retail Price in US Dollars



**Fast-track Your Designs...
Order Your Developer Kit Today!**

ACCELERATES INTEGRATION PROCESS

- Complete out-of-the-box solution with the all components need to put a system "on the air"
- Utility Program includes multi-tab dialog boxes for rapid and straight-forward parameter configuration
- Register your developer kit to receive free technical support

RFM RF Modules Developer Kits include the technology hardware and software to support the development and integration of RFM RF Modules into any machine-to-machine (M2M) application.

SIMPLE TO SET-UP AND CONFIGURE

- Includes "Quick Start Guide" to rapidly put a system on the air in less than an hour
- Utility Program is Windows-based and very intuitive to use
- Development boards included in each kit feature power supplies, interfaces and direct connections to quickly connect to PC



**WSN802GDK
(shown)
\$139**

(1) WSN802G module, (1) WSN802G development board, Serial and USB Cables, 9 V Battery and Wall-mount Power Supply, Antenna, Program CD with software and manuals, Quick Start Guide

**WSN802GDK-A
\$199**

(1) WSN802G module, (1) WSN802G development board, Pre-configured Wireless Router, Serial and USB Cables, 9 V Battery and Wall-mount Power Supply, Antenna, Program CD with software and manuals, Quick Start Guide



**LPR2430DK
LPR2430ERDK
(shown)
\$299**

(4) LPR2430 or (4) LPR2430ER modules (2) installed on developer boards labeled Base and Remote), (2) patch antennas, (2) dipole antennas with MMCX to SMA-R adapter cables, (2) 9 V wall-plug power suppliers (120/240 Vac plus (2) 9 V batteries), (2) RS-232 cables, (2) USB Serial cables, Documentation, Software CD

**LPR2430ADK
LPR2430ERADK
\$299**

(4) LPR2430A or LPR2430ERA modules (2) installed on developer boards labeled Base and Remote), (2) 9 V wall-plug power suppliers (120/240 Vac plus (2) 9 V batteries), (2) RS-232 cables, (2) USB Serial cables, Documentation, Software CD



**ZMN2405DK
ZMN2405HPDK
(shown)
\$299**

(2) ZMN2430A or (2) ZMN24030HPA evaluation boards, (2) AC power adapters and cords, (2) patch antennas, (2) USB cables, (2) Serial cables, (2) RF cables, (2) omni antennas, (2) 9 V batteries, Software CD

**ZMN2430ADK
ZMN2430HPADK
\$299**

(2) ZMN2430A or (2) ZMN2430HPA evaluation boards, (2) AC power adapters and cords, (2) patch antennas, (2) USB cables, (2) Serial cables, (2) RF cables, (2) omni antennas, (2) 9 V batteries, Software CD

**ZMN24HPDK-B
\$199**

(1) serial / sensor evaluation board configured as a Router, (1) ZN-241Z serial radio modem built around the ZigBee ZMN2405HP module configured as a Coordinator, (1) patch antenna, (1) USB cable, (2) Serial cables, (1) RF cable, (2) omni antennas, (1) 9 V battery, Software CD

RF MODULES DEVELOPER KITS

Manufacturer's Suggested Retail Price in US Dollars

**XDM2140DK**
\$2,995

(4) XDM2140 modules, (4) XDM2140 development boards, (1) XG2400E gateway, (1) Ethernet and (5) Serial cables, 9 V batteries and wall-mount power supplies, Antennas and RF cables, Program CD with software and manuals, Quick Start Guide

**DM1810-434-DK**
\$495

Developer Kit containing (1) DM1810-434 Base, (3) Routers, 3 Nodes

DM1810-434-QK
\$199

Quick Kit containing (1) DM1810-434 Base, (1) Router, 2 Nodes

DM1810-916-DK
\$495

Developer Kit containing (1) DM1810-916 Base, (3) Routers, 3 Node

DM1810-916-QK
\$199

Quick Kit containing (1) DM1810-916Base, (1) Router, (2) Nodes

**DNT900DK**
(shown)
\$359

(2) DNT900P radios, (2) DNT900 development boards, (2) 2 dBi dipole antennas, (2) 120/240 VAC 9 V wall-plug power supplies, (2) 9 V batteries, (2) RJ-45/DB-9F cable assemblies, (1) RJ-11/DB-9F cable assembly, (2) A/B USB cables, DNT900DK documentation and software CD

DNT2400DK
\$359

(2) DNT2400P radios, (2) DNT2400 development boards, (2) 2 dBi dipole antennas, (2) 120/240 VAC 9 V wall-plug power supplies, (2) 9 V batteries, (2) RJ-45/DB-9F cable assemblies, (1) RJ-11/DB-9F cable assembly, (2) A/B USB cables, DNT2400DK documentation and software CD

**WIT910DK**
\$795

(2) HN-591 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, (2) WIT910M modules, RF cables, antennas and programming software

WIT2410DK
\$795

(2) HN-510 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, (2) WIT2410M modules, RF cables, antennas and programming software

WIT2411DK
\$995

(2) HN-211 serial modems with flow control indicators, RS-232 and USB interfaces, battery, dipole antenna, (2) WIT2411 modules, and programming software

WIT2450DK
\$495

(2) HN-550 serial modems with flow control indicators, RS-232 interface, battery pack, power supply, dipole antenna, (2) WIT2450 modules, RF cables, antennas and programming software



SHORT-RANGE RADIO PRODUCT SELECTION TOOL

		1										2						3						4				5			6		7												
		FREQUENCY										DATA RATE		RANGE				RF POWER		TX CURRENT		RX CURRENT		MODULATION & TECHNOLOGY				FEATURES			INTER FACE		PACKAGE												
		303.825 MHz	315 MHz	403.5 MHz	418 MHz	433.92 MHz	868.35 MHz	914 MHz	916.5 MHz	902- 928 MHz	2.4 GHz	19.2 kbps	115.2 kbps	Up to 256 kbps	100 m Line-of-Sight	200 m Line-of-Sight	600 m Line-of-Sight	0 dBm	4 dBm	10 dBm	6 mA	15 mA	32 mA	1.8 mA	3.0 mA	4.3 mA	11 mA	OOK / ASK	Single Channel	Multi-Channel	FHSS	DSSS	Duty Cycle	Clock Recovery	Start Symbol	Digital	SPI	4 X 4 mm	5 X 5 mm	6.4 X 5 mm	10 X 7 mm	11 X 7 mm	11 X 9.5 mm		
SAW-BASED TRANSCEIVERS																																													
2nd Generation SAW-Based (TR)	TR1000								✓			✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR1001					✓						✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR1004						✓					✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR1100							✓				1 M			✓		✓				✓			✓				✓	✓						✓					✓					
	TR3000					✓						✓			✓		✓				✓			✓				✓	✓						✓						✓				
	TR3001		✓									✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR3002				✓							✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR3003	✓										✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR3005			✓								✓			✓		✓				✓			✓				✓	✓						✓					✓					
	TR3100					✓								✓		✓		✓			✓			✓				✓	✓						✓						✓				
3rd Generation SAW-Based (TR)	TR7000					✓						✓				✓				✓			✓				✓		✓	✓				✓	✓	✓	✓		✓				✓		
	TR7001		✓									✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
	TR7002				✓							✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
	TR7003	✓										✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
	TR8000							✓				✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
	TR8001						✓					✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
	TR8100							✓				✓				✓				✓			✓				✓		✓	✓					✓	✓	✓	✓		✓			✓		
RFIC TRANSCEIVERS																																													
RFICs	TRC103					✓	✓	✓	✓			✓			✓		✓			✓			✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	TRC104									✓		1 M			✓	✓		13 mA		18 mA			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	TRC105	✓	✓	✓	✓	✓						✓			✓		✓		✓		✓			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAW-BASED TRANSMITTERS																																													
2nd Generation SAW-Based (TX)	TX5000					✓						✓			✓		✓				✓						✓	✓							✓								✓		
	TX5001		✓									✓			✓		✓				✓						✓	✓							✓							✓			
	TX5002				✓							✓			✓		✓				✓						✓	✓							✓								✓		
	TX5003	✓										✓			✓		✓				✓						✓	✓							✓							✓			
	TX6000						✓					✓			✓		✓				✓						✓	✓							✓						✓				
	TR6001					✓						✓			✓		✓				✓						✓	✓							✓						✓				
	TX6004					✓						✓			✓		✓				✓						✓	✓							✓						✓				
RFIC RECEIVERS																																													
RFICs	TXC100	✓	✓	✓	✓	✓						✓			✓		✓		✓		✓					✓	✓	✓						✓	✓	✓		✓	✓						
SAW-BASED RECEIVERS																																													
2nd Generation SAW-Based (RX)	RX5000					✓						✓			✓										✓										✓									✓	
	RX5001		✓									✓			✓									✓			✓								✓								✓		
	RX5002				✓							✓			✓		✓						✓			✓									✓							✓			
	RX5003	✓										✓			✓		✓						✓			✓									✓							✓			
	RX5005H					✓						✓			✓		✓						✓			✓									✓						✓				
	RX5500					✓						✓			✓		✓						✓			✓									✓							✓			
	RX5501		✓									✓			✓		✓						✓			✓									✓							✓			
	RX6000						✓					✓			✓		✓						✓			✓									✓							✓			
	RX6001					✓						✓			✓		✓						✓			✓									✓							✓			
	RX6004					✓						✓			✓		✓						✓			✓									✓							✓			
	RX6501					✓						✓			✓		✓						✓			✓									✓							✓			

*With the addition of a crystal (see RFM Crystal products) the RFM RFIC products can accommodate multiple frequencies in a single device.

SUNSTAR射频通信 <http://www.rfoe.net/> TEL:0755-83397033 FAX:0755-83376182 E-MAIL:szss20@163.com

Consider the seven key questions below, matching them to the product selection tables to the left in order to identify the part number for the short-range radio that is most suitable for your application. Then locate the part number in this short-form catalog and select the development kit part number. **Order your development kit today!**

Seven Key Questions (Match Question Number to Product Selection Tables at Left)

1 Frequency:

In North or South America, if the application is for remote control choose 303 MHz or 433 MHz frequencies. If the application is for transmitting data choose 900 MHz.

In Europe, choose 433 MHz or 868 MHz for all applications.

In Asia and Pan Pacific, choose from any offered frequency. The RF power output is software programmable to meet the rules / regulations of a wide range of countries.

2 Data rate and range:

Choose the data rate and distance / line-of-sight range over which the remote control is to be activated or over which the data is to be transmitted.

3 RF Power and RX / TX Current:

Is long battery life or transmission distance primarily important? The lower the power / current the longer the battery life. The longer the transmission range the higher the power / current required to transmit over extended ranges.

Also, is the application to be powered by main or by battery? If battery, then obtaining the lowest power / current is critical.

4 Modulation and Technology:

Does the application require noise immunity or resistance to fading? Modulation enables transmission across a single channel (OOK/ASK) or multi-channel (FSK) to affect desired level of noise immunity. FSK and FHSS offers highest immunity to interference.

5 Features:

All SAW-based and RFIC short-range radios include a sleep mode feature to reduce power consumption.

Duty Cycle: Is programmable duty-cycle important (helps to regulate RF power output)? RFM 3rd generation SAW-based and RFIC short-range radios include a software programmable duty-cycle feature.

Clock Recovery: Is clock recovery needed within the RF device? RFM 3rd generation SAW-based and RFIC short-range radios have built-in clock recovery so that the microprocessor does not have to perform that function to minimize the processing overhead on the microprocessor. RFM 2nd generation short-range radios do not feature built-in clock recovery as they interface to encoders/decoders with built-in clock recovery.

Start Symbol: RFM's third generation SAW-based and RFIC short-range radios include a transmission start symbol option. The start symbol allows the receiver to automatically detect the start of a message, unloading this function from the host microprocessor. If automatic message detection by the radio is not mandatory, a second generation SAW-based radio can be used to achieve lowest receiver current.

6 Interface to microprocessor:

Does your microprocessor have limited I/O? If so choose a short-range radio with serial (SPI) interface. Choose a short-range radio with digital interface if your microprocessor requires digital I/O.

7 Package:

SAW-Based Short-range radios are encased in a rugged, self-shielding, metal ceramic, hybrid package. RFIC Short-range radios are encased in smaller plastic packages.

Design Support. Go to www.RFM.com to locate design support resources for RFM Short-Range Radio Products.

Design Support Tools	
Product Brochure	Describes Product Features, Benefits & Applications
Application Circuit	Complete circuit layout with Microcontroller, Antenna & Matching
Development Kit - Multiple Frequencies	Radio Boards which allow test and evaluation of product performance
Field Applications Engineering Support	Technical Support to reduce design cycle
RFIC Design Assistant	Tool to allow configuration and operation of radio
C Code Firmware	Register settings to configure radio
RFIC User's Guide	Guide to using the Development Kit
Gerber Files - PCB Layout	Electronic files for PCB Layout
Product Samples	Available for Qualified Design Opportunities
Antenna Application Note	Optimize radio performance
Regulatory Application Note	Assist in obtaining Regulatory Certification of radio design



RFIC SHORT-RANGE RADIOS

RFM Short-Range Radios
are Manufactured in
ISO 9001 : 2008
Certified Factories

300-510 MHz
TRC105



OOK / FSK MODULATION
5 mm x 5 mm

869-960 MHz
TRC103



2.4 GHz
TRC104



GSFK MODULATION
4 mm x 4 mm

SINGLE-CHIP

FHSS CAPABLE

MULTI-CHANNEL

SMALL SIZE

RFM RFIC Radios include PLL-based, single- or multi-channel transceivers and transmitters, evaluation boards and RF Design Assistant Software, servicing varied wireless applications in the marketplace and providing the following features:

- Integrated PLL, IF and Baseband Circuitry to minimize external component count and simplify / speed design-ins
- Support for single- and multiple-channel applications
- Wide frequency range
- Wide operating supply voltage
- Frequency Hopping Spread Spectrum capability
- Very few external components required
- Small size plastic packages

Transmitters					
RFM Part	Frequency	Data Rate	Output Power	Description	Case
TXC100	300-450 MHz	100 kbps	10 dBm	ASK/FSK	3 mm x 3 mm

Transceivers					
RFM Part	Frequency	Data Rate	Output Power	Description	Case
TRC103	863-960 MHz	200 kbps	13 dBm	Multi-channel OOK/FSK	5 mm x 5 mm
TRC104	2.401-2.527 GHz	1 Mbps	0 dBm	Multi-channel GFSK	4 mm x 4 mm
TRC105	300-510 MHz	200 kbps	13 dBm	Multi-channel OOK/FSK	5 mm x 5 mm

NEW! TRC105 RFIC Transceiver Features:

- Ultra-low Receiver Current Consumption @ 3.3 mA (TRC103) and 2.7 mA (TRC105)
- High RX Sensitivity: -112 dBm Typical (FSK)
- High Data Rate (Programmable): 32 kb/s OOK, 200 kb/s FSK
- Programmable Transmit Power: +11 dBm (TRC103) and +13 dBm (TRC105)
- Programmable 32-Bit Sync Byte
- Integrated PPL, IF and Baseband Circuitry
- Programmable 64-byte TX/RX FIFO
- Standard SPI Interface
- Integrated Crystal Oscillator:
 - TRC103 / TRC105 12.8 MHz Crystal Reference
 - TRC104 16 MHz Crystal Reference
- Programmable Clock Output Frequency
- Integrated RSSI – Digital
- Integrated Packet CRC
- Integrated Data Whitening
- Integrated Manchester Encoding/Decoding
- Operating Voltage: 2.1 V to 3.6 V



RFIC SHORT-RANGE RADIOS

Developer Kits and Evaluation Boards

RFM Short-Range Radios
are Manufactured in
ISO 9001 : 2008
Certified Factories

Fast-track Your Design...
Order Your Developer Kit and Evaluation Boards Today!

