

# Raltron Products for Smart City Applications

Apr. 2023

The Raltron logo is displayed in a stylized, bold, black font with a white outline. The letter 'O' is replaced by a solid blue circle. The logo is set against a white rectangular background with a black border.

**RALTRON**

# Introduction



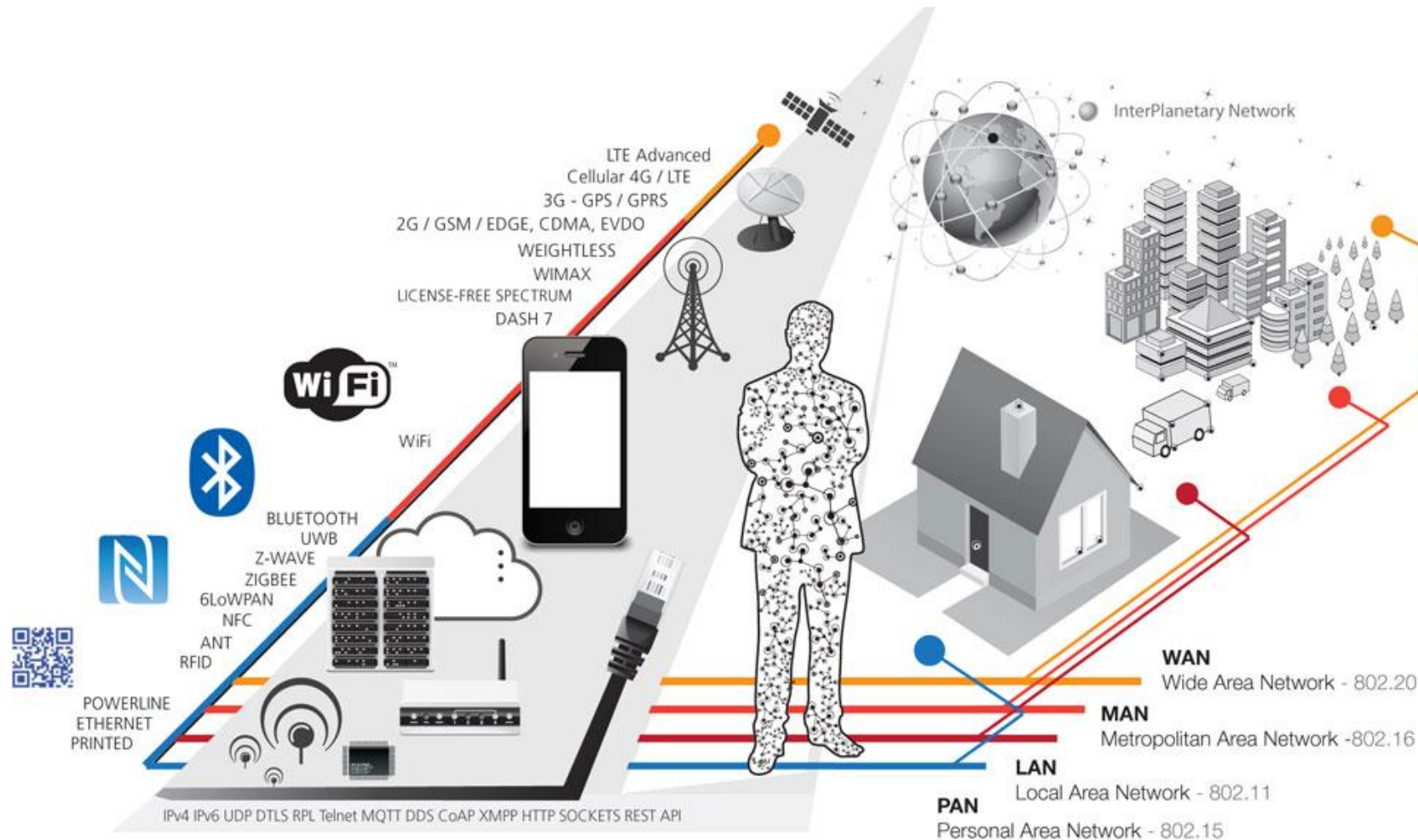
**Raltron** offers the most comprehensive line of frequency management components for Smart City Applications, from simple tuning fork crystals to high stability temperature compensated crystal oscillators and antennas. These products are designed to satisfy the ultra-low power, small footprint, and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

