

# Frequency Components and Antennas for Smart Industrial Lighting Application



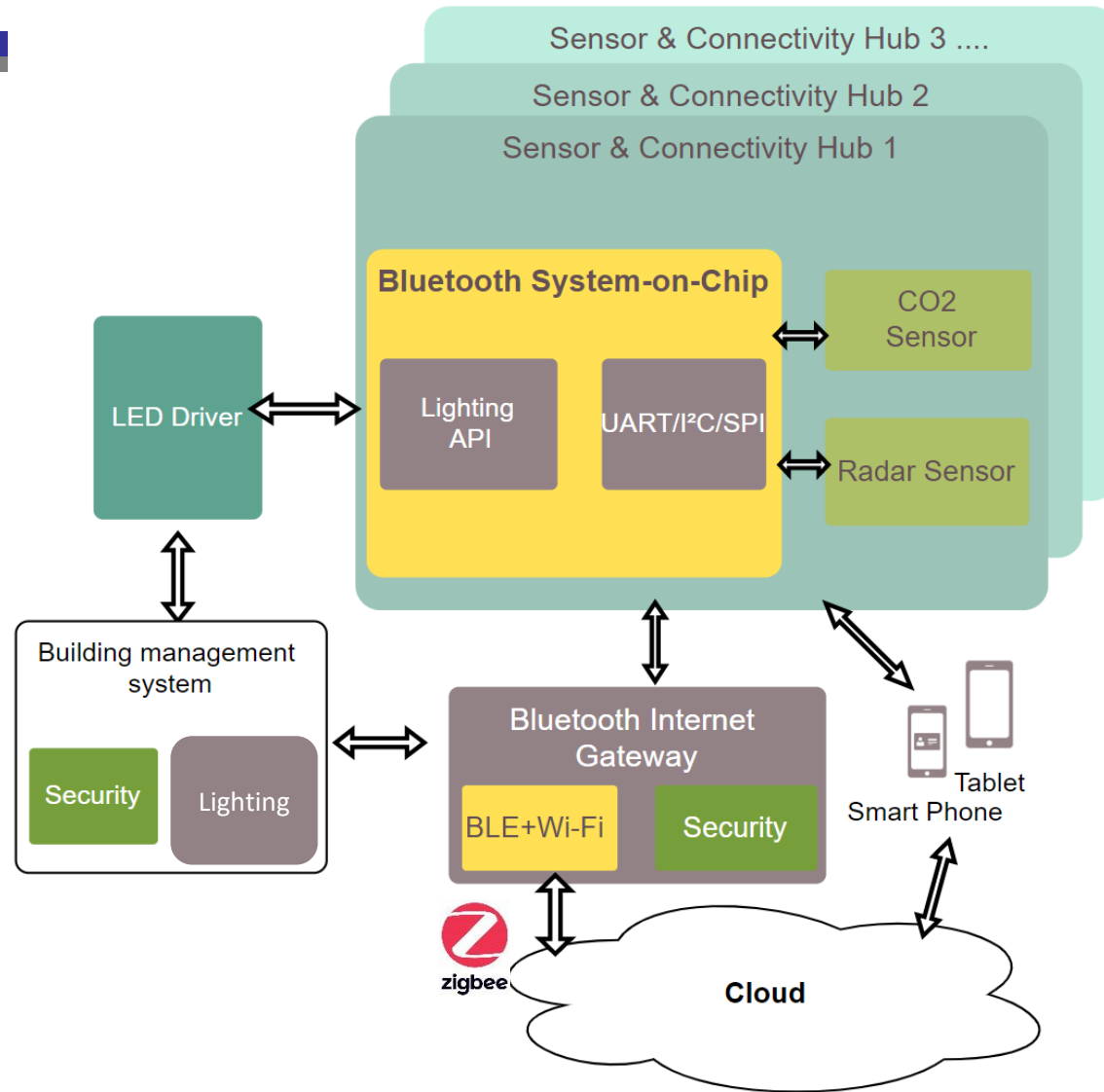
**RAFLTRON**

# Introduction



**Raltron** offers the most comprehensive line of frequency management components for Smart Industrial Lighting, from simple tuning fork crystals to high stability, temperature compensated crystal oscillators and antennas. These products are designed to satisfy the ultra-low power, small footprint, and low-cost requirements of this growing market.