Developer Kits - "Out-of-the-Box" Operation

RFM Part	Frequency	Data Rate	Output Power	RFM XTAL Part #	RFM Filter Part #
DR-TRC103-868-DK	863-870 MHz	200 kbps	13 dBm	XTL1020	RF3501E
DR-TRC103-915-DK	902-928 MHz	200 kbps	13 dBm	XTL1020	RF2040E or SF2093E
DR-TRC103-950-DK	950-960 MHz	200 kbps	13 dBm	XTL1020	RF3601E
DR-TRC104-2400-DK	2.401-2.527 GHz	1 Mbps	0 dBm	XTL1021	Not Needed
DR-TRC105-304-DK	303.325-307.3 MHz	200 kbps	13 dBm	XTL1020	RF3602D
DR-TRC105-315-DK	310.0-319.5 MHz	200 kbps	13 dBm	XTL1020	RF3603D
DR-TRC105-345-DK	342.0-348.0 MHz	200 kbps	13 dBm	XTL1020	RF3607D
DR-TRC105-372-DK	365.0-381.0 MHz	200 kbps	13 dBm	XTL1020	RF3608D
DR-TRC105-390-DK	382.0-398.0 MHz	200 kbps	13 dBm	XTL1020	RF3604D
DR-TRC105-403-DK	402.0-407.3 MHz	200 kbps	13 dBm	XTL1020	RF3605D
DR-TRC105-434-DK	416.395-436.395 MHz	200 kbps	13 dBm	XTL1020	RF3606D
DR-TRC105-450-DK	447.0-451.0 MHz	200 kbps	13 dBm	XTL1020	RF3609D

Includes the necessary hardware, firmware and utility software to support efficient technology evaluation, and prototype and system development.

\$280

Each Kit Contains:

- (2) DR Radio Boards
- (2) DR Interface Boards
- (2) Dipole Antennas
- (2) USB 2.0 A/B cables
- (2) Universal Wall-plug Power Supplies
- (2) AA Battery Packs
- (4) AA Batteries
- CD Containing: RFIC Design Assistant Software, KIT Firmware C Source Code, User's Guides

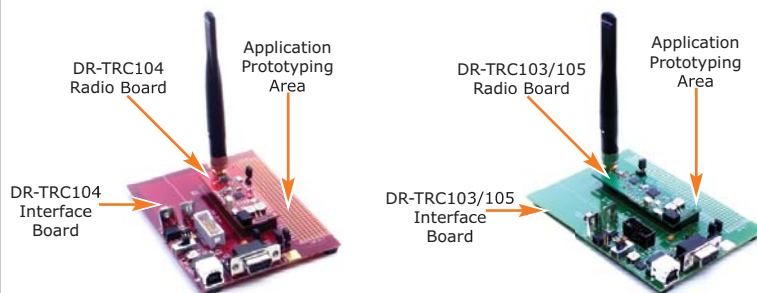
DR-TRC103/105 Series DK



DR-TRC104-2400-DK



Development Boards In RFIC Developer Kits



Evaluation Kits

RFM Part	Frequency	Data Rate	Output Power	RFM XTAL Part #	RFM Filter Part #
DR-TRC103-868-EV	863-870 MHz	200 kbps	13 dBm	XTL1020	RF3501E
DR-TRC103-915-EV	902-928 MHz	200 kbps	13 dBm	XTL1020	RF2040E or SF2093E
DR-TRC103-950-EV	950-960 MHz	200 kbps	13 dBm	XTL1020	RF3601E
DR-TRC104-2400-EV	2.401-2.527 GHz	1 Mbps	0 dBm	XTL1021	Not Needed
DR-TRC105-304-EV	303.325-307.3 MHz	200 kbps	13 dBm	XTL1020	RF3602D
DR-TRC105-315-EV	310.0-319.5 MHz	200 kbps	13 dBm	XTL1020	RF3603D
DR-TRC105-345-EV	342.0-348.0 MHz	200 kbps	13 dBm	XTL1020	RF3607D
DR-TRC105-372-EV	365.0-381.0 MHz	200 kbps	13 dBm	XTL1020	RF3608D
DR-TRC105-390-EV	382.0-398.0 MHz	200 kbps	13 dBm	XTL1020	RF3604D
DR-TRC105-403-EV	402.0-407.3 MHz	200 kbps	13 dBm	XTL1020	RF3605D
DR-TRC105-434-EV	416.395-436.395 MHz	200 kbps	13 dBm	XTL1020	RF3606D
DR-TRC105-450-EV	447.0-451.0 MHz	200 kbps	13 dBm	XTL1020	RF3609D
DR-TXC100-315	315 MHz	100 kbps	10 dBm	Price for Transmitter Eval Kits is \$48	
DR-TXC100-433	433.92 MHz	100 kbps	10 dBm		

Use for initial evaluation of the RFM RFIC radio technology

\$192

Prototype applications that will be using the RFM RFICs

Evaluation Board in the DR-TRC104-2400-EV



Evaluation Kit Contains:

- (2) DR Evaluation Boards
- (2) Dipole Antennas
- (2) AA Battery Packs
- (4) AA Batteries
- User Guide



DR-TRC103/105 Series Evaluation Kit



SAW-BASED SHORT-RANGE RADIOS

RFM Short-Range Radios
are Manufactured in
ISO 9001 : 2008
Certified Factories

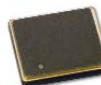
RFM SAW-Based Radio Products include RFM second and third generation ultra-low-power, proprietary amplifier-sequenced hybrid (ASH) radio architecture. RFM SAW-Based radios are integrated RF ICs with quartz SAW filtering and frequency control components built into a single hybrid to greatly simplify and speed up the RF design task. No external RF filters, IF filters, resonators or crystals are required. RFM SAW-based radios include transmitters, receivers, and transceivers operating in 300 - 1000 MHz frequencies. Featuring OOK / ASK for single-channel frequency and high out-of-band rejection where 80 dBm is typical, RFM second and third generation SAW-based radios are easy to optimize for a variety of applications.

Second Generation ASH Technology

- Short-range - 200 meters line-of-sight
- Ultra-low-power consumption with very long battery life
 - TX current of 6 mA
 - RX current of 1.8 mA
- Data rates: 115.2 kb/s to 1 Mb/s
- Adjustable Transmit Power up to 0 dBm
- Sleep Mode Current 700 nA
- Digital Interface

Third Generation ASH Technology

- Longer-range - 600 meters line-of-sight
- Very low power with excellent receiver sensitivity
 - TX current of 32 mA
 - RX current of 4.3 mA
- Data rates: 115.2 kb/s
- Adjustable Transmit Power up to 10 mW
- Sleep Mode Current 200 nA
- SPI Interface
- Additional features include DSSS, Clock Recovery, and Start Symbol

	RFM Part	Frequency	Data Rate	Output Power	Case	Dev Kit	
Transmitters							
Second Generation	TX5000	433.92 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm	DR4100	TX5003  10.8 mm X 9.52 mm SM-20L Package TX6004  10.2 mm X 7.06 mm SM-20H Package
	TX5001	315 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm	DR4101	
	TX5002	418 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm		
	TX5003	303.825 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm	DR4103	
	TX6000	916.5 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm	DR4000	
	TX6001	868.35 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm	DR4001	
	TX6004	914 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm		
Transceivers							
Second Generation	TR1000	916.5 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm	DR2000-DK	TX5003  10.8 mm X 9.52 mm SM-20L Package TX6004  10.2 mm X 7.06 mm SM-20H Package TR3006HS  10.7 mm X 6.8 mm SM3-20H Package
	TR1001	868.35 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm	DR1201-DK	
	TR1004	914 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm		
	TR1100	916.5 MHz	1000 kbps	1 mW	10.2 mm x 7.06 mm	DR3300	
	TR3000	433.92 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm	DR1300-DK	
	TR3001	315 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm	DR3101	
	TR3002	418 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm		
	TR3003	303.825 MHz	115.2 kbps	1 mW	10.8 mm x 9.52 mm		
	TR3005	403.5 MHz	115.2 kbps	1 mW	10.2 mm x 7.06 mm		
	TR3006HS	314 MHz	115.2 kbps	1 mW	10.7 mm x 6.8 mm		
	TR3100	433.92 MHz	576 kbps	1 mW	10.8 mm x 9.52 mm		
Third Generation	TR7000	433.92 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR7000-DK	TR8100  10.7 mm X 6.8 mm SM3-20H Package
	TR7001	315 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR7001-DK	
	TR7002	418 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR7002-DK	
	TR7003	303.825 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR7003-DK	
	TR8000	916.5 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR8000-DK	
	TR8001	868.35 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR8001-DK	
	TR8100	916.5 MHz	115.2 kbps	10 mW	10.7 mm x 6.8 mm	DR8100-DK	
Receivers							
Second Generation	RX5000	433.92 MHz	115.2 kbps		10.8 mm x 9.52 mm	DR5100	RX5000  10.8 mm X 9.52 mm SM-20L Package RX6501  10.2 mm X 7.06 mm SM-20H Package
	RX5001	315 MHz	115.2 kbps		10.8 mm x 9.52 mm	DR5101	
	RX5002	418 MHz	115.2 kbps		10.8 mm x 9.52 mm		
	RX5003	303.825 MHz	115.2 kbps		10.8 mm x 9.52 mm	DR5103	
	RX5005H	433.42 MHz	115.2 kbps		10.2 mm x 7.06 mm		
	RX5500	433.92 MHz	19.2 kbps		10.8 mm x 9.52 mm		
	RX5501	315 MHz	19.2 kbps		10.8 mm x 9.52 mm		
	RX6000	916.5 MHz	115.2 kbps		10.2 mm x 7.06 mm	DR5000	
	RX6001	868.35 MHz	115.2 kbps		10.2 mm x 7.06 mm	DR5001	
	RX6004	914 MHz	115.2 kbps		10.2 mm x 7.06 mm		
	RX6501	868.35 MHz	19.2 kbps		10.2 mm x 7.06 mm		
RF UART Integrated Circuits							
	IC1000	Data/Clock Extraction			k04-057		
	IC1003	RF Uart IC			va64		



SAW-BASED SHORT-RANGE RADIOS

Developer Kits and Evaluation Boards

RFM Short-Range Radios
are Manufactured in
ISO 9001 : 2008
Certified Factories

Fast-track Your Design...
Order Your Developer Kit, Evaluation Kit, and Radio Modules Today!

Developer Kits - "Out-of-the-Box" Operation

\$280

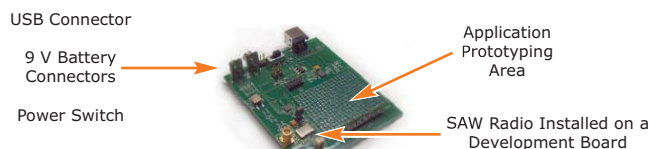
	RFM Part	Frequency	Data Rate	Output Power
Second Generation	DR1200A-DK	916.5 MHz	2 kbps	1 mW
	DR1200-DK	916.5 MHz	22.5 kbps	1 mW
	DR1201A-DK	868.35 MHz	2 kbps	1 mW
	DR1201-DK	868.35 MHz	22.5 kbps	1 mW
	DR1300A-DK	433.92 MHz	2 kbps	1 mW
	DR1300-DK	433.92 MHz	22.5 kbps	1 mW
Third Generation	DR2000-DK	916.5 MHz	115.2 kbps	1 mW
	DR7000-DK	433.92 MHz	115.2 kbps	10 mW
	DR7001-DK	315 MHz	115.2 kbps	10 mW
	DR7002-DK	418 MHz	115.2 kbps	10 mW
	DR7003-DK	303.825 MHz	115.2 kbps	10 mW
	DR8000-DK	916.5 MHz	115.2 kbps	10 mW
	DR8001-DK	868.35 MHz	115.2 kbps	10 mW
	DR8100-DK	916.5 MHz	115.2 kbps	10 mW

Each Kit Contains:

- (2) DR Development Boards
- (2) USB 2.0 cables
- (2) 9 V batteries
- (2) tuned, SMA antennas
- Program CD with documentation
- Configuration software



Example Development Board In SAW-based Short-Range Radio Developer Kits



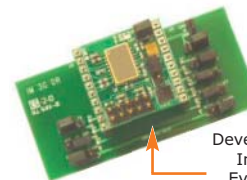
SAW Radio Transceiver Evaluation Kits (Third Generation ASH Technology Only)

\$56

	RFM Part	Frequency	Data Rate	Output Power
Third Generation	DR7000-EV	433.92 MHz	115.2 kbps	10 mW
	DR7001-EV	315 MHz	115.2 kbps	10 mW
	DR7003-EV	303.825 MHz	115.2 kbps	10 mW
	DR8000-EV	916.5 MHz	115.2 kbps	10 mW
	DR8001-EV	868.35 MHz	115.2 kbps	10 mW
	DR8100-EV	916.5 MHz	115.2 kbps	10 mW

Each Evaluation Kit Contains:

- (1) DR Module
- (1) Interface Board w/Microprocessor
- (2) USB 2.0 cables
- (2) 9 V batteries
- (2) tuned, SMA antennas
- Program CD with documentation



SAW Radio Development Module Installed on an Evaluation Board with Microprocessor

SAW Radio Development Modules (Second and Third Generation ASH Technology)

\$16 - \$18

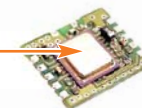
	RFM Part	Frequency	Data Rate	Output Power
Second Generation ASH Technology	DR3000	916.5 MHz	2.4 kbps	1 mW
	DR3000-1	916.5 MHz	115.2 kbps	1 mW
	DR3001	868.35 MHz	2.4 kbps	1 mW
	DR3100	433.92 MHz	2.4 kbps	1 mW
	DR3100-1	433.92 MHz	115.2 kbps	1 mW
	DR3101	315 MHz	2.4 kbps	1 mW
	DR3300	916.5 MHz	1000 kbps	1 mW
	DR4000	916.5 MHz	115.2 kbps	1 mW
	DR4001	868.35 MHz	115.2 kbps	1 mW
	DR4100	433.92 MHz	115.2 kbps	1 mW
	DR4101	315 MHz	115.2 kbps	1 mW
	DR4103	303.825 MHz	115.2 kbps	1 mW
	DR5000	916.5 MHz	19.2 kbps	1 mW
	DR5001	868.35 MHz	19.2 kbps	1 mW
Third Generation	DR5100	433.92 MHz	19.2 kbps	1 mW
	DR5101	315 MHz	19.2 kbps	1 mW
	DR5103	303.825 MHz	19.2 kbps	1 mW
	DR7000	433.92 MHz	115.2 kbps	10 mW
	DR7001	315 MHz	115.2 kbps	10 mW
	DR7003	303.825 MHz	115.2 kbps	10 mW
	DR8000	916.5 MHz	115.2 kbps	10 mW
	DR8001	868.35 MHz	115.2 kbps	10 mW
	DR8100	916.5 MHz	115.2 kbps	10 mW

Pre-mounted, pre-soldered, and ready for proof-of-concept, testing and evaluation.

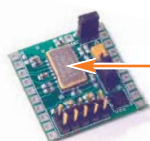
Hook up to a microprocessor and you are ready to go.



10.2 mm x 7.06 mm
Surface Mount
Package



10.8 mm x 9.52 mm
Surface Mount
Package



10.7 mm x 6.8 mm
Surface Mount
Package

\$47.80



SAW-BASED COMPONENTS and FREQUENCY CONTROL

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

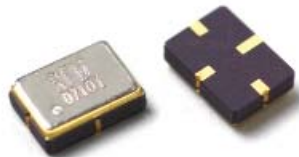
High performance wireless components integral to enabling wireless connections and communications; embedded into a wide range of products.

6 MHz – 2.6 GHz

SMALL SIZE

LOW COST

LOW POWER CONSUMPTION



✓ All RFM SAW Resonators are RoHS compliant.

SAW Resonators (pages 26-28). Low-power SAW resonators are used as frequency control elements in transmitter and receiver LO circuits. These components are essential to the miniature radio frequency transmitters and receivers that enable a variety of wireless consumer, automotive, industrial, medical and commercial applications. RFM manufactures reliable, high performance, low-cost components in a variety of small surface-mount packages as well as the traditional TO39 "metal can" package.

SAW Narrowband Front-End Filters (pages 29-30). The use of narrowband SAW filters has become a necessity in a variety of wireless links. RFM SAW coupled resonators filter components are used as narrowband front-end filters for receivers to reject strong out of band signals. RFM has an extensive offering of low-cost, rugged, narrowband SAW front-end filters in a broad range of frequencies and a variety of small packages. These low-cost front-end filters exhibit excellent rejection characteristics, low insertion loss and superior temperature stability.



✓ All RFM SAW Narrowband Front-End Filters are RoHS compliant.

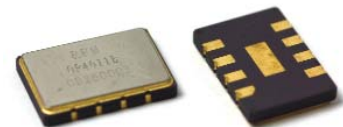


✓ All RFM SAW RF/IF Filters are RoHS compliant.