# What is Smart City?

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- ❑ A Smart City is a city that utilizes advanced technologies and data-driven solutions to enhance the quality of life for its citizens and improve the efficiency of urban services. To achieve this goal, a Smart City aims to create an intelligent and sustainable ecosystem by integrating various components such as transportation, energy, healthcare, and communication.
- ❑ To collect and analyze data in real-time, a Smart City uses sensors, data analytics, and Internet of Things (IoT) devices. This data helps city administrators make informed decisions and optimize resource allocation. By leveraging technology, a Smart City can improve mobility, reduce carbon emissions, increase safety, and foster economic growth.
- ❑ Smart Cities offer a promising solution to address urban challenges and create a better future for citizens, especially with the growing global population and rapid urbanization.

# The Future Of Smart Cities



Source: <https://www.trafficsafetystore.com/blog/how-iot-technology-is-creating-the-future-smart-cities/>

# 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 City Applications 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** Wireless Smart City Applications 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 City Applications 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

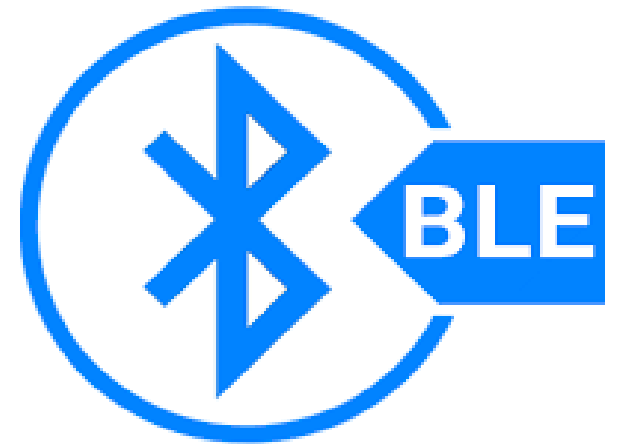
Nordic Semiconductor - nRF52810 - 64 MHz Crystal Oscillator, 32 MHz Crystal  
32.768 kHz Crystal Oscillator, 32.768 kHz Crystal  
1 MHz/16 MHz/32 MHz Peripheral Clock  
- 2.4 GHz Antenna

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** Smart City Applications 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](#)

# Applicable Raltron Products

## Texas Instruments - CC330x

**40 MHz Crystal 6pf 10/10ppm 60Ω**

[R2016-40.000-6-F-1010-EXT-TR-NS1](#)