# Smart Lighting System Architecture



# Solutions for Wi-Fi Protocol

The Wi-Fi/IEEE 802.11 has three frequency bands, 2.4/5/6 GHz.

Some Typical Crystal or TCXO frequencies for **Wi-Fi** Smart Industrial Lighting ICs:

Infineon - CYW43012 - 37.4 MHz, 32.768 kHz  
CY8C62xA - 16 to 35 MHz , 32.768 kHz

Silicon Labs - WF200 - 38.4 MHz, 32.768 kHz  
RS9116 - 40 MHz, 32.768 kHz

Microchip - ATWINC3400A-MU - 26 MHz, 32.768 kHz

## Raltron Stub Antennas Solutions

[RST-2400-P-190-IPEX-H](#)

[RST-MB-P-153-SMA-G](#)



The Wi-Fi 6/IEEE 802.11ax has two frequency bands, 2.4/5 GHz.

The Crystals for lower frequencies of Wi-Fi 6 such as 38.4 and 48 MHz, and for higher are 76.8 and 96 MHz

Some Typical Crystals or TCXO frequencies for **Wi-Fi 6** Smart Industrial Lighting ICs:

SparkLan - WNFB-266AXI(BT) - 37.4 MHz, 32.768 kHz  
AP6281 - 59.97 MHz, 32.768 kHz

[See All Crystal Products](#)

[See Antenna Products for Wi-Fi](#)

# Solutions for Bluetooth & BLE Protocol

Bluetooth Low Energy uses the same 2.4 GHz radio frequencies as classic Bluetooth  
Some Typical Crystal or TCXO frequencies for **Bluetooth & BLE** Smart Industrial Lighting ICs:

Infineon - PSoC 6 MCU: CY8C63x6, CY8C63x7 - 16 MHz/32 MHz Crystal Oscillator  
16 to 35 MHz, 32.768 kHz On-chip Crystal Oscillators  
- 2.4 GHz Chip Antenna

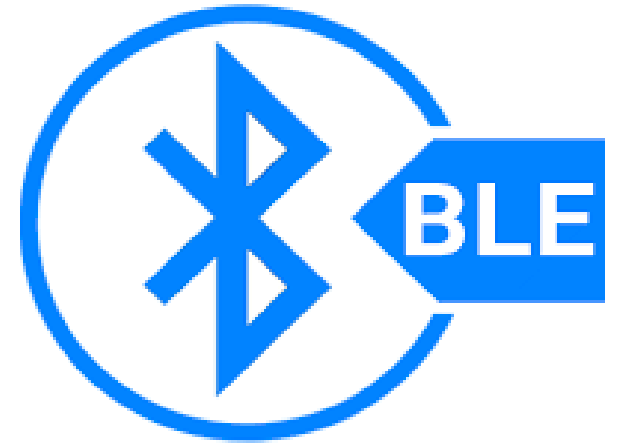
Nordic Semiconductor - nRF52810 - 64 MHz Crystal Oscillator, 32 MHz Crystal  
32.768 kHz Crystal Oscillator, 32.768 kHz Crystal  
1 MHz/16 MHz/32 MHz Peripheral Clock  
- 2.4 GHz Antenna

Texas Instruments - CC2640R2F - 32.8 kHz/48 MHz RC Oscillator, 24 MHz Crystal Oscillator  
32.768 kHz Crystal Oscillator  
- 2.4 GHz Antenna

NXP Semiconductors - MKW39/38/37 - 26 MHz/32 MHz Crystal, 32.768 kHz Crystal Oscillator  
- 2.4 GHz Antenna

Dialog Semiconductor - DA1469x - 32 MHz Crystal, 32.768 kHz Crystal Oscillator  
- 2.4 GHz Antenna

STMicroelectronics - BlueNRG-LPS - 32 MHz Crystal, 32.768 kHz Crystal  
- 2.4 GHz Antenna



[See All Crystal Products](#)

[See Antenna Products for Bluetooth](#)



# Solutions for ZigBee Protocol

The ZigBee/IEEE 802.15.4 has three frequency bands, allowing operation in all regions of the world: 2.4 GHz for worldwide applications, 868 MHz for Europe and 915 MHz for the American.