SAW RF/IF Filters (pages 31-36). RFM filter products includes a variety of standard and custom bandpass filters for radio frequency (RF), intermediate frequency (IF) and other applications. The operating frequencies of these filters range from 40 MHz to 2.6 GHz. These filters are available in a variety of leaded and surface-mount packages. RFM also custom designs and manufactures SAW delay lines and notch filters.

Frequency Control (pages 37-38). RFM Frequency Control products include a broad array of devices:

- SAW-stabilized Optical Timing Clocks and Diff-Sine Wave Clocks and Oscillators in a wide range of operating frequencies between 200 MHz and 1.8 GHz. These frequency sources exhibit very low phase noise and jitter. They have tolerances of 100 ppm basic stability, or the ability to phase lock to high-stability system clocks.
- A variety of tiny, high performance Crystal-based devices used in both time and frequency domain applications.



✓ All RFM Frequency Control products are RoHS compliant.



SAW RESONATORS

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

RFM provides a large selection of SAW resonators in a broad range of frequencies from 300 MHz to over 1 GHz. These products are designed to be the frequency control elements in transmitters and receiver local oscillators. Their use allows reduced receiver bandwidths, which results in improved sensitivity and immunity to interference. Tighter center frequency tolerances are becoming popular especially in Europe. RFM can provide tolerances down to ± 50 kHz. These quartz-stabilized devices ensure maximum temperature performance in a variety of applications.

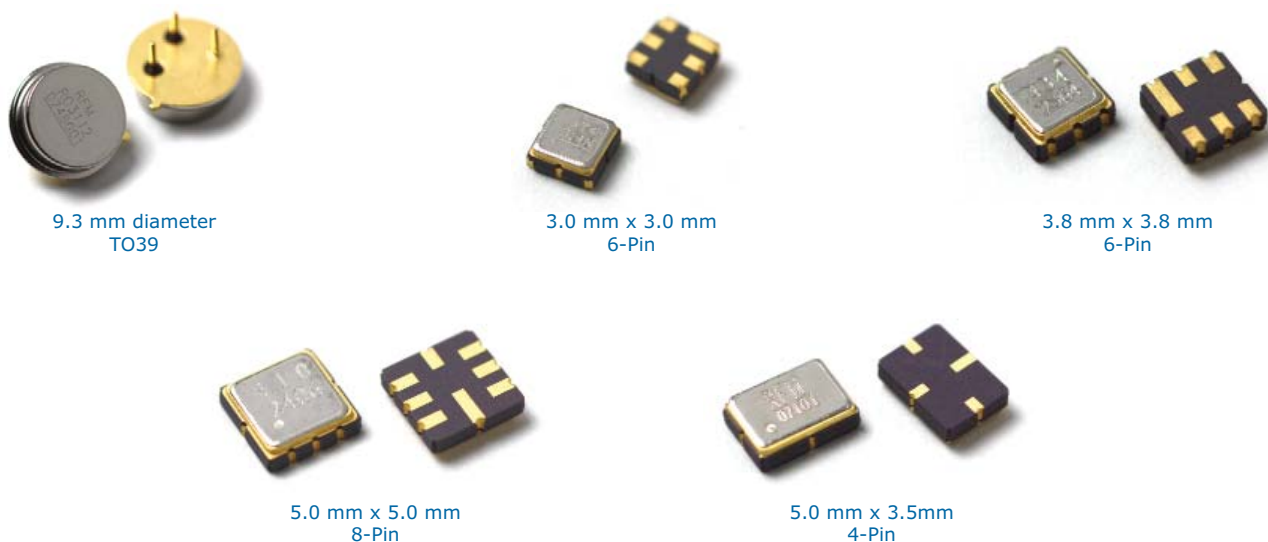
Applications

- Automotive keyless entry
- Tire pressure monitoring
- GPS receivers
- Wireless point-of-sale terminals
- Data link equipment
- Peripherals
- High Performance Computing
- Remote bar code data entry
- Bar code readers
- Identification tags
- Home automation
- Door and gate openers
- Personal and home security
- Automated meter reading
- Consumer sports

Packaging and Minimum Order Quantities. RO resonator products are packaged in both TO39 leaded packages and a variety of surface-mount packages (SMT). The TO39 packaged resonators are shipped in antistatic shipping tubes with a quantity of 50 pieces per tube.

The SMT packaged resonators are shipped in tape and reel with 500 units in 7" tape and reel, and 3,000 or 4,000 units on 13" tape and reel. Resonators are sold by the tape and reel. Contact a sales rep, distributor, or stocking rep / distributor near you to request samples or your evaluations and / or prototype designs. For package options, see RF COMPONENTS PACKAGE SELECTION GUIDE on page 39.

RFM is currently manufacturing both the TO39 and SMT versions of one-port resonators in high volumes.



Port Type. The SAW Resonator product family includes one (Single Port) and two port (Dual Port) types. The RO series is a line of true single-port devices with a lumped element model that is similar to that of a bulk crystal device. Single-port resonators are typically used in modified Colpitts oscillator configurations where the resonator is connected between the base of a transistor and ground.

Dual-Port Resonators			
RFM Part	Freq. (MHz)	Lid Symbol	Case
RP1104	824.25	P1104	9.3mm diameter
RP1105	640	P1105	9.3mm diameter
RP1236-1	312	RP1236-1	9.3mm diameter
RP1298-2	423.22	RP1298-2	9.3mm diameter
RP1298	423.22	P1298	9.3mm diameter
RP1308	433.92	P1308	9.3mm diameter

All RFM SAW Resonators are RoHS compliant.

See Single-Port Resonators next page.



SAW RESONATORS

Listed in Order by Part Number

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

Single-Port Resonators in Order by Part Number

RFM Part	Freq (MHz)	Lid Symbol	Case
RO2043	303.875	RO2043	9.3mm diameter
RO2055	403.966	RO2055	9.3mm diameter
RO2073	315	RO2073	9.3mm diameter
RO2073C	315	412	5.0 x 5.0
RO2073D	315	442	3.8 x 3.8
RO2078	315.05	RO2078	9.3mm diameter
RO2100	295.05	RO2100	9.3mm diameter
RO2101	433.92	RO2101	9.3mm diameter
RO2101C	433.92	411	5.0 x 5.0
RO2101D	433.92	439	3.8 x 3.8
RO2102	423.22	RO2102	9.3mm diameter
RO2103	418	RO2103	9.3mm diameter
RO2104	303.825	RO2104	9.3mm diameter
RO2112C	433.42	438	5.0 x 5.0
RO2112D	433.42	467	3.8 x 3.8
RO2115	417.5	RO2115	9.3mm diameter
RO2131D	314.35	440	3.8 x 3.8
RO3023	433.97	RO3023	9.3mm diameter
RO3023A-1	433.97	718	5.0 x 3.5
RO3030A-1	314.2	830	5.0 x 3.5
RO3053A-1	310	810	5.0 x 3.5
RO3073	315	RO3073	9.3mm diameter
RO3073A	315	656	5.0 x 3.5
RO3073A-1	315	742	5.0 x 3.5
RO3073A-5	315.05	788	5.0 x 3.5
RO3073A-6	315	789	5.0 x 3.5
RO3073A-11	315	907	5.0 x 3.5
RO3073A-14	315	915	5.0 x 3.5
RO3073C	315	706	5.0 x 5.0
RO3073D	315	705	3.8 x 3.8
RO3073E	315	704	3.0 x 3.0
RO3073E-1	315	802	3.0 x 3.0
RO3073E-11	315	909	3.0 x 3.0
RO3073E-14	315	908	3.0 x 3.0
RO3075	345	RO3075	9.3mm diameter
RO3075A	345	664	5.0 x 3.5
RO3075E	345	694	3.0 x 3.0
RO3101	433.92	RO3101	9.3mm diameter
RO3101A	433.92	655	5.0 x 3.5
RO3101A-1	433.92	745	5.0 x 3.5
RO3101A-11	433.92	904	5.0 x 3.5
RO3101A-14	433.92	903	5.0 x 3.5
RO3101A-21	433.92	807	5.0 x 3.5
RO3101C	433.92	703	5.0 x 5.0
RO3101D	433.92	702	3.8 x 3.8
RO3101E	433.92	701	3.0 x 3.0
RO3101E-1	433.92	750	3.0 x 3.0
RO3101E-11	433.92	894	3.0 x 3.0
RO3101E-14	433.92	902	3.0 x 3.0
RO3102	423.22	RO3102	9.3mm diameter
RO3102A	423.22	823	5.0 x 3.5
RO3102A-1	423.22	784	5.0 x 3.5
RO3103	418	RO3103	9.3mm diameter
RO3103A	418	659	5.0 x 3.5
RO3103D	418	717	3.8 x 3.8
RO3103E	418	676	3.0 x 3.0
RO3104	303.825	RO3104	9.3mm diameter
RO3104A	303.825	662	5.0 x 3.5
RO3104C	303.825	688	5.0 x 5.0
RO3104D	303.825	689	3.8 x 3.8
RO3104E	303.825	690	3.0 x 3.0
RO3112	433.42	RO3112	9.3mm diameter
RO3112A	433.42	658	5.0 x 3.5
RO3112C	433.42	657	5.0 x 5.0

Single-Port Resonators in Order by Part Number

RFM Part	Freq (MHz)	Lid Symbol	Case
RO3112D	433.42	683	3.8 x 3.8
RO3112E	433.42	684	3.0 x 3.0
RO3113	314.5	RO3113	9.3mm diameter
RO3113A	314.5	801	5.0 x 3.5
RO3115	417.5	RO3115	9.3mm diameter
RO3115A	417.5	833	5.0 x 3.5
RO3116	303.325	RO3116	9.3mm diameter
RO3116A	303.325	819	5.0 x 3.5
RO3118	318	RO3118	9.3mm diameter
RO3118A	318	661	5.0 x 3.5
RO3118D	318	716	3.8 x 3.8
RO3118E	318	687	3.0 x 3.0
RO3119A	317.5	834	5.0 x 3.5
RO3120A	403.55	824	5.0 x 3.5
RO3122A	293.125	835	5.0 x 3.5
RO3123A	307.3	831	5.0 x 3.5
RO3125	304.3	RO3125	9.3mm diameter
RO3125A	304.3	787	5.0 x 3.5
RO3125A-2	304.3	815	5.0 x 3.5
RO3131A	314.35	849	5.0 x 3.5
RO3132A	312	794	5.0 x 3.5
RO3134A	372.5	836	5.0 x 3.5
RO3135A	319.508	839	5.0 x 3.5
RO3136A	432.92	850	5.0 x 3.5
RO3138A	407.3	837	5.0 x 3.5
RO3143A	372	820	5.0 x 3.5
RO3144	916.5	RO3144	9.3mm diameter
RO3144A	916.5	663	5.0 x 3.5
RO3144A-1	916.5	897	5.0 x 3.5
RO3144A-2	916.5	813	5.0 x 3.5
RO3144C	916.5	691	5.0 x 5.0
RO3144D	916.5	692	3.8 x 3.8
RO3144D-1	916.5	767	3.8 x 3.8
RO3144D-2	916.5	768	3.8 x 3.8
RO3144E	916.5	693	3.0 x 3.0
RO3144E-1	916.5	769	3.0 x 3.0
RO3144E-2	916.5	770	3.0 x 3.0
RO3150A	304	838	5.0 x 3.5
RO3156A	868.95	714	5.0 x 3.5
RO3156A-1	868.95	923	5.0 x 3.5
RO3156A-2	868.95	828	5.0 x 3.5
RO3156A-3	868.95	808	5.0 x 3.5
RO3156D	868.95	715	3.8 x 3.8
RO3156D-1	868.95	924	3.8 x 3.8
RO3156D-2	868.95	925	3.8 x 3.8
RO3156E	868.95	707	3.0 x 3.0
RO3156E-1	868.95	708	3.0 x 3.0
RO3156E-2	868.95	926	3.0 x 3.0
RO3164	868.35	RO3164	9.3mm diameter
RO3164A	868.35	660	5.0 x 3.5
RO3164A-1	868.35	780	5.0 x 3.5
RO3164A-2	868.35	868	5.0 x 3.5
RO3164A-3	868.35	814	5.0 x 3.5
RO3164C	868.35	799	5.0 x 5.0
RO3164D	868.35	685	3.8 x 3.8
RO3164D-1	868.35	771	3.8 x 3.8
RO3164D-2	868.35	772	3.8 x 3.8
RO3164E	868.35	686	3.0 x 3.0
RO3164E-1	868.35	773	3.0 x 3.0
RO3164E-2	868.35	774	3.0 x 3.0
RO3188A	390	797	5.0 x 3.5
RO3193A	379.3	832	5.0 x 3.5
RO3300E	403.55	719	3.0 x 3.0

All RFM SAW Resonators are RoHS compliant.



SAW RESONATORS

Listed in Order by Frequency

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

Single-Port Resonators in Order by Frequency

RFM Part	Freq (MHz)	Lid Symbol	Case
RO3122A	293.125	835	5.0 x 3.5
RO2100	295.05	RO2100	9.3mm diameter
RO3116	303.325	RO3116	9.3mm diameter
RO3116A	303.325	819	5.0 x 3.5
RO2104	303.825	RO2104	9.3mm diameter
RO3104	303.825	RO3104	9.3mm diameter
RO3104A	303.825	662	5.0 x 3.5
RO3104C	303.825	688	5.0 x 5.0
RO3104D	303.825	689	3.8 x 3.8
RO3104E	303.825	690	3.0 x 3.0
RO2043	303.875	RO2043	9.3mm diameter
RO3150A	304	838	5.0 x 3.5
RO3125	304.3	RO3125	9.3mm diameter
RO3125A	304.3	787	5.0 x 3.5
RO3125A-2	304.3	815	5.0 x 3.5
RO3123A	307.3	831	5.0 x 3.5
RO3053A-1	310	810	5.0 x 3.5
RO3132A	312	794	5.0 x 3.5
RO3030A-1	314.2	830	5.0 x 3.5
RO2131D	314.35	440	3.8 x 3.8
RO3131A	314.35	849	5.0 x 3.5
RO3113	314.5	RO3113	9.3mm diameter
RO3113A	314.5	801	5.0 x 3.5
RO2073	315	RO2073	9.3mm diameter
RO2073C	315	412	5.0 x 5.0
RO2073D	315	442	3.8 x 3.8
RO3073	315	RO3073	9.3mm diameter
RO3073A	315	656	5.0 x 3.5
RO3073A-1	315	742	5.0 x 3.5
RO3073A-11	315	907	5.0 x 3.5
RO3073A-14	315	915	5.0 x 3.5
RO3073A-6	315	789	5.0 x 3.5
RO3073C	315	706	5.0 x 5.0
RO3073D	315	705	3.8 x 3.8
RO3073E	315	704	3.0 x 3.0
RO3073E-1	315	802	3.0 x 3.0
RO3073E-11	315	909	3.0 x 3.0
RO3073E-14	315	908	3.0 x 3.0
RO2078	315.05	RO2078	9.3mm diameter
RO3073A-5	315.05	788	5.0 x 3.5
RO3119A	317.5	834	5.0 x 3.5
RO3118	318	RO3118	9.3mm diameter
RO3118A	318	661	5.0 x 3.5
RO3118D	318	716	3.8 x 3.8
RO3118E	318	687	3.0 x 3.0
RO3135A	319.508	839	5.0 x 3.5
RO3075	345	RO3075	9.3mm diameter
RO3075A	345	664	5.0 x 3.5
RO3075E	345	694	3.0 x 3.0
RO3143A	372	820	5.0 x 3.5
RO3134A	372.5	836	5.0 x 3.5
RO3193A	379.3	832	5.0 x 3.5
RO3188A	390	797	5.0 x 3.5
RO3120A	403.55	824	5.0 x 3.5
RO3300E	403.55	719	3.0 x 3.0
RO2055	403.966	RO2055	9.3mm diameter
RO3138A	407.3	837	5.0 x 3.5
RO2115	417.5	RO2115	9.3mm diameter
RO3115	417.5	RO3115	9.3mm diameter
RO3115A	417.5	833	5.0 x 3.5
RO2103	418	RO2103	9.3mm diameter
RO3103	418	RO3103	9.3mm diameter
RO3103A	418	659	5.0 x 3.5
RO3103D	418	717	3.8 x 3.8

All RFM SAW Resonators are RoHS compliant.

