

Frequency Components and Antennas for Electronic Shelf Label



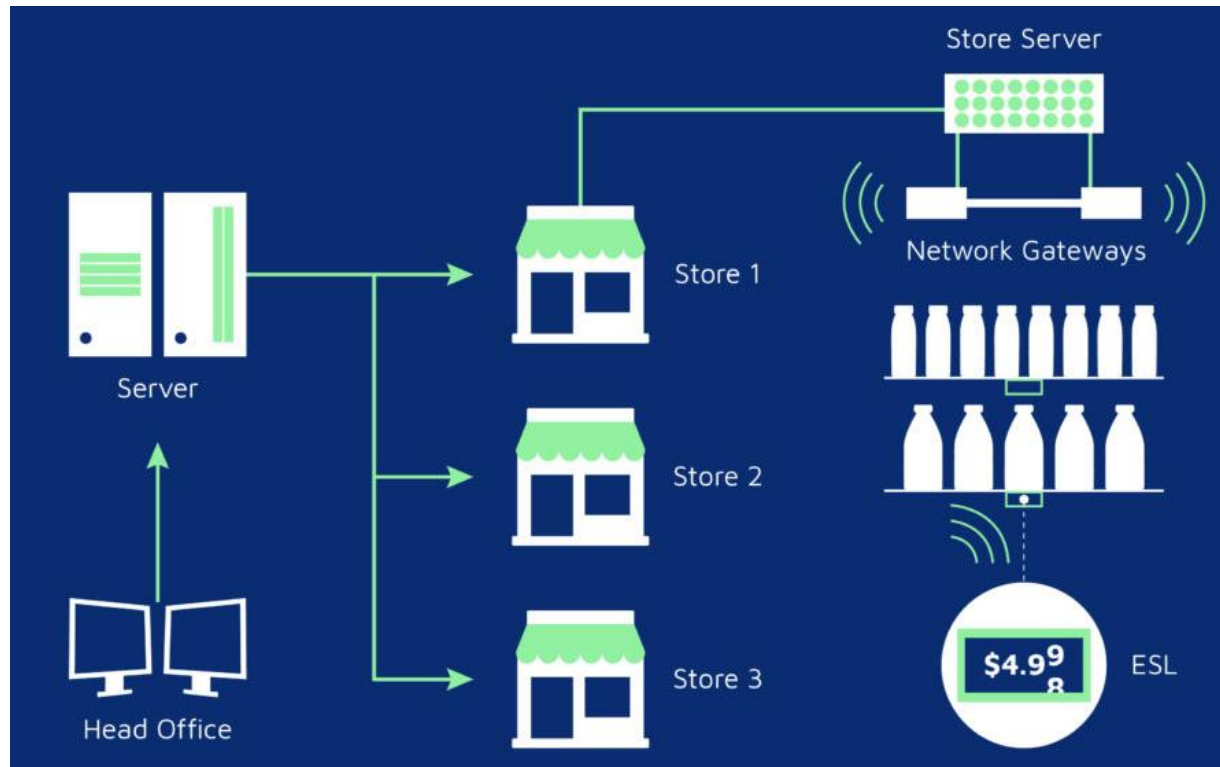
RAFLTRON

Introduction



Raltron offers the most comprehensive line of frequency management components for Electronic Shelf Label, 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.

What is Electronic Shelf Label?



- Digital price tags for store shelves
- Replace traditional paper labels
- Display pricing and product information
- Update information wirelessly in real-time
- Communication protocols used:
 - Near Field Communication (NFC)
 - Bluetooth Low Energy (BLE)

Source: <https://www.telink-semi.com/benefits-electronic-shelf-label-retail/>

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** Electronic Shelf Label 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

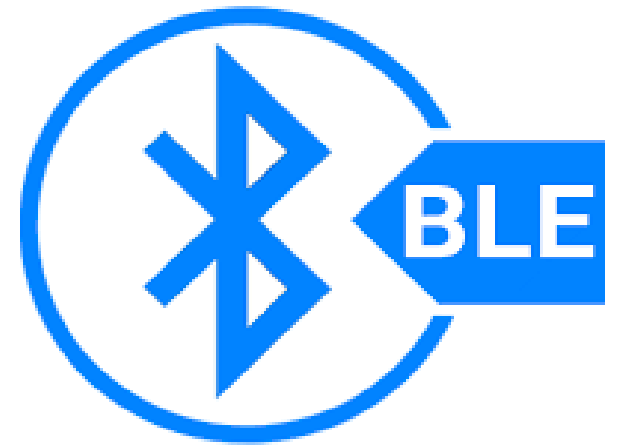
Nordic Semiconductor - nRF52810 - 64 MHz Crystal Oscillator, 32 MHz Crystal
32.768 kHz Crystal Oscillator, 32.768 kHz Crystal
1 MHz/16 MHz/32 MHz Peripheral Clock
- 2.4 GHz Antenna

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 Near-field Communication Protocol

NFC operates at 13.56 MHz on ISO/IEC 18000-3 air interface. The technology is a simple extension of the ISO/IEC14443 proximity-card standard(contactless card, RFID).