Some Typical Crystal or TCXO frequencies for **ZigBee** Smart Industrial Lighting ICs :

Texas Instruments - CC2652RSIP - 48 MHz Crystal  
48 MHz Crystal Oscillator  
32.768 kHz Crystal Oscillator  
- 2.4 GHz Inverted F Antenna

Nordic Semiconductor - nRF52832 - 64 MHz Crystal Oscillator  
32 MHz Crystal, 32.768 kHz Crystal Oscillator  
- 2.4 GHz Chip Antenna

NXP Semiconductors - JN5189 - 32 MHz Crystal Oscillator  
32.768 kHz Crystal Oscillator  
- 2.4 GHz Antenna

## Raltron Stub Antennas Solutions

[RST-2400-P-190-IPEX-H](#)

[RST-MB-P-153-SMA-G](#)



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[See Antenna Products for ZigBee](#)

# Raltron Solutions - MHz Crystals

## Available Crystal Packages









Part #	Size(mm)
<a href="#">R2016-32.000-12-F-1010-EXT-TR</a>	1.60 x 1.25 x 0.32
<a href="#">R2016-48.000-8-F-1030-EXT-TR</a>	2.00 x 1.60 x 0.50
<a href="#">R2520-16.000-10-1020-EXT-TR</a>	2.50 x 2.00 x 0.65
<a href="#">RH100-24.000-9-1010-TR</a>	3.20 x 2.50 x 0.70

[See All Crystal Products](#)

### Typical Frequencies:

16 MHz, 26 MHz, 32 MHz, 37.4 MHz, 38.4 MHz, 48 MHz, 59.97 MHz , 64 MHz

## Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
<b>R1612</b> <a href="#">View products in stock</a>	 PDF		<a href="#">Buy Now</a>
<b>R2016</b> <a href="#">View products in stock</a>	 PDF		<a href="#">Buy Now</a>
<b>R2520</b> <a href="#">View products in stock</a>	 PDF		<a href="#">Buy Now</a>
<b>RH100</b> <a href="#">View products in stock</a>	 PDF		<a href="#">Buy Now</a>



# Raltron Solutions - Tuning Fork 32.768 kHz

## Available Tuning Fork Crystal Packages

Part #	SIZE(mm)
<a href="#">RT1210-32.768-9-TR</a>	1.2 x 1.0
<a href="#">RT1610-32.768-12.5-TR</a>	1.6 x 1.0
<a href="#">RT2012-32.768-7-20-EXT-TR</a>	2.0 x 1.2
<a href="#">RT3215-32.768-12.5-TR</a>	3.2 x 1.5
<a href="#">RSE-32.768-12.5-H14-TR</a>	6.9 x 1.4
<a href="#">RSM200S-32.768-12.5-TR</a>	8.0 x 3.8

Load capacitance values: 6 pF, 7 pF, 9 pF and 12.5 pF

Frequency Tolerances:  $\pm 20$  ppm and  $\pm 10$  ppm



## Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
<b>RT1210</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RT1610</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RT2012</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RT3215</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RSE H14</b>			<a href="#">Buy Now</a>
<b>RSM200S</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>

[See All Crystal Products](#)



# Raltron Solutions - TCXOs and VCTCXOs





## Raltron TCXOs IC Solutions

Part #	Size(mm)
<a href="#">RTX-1612BD32-S-52.000-TR</a>	1.6 x 1.2
<a href="#">RTX-2016AD333-S-26.000-TR</a>	2.0 x 1.6
<a href="#">RTX-2520AD31-S-26.000-TR</a>	2.5 x 2.0
<a href="#">RTX-2520AF32-S-48.000-TR</a>	2.5 x 2.0

[See All TCXOs Products](#)

- Tighter Stability:  $\pm 0.5$  ppm ~  $\pm 2.5$  ppm,  $-40 \sim +85^{\circ}\text{C}$
- Improved Frequency Tuning Characteristic
- Superior Phase Noise Performance ( $-130$  dBc/Hz on the floor)
- Range Supply Voltage:  $1.8\text{ V} \sim 3.3\text{ V}$
- Typical Frequencies: 10.0 MHz, 16.0 MHz, 19.2 MHz, 20.0 MHz, 26.0 MHz, 32.0 MHz, 38.4MHz, 48.0 MHz, 50.0 MHz, 52.0 MHz













## Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
<b>RTX-1612</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RTX /RTV-2016</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RTX /RTV-2520</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>