Single-Port Resonators in Order by Frequency

RFM Part	Freq (MHz)	Lid Symbol	Case
RO3103E	418	676	3.0 x 3.0
RO2102	423.22	RO2102	9.3mm diameter
RO3102	423.22	RO3102	9.3mm diameter
RO3102A	423.22	823	5.0 x 3.5
RO3102A-1	423.22	784	5.0 x 3.5
RO3136A	432.92	850	5.0 x 3.5
RO2112C	433.42	438	5.0 x 5.0
RO2112D	433.42	467	3.8 x 3.8
RO3112	433.42	RO3112	9.3mm diameter
RO3112A	433.42	658	5.0 x 3.5
RO3112C	433.42	657	5.0 x 5.0
RO3112D	433.42	683	3.8 x 3.8
RO3112E	433.42	684	3.0 x 3.0
RO2101	433.92	RO2101	9.3mm diameter
RO2101C	433.92	411	5.0 x 5.0
RO2101D	433.92	439	3.8 x 3.8
RO3101	433.92	RO3101	9.3mm diameter
RO3101A	433.92	655	5.0 x 3.5
RO3101A-1	433.92	745	5.0 x 3.5
RO3101A-11	433.92	904	5.0 x 3.5
RO3101A-14	433.92	903	5.0 x 3.5
RO3101A-21	433.92	807	5.0 x 3.5
RO3101C	433.92	703	5.0 x 5.0
RO3101D	433.92	702	3.8 x 3.8
RO3101E	433.92	701	3.0 x 3.0
RO3101E-1	433.92	750	3.0 x 3.0
RO3101E-11	433.92	894	3.0 x 3.0
RO3101E-14	433.92	902	3.0 x 3.0
RO3023	433.97	RO3023	9.3mm diameter
RO3023A-1	433.97	718	5.0 x 3.5
RO3164	868.35	RO3164	9.3mm diameter
RO3164A	868.35	660	5.0 x 3.5
RO3164A-1	868.35	780	5.0 x 3.5
RO3164A-2	868.35	868	5.0 x 3.5
RO3164A-3	868.35	814	5.0 x 3.5
RO3164C	868.35	799	5.0 x 5.0
RO3164D	868.35	685	3.8 x 3.8
RO3164D-1	868.35	771	3.8 x 3.8
RO3164D-2	868.35	772	3.8 x 3.8
RO3164E	868.35	686	3.0 x 3.0
RO3164E-1	868.35	773	3.0 x 3.0
RO3164E-2	868.35	774	3.0 x 3.0
RO3156A	868.95	714	5.0 x 3.5
RO3156A-1	868.95	923	5.0 x 3.5
RO3156A-2	868.95	828	5.0 x 3.5
RO3156A-3	868.95	808	5.0 x 3.5
RO3156D	868.95	715	3.8 x 3.8
RO3156D-1	868.95	924	3.8 x 3.8
RO3156D-2	868.95	925	3.8 x 3.8
RO3156E	868.95	707	3.0 x 3.0
RO3156E-1	868.95	708	3.0 x 3.0
RO3156E-2	868.95	926	3.0 x 3.0
RO3144	916.5	RO3144	9.3mm diameter
RO3144A	916.5	663	5.0 x 3.5
RO3144A-1	916.5	897	5.0 x 3.5
RO3144A-2	916.5	813	5.0 x 3.5
RO3144C	916.5	691	5.0 x 5.0
RO3144D	916.5	692	3.8 x 3.8
RO3144D-1	916.5	767	3.8 x 3.8
RO3144D-2	916.5	768	3.8 x 3.8
RO3144E	916.5	693	3.0 x 3.0
RO3144E-1	916.5	769	3.0 x 3.0
RO3144E-2	916.5	770	3.0 x 3.0



SAW NARROWBAND FRONT-END FILTERS

Listed in Order by Part Number

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

RFM provides a large selection of low-loss narrowband front end filters for all major frequencies used in low-power unlicensed communications equipment from 300-1000 MHz. Coupled resonator filter technology is used in the RF series of components. These devices are used as narrowband front-end filters to reject strong out-of-band signals.

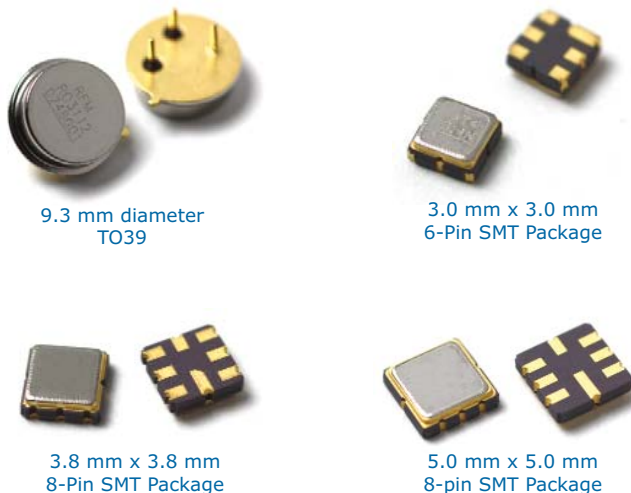
Typical bandwidths are 600-900 kHz with typical ultimate out-of-band rejection of 50 dB. Special rejection is provided at key points such as -10.7 MHz for local oscillator rejection and -21.4 MHz for the image spurious response in typical superhet receivers.

Optimum implementation of this filter technology is accomplished when the filter is matched on both input and output ports. This matching is typically a simple inductor-capacitor network. In addition to matching, careful attention to circuit board layout is also important to achieve optimum filter performance.

Applications

- Automotive keyless entry
- Tire pressure monitoring
- GPS receivers
- Wireless point-of-sale terminals
- Data link equipment
- Peripherals
- Remote bar code data entry
- Bar code readers
- Identification tags
- Home automation
- Door and gate openers
- Personal and home security
- Automated meter reading
- Consumer sports

Packages. RFM SAW Narrowband Front-End Filters are packaged in both TO39 leaded packages and a variety of surface-mount (SMT) packages. The TO39 parts are shipped in antistatic shipping tubes and the SMT parts are shipped in tape and reel.



SAW Narrowband Front End Filters by Part				
RFM Part	Freq. (MHz)	Bandwidth (kHz)	Lid Symbol	Case
RF1171	418	600	RF1171	9.3mm diameter
RF1172	433.92	600	RF1172	9.3mm diameter
RF1172C	433.92	700	409	5.0 x 5.0
RF1172D	433.92	600	477	3.8 x 3.8
RF1211	315	700	RF1211	9.3mm diameter
RF1211C	315	900	410	5.0 x 5.0
RF1211D	315	600	476	3.8 x 3.8
RF1238	318	700	RF1238	9.3mm diameter
RF1284	319.5	600	RF1284	9.3mm diameter
RF1295C	451.35	1000	482	5.0 x 5.0
RF1301	499.25	30	RF1301	9.3mm diameter
RF1302	439.25	30	RF1302	9.3mm diameter
RF1353C	345	430	446	5.0 x 5.0
RF1353D	345	430	444	3.8 x 3.8
RF1391C	433.42	600	415	5.0 x 5.0
RF1396C	434.42	700	427	5.0 x 5.0
RF1400D	433.92	1150	490	3.8 x 3.8
RF1401D	433.92	1000	495	3.8 x 3.8
RF1402D	315	1000	496	3.8 x 3.8
RF1404C	433.92	600	499	5.0 x 5.0
RF1407D	868.6	1800	505	3.8 x 3.8
RF1408D	447.7	840	511	3.8 x 3.8
RF1411D	869.2625	1250	512	3.8 x 3.8
RF1414D	372.5	425	528	3.8 x 3.8
RF1417D	315	600	550	3.8 x 3.8
RF1419D	403.5	7500	560	3.8 x 3.8
RF1432C	319.5	600	621	5.0 x 5.0
RF1439E	315	850	795	3.0 x 3.0
RF3171	418	600	RF3171	9.3mm diameter
RF3171D	418	600	775	3.8 x 3.8
RF3181	916.5	750	RF3181	9.3mm diameter
RF3181D	916.5	750	671	3.8 x 3.8
RF3181E	916.5	750	689	3.0 x 3.0
RF3210	303.825	500	RF3210	9.3mm diameter
RF3210D	303.825	650	675	3.8 x 3.8
RF3319D	868.95	650	668	3.8 x 3.8
RF3319E	868.95	800	695	3.0 x 3.0
RF3336	868.35	600	RF3336	9.3mm diameter
RF3336C	868.35	600	673	5.0 x 5.0
RF3336D	868.35	600	699	3.8 x 3.8
RF3336E	868.35	600	700	3.0 x 3.0
RF3355C	390	440	736	5.0 x 5.0
RF3404	433.92	600	RF3404	9.3mm diameter
RF3404D	433.92	600	539	3.8 x 3.8
RF3404E	433.92	600	697	3.0 x 3.0
RF3414D	372.5	425	846	3.8 x 3.8
RF3414E	372.5	450	720	3.0 x 3.0
RF3417	315	700	RF3417	9.3mm diameter
RF3417D	315	600	550	3.8 x 3.8
RF3417E	315	600	696	3.0 x 3.0
RF3501E	866.1	31000	805	3.0 x 3.0
RF3601E	960	40000	818	3.0 x 3.0

All RFM SAW Narrowband Front-End Filters are RoHS compliant.

Minimum Order Quantities.

TO-39 packaged parts are shipped in antistatic shipping tubes with a minimum quantity of 50 per tube.

The SMT packaged filters are shipped in tape and reel with 500 units in 7" tape and reel, and 3,000 units in 13" tape and reel.

Contact a sales rep, distributor, or stocking rep / distributor near you to request samples for your evaluations and / or prototype designs.



SAW NARROWBAND FRONT-END FILTERS

Listed in Order by Frequency and Listed in Order by Bandwidth

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

SAW Narrowband Front End Filters by Frequency

RFM Part	Freq. (MHz)	Bandwidth (kHz)	Lid Symbol	Case
RF3210	303.825	500	RF3210	9.3mm diameter
RF3210D	303.825	650	675	3.8 x 3.8
RF1211	315	700	RF1211	9.3mm diameter
RF1211C	315	900	410	5.0 x 5.0
RF1211D	315	600	476	3.8 x 3.8
RF1402D	315	1000	496	3.8 x 3.8
RF1417D	315	600	550	3.8 x 3.8
RF1439E	315	850	795	3.0 x 3.0
RF3417	315	700	RF3417	9.3mm diameter
RF3417D	315	600	550	3.8 x 3.8
RF3417E	315	600	696	3.0 x 3.0
RF1238	318	700	RF1238	9.3mm diameter
RF1284	319.5	600	RF1284	9.3mm diameter
RF1432C	319.5	600	621	5.0 x 5.0
RF1353C	345	430	446	5.0 x 5.0
RF1353D	345	430	444	3.8 x 3.8
RF1414D	372.5	425	528	3.8 x 3.8
RF3414D	372.5	425	846	3.8 x 3.8
RF3414E	372.5	450	720	3.0 x 3.0
RF3355C	390	440	736	5.0 x 5.0
RF1419D	403.5	7500	560	3.8 x 3.8
RF1171	418	600	RF1171	9.3mm diameter
RF3171	418	600	RF3171	9.3mm diameter
RF3171D	418	600	775	3.8 x 3.8
RF1391C	433.42	600	415	5.0 x 5.0
RF1172	433.92	600	RF1172	9.3mm diameter
RF1172C	433.92	700	409	5.0 x 5.0
RF1172D	433.92	600	477	3.8 x 3.8
RF1400D	433.92	1150	490	3.8 x 3.8
RF1401D	433.92	1000	495	3.8 x 3.8
RF1404C	433.92	600	499	5.0 x 5.0
RF3404	433.92	600	RF3404	9.3mm diameter
RF3404D	433.92	600	539	3.8 x 3.8
RF3404E	433.92	600	697	3.0 x 3.0
RF1396C	434.42	700	427	5.0 x 5.0
RF1302	439.25	30	RF1302	9.3mm diameter
RF1408D	447.7	840	511	3.8 x 3.8
RF1295C	451.35	1000	482	5.0 x 5.0
RF1301	499.25	30	RF1301	9.3mm diameter
RF3501E	866.1	31000	805	3.0 x 3.0
RF3336	868.35	600	RF3336	9.3mm diameter
RF3336C	868.35	600	673	5.0 x 5.0
RF3336D	868.35	600	699	3.8 x 3.8
RF3336E	868.35	600	700	3.0 x 3.0
RF1407D	868.6	1800	505	3.8 x 3.8
RF3319D	868.95	650	668	3.8 x 3.8
RF3319E	868.95	800	695	3.0 x 3.0
RF1411D	869.2625	1250	512	3.8 x 3.8
RF3181	916.5	750	RF3181	9.3mm diameter
RF3181D	916.5	750	671	3.8 x 3.8
RF3181E	916.5	750	689	3.0 x 3.0
RF3601E	960	40000	818	3.0 x 3.0

All RFM SAW Narrowband Front-End Filters are RoHS compliant.

SAW Narrowband Front End Filters by Bandwidth

RFM Part	Freq. (MHz)	Bandwidth (kHz)	Lid Symbol	Case
RF1301	499.25	30	RF1301	9.3mm diameter
RF1302	439.25	30	RF1302	9.3mm diameter
RF1414D	372.5	425	528	3.8 x 3.8
RF3414D	372.5	425	846	3.8 x 3.8
RF1353C	345	430	446	5.0 x 5.0
RF1353D	345	430	444	3.8 x 3.8
RF3355C	390	440	736	5.0 x 5.0
RF3414E	372.5	450	720	3.0 x 3.0
RF3210	303.825	500	RF3210	9.3mm diameter
RF1171	418	600	RF1171	9.3mm diameter
RF1172	433.92	600	RF1172	9.3mm diameter
RF1172D	433.92	600	477	3.8 x 3.8
RF1211D	315	600	476	3.8 x 3.8
RF1284	319.5	600	RF1284	9.3mm diameter
RF1391C	433.42	600	415	5.0 x 5.0
RF1404C	433.92	600	499	5.0 x 5.0
RF1417D	315	600	550	3.8 x 3.8
RF1432C	319.5	600	621	5.0 x 5.0
RF3171	418	600	RF3171	9.3mm diameter
RF3171D	418	600	775	3.8 x 3.8
RF3336	868.35	600	RF3336	9.3mm diameter
RF3336C	868.35	600	673	5.0 x 5.0
RF3336D	868.35	600	699	3.8 x 3.8
RF3336E	868.35	600	700	3.0 x 3.0
RF3404	433.92	600	RF3404	9.3mm diameter
RF3404D	433.92	600	539	3.8 x 3.8
RF3404E	433.92	600	697	3.0 x 3.0
RF3417D	315	600	550	3.8 x 3.8
RF3417E	315	600	696	3.0 x 3.0
RF3210D	303.825	650	675	3.8 x 3.8
RF3319D	868.95	650	668	3.8 x 3.8
RF1172C	433.92	700	409	5.0 x 5.0
RF1211	315	700	RF1211	9.3mm diameter
RF1238	318	700	RF1238	9.3mm diameter
RF1396C	434.42	700	427	5.0 x 5.0
RF3417	315	700	RF3417	9.3mm diameter
RF3181	916.5	750	RF3181	9.3mm diameter
RF3181D	916.5	750	671	3.8 x 3.8
RF3181E	916.5	750	689	3.0 x 3.0
RF3319E	868.95	800	695	3.0 x 3.0
RF1408D	447.7	840	511	3.8 x 3.8
RF1439E	315	850	795	3.0 x 3.0
RF1211C	315	900	410	5.0 x 5.0
RF1295C	451.35	1000	482	5.0 x 5.0
RF1401D	433.92	1000	495	3.8 x 3.8
RF1402D	315	1000	496	3.8 x 3.8
RF1400D	433.92	1150	490	3.8 x 3.8
RF1411D	869.2625	1250	512	3.8 x 3.8
RF1407D	868.6	1800	505	3.8 x 3.8
RF1419D	403.5	7500	560	3.8 x 3.8
RF3501E	866.1	31000	805	3.0 x 3.0
RF3601E	960	40000	818	3.0 x 3.0

All RFM SAW Narrowband Front-End Filters are RoHS compliant.



SAW RF / IF FILTERS

Listed in Order by Part Number

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

RFM designs and manufactures bandpass filters, delay lines and notch filters for a wide range of wireless telecommunication and data communication applications. We provide filters from 40 MHz to more than 2.6 GHz in surface-mount, dual-in-line (DIP) and TO39 packages. Our filter products offer a wide range of bandwidths, low insertion loss, low amplitude and group delay ripple, small size and high out-of-band rejection.

