

# Frequency Components and Antennas for Hearing Aids



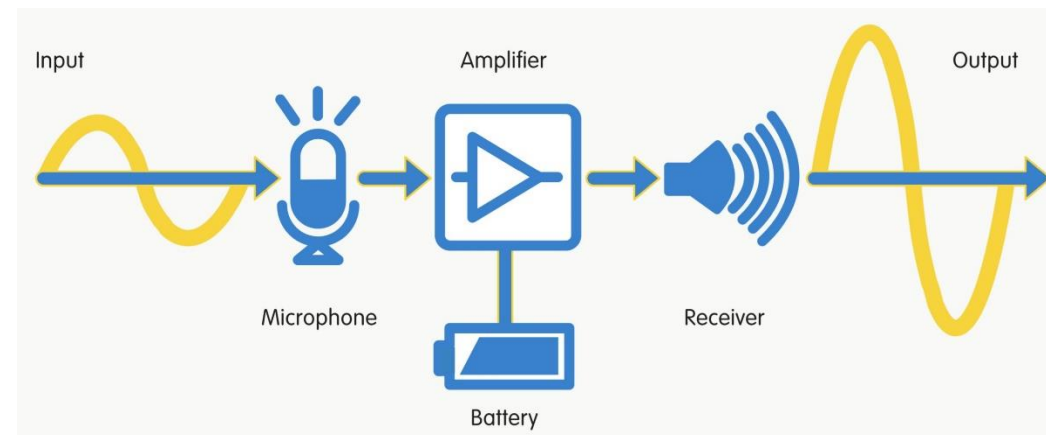
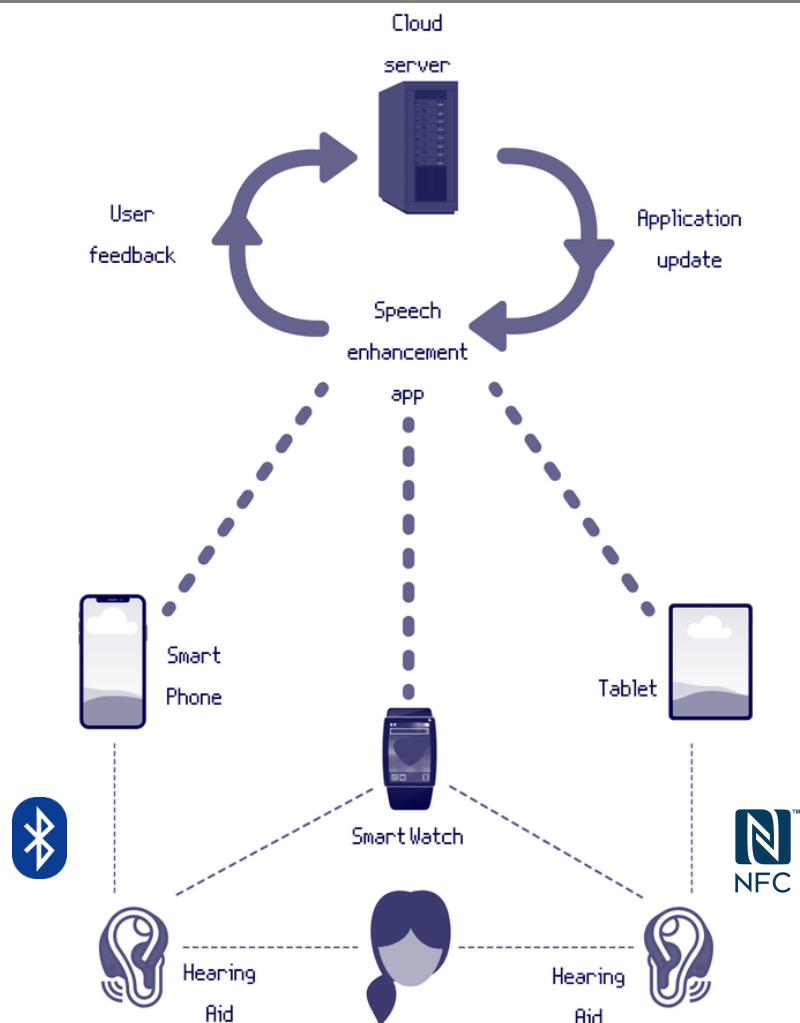
**RALTRON**

# Introduction



**Raltron** offers the **most comprehensive and smallest** line of frequency management components for Hearing Aids, 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.

# How do Hearing Aids Work?



Some hearing aid manufacturers have developed proprietary protocols that operate in the 2.4GHz frequency band, allowing for direct streaming of audio to the hearing aids.

Source: <https://www.clearliving.com/hearing/hearing-aids/bluetooth/>, <https://www.soundguys.com/how-do-hearing-aids-work-57482/>

# 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** Hearing Aids 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

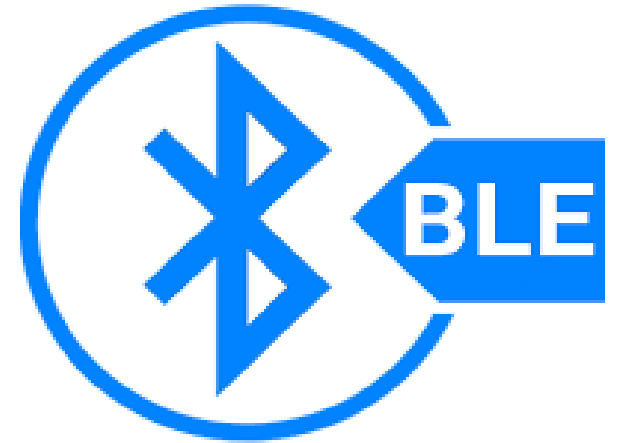
Nordic Semiconductor - nRF52810 - 64 MHz Crystal Oscillator, 32 MHz Crystal  
32.768 kHz Crystal Oscillator, 32.768 kHz Crystal  
1 MHz/16 MHz/32 MHz Peripheral Clock  
- 2.4 GHz Antenna

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** Hearing Aids ICs:

NXP Semiconductors - PN7160\_PN7161 - 27.12 MHz Crystal, 40 MHz Oscillator  
PN7150 - 27.12 MHz Crystal, 40 MHz Oscillator

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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)
<a href="#">R1612-27.120-8-F-3030-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="#">R2520-27.120-10-F-1515-TR-NS1</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

### Typical Frequencies:

16 MHz, 26 MHz, 32 MHz, 37.4 MHz, 38.4 MHz, 40 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>			<a href="#">Buy Now</a>
<b>R2016</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>R2520</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RH100</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>

[See All Crystal Products](#)



# 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

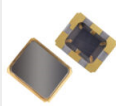
## Raltron TCXOs Solutions

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 ~ +85°C
- Improved Frequency Tuning Characteristic
- Superior Phase Noise Performance (-130 dBc/Hz on the floor)
- Range Supply Voltage: 1.8 V ~ 3.3 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>RTV-2016</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>
<b>RTX-2520</b> <a href="#">View products in stock</a>			<a href="#">Buy Now</a>





# Raltron Products – LTCC Filters, Baluns and Diplexers

## Raltron LTCC Filters, Baluns and Diplexers Solutions

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

[See All LTCC Filters, Baluns and Diplexers Products](#)



# Contact



<http://www.raltron.com>

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