# Raltron Solutions – Antennas

## Raltron Antennas Solutions

Part #	Datasheet	Image	Frequency(MHz)	Contact Us / Buy Now
<a href="#">RCA-3216-A1-TR</a>			2450±50	Contact Us
<a href="#">RCA-5220-A0-TR</a>			2450±50	Buy Now
<a href="#">RCA-E-3216-A2-TR</a>			2400~2483.5	Contact Us
<a href="#">RCA-E-3216-E1-TR</a>			1575	Contact Us
<a href="#">RCA-W2-P-3216-A29-G</a>			2545	Contact Us
<a href="#">RCA-W2A1-3216-Z-040</a>			2400~2500	Buy Now

[See Antenna Products for Wi-Fi](#)




[See Antenna Products for Bluetooth](#)

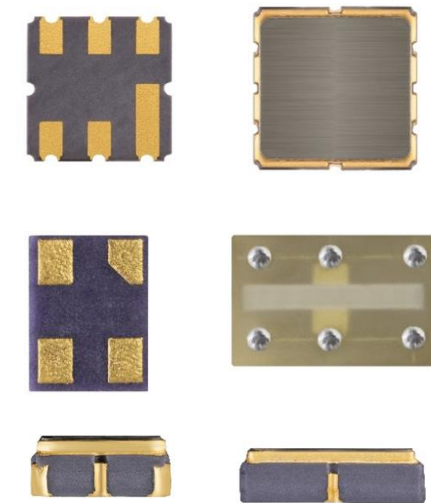
[See Antenna Products for ZigBee](#)



# Raltron Solutions – SAW Filters

## Raltron SAW Filter IC Solutions













Part #	Datasheet	Size(mm)	Contact Us / Buy Now
<a href="#">RSF-1176.450-20460-1109-TR</a>	 PDF	1.1 x 0.9 x 0.55	<a href="#">Buy Now</a>
<a href="#">RSF-1582.400-46800-1109-TR</a>	 PDF	1.1 x 0.9 x 0.55	<a href="#">Buy Now</a>
<a href="#">RSF-915.000-926000-2016-TR</a>	 PDF	2.0 x 1.6 x 0.73	<a href="#">Contact Us</a>



[See All SAW Filters Products](#)

# Raltron Solutions - RF Connectors











**Raltron RF connectors** with low insertion loss and excellent voltage standing wave ratio support the high-level performance demanded by Smart Industrial Lighting.

Product #	Datasheet	Image	Connector Family	Description
<a href="#">RCN-3F-3108-K-001</a>			<a href="#">BNC</a>	BNC Straight Jack PCB Receptacle
<a href="#">RCN-4F-28012-K-001</a>			<a href="#">MCX</a>	MCX Straight Jack PCB Receptacle
<a href="#">RCN-5F-33106-K-001</a>			<a href="#">MMCX</a>	MMCX Straight Jack PCB Receptacle
<a href="#">RCN-17M-12816-K-001</a>			<a href="#">N</a>	Type N Right Angle Plug
<a href="#">RCN-1M-21419-K-001</a>			<a href="#">SMA</a>	SMA Straight Plug (Quick Fit) for Semi Rigid Cable
<a href="#">RCN-9F-16801-K-001</a>			<a href="#">TNC</a>	TNC Straight Jack Bulkhead Crimp



# Raltron Solutions - RF Cable Assemblies

Raltron cable assemblies range from simple jumpers to power and high-speed data cables.

Product #	Datasheet	Image	Cable Assemblies	Description
<a href="#">RCB-16-F-95-11-SD</a>	 PDF		<a href="#">SMA to IPEX</a>	RP SMA Jack S/T For RF1.13 Cable
<a href="#">RCB-21-174-150-DO-001</a>	 PDF		<a href="#">MCX to MCX</a>	MCX Plug to MCX R/A Plug For RG174 Cable
<a href="#">RCB-14-H-100-12-SD</a>	 PDF		<a href="#">MCX to SMA</a>	SMA Jack to MCX Plug For RF1.37 Cable
<a href="#">RCB-15-A-100-12-SD</a>	 PDF		<a href="#">MMCX to SMA</a>	SMA to MMCX For RG174 Cable
<a href="#">RCB-13-J-600-13-SD</a>	 PDF		<a href="#">TNC to SMA</a>	TNC Jack S/T For RG316 Cable



[CABLE ASSEMBLIES SHORT FORM CATALOG](#)

# Contact



<http://www.raltron.com>

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