Custom Designed Filters. RFM also provides custom filters for high volume applications: Satellite Digital Audio Radio (SDAR) subscriber platforms (Sirius and XM), cellular handsets, base stations, and repeaters (EDGE, WCDMA, CDMA-2000, TD-SCDMA, GSM900, DCS1800, PCS1900, CDMA, TDMA and AMPS, DECT), Global Positioning System (GPS), microwave radio, wireless local loop (WLL), wireless local area networks (WLAN), and multimedia and fiber-optic transmission equipment.

Applications

- Wireless point-of-sale terminals
- Data link equipment
- Peripherals
- High Performance Computing (HPC)
- Remote bar code data entry
- Bar code readers
- Satellite digital audio radio (SDAR)
- Global positioning systems (GPS)
- Wireless local area network (WLAN)
- CATV Infrastructure
- Synchronous optical network (SONET)
- Automated meter reading
- Cellular Subscriber Terminals, Base Stations, and Repeater for:
 - GSM
 - TD-SCDMA
 - TDMA
 - W-CDMA
 - CDMA
 - Wireless Local Loop
- Cellular Digital Packet Data (CDPD) modems

Packages and Minimum Order Quantities. TO39 packaged parts are shipped in antistatic shipping tubes with a minimum quantity of 50 per tube. The SMT packaged filters are shipped via tape and reel with minimum of 500 units in 7" reel, and minimum of 2,000 units in 13" reel. Contact a sales rep, distributor, or stocking rep / distributor near you to request samples for your evaluations and / or prototype designs. For package options, see RF COMPONENTS PACKAGE SELECTION GUIDE on page 39.

SAW RF / IF Filters in Order by Part Number					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
IF Filter	PX1002	86.85	0.024	IS-54 TDMA	13.3 x 6.5
IF Filter	PX1004	82.2	0.03	IS-54 TDMA	13.3 x 6.5
RF Filter	RF1199	291.4	0.5	Filter	9.3 mm diameter
RF Filter	RF1301	499.25	0.06	Narrowband RF Filter	9.3 mm diameter
RF Filter	RF1302	439.25	0.06	Narrowband RF Filter	9.3 mm diameter
RF Filter	RF1353C	345	0.43	Narrowband RF Filter	5.0 x 5.0
IF Filter	SF1056A	110.592	1.152	DECT	13.3 x 6.5
IF Filter	SF1059A	350	0.8	IF Filter	9.1 x 7.1
IF Filter	SF1081A	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF1081A-1	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF1088A	170.6	0.18	GSM/EDGE	19 x 6.5
IF Filter	SF1091A	211	0.9	GSM/EDGE	13.3 x 6.5
IF Filter	SF1092A	199	0.2	GSM/EDGE	19 x 6.5
IF Filter	SF1111A	160	1.18	CDMA	24.6 x 9
IF Filter	SF1115A	199	0.2	GSM/EDGE	9.1 x 7.1
IF Filter	SF1120B	298.74	1.5	GPS	7.0 x 5.0
IF Filter	SF1131B	266.01	0.5	GPS	7.0 x 5.0
IF Filter	SF1140B	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1140B-2	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1141B	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-2	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-4	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1142B	315	4.2	SDARS	7.0 x 5.0
IF Filter	SF1143B	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-1	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-2	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-4	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1145B	427.25	0.03	Cable	7.0 x 5.0
IF Filter	SF1146B	499.25	0.03	Cable	7.0 x 5.0
IF Filter	SF1174B	374	17	WLAN	5.0 x 5.0
IF Filter	SF1174D	374	17	WLAN	3.8 x 3.8
IF Filter	SF1177A	57.6	21.2	WCDMA/TD-SCDMA	13.3 x 6.5
IF Filter	SF1179B	184.14	11	IF Filter	7.0 x 5.0
RF Filter	SF1182B	836.5	25	Cellular	3.0 x 3.0
RF Filter	SF1183G	881.5	25	Cellular	2.5 x 2.0
RF Filter	SF1184B-1	947.5	25	GSM	3.0 x 3.0
RF Filter	SF1186B-2	1575.42	2.046	GPS	3.0 x 3.0
RF Filter	SF1186G	1575.42	2	GPS	2.5 x 2.0
RF Filter	SF1186H	1575.42	2.4	GPS	2.0 x 1.6
RF Filter	SF1186H-1	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186H-2	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186K-2	1575.42	2	GPS	1.4 x 1.1

SAW RF / IF Filters in Order by Part Number					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
RF Filter	SF1186K-3	1575.42	2	GPS	1.4 x 1.1
RF Filter	SF1188C	465	4	Wireless Access	5.0 x 5.0
IF Filter	SF1189B-1	280	18.5	Wireless Access	5.0 x 5.0
RF Filter	SF1192B	1842.5	75	DCS	3.0 x 3.0
IF Filter	SF1197B	248.6	5	IF Filter	7.0 x 5.0
IF Filter	SF1200B	96	20	TD-SCDMA	7.0 x 5.0
RF Filter	SF1201D	455	5	CDMA450	3.8 x 3.8
RF Filter	SF1202D	465	5	CDMA450	3.8 x 3.8
Duplexer	SF1207C	836.5/881.5	25	CDMA	5.0 x 5.0
Duplexer	SF1207D	836.5/881.5	25	CDMA	3.8 x 3.8
RF Filter	SF1208H	2017.5	15	TD-SCDMA	2.0 x 1.6
RF Filter	SF1212D	452.5	4.8	CDMA450	3.8 x 3.8
RF Filter	SF1213D	462.5	4.8	CDMA450	3.8 x 3.8
RF Filter	SF1214D	413.7	4.3	CDMA450	3.8 x 3.8
RF Filter	SF1215D	423.75	4.3	CDMA450	3.8 x 3.8
RF Filter	SF1216D	481.2	4.5	CDMA450	3.8 x 3.8
RF Filter	SF1217D	491.2	4.5	CDMA450	3.8 x 3.8
RF Filter	SF1218D	453.5	7	CDMA450	3.8 x 3.8
RF Filter	SF1219K	2338.75	12.5	SDARS RF	1.4 x 1.1
RF Filter	SF1220K-1	2326	14	SDARS RF	1.4 x 1.1
Duplexer	SF1221F	1950/2140	60	WCDMA	3.2 x 2.5
Duplexer	SF1222D	2110/2190	20	WCDMA	3.8 x 3.8
RF Filter	SF2001E	1960	60	PCS	3.0 x 3.0
RF Filter	SF2002B-2	942.5	35	EGSM	3.0 x 3.0
RF Filter	SF2002E	942.5	35	EGSM	3.0 x 3.0
IF Filter	SF2006C	190	4.8	WCDMA	5.0 x 5.0
RF Filter	SF2008D	930.5	4	Wireless Access	3.8 x 3.8
IF Filter	SF2017D	1220	8	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2024B	467.751	12.688	SDARS	7.0 x 5.0
IF Filter	SF2024D	467.751	12.5	SDARS	3.8 x 3.8 x 12
IF Filter	SF2024D-1	467.751	12.5	SDARS	3.8 x 3.8 x 10
IF Filter	SF2024E-1	467.751	12.5	SDARS	3.0 x 3.0 x 0.9
IF Filter	SF2024E-2	467.751	12.5	SDARS	3.0 x 3.0 x 0.9
IF Filter	SF2025B	259.861	12.708	SDARS	7.0 x 5.0
IF Filter	SF2026B	114.815	6.111	SDARS	7.0 x 5.0
IF Filter	SF2027B	199	0.2	GSM/EDGE	13.3 x 6.5
IF Filter	SF2030A	243.95	0.3	PHS	11.5 x 4.0
IF Filter	SF2032E	1220	28	Cable/DOCSIS	3.0 x 3.0
IF Filter	SF2033A	350	2.4	IF Filter	13.3 x 6.5
RF Filter	SF2036E	1880	60	DCS	3.0 x 3.0
IF Filter	SF2037B	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037B-2	76.5	3.8	SDARS	7.0 x 5.0

All RFM SAW RF / IF Filters are RoHS compliant.



SAW RF / IF FILTERS

Listed in Order by Part Number

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

www.RFM.com

SAW RF / IF Filters in Order by Part Number					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
IF Filter	SF2037B-3	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037C	76	3.8	SDARS	5.0 x 5.0
IF Filter	SF2038B	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-2	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-3	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038C	76	12.5	SDARS	5.0 x 5.0
IF Filter	SF2039B	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-2	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-3	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-2	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-3	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2042B	456	12.8	Wimax	5.0 x 7.0
IF Filter	SF2042C	456	12.8	Wimax	5.0 x 5.0
IF Filter	SF2045A	140	8	IF Filter	13.3 x 6.5
IF Filter	SF2046B	456.44	5.22	Wimax	7.0 x 5.0
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E-1	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2053E	915	12.5	ISM Band	3.0 x 3.0
IF Filter	SF2055A	240.05	0.3	PHS	11.5 x 4.0
RF Filter	SF2059B-1	137.5	0.8	Orbcomm	5.0 x 7.0
IF Filter	SF2060B	115.18	12.5	SDARS	5.0 x 7.0
IF Filter	SF2060B-1	115.18	12.5	SDARS	5.0 x 7.0
IF Filter	SF2062A	229.25	0.3	PHS	11.5 x 4.0
IF Filter	SF2063A	156	9.4	Wibro	13.3 x 6.5
IF Filter	SF2064A	156	10	Wimax	13.3 x 6.5
RF Filter	SF2065C	743	6	Wimax	5.0 x 5.0
IF Filter	SF2067B	172.8	8.84	WCDMA	7.0 x 5.0
IF Filter	SF2069A	96	4.68	TD-SCDMA	13.3 x 6.5
IF Filter	SF2069A-1	96	4.3	TD-SCDMA	19.0 x 6.5
IF Filter	SF2069A-2	96	5	TD-SCDMA	13.3 x 6.5
IF Filter	SF2072C	360	30	Wimax	5.0 x 5.0
IF Filter	SF2073B	456	10	Wimax	7.0 x 5.0
IF Filter	SF2076B	464	3.4	Wimax	7.0 x 5.0
IF Filter	SF2079D	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2079D-1	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2081D	1220	50	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2081E	1220	50	Cable/DOCSIS	3.0 x 3.0
IF Filter	SF2085A	96	35	IF Filter	13.3 x 6.5
IF Filter	SF2086C	240	30	IF Filter	5.0 x 5.0
IF Filter	SF2087C	267.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2088C	297.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2089C	327.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2090C	357.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2091C	385	30	IF Filter	5.0 x 5.0
RF Filter	SF2092E	810	17	RF Filter	3.0 x 3.0
RF Filter	SF2093E	915	26	ISM band RF Filter	3.0 x 3.0
IF Filter	SF2094B	380	3.4	Wimax	7.0 x 5.0
RF Filter	SF2098G	915	26	ISM band RF Filter	2.5 x 2.0
IF Filter	SF2109D	305	8	Wibro	3.8 x 3.8
IF Filter	SF2110D	305	10	Wimax	3.8 x 3.8
IF Filter	SF2111A	140	15	TD-SCDMA	13.3 x 6.5
RF Filter	SF2120C	149	2	Orbcomm	5.0 x 5.0
RF Filter	SF2124E	2441.8	83.5	ISM Band	3.0 x 3.0
IF Filter	SF2125D	305	5	Wimax	3.8 x 3.8
RF Filter	SF2126E	725	50	WIMAX	3.0 x 3.0
IF Filter	SF2131B	92.16	20	TD-SCDMA	7.0 x 5.0
RF Filter	SF2133E	1747.5	75	RF Filter	3.0 x 3.0
RF Filter	SF2134E	897.5	15	RF Filter	3.0 x 3.0
IF Filter	SF2135A	96	1.56	IF Filter	13.3 x 6.5
RF Filter	SF2136E	433.92	1.74	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2137D	869	2	ISM band RF Filter	3.8 x 3.8
RF Filter	SF2137E	869	2	ISM band RF Filter	3.0 x 3.0
IF Filter	SF2138B	144.132	12.5	SDARS	7.0 x 5.0

All RFM SAW RF / IF Filters are RoHS compliant.

SAW RF / IF Filters in Order by Part Number					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
IF Filter	SF2139D	177	20	CDMA2000	3.8 x 3.8
IF Filter	SF2140A	140	18.4	WCDMA/TD-SCDMA IF	13.3 x 6.5
IF Filter	SF2140A-1	140	18.4	WCDMA/TD-SCDMA IF	13.3 x 6.5
IF Filter	SF2141B	210.38	0.6	CDMA	7.0 x 5.0
RF Filter	SF2142G	867.5	25	RF Filter	2.5 x 2.0
Duplexer	SF2143A	72.54/80.46	3.7	SDARS	11.4 x 5.3
Duplexer	SF2143B	72.54/80.46	3.7	SDARS	7.0 x 5.0
RF Filter	SF2145B	895	15.5	RF Filter	7.0 x 5.0
RF Filter	SF2146D	415	25	RF Filter	3.8 x 3.8
IF Filter	SF2147D	157	20	CDMA2000	3.8 x 3.8
IF Filter	SF2148B	138.24	20	LTE/TD-SCDMA	5.0 x 5.0
IF Filter	SF2149A	46.08	5	TD-SCDMA	13.3 x 6.5
RF Filter	SF2150E	915	10	ISM band RF Filter	3.0 x 3.0
IF Filter	SF2151B	211.2	18.84	LTE/WCDMA	5.0 x 7.0
IF Filter	SF2155B	153.6	20	IF Filter	5.0 x 7.0
RF Filter	SF2156B	611	7	RF Filter	5.0 x 7.0
IF Filter	SF2157A	156	20	IF Filter	13.3 x 6.5
RF Filter	SF2158E	2535	70	RF Filter	3.0 x 3.0
IF Filter	SF2159E	974	40	DirecTV IF	3.0 x 3.0
RF Filter	SF2160E	2330	60	RF Filter	3.0 x 3.0
RF Filter	SF2161E	2650	70	RF Filter	3.0 x 3.0
IF Filter	SF2162E	1178.12	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2163E	1076.06	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2164E	1484.3	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2165E	1586.36	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2166E	1280.18	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2167E	1382.24	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2168E	1688.42	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2169E	1790.48	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2170D	165	20	CDMA2000	3.8 x 3.8
RF Filter	SF2171E	719	5	MediaFlo	3.0 x 3.0
IF Filter	SF2172C	280	15	IF Filter	5.0 x 5.0
RF Filter	SF2173E	2350	100	LTE RF	3.0 x 3.0
RF Filter	SF2176E	433.92	1.6	ISM RF	3.0 x 3.0
RF Filter	SF2177E	1472	40	RF Filter	3.0 x 3.0
IF Filter	SF2178A	168	20	Wimax	13.3 x 6.5
IF Filter	SF2179C	495	4	IF Filter	5.0 x 5.0
IF Filter	SF2180D	700	3.8	IF Filter	3.8 x 3.8
IF Filter	SF2181D	140	22	IF Filter	3.8 x 3.8
IF Filter	SF2182D	140	40	IF Filter	3.8 x 3.8
IF Filter	SF2183E	400	0.25	IF Filter	3.0 x 3.0
RF Filter	SF2184E	953	3	RF Filter	3.0 x 3.0
IF Filter	SF2185A	70	9	IF Filter	13.3 x 6.5
IF Filter	SF2185A-1	70	9.1	IF Filter	13.3 x 6.5
RF Filter	SF2186E	1268.52	20.46	Beidou/Compass	3.0 x 3.0
IF Filter	SF2187	190	60	Sat Receiver	7.0 x 5.0
RF Filter	SF2188C	340	6	SCDMA	5.0 x 5.0
RF Filter	SF2188D	340	8	SCDMA	3.8 x 3.8
IF Filter	SF2189A	140	30	IF Filter	13.3 x 6.5
IF Filter	SF2190B	138	60	Sat Receiver	5.0 x 7.0
RF Filter	SF2191E	1621	10	RF Filter	3.0 x 3.0
IF Filter	SF2192D	495	0.89	IF Filter	3.8 x 3.8
RF Filter	SF2193E	1228	20	GPS RF	3.0 x 3.0
IF Filter	SF2194E	1220	0.5	Wimax IF	3.0 x 3.0
RF Filter	SF2195E	842.5	5	RF Filter	3.0 x 3.0
RF Filter	SF2196E	315	0.6	ISM RF	3.0 x 3.0
RF Filter	SF2197E	847	30	BTS RF	3.0 x 3.0
RF Filter	SF2198E	806	30	BTS RF	3.0 x 3.0
RF Filter	SF2199E	787	22	BTS RF	3.0 x 3.0
RF Filter	SF2200E	707	18	BTS RF	3.0 x 3.0
RF Filter	SF2201E	916.45	4	ISM RF	3.0 x 3.0
RF Filter	SF2202E	2017.5	15	TD-SCDMA B Band RF	3.0 x 3.0
RF Filter	SF2203E	834	30	RF Filter	3.0 x 3.0
RF Filter	SF2204E	1900	40	TD-SCDMA A Band RF	3.0 x 3.0
RF Filter	SF2205E	879	30	BTS RF	3.0 x 3.0