Some Typical Crystal or TCXO frequencies for **Near-field communication** Electronic Shelf Label ICs:

NXP Semiconductors - PN7160_PN7161 - 27.12 MHz Crystal, 40 MHz Oscillator
PN7150 - 27.12 MHz Crystal, 40 MHz Oscillator

STMicroelectronics - ST25R3916 - 27.12 MHz Crystal, 27 kHz RC Oscillator, 32.768 kHz Crystal
ST25RU3993 - 20 MHz TCXO
ST95HF - 27.12 MHz Crystal



[See All Crystal Products](#)

[See Antenna Products for NFC](#)

Raltron Solutions - MHz Crystals









Available Crystal Packages

Part #	Size(mm)
R1612-27.120-8-F-3030-EXT-TR	1.60 x 1.25 x 0.32
R2016-48.000-8-F-1030-EXT-TR	2.00 x 1.60 x 0.50
R2520-27.120-10-F-1515-TR-NS1	2.50 x 2.00 x 0.65
RH100-24.000-9-1010-TR	3.20 x 2.50 x 0.70

Typical Frequencies:

16 MHz, 26 MHz, 32 MHz, 37.4 MHz, 38.4 MHz, 40 MHz, 48 MHz, 59.97 MHz , 64 MHz

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R2520 View products in stock			Buy Now
RH100 View products in stock			Buy Now

[See All Crystal Products](#)



Raltron Solutions - Tuning Fork 32.768 kHz

Available Tuning Fork Crystal Packages

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

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

Frequency Tolerances: ± 20 ppm and ± 10 ppm



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RSE H14			Buy Now
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Typical example of IC for Electronic Shelf Label using a 32.768 kHz crystal as frequency reference:

Texas Instruments - CC1352P7

Using 32.768 kHz crystal

CL: 6, 7 or 12 pF

ESR: 90 k Ω max

[See All Crystal Products](#)

Raltron Solutions - TCXOs and VCTCXOs

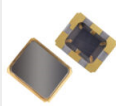
Raltron TCXOs Solutions

Part #	Size(mm)
RTX-1612BD32-S-52.000-TR	1.6 x 1.2
RTX-2016AD333-S-26.000-TR	2.0 x 1.6
RTX-2520AD31-S-26.000-TR	2.5 x 2.0
RTX-2520AF32-S-48.000-TR	2.5 x 2.0

[See All TCXOs Products](#)

- Tighter Stability: ± 0.5 ppm ~ ± 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











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RTV-2016 View products in stock			Buy Now
RTX-2520 View products in stock			Buy Now



Raltron Solutions – Antennas

Raltron Antennas Solutions





Part #	Datasheet	Image	Frequency(MHz)	Contact Us / Buy Now
RCA-3216-A1-TR	 PDF		BLUETOOTH: 2450±50	Contact Us
RCA-5220-A0-TR	 PDF		BLUETOOTH: 2450±50	Buy Now
RCA-E-3216-A2-TR	 PDF		BLUETOOTH: 2400~2483.5	Contact Us
RCA-W2-P-3216-A29-G	 PDF		BLUETOOTH: 2545	Contact Us
RCA-W2A1-3216-Z-040	 PDF		2400~2500	Buy Now

[See Antenna Products for Bluetooth](#)
[See Antenna Products for NFC](#)



Raltron Products – LTCC Filters, Baluns and Diplexers

Raltron LTCC Filters, Baluns and Diplexers Solutions

Part #	Datasheet	Size(mm)	Contact Us / Buy Now
RCF-5500.000-700000-1005-W-001	 PDF	1.00 x 0.50 x 0.40	Contact Us
RBL-2430.000-1005-EV-001	 PDF	1.00 x 0.50 x 0.40	Contact Us
RCDI-24-49-1608-W-TR	 PDF	1.60 x 0.80 x 0.60	Contact Us
RCDI-W2A1-W5A17-1608-W-TR	 PDF	1.60 x 0.80 x 0.60	Contact Us

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Contact



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