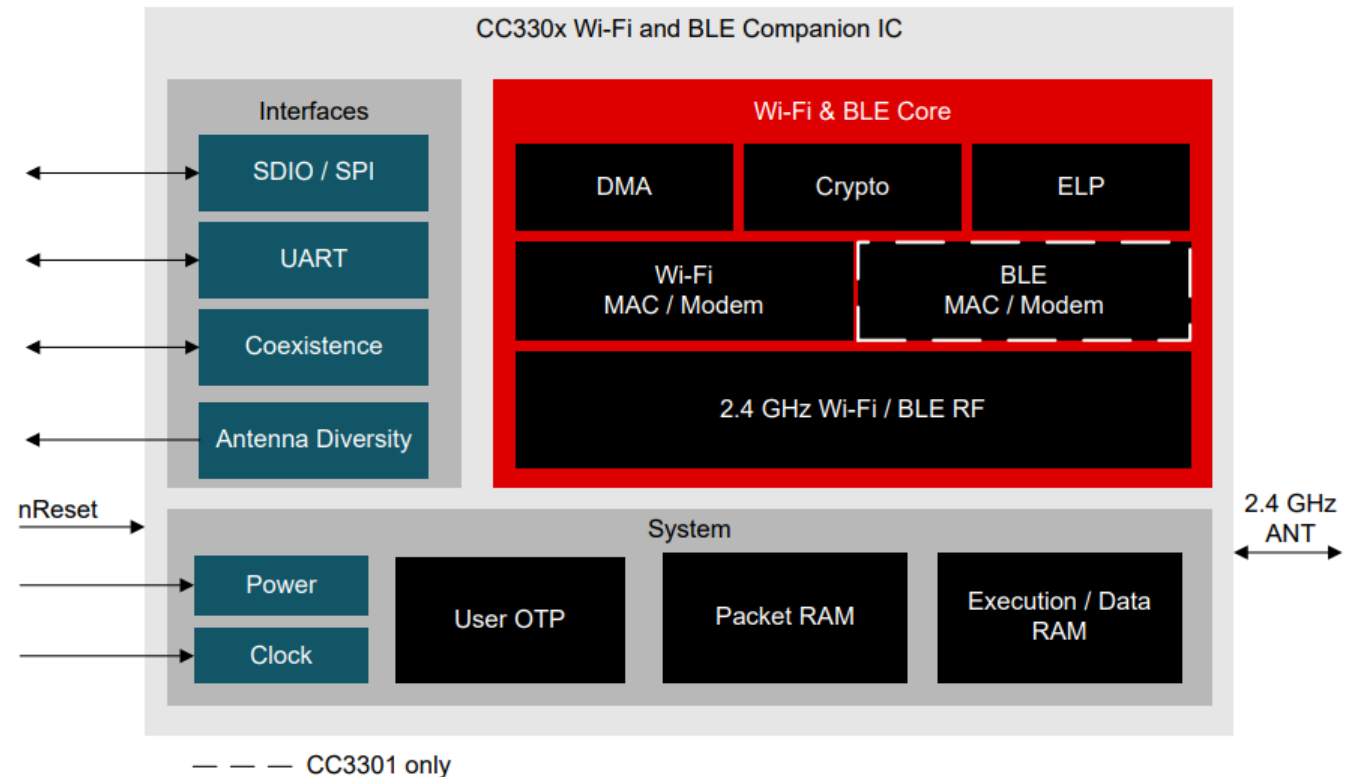
[R2520-40.000-6-F-1010-EXT-TR-NS1](#)

**32.768 kHz Crystal Oscillator**

[RT3215-32.768-12.5-TR](#)

**2.4 GHz Antenna**

[RST-W2-P-105-RPSMA-H](#)





# Applicable Raltron Products

## Renesas - R9A06G150

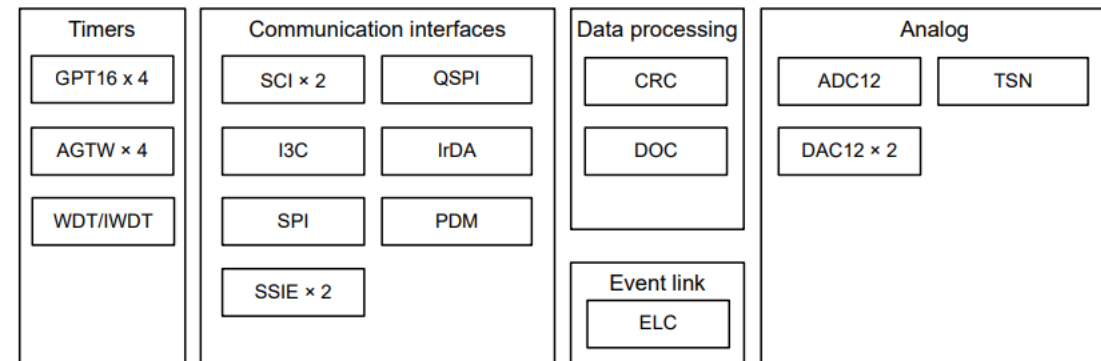
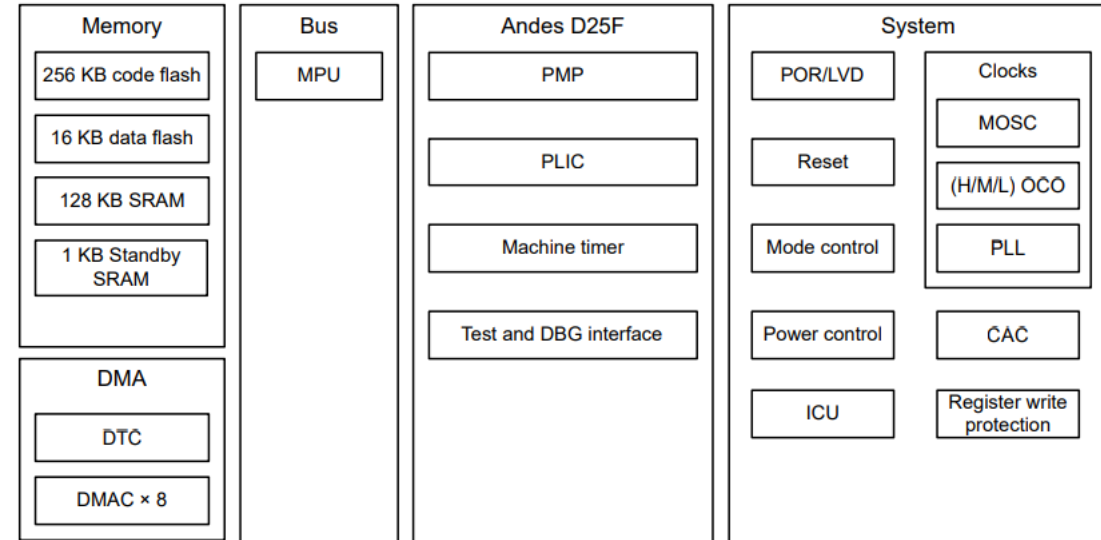
### 24 MHz Clock Oscillators