SAW RF / IF FILTERS

Listed in Order by Frequency

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

SAW RF / IF Filters in Order by Frequency

Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case mmxmm
IF Filter	SF2149A	46.08	5	TD-SCDMA	13.3 x 6.5
IF Filter	SF1177A	57.6	21.2	WCDMA/TD-SCDMA	13.3 x 6.5
IF Filter	SF2185A	70	9	IF Filter	13.3 x 6.5
IF Filter	SF2185A-1	70	9.1	IF Filter	13.3 x 6.5
IF Filter	SF1081A	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF1081A-1	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF2039B	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-2	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-3	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF1140B	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1140B-2	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1141B	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-2	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-4	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF2037C	76	3.8	SDARS	5.0 x 5.0
IF Filter	SF2038C	76	12.5	SDARS	5.0 x 5.0
IF Filter	SF2037B	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037B-2	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037B-3	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2038B	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-2	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-3	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2040B	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-2	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-3	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	PX1004	82.2	0.03	IS-54 TDMA	13.3 x 6.5
IF Filter	PX1002	86.85	0.024	IS-54 TDMA	13.3 x 6.5
IF Filter	SF2131B	92.16	20	TD-SCDMA	7.0 x 5.0
IF Filter	SF1200B	96	20	TD-SCDMA	7.0 x 5.0
IF Filter	SF2069A	96	4.68	TD-SCDMA	13.3 x 6.5
IF Filter	SF2069A-1	96	4.3	TD-SCDMA	19.0 x 6.5
IF Filter	SF2069A-2	96	5	TD-SCDMA	13.3 x 6.5
IF Filter	SF2085A	96	35	IF Filter	13.3 x 6.5
IF Filter	SF2135A	96	1.56	IF Filter	13.3 x 6.5
IF Filter	SF1056A	110.592	1.152	DECT	13.3 x 6.5
IF Filter	SF2026B	114.815	6.111	SDARS	7.0 x 5.0
IF Filter	SF2060B	115.18	12.5	SDARS	5.0 x 7.0
IF Filter	SF2060B-1	115.18	12.5	SDARS	5.0 x 7.0
RF Filter	SF2059B-1	137.5	0.8	Orbcomm	5.0 x 7.0
IF Filter	SF2190B	138	60	Sat Receiver	5.0 x 7.0
IF Filter	SF2148B	138.24	20	LTE/TD-SCDMA	5.0 x 5.0
IF Filter	SF2045A	140	8	IF Filter	13.3 x 6.5
IF Filter	SF2111A	140	15	TD-SCDMA	13.3 x 6.5
IF Filter	SF2140A	140	18.4	WCDMA/TD-SCDMA IF	13.3 x 6.5
IF Filter	SF2140A-1	140	18.4	WCDMA/TD-SCDMA IF	13.3 x 6.5
IF Filter	SF2181D	140	22	IF Filter	3.8 x 3.8
IF Filter	SF2182D	140	40	IF Filter	3.8 x 3.8
IF Filter	SF2189A	140	30	IF Filter	13.3 x 6.5
IF Filter	SF2138B	144.132	12.5	SDARS	7.0 x 5.0
RF Filter	SF2120C	149	2	Orbcomm	5.0 x 5.0
IF Filter	SF2155B	153.6	20	IF Filter	5.0 x 7.0
IF Filter	SF2063A	156	9.4	Wibro	13.3 x 6.5
IF Filter	SF2064A	156	10	Wimax	13.3 x 6.5
IF Filter	SF2157A	156	20	IF Filter	13.3 x 6.5
IF Filter	SF2147D	157	20	CDMA2000	3.8 x 3.8
IF Filter	SF1111A	160	1.18	CDMA	24.6 x 9.0
IF Filter	SF2170D	165	20	CDMA2000	3.8 x 3.8
IF Filter	SF2178A	168	20	Wimax	13.3 x 6.5
IF Filter	SF1088A	170.6	0.18	GSM/EDGE	19 x 6.5
IF Filter	SF2067B	172.8	8.84	WCDMA	7.0 x 5.0
IF Filter	SF2139D	177	20	CDMA2000	3.8 x 3.8
IF Filter	SF1179B	184.14	11	IF Filter	7.0 x 5.0
IF Filter	SF2006C	190	4.8	WCDMA	5.0 x 5.0
IF Filter	SF2187	190	60	Sat Receiver	7.0 x 5.0
IF Filter	SF1092A	199	0.2	GSM/EDGE	19 x 6.5
IF Filter	SF1115A	199	0.2	GSM/EDGE	9.1 x 7.1
IF Filter	SF2027B	199	0.2	GSM/EDGE	13.3 x 6.5
IF Filter	SF2141B	210.38	0.6	CDMA	7.0 x 5.0
IF Filter	SF1091A	211	0.9	GSM/EDGE	13.3 x 6.5

SAW RF / IF Filters in Order by Frequency

Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case mmxmm
IF Filter	SF2151B	211.2	18.84	LTE/WCDMA	5.0 x 7.0
IF Filter	SF2062A	229.25	0.3	PHS	11.5 x 4.0
IF Filter	SF2086C	240	30	IF Filter	5.0 x 5.0
IF Filter	SF2055A	240.05	0.3	PHS	11.5 x 4.0
IF Filter	SF2030A	243.95	0.3	PHS	11.5 x 4.0
IF Filter	SF1197B	248.6	5	IF Filter	7.0 x 5.0
IF Filter	SF2079D	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2079D-1	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2025B	259.861	12.708	SDARS	7.0 x 5.0
IF Filter	SF1131B	266.01	0.5	GPS	7.0 x 5.0
IF Filter	SF2087C	267.5	35	IF Filter	5.0 x 5.0
IF Filter	SF1189B-1	280	18.5	Wireless Access	5.0 x 5.0
IF Filter	SF2172C	280	15	IF Filter	5.0 x 5.0
RF Filter	RF1199	291.4	0.5	Filter	9.3 mm diameter
IF Filter	SF2088C	297.5	35	IF Filter	5.0 x 5.0
IF Filter	SF1120B	298.74	1.5	GPS	7.0 x 5.0
IF Filter	SF2109D	305	8	Wibro	3.8 x 3.8
IF Filter	SF2110D	305	10	Wimax	3.8 x 3.8
IF Filter	SF2125D	305	5	Wimax	3.8 x 3.8
IF Filter	SF1142B	315	4.2	SDARS	7.0 x 5.0
IF Filter	SF1143B	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-1	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-2	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-4	315	12.7	SDARS	7.0 x 5.0
RF Filter	SF2196E	315	0.6	ISM RF	3.0 x 3.0
IF Filter	SF2089C	327.5	35	IF Filter	5.0 x 5.0
RF Filter	SF2188C	340	6	SCDMA	5.0 x 5.0
RF Filter	SF2188D	340	8	SCDMA	3.8 x 3.8
RF Filter	RF1353C	345	0.43	Narrowband RF Filter	5.0 x 5.0
IF Filter	SF1059A	350	0.8	IF Filter	9.1 x 7.1
IF Filter	SF2033A	350	2.4	IF Filter	13.3 x 6.5
IF Filter	SF2090C	357.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2072C	360	30	Wimax	5.0 x 5.0
IF Filter	SF1174B	374	17	WLAN	5.0 x 5.0
IF Filter	SF1174D	374	17	WLAN	3.8 x 3.8
IF Filter	SF2094B	380	3.4	Wimax	7.0 x 5.0
IF Filter	SF2091C	385	30	IF Filter	5.0 x 5.0
IF Filter	SF2183E	400	0.25	IF Filter	3.0 x 3.0
RF Filter	SF1214D	413.7	4.3	CDMA450	3.8 x 3.8
RF Filter	SF2146D	415	25	RF Filter	3.8 x 3.8
RF Filter	SF1215D	423.75	4.3	CDMA450	3.8 x 3.8
IF Filter	SF1145B	427.25	0.03	Cable	7.0 x 5.0
RF Filter	SF2136E	433.92	1.74	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2176E	433.92	1.6	ISM RF	3.0 x 3.0
RF Filter	RF1302	439.25	0.06	Narrowband RF Filter	9.3 mm diameter
RF Filter	SF1212D	452.5	4.8	CDMA450	3.8 x 3.8
RF Filter	SF1218D	453.5	7	CDMA450	3.8 x 3.8
RF Filter	SF1201D	455	5	CDMA450	3.8 x 3.8
IF Filter	SF2042B	456	12.8	Wimax	5.0 x 7.0
IF Filter	SF2042C	456	12.8	Wimax	5.0 x 5.0
IF Filter	SF2073B	456	10	Wimax	7.0 x 5.0
IF Filter	SF2046B	456.44	5.22	Wimax	7.0 x 5.0
RF Filter	SF1213D	462.5	4.8	CDMA450	3.8 x 3.8
IF Filter	SF2076B	464	3.4	Wimax	7.0 x 5.0
RF Filter	SF1188C	465	4	Wireless Access	5.0 x 5.0
RF Filter	SF1202D	465	5	CDMA450	3.8 x 3.8
IF Filter	SF2024B	467.751	12.688	SDARS	7.0 x 5.0
IF Filter	SF2024D	467.751	12.5	SDARS	3.8 x 3.8 x 1.2
IF Filter	SF2024D-1	467.751	12.5	SDARS	3.8 x 3.8 x 1.0
IF Filter	SF2024E-1	467.751	12.5	SDARS	3.0 x 3.0 x 0.9
IF Filter	SF2024E-2	467.751	12.5	SDARS	3.0 x 3.0 x 0.9
RF Filter	SF1216D	481.2	4.5	CDMA450	3.8 x 3.8
RF Filter	SF1217D	491.2	4.5	CDMA450	3.8 x 3.8
IF Filter	SF2179C	495	4	IF Filter	5.0 x 5.0
IF Filter	SF2192D	495	0.89	IF Filter	3.8 x 3.8
RF Filter	RF1301	499.25	0.06	Narrowband RF Filter	9.3 mm diameter
IF Filter	SF1146B	499.25	0.03	Cable	7.0 x 5.0
RF Filter	SF2156B	611	7	RF Filter	5.0 x 7.0
IF Filter	SF2180D	700	3.8	IF Filter	3.8 x 3.8

All RFM SAW RF / IF Filters are RoHS compliant.

SUNSTAR微波通信 <http://www.rfoc.net/> TEL:0755-83397033 FAX:0755-83376182 E-MAIL:szss20@163.com



SAW RF / IF FILTERS

Listed in Order by Frequency

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

SAW RF / IF Filters in Order by Frequency					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case mmxmm
RF Filter	SF2200E	707	18	BTS RF	3.0 x 3.0
RF Filter	SF2171E	719	5	MediaFlo	3.0 x 3.0
RF Filter	SF2126E	725	50	WIMAX	3.0 x 3.0
RF Filter	SF2065C	743	6	Wimax	5.0 x 5.0
RF Filter	SF2199E	787	22	BTS RF	3.0 x 3.0
RF Filter	SF2198E	806	30	BTS RF	3.0 x 3.0
RF Filter	SF2092E	810	17	RF Filter	3.0 x 3.0
RF Filter	SF2203E	834	30	RF Filter	3.0 x 3.0
RF Filter	SF1182B	836.5	25	Cellular	3.0 x 3.0
RF Filter	SF2195E	842.5	5	RF Filter	3.0 x 3.0
RF Filter	SF2197E	847	30	BTS RF	3.0 x 3.0
RF Filter	SF2142G	867.5	25	RF Filter	2.5 x 2.0
RF Filter	SF2137D	869	2	ISM band RF Filter	3.8 x 3.8
RF Filter	SF2137E	869	2	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2205E	879	30	BTS RF	3.0 x 3.0
RF Filter	SF1183G	881.5	25	Cellular	2.5 x 2.0
RF Filter	SF2145B	895	15.5	RF Filter	7.0 x 5.0
RF Filter	SF2134E	897.5	15	RF Filter	3.0 x 3.0
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E-1	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2053E	915	12.5	ISM Band	3.0 x 3.0
RF Filter	SF2093E	915	26	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2098G	915	26	ISM band RF Filter	2.5 x 2.0
RF Filter	SF2150E	915	10	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2201E	916.45	4	ISM RF	3.0 x 3.0
RF Filter	SF2008D	930.5	4	Wireless Access	3.8 x 3.8
RF Filter	SF2002B-2	942.5	35	EGSM	3.0 x 3.0
RF Filter	SF2002E	942.5	35	EGSM	3.0 x 3.0
RF Filter	SF1184B-1	947.5	25	GSM	3.0 x 3.0
RF Filter	SF2184E	953	3	RF Filter	3.0 x 3.0
IF Filter	SF2159E	974	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2163E	1076.06	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2162E	1178.12	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2017D	1220	8	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2032E	1220	28	Cable/DOCSIS	3.0 x 3.0
IF Filter	SF2081D	1220	50	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2081E	1220	50	Cable/DOCSIS	3.0 x 3.0
IF Filter	SF2194E	1220	0.5	Wimax IF	3.0 x 3.0
RF Filter	SF2193E	1228	20	GPS RF	3.0 x 3.0
RF Filter	SF2186E	1268.52	20.46	Beidou/Compass	3.0 x 3.0
IF Filter	SF2166E	1280.18	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2167E	1382.24	40	DirecTV IF	3.0 x 3.0
RF Filter	SF2177E	1472	40	RF Filter	3.0 x 3.0
IF Filter	SF2164E	1484.3	40	DirecTV IF	3.0 x 3.0
RF Filter	SF1186B-2	1575.42	2.046	GPS	3.0 x 3.0
RF Filter	SF1186G	1575.42	2	GPS	2.5 x 2.0
RF Filter	SF1186H	1575.42	2.4	GPS	2.0 x 1.6
RF Filter	SF1186H-1	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186H-2	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186K-2	1575.42	2	GPS	1.4 x 1.1
RF Filter	SF1186K-3	1575.42	2	GPS	1.4 x 1.1
IF Filter	SF2165E	1586.36	40	DirecTV IF	3.0 x 3.0
RF Filter	SF2191E	1621	10	RF Filter	3.0 x 3.0
IF Filter	SF2168E	1688.42	40	DirecTV IF	3.0 x 3.0
RF Filter	SF2133E	1747.5	75	RF Filter	3.0 x 3.0
IF Filter	SF2169E	1790.48	40	DirecTV IF	3.0 x 3.0
RF Filter	SF1192B	1842.5	75	DCS	3.0 x 3.0
RF Filter	SF2036E	1880	60	DCS	3.0 x 3.0
RF Filter	SF2204E	1900	40	TD-SCDMA Band RF	3.0 x 3.0
RF Filter	SF2001E	1960	60	PCS	3.0 x 3.0
RF Filter	SF1208H	2017.5	15	TD-SCDMA	2.0 x 1.6
RF Filter	SF2202E	2017.5	15	TD-SCDMA Band RF	3.0 x 3.0
RF Filter	SF1220K-1	2326	14	SDARS RF	1.4 x 1.1
RF Filter	SF2160E	2330	60	RF Filter	3.0 x 3.0
RF Filter	SF1219K	2338.75	12.5	SDARS RF	1.4 x 1.1
RF Filter	SF2173E	2350	100	LTE RF	3.0 x 3.0
RF Filter	SF2124E	2441.8	83.5	ISM Band	3.0 x 3.0
RF Filter	SF2158E	2535	70	RF Filter	3.0 x 3.0

SAW RF / IF Filters in Order by Frequency					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case mmxmm
RF Filter	SF2161E	2650	70	RF Filter	3.0 x 3.0
Duplexer	SF2143A	72.54/80.46	3.7	SDARS	11.4 x 5.3
Duplexer	SF2143B	72.54/80.46	3.7	SDARS	7.0 x 5.0
Duplexer	SF1207C	836.5/881.5	25	CDMA	5.0 x 5.0
Duplexer	SF1207D	836.5/881.5	25	CDMA	3.8 x 3.8
Duplexer	SF1221F	1950/2140	60	WCDMA	3.2 x 2.5
Duplexer	SF1222D	2110/2190	20	WCDMA	3.8 x 3.8

For package options, see RF COMPONENTS PACKAGE SELECTION GUIDE on page 39.

All RFM SAW RF / IF Filters are RoHS compliant.



SAW RF / IF FILTERS

Listed in Order by Bandwidth

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

SAW RF / IF Filters in Order by Bandwidth					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
IF Filter	PX1002	86.85	0.024	IS-54 TDMA	13.3 x 6.5
IF Filter	PX1004	82.2	0.03	IS-54 TDMA	13.3 x 6.5
IF Filter	SF1145B	427.25	0.03	Cable	7.0 x 5.0
IF Filter	SF1146B	499.25	0.03	Cable	7.0 x 5.0
RF Filter	RF1301	499.25	0.06	Narrowband RF Filter	TO39-3
RF Filter	RF1302	439.25	0.06	Narrowband RF Filter	TO39-3
IF Filter	SF1088A	170.6	0.18	GSM/EDGE	19 x 6.5
IF Filter	SF1081A	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF1081A-1	71	0.2	GSM/EDGE	22.1 x 8.0
IF Filter	SF1092A	199	0.2	GSM/EDGE	19 x 6.5
IF Filter	SF1115A	199	0.2	GSM/EDGE	9.1 x 7.1
IF Filter	SF2027B	199	0.2	GSM/EDGE	13.3 x 6.5
IF Filter	SF2183E	400	0.25	IF Filter	3.0 x 3.0
IF Filter	SF2030A	243.95	0.3	PHS	11.5 x 4.0
IF Filter	SF2055A	240.05	0.3	PHS	11.5 x 4.0
IF Filter	SF2062A	229.25	0.3	PHS	11.5 x 4.0
RF Filter	RF1353C	345	0.43	Narrowband RF Filter	5.0 x 5.0
RF Filter	RF1199	291.4	0.5	Filter	TO39-3
IF Filter	SF1131B	266.01	0.5	GPS	7.0 x 5.0
IF Filter	SF2194E	1220	0.5	Wimax IF	3.0 x 3.0
IF Filter	SF2141B	210.38	0.6	CDMA	7.0 x 5.0
RF Filter	SF2196E	315	0.6	ISM RF	3.0 x 3.0
IF Filter	SF1059A	350	0.8	IF Filter	9.1 x 7.1
RF Filter	SF2059B-1	137.5	0.8	Orbcomm	5.0 x 7.0
IF Filter	SF2192D	495	0.89	IF Filter	3.8 x 3.8
IF Filter	SF1091A	211	0.9	GSM/EDGE	13.3 x 6.5
IF Filter	SF1056A	110.592	1.152	DECT	13.3 x 6.5
IF Filter	SF1111A	160	1.18	CDMA	24.6 x 9
IF Filter	SF1120B	298.74	1.5	GPS	7.0 x 5.0
IF Filter	SF2135A	96	1.56	IF Filter	13.3 x 6.5
RF Filter	SF2176E	433.92	1.6	ISM RF	3.0 x 3.0
RF Filter	SF2136E	433.92	1.74	ISM band RF Filter	3.0 x 3.0
RF Filter	SF1186G	1575.42	2	GPS	2.5 x 2.0
RF Filter	SF1186H-1	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186H-2	1575.42	2	GPS	2.0 x 1.6
RF Filter	SF1186K-2	1575.42	2	GPS	1.4 x 1.1
RF Filter	SF1186K-3	1575.42	2	GPS	1.4 x 1.1
RF Filter	SF2120C	149	2	Orbcomm	5.0 x 5.0
RF Filter	SF2137D	869	2	ISM band RF Filter	3.8 x 3.8
RF Filter	SF2137E	869	2	ISM band RF Filter	3.0 x 3.0
RF Filter	SF1186B-2	1575.42	2.046	GPS	3.0 x 3.0
RF Filter	SF1186H	1575.42	2.4	GPS	2.0 x 1.6
IF Filter	SF2033A	350	2.4	IF Filter	13.3 x 6.5
RF Filter	SF2184E	953	3	RF Filter	3.0 x 3.0
IF Filter	SF2076B	464	3.4	Wimax	7.0 x 5.0
IF Filter	SF2094B	380	3.4	Wimax	7.0 x 5.0
IF Filter	SF2039B	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-2	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2039B-3	72.54	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-2	80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2040B-3	80.46	3.7	SDARS	7.0 x 5.0
Duplexer	SF2143A	72.54/80.46	3.7	SDARS	11.4 x 5.3
Duplexer	SF2143B	72.54/80.46	3.7	SDARS	7.0 x 5.0
IF Filter	SF2037B	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037B-2	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037B-3	76.5	3.8	SDARS	7.0 x 5.0
IF Filter	SF2037C	76	3.8	SDARS	5.0 x 5.0
IF Filter	SF2180D	700	3.8	IF Filter	3.8 x 3.8
RF Filter	SF1188C	465	4	Wireless Access	5.0 x 5.0
RF Filter	SF2008D	930.5	4	Wireless Access	3.8 x 3.8
RF Filter	SF2179C	495	4	IF Filter	5.0 x 5.0
RF Filter	SF2201E	916.45	4	ISM RF	3.0 x 3.0
IF Filter	SF1140B	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1140B-2	75	4.2	SDARS	7.0 x 5.0
IF Filter	SF1142B	315	4.2	SDARS	7.0 x 5.0
RF Filter	SF1214D	413.7	4.3	CDMA450	3.8 x 3.8
RF Filter	SF1215D	423.75	4.3	CDMA450	3.8 x 3.8
IF Filter	SF2069A-1	96	4.3	TD-SCDMA	19.0 x 6.5

SAW RF / IF Filters in Order by Bandwidth					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
RF Filter	SF1216D	481.2	4.5	CDMA450	3.8 x 3.8
RF Filter	SF1217D	491.2	4.5	CDMA450	3.8 x 3.8
IF Filter	SF2069A	96	4.68	TD-SCDMA	13.3 x 6.5
RF Filter	SF1212D	452.5	4.8	CDMA450	3.8 x 3.8
RF Filter	SF1213D	462.5	4.8	CDMA450	3.8 x 3.8
IF Filter	SF2006C	190	4.8	WCDMA	5.0 x 5.0
IF Filter	SF1197B	248.6	5	IF Filter	7.0 x 5.0
RF Filter	SF1201D	455	5	CDMA450	3.8 x 3.8
RF Filter	SF1202D	465	5	CDMA450	3.8 x 3.8
IF Filter	SF2069A-2	96	5	TD-SCDMA	13.3 x 6.5
IF Filter	SF2125D	305	5	Wimax	3.8 x 3.8
IF Filter	SF2149A	46.08	5	TD-SCDMA	13.3 x 6.5
RF Filter	SF2171E	719	5	MediaFlo	3.0 x 3.0
RF Filter	SF2195E	842.5	5	RF Filter	3.0 x 3.0
IF Filter	SF2046B	456.44	5.22	Wimax	7.0 x 5.0
RF Filter	SF2065C	743	6	Wimax	5.0 x 5.0
RF Filter	SF2188C	340	6	SCDMA	5.0 x 5.0
IF Filter	SF2026B	114.815	6.111	SDARS	7.0 x 5.0
RF Filter	SF1218D	453.5	7	CDMA450	3.8 x 3.8
RF Filter	SF2156B	611	7	RF Filter	5.0 x 7.0
IF Filter	SF2017D	1220	8	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2045A	140	8	IF Filter	13.3 x 6.5
IF Filter	SF2109D	305	8	Wibro	3.8 x 3.8
RF Filter	SF2188D	340	8	SCDMA	3.8 x 3.8
IF Filter	SF2067B	172.8	8.84	WCDMA	7.0 x 5.0
IF Filter	SF2185A	70	9	IF Filter	13.3 x 6.5
IF Filter	SF2185A-1	70	9.1	IF Filter	13.3 x 6.5
IF Filter	SF2063A	156	9.4	Wibro	13.3 x 6.5
IF Filter	SF2064A	156	10	Wimax	13.3 x 6.5
IF Filter	SF2073B	456	10	Wimax	7.0 x 5.0
IF Filter	SF2110D	305	10	Wimax	3.8 x 3.8
RF Filter	SF2150E	915	10	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2191E	1621	10	RF Filter	3.0 x 3.0
IF Filter	SF1179B	184.14	11	IF Filter	7.0 x 5.0
RF Filter	SF1219K	2338.75	12.5	SDARS RF	1.4 x 1.1
IF Filter	SF2024D	467.751	12.5	SDARS	3.8x3.8x1.2
IF Filter	SF2024D-1	467.751	12.5	SDARS	3.8x3.8x1.0
IF Filter	SF2024E-1	467.751	12.5	SDARS	3.0x3.0x0.9
IF Filter	SF2024E-2	467.751	12.5	SDARS	3.0x3.0x0.9
IF Filter	SF2038B	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-2	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038B-3	76.5	12.5	SDARS	7.0 x 5.0
IF Filter	SF2038C	76	12.5	SDARS	5.0 x 5.0
RF Filter	SF2053E	915	12.5	ISM Band	3.0 x 3.0
IF Filter	SF2060B	115.18	12.5	SDARS	5.0 x 7.0
IF Filter	SF2060B-1	115.18	12.5	SDARS	5.0 x 7.0
IF Filter	SF2079D	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2079D-1	251.045	12.5	SDARS	3.8 x 3.8
IF Filter	SF2138B	144.132	12.5	SDARS	7.0 x 5.0
IF Filter	SF2024B	467.751	12.688	SDARS	7.0 x 5.0
IF Filter	SF1141B	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-2	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1141B-4	75	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-1	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-2	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF1143B-4	315	12.7	SDARS	7.0 x 5.0
IF Filter	SF2025B	259.861	12.708	SDARS	7.0 x 5.0
IF Filter	SF2042B	456	12.8	Wimax	5.0 x 7.0
IF Filter	SF2042C	456	12.8	Wimax	5.0 x 5.0
RF Filter	SF1220K-1	2326	14	SDARS RF	1.4 x 1.1
RF Filter	SF1208H	2017.5	15	TD-SCDMA	2.0 x 1.6
IF Filter	SF2111A	140	15	TD-SCDMA	13.3 x 6.5
RF Filter	SF2134E	897.5	15	RF Filter	3.0 x 3.0
IF Filter	SF2172C	280	15	IF Filter	5.0 x 5.0
RF Filter	SF2202E	2017.5	15	TD-SCDMA B Band RF	3.0 x 3.0
RF Filter	SF2145B	895	15.5	RF Filter	7.0 x 5.0
IF Filter	SF1174B	374	17	WLAN	5.0 x 5.0
IF Filter	SF1174D	374	17	WLAN	3.8 x 3.8

All RFM SAW RF / IF Filters are RoHS compliant



SAW RF / IF FILTERS

Listed in Order by Bandwidth

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

SAW RF / IF Filters in Order by Bandwidth					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
RF Filter	SF2092E	810	17	RF Filter	3.0 x 3.0
RF Filter	SF2200E	707	18	BTS RF	3.0 x 3.0
IF Filter	SF2140A	140	18.4	WCDMA/TD-SCDMA IF	13.3 x 6.5
IF Filter	SF2140A-1	140	18.4	WCDMA/D-SCDMA IF	13.3 x 6.5
IF Filter	SF1189B-1	280	18.5	Wireless Access	5.0 x 5.0
IF Filter	SF2151B	211.2	18.84	LTE/WCDMA	5.0 x 7.0
IF Filter	SF1200B	96	20	TD-SCDMA	7.0 x 5.0
Duplexer	SF1222D	2110/2190	20	WCDMA	3.8 x 3.8
IF Filter	SF2131B	92.16	20	TD-SCDMA	7.0 x 5.0
IF Filter	SF2139D	177	20	CDMA2000	3.8 x 3.8
IF Filter	SF2147D	157	20	CDMA2000	3.8 x 3.8
IF Filter	SF2148B	138.24	20	LTE/TD-SCDMA	5.0 x 5.0
IF Filter	SF2155B	153.6	20	IF Filter	5.0 x 7.0
IF Filter	SF2157A	156	20	IF Filter	13.3 x 6.5
IF Filter	SF2170D	165	20	CDMA2000	3.8 x 3.8
IF Filter	SF2178A	168	20	Wimax	13.3 x 6.5
RF Filter	SF2193E	1228	20	GPS RF	3.0 x 3.0
RF Filter	SF2186E	1268.52	20.46	Beidou/Compass	3.0 x 3.0
IF Filter	SF1177A	57.6	21.2	WCDMA/TD-SCDMA	13.3 x 6.5
IF Filter	SF2181D	140	22	IF Filter	3.8 x 3.8
RF Filter	SF2199E	787	22	BTS RF	3.0 x 3.0
RF Filter	SF1182B	836.5	25	Cellular	3.0 x 3.0
RF Filter	SF1183G	881.5	25	Cellular	2.5 x 2.0
RF Filter	SF1184B-1	947.5	25	GSM	3.0 x 3.0
Duplexer	SF1207C	836.5/881.5	25	CDMA	5.0 x 5.0
Duplexer	SF1207D	836.5/881.5	25	CDMA	3.8 x 3.8
RF Filter	SF2142G	867.5	25	RF Filter	2.5 x 2.0
RF Filter	SF2146D	415	25	RF Filter	3.8 x 3.8
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2049E-1	915	26	ISM Band	3.0 x 3.0
RF Filter	SF2093E	915	26	ISM band RF Filter	3.0 x 3.0
RF Filter	SF2098G	915	26	ISM band RF Filter	2.5 x 2.0
IF Filter	SF2032E	1220	28	Cable/DOCSIS	3.0 x 3.0
IF Filter	SF2072C	360	30	Wimax	5.0 x 5.0
IF Filter	SF2086C	240	30	IF Filter	5.0 x 5.0
IF Filter	SF2091C	385	30	IF Filter	5.0 x 5.0
IF Filter	SF2189A	140	30	IF Filter	13.3 x 6.5
RF Filter	SF2197E	847	30	BTS RF	3.0 x 3.0
RF Filter	SF2198E	806	30	BTS RF	3.0 x 3.0
RF Filter	SF2203E	834	30	RF Filter	3.0 x 3.0
RF Filter	SF2205E	879	30	BTS RF	3.0 x 3.0
RF Filter	SF2002B-2	942.5	35	EGSM	3.0 x 3.0
RF Filter	SF2002E	942.5	35	EGSM	3.0 x 3.0
IF Filter	SF2085A	96	35	IF Filter	13.3 x 6.5
IF Filter	SF2087C	267.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2088C	297.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2089C	327.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2090C	357.5	35	IF Filter	5.0 x 5.0
IF Filter	SF2159E	974	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2162E	1178.12	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2163E	1076.06	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2164E	1484.3	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2165E	1586.36	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2166E	1280.18	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2167E	1382.24	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2168E	1688.42	40	DirecTV IF	3.0 x 3.0
IF Filter	SF2169E	1790.48	40	DirecTV IF	3.0 x 3.0
RF Filter	SF2177E	1472	40	RF Filter	3.0 x 3.0
IF Filter	SF2182D	140	40	IF Filter	3.8 x 3.8
RF Filter	SF2204E	1900	40	TD-SCDMA Band RF	3.0 x 3.0
IF Filter	SF2081D	1220	50	Cable/DOCSIS	3.8 x 3.8
IF Filter	SF2081E	1220	50	Cable/DOCSIS	3.0 x 3.0
RF Filter	SF2126E	725	50	WIMAX	3.0 x 3.0
Duplexer	SF1221F	1950/2140	60	WCDMA	3.2 x 2.5
RF Filter	SF2001E	1960	60	PCS	3.0 x 3.0
RF Filter	SF2036E	1880	60	DCS	3.0 x 3.0
RF Filter	SF2160E	2330	60	RF Filter	3.0 x 3.0
IF Filter	SF2190B	138	60	Sat Receiver	5.0 x 7.0

SAW RF / IF Filters in Order by Bandwidth					
Type	Part No.	Frequency (MHz)	BW (MHz)	Application	Case (mm)
RF Filter	SF2158E	2535	70	RF Filter	3.0 x 3.0
RF Filter	SF2161E	2650	70	RF Filter	3.0 x 3.0
RF Filter	SF1192B	1842.5	75	DCS	3.0 x 3.0
RF Filter	SF2133E	1747.5	75	RF Filter	3.0 x 3.0
RF Filter	SF2124E	2441.8	83.5	ISM Band	3.0 x 3.0
RF Filter	SF2173E	2350	100	LTE RF	3.0 x 3.0
IF Filter	SF2187	190	60	Sat Receiver	7.0 x 5.0

For package options, see RF COMPONENTS PACKAGE SELECTION GUIDE on page 39.

All RFM SAW RF / IF Filters are RoHS compliant.



SAW-BASED FREQUENCY CONTROL PRODUCTS

Voltage Controlled Oscillators, VCISO Timing Clocks, and Diff SinWave Clocks

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

RFM retains a long history of providing stable, SAW based frequency control products for computer timing, communications, test instrumentation and military applications. In addition, RFM manufactures optical timing products based on our patented "Diff Sine" technology to meet the increasing demand for bandwidth in communication systems. These products have been specifically developed for applications such as dense wave division multiplexing (DWDM) equipment where timing integrity and elimination of system noise in circuits are critical.

The OP4005B and OP4005B-1 are both 622.08 MHz differential clocks with near perfect symmetry and extremely low jitter with or without noise on the power planes. The OP4006B is a 666.5 MHz Clock for forward error correction timing. RFM's "Diff Sine" architecture is the basis of each of these high performance optical products.

The OPB series along with the SCB series Clocks are also used for timing on ultra high speed A to D converter applications and other digital radio applications.

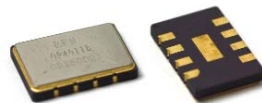
Applications

- Digital communication systems
- High performance analog and digital radios
- Air Traffic Control (ATC) and Traffic Collision Avoidance Systems (TCAS)
- IFF interrogators & transponders, instruments
- Point-to-point microwave communications systems
- GPS systems

Packages and Minimum Order Quantities. Frequency Control products are packaged in dual-in-line package (DIP) and surface mount (SMC) packages. The DIP packaged parts are shipped in antistatic box with a minimum quantity of 30. The SMC packaged parts are shipped via tape and reel with minimum quantity of 500 for a 7" reel.



DIP16-8 Case
25.02 mm x 12.83 mm x 6.35 mm



SMC-8 Case
14 mm x 9 mm

Voltage Controlled Oscillators			
Part No.	Freq. (MHz)	Tol/Spec	Case
HO4001-1	1000	+/- 0.15 MHz, 0~5 Vdc, Low Phase Noise	DIP16-8
HO4002-1	400	+/- 0.04 MHz, 0~10 Vdc, Low Phase Noise	DIP16-8
HO4050B-1	622.08	+/- 100 ppm, 1 ps RMS Jitter, Low Phase Noise	SMC-08
HO1080-3	1030	+/- 200 KHz (-55 °C to 105 °C)	DIP16-8
HO1081-3	1090	+/- 250 KHz (-55 °C to 105 °C)	DIP16-8

VCISO Timing Clock for Optical Networking			
Part No.	Freq. (MHz)	Tol/Spec	Case
OP4004B	625	+/-100 ppm, 2ps RMS Jitter, Low Phase Noise	SMC-8
OP4005B	622.08	+/-100 ppm, 0.1ps RMS Jitter, Low Phase Noise	SMC-8
OP4005B-1	622.08	+/-100 ppm, 0.1ps RMS Jitter, Low Phase Noise	SMC-8A
OP4006B	666.51	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4006B-1	666.51	+/-100 ppm, 1ps RMS Jitter, Low Phase Noise	SMC-8A
OP4007B	669.128	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4008B	669.327	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4009B	672.163	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4010B	663.552	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4011B	719.734	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4012B	644.53125	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4013B	693.48342	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4014B	627.329	+/-100 ppm, <1 ps RMS Jitter, Low Phase Noise	SMC-8
OP4015B	780.881	+/-100 ppm, 0.2 ps RMS Jitter, Low Phase Noise	SMC-8
OP4017B	777.6	+/-100 ppm, 1 ps RMS Jitter, Low Phase Noise	SMC-8
OP4017B-1	777.6	+/-100 ppm, 2 ps RMS Jitter, Low Phase Noise	SMC-8A
OP4018B-1	718.864	+/-50 ppm, 0.5 ps RMS Jitter, Low Phase Noise	SMC-8A

Diff Sine Wave Clock			
Part No.	Freq. (MHz)	Tol/Spec	Case
SC3011B-1	600	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3015B	550	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3017B	400	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3019B	500	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3035B-1	800	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3035B-2	800	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3037B	350	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3038B	532	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3040B	400	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3041B	300	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3042B	624	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3044B	251	Tol = 300 ppm, Vcc=3.3	SMC-8
SC3045B	621.6	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3046B-5	933.12	Tol = 70 ppm, Vcc=3.3	SMC-8B
SC3048B	444	Tol = 200 ppm, Vcc=3.3	SMC-8
SC3049B	700	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3053B	750	Tol = 250 ppm, Vcc=3.3	SMC-8
SC3056B	667	Tol = 250 ppm, Vcc=3.3	SMC-8B

All RFM SAW-Based Frequency Control Products are RoHS compliant.



CRYSTAL-BASED PRODUCTS

Crystal-based Filters, Oscillators and Resonators

RFM RF Components
are Manufactured in
ISO 9001 / TS 16949
Certified Factories

RFM offers a variety of crystal based products. These products are small, high performance devices used in both time and frequency domain applications. RFM's Crystal Base Products include multiple series of surface mount devices: XTL, XTC, XVT, XO, and XFL series. These are surface mount devices based on crystal technology and used in most wireless and digital applications:

- **XTL:** Crystals
- **XTC:** TCXO (Temperature Compensated Crystal Oscillators)
- **XVT:** VCTCXO (Voltage Controlled Temperature Compensated Crystal Oscillators)
- **XFL:** Crystal Filters
- **XO:** Crystal Oscillators

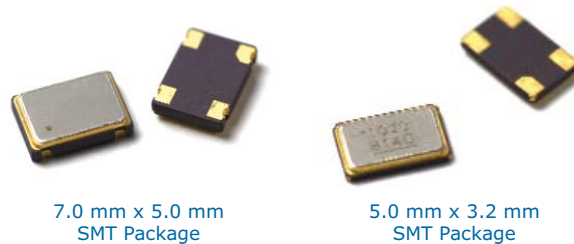
Applications

- AMR (Automated Meter Reading)
- SDARS
- Cellular BTS and Repeater
- Cable Modem and Digital Set-Top Box
- RFID reader
- WiMax
- GPS
- Cellular Phone

Packages and Minimum Order Quantities. Crystal-based products are packaged in surface mount packages (SMT) in a variety of sizes:

- 1.6 mm x 1.2 mm
- 2.0 mm x 1.6 mm
- 2.5 mm x 2.0 mm
- 3.2 mm x 2.5 mm
- 3.2 mm x 2.6 mm
- 3.2 mm x 2.7 mm
- 3.2 mm x 2.8 mm
- 5.0 mm x 3.2 mm
- 7.0 mm x 5.0 mm

They are shipped in tape and reel with minimum quantity of 500 in 7" reel, and minimum quantity of 2,000 in 13" reel.



Crystal Filter in Order by Part Number			
Part No.	Freq. (MHz)	Tol/Spec	Case (mm)
XFL8001	76.8	4 kHz BW, -3 dB IL, -30 °C to +80 °C	5.0 x 3.2

Crystal Oscillators in Order by Part Number			
Part No.	Freq. (MHz)	Tol/Spec	Case (mm)
XO3001	125	3.3 V, +/- 50 ppm, -40 °C to +85 °C	7.0 x 5.0
XO3001-1	125	3.3 V, +/- 80 ppm, -40 °C to +85 °C	7.0 x 5.0
XO3002	20.48	3.3 V, +/- 40 ppm, -40 °C to +85 °C	7.0 x 5.0
XO3003	25.6	3.3 V, +/- 40 ppm, -40 °C to +85 °C	7.0 x 5.0

Temperature Compensated Crystal Oscillator			
Part No.	Freq. (MHz)	Tol/Spec	Case (mm)
XTC7001	18.414	3.0 V, +/-2 ppm, -40 °C to +85 °C	5.0 x 3.2
XTC7002	30	2.8 V, +/-2 ppm, -30 °C to +85 °C	3.2 x 2.5
XTC7003	12.8	3.0 V, +/-1 ppm, -30 °C to +85 °C	5.0 x 3.2
XTC7003P	12.8	3.0 V, +/-1 ppm, -30 °C to +70 °C	3.2 x 2.5
XTC7004	16.367667	2.85 V, +/-0.5 ppm, -30 °C to +85 °C	3.2 x 2.5
XTC7005	16.369	2.85 V, +/-0.5 ppm, -30 °C to +85 °C	3.2 x 2.5
XTC7006	26	3.0 V, +/-0.5 ppm, -30 °C to +80 °C	3.2 x 2.5
XTC7007	13	up to 3.6 V, +/-2.0 ppm, -30 °C to +80 °C	3.2 x 2.5
XTC7008	40	2.8 V, +/-2.5 ppm, -30 °C to +85 °C	3.2 x 2.5
XTC7009	16.368	2.85 V, +/-0.5 ppm, -30 °C to +85 °C	3.2 x 2.5

Voltage Controlled Temperature Compensated Crystal Oscillator			
Part No.	Freq. (MHz)	Tol/Spec	Case (mm)
XVT9001	19.2	2.8V, +/-2.5 ppm, -20 °C to +70 °C	3.2 x 2.5
XVT9002	26	2.8V, +/-2.5 ppm, -20 °C to +75 °C	3.2 x 2.5
XVT9003	19.2	2.8V, +/-2.5 ppm, -30 °C to +80 °C	3.2 x 2.5
XVT9004	30	2.8V, +/-2.5ppm, -30 °C to +80 °C	3.2 x 2.6
XVT9005	32	2.8V, +/-2.0ppm, -30 °C to +85 °C	3.2 x 2.7
XVT9006	40	2.8V, +/-2.0ppm, -30 °C to +85 °C	3.2 x 2.8
XVT9007	19.6608	2.8V, +/-2.0ppm, -30 °C to +85 °C	3.2 x 2.8
XVT9008	30	3.3V, +/-2.5ppm, -30 °C to +75 °C	3.2 x 2.5
XVT9009	20	3.3V, +/-0.5ppm, -40 °C to +85 °C	7.0 x 5.0

Crystal Resonator in Order by Frequency			
Part No.	Freq. (MHz)	Tol/Spec	Case (mm)
XTL1009	8	12 pF, +/-30 ppm, -40 °C to +85 °C	5.0 x 3.2
XTL1005	9.84375	3 pF, +/-50 ppm, -40 °C to +125 °C	5.0 x 3.2
XTL1001	9.84375	10 pF, +/-30 ppm, -40 °C to +125 °C	5.0 x 3.2
XTL1002	10	12 pF, +/-20 ppm, -20 °C to +70 °C	5.0 x 3.2
XTL1010	12	12 pF, +/-30 ppm, -10 °C to +60 °C	5.0 x 3.2
XTL1020	12.8	15 pF, +/- 20 ppm, -40 °C to +85 °C	5.0 x 3.2
XTL1006	13.56	3 pF, +/-50 ppm, -40 °C to +125 °C	5.0 x 3.2
XTL1026	13.56	12 pF, +/- 30 ppm, -20 °C to +70 °C	5.0 x 3.2
XTL1003-1	13.56	13.5 pF, +/- 20 ppm, -20 °C to +70 °C	5.0 x 3.2
XTL1004	13.56	20 pF, +/-10 ppm, -20 °C to +70 °C	5.0 x 3.2
XTL1003	13.56	20 pF, +/- 50 ppm, -40 °C to +125 °C	5.0 x 3.2
XTL1021	16	12 pF, +/- 20 ppm, -40 °C to +85 °C	5.0 x 3.2
XTL1022	24	10 pF, +/- 10 ppm, -40 °C to +85 °C	2.5 x 2.0
XTL1012	24.265	12 pF, +/-15 ppm, -40 °C to +85 °C	2.5 x 2.0
XTL1018	24.265	12 pF, +/-30 ppm, -40 °C to +85 °C	2.0 x 1.6
XTL1023	26	9 pF, +/-10 ppm, -40 °C to +85 °C	2.0 x 1.6
XTL1011	26	9 pF, +/-30 ppm, -20 °C to +75 °C	3.2 x 2.5
XTL1013	26	10.3 pF, +/-10 ppm, -20 °C to +75 °C	3.2 x 2.5
XTL1008	26	16 pF, +/-10 ppm, -20 °C to +70 °C	3.2 x 2.5
XTL1027	26.43875	12 pF, +/-20 ppm, -20 °C to +80 °C	5.0 x 3.2
XTL1025	27.13438	12 pF, +/-30 ppm, -20 °C to +70 °C	5.0 x 3.2
XTL1028N	30	12 pF, +/-20 ppm, -40 °C to +85 °C	5.0 x 3.2
XTL1017	30	20 pF, +/-15 ppm, -40 °C to +105 °C	3.2 x 2.5
XTL1024	40	8 pF, +/-10 ppm, -20 °C to +75 °C	1.6 x 1.2
XTL1014	48.53	8 pF, +/-30 ppm, -40 °C to +85 °C	2.5 x 2.0
XTL1015	48.53	10 pF, +/-30 ppm, -40 °C to +85 °C	2.5 x 2.0
XTL1016	48.53	12 pF, +/-30 ppm, -40 °C to +85 °C	2.5 x 2.0
XTL1019	48.53	12 pF, +/-30 ppm, -40 °C to +85 °C	2.0 x 1.6

All RFM Crystal-Based Products are RoHS compliant.

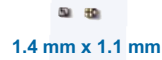


RF COMPONENTS PACKAGE SELECTION GUIDE

RFM RF Components
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ISO 9001 / TS 16949
Certified Factories

RFM SAW Filters, SAW based Frequency Control devices, and Crystal Products come in the following package styles.

Packages shown below are near actual size.



1.4 mm x 1.1 mm



2.0 mm x 1.6 mm



2.5 mm x 2.0 mm



3.2 mm x 2.5 mm



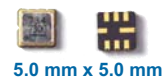
3.0 mm x 3.0 mm



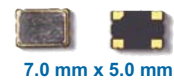
3.8 mm x 3.8 mm



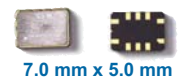
5.0 mm x 3.2 mm



5.0 mm x 5.0 mm



7.0 mm x 5.0 mm



7.0 mm x 5.0 mm



7.0 mm x 5.0 mm



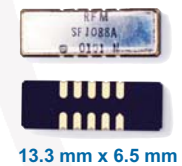
9.0 mm x 7.0 mm



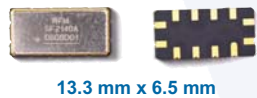
9.3 mm diameter



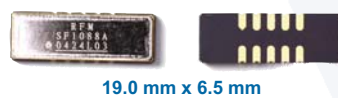
11.0 mm x 4.0 mm



13.3 mm x 6.5 mm



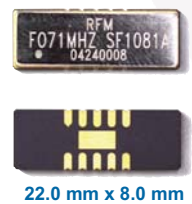
13.3 mm x 6.5 mm



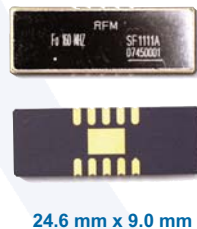
19.0 mm x 6.5 mm



14 mm x 9 mm



22.0 mm x 8.0 mm



24.6 mm x 9.0 mm



25.02 mm x 12.83 mm x 6.35 mm



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RF Monolithics, Inc. (RFM)

Corporate Headquarters
4441 Sigma Road
Dallas, TX 75244
Phone: +1 972-233-2903
Fax: +1 972-389-8148
Email: info@rfm.com

Modules Engineering Office
3079 Premiere Parkway, Suite 140
Duluth, GA 30097
Phone: +1 678-684-2000
Fax: +1 678-684-2001

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电话:0755-83607652 83376489 83376549 83370250 83370251 82500323

传真:0755-83376182 (0)13902971329 MSN: SUNS888@hotmail.com

邮编:518033 E-mail: szss20@163.com QQ: 195847376

深圳赛格展销部:深圳华强北路赛格电子市场2583号 电话:0755-83665529

技术支持:0755-83394033 13501568376