[CO2016-24.000-3.3-25-TR-NS1](#)

[CO2520-24.000-3.3-50-EXT-T-TR](#)

### 32.768 kHz Crystal Oscillator

[RT1610-32.768-12.5-TR](#)



# Raltron Solutions - MHz Crystals


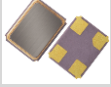



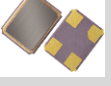

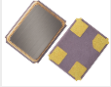
## Available Crystal Packages

Part #	Size(mm)
<a href="#">R2016-40.000-6-F-1010-EXT-TR-NS1</a>	2.00 x 1.60 x 0.50
<a href="#">R2520-40.000-6-F-1010-EXT-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

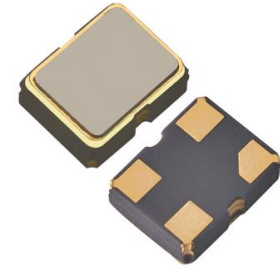
## Stock at our Distributors

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 – Oscillators



## Raltron MHz Oscillators Solutions

Part #	Frequency(MHz)
<a href="#">CO2016-24.000-3.3-25-TR-NS1</a>	24
<a href="#">CO2520-24.000-3.3-50-EXT-T-TR</a>	24

## Raltron kHz Oscillators Solutions

Part #	Frequency(kHz)
<a href="#">CO2016-0.032768-3.3-25-X-T-TR</a>	32.768
<a href="#">CO2520-0.032768-3.3-50-X-TR</a>	32.768

[See Products for Oscillators](#)

# 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



[See All Crystal Products](#)

## 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>

**Typical example of IC for Smart City Applications  
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 $\Omega$  max

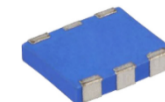
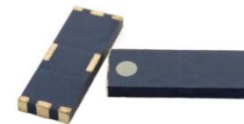
# Raltron Solutions – Antennas

## Raltron Stub Antennas Solutions

Part #	Frequency(MHz)
<a href="#">RST-W2-P-195-RPSMA-G</a>	2400 ~ 2500
<a href="#">RST-W2A1-20022-17M-TE-001</a>	2400 ~ 2500
<a href="#">RST-W7-30-A-G</a>	2400 ~ 2500

## Raltron Chip Antennas Solutions

Part #	Frequency(MHz)
<a href="#">RCA-3216-A1-TR</a>	2450



[See Antenna Products for Matter](#)

# Raltron Products – LTCC Filters, Baluns and Diplexers

## Raltron LTCC Filters, Baluns and Diplexers Solutions

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

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



# Raltron Solutions RF Connectors and RF Cable Assemblies

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



SMA CONNECTORS - [RCN-1M-21419-K-001](#)

BNC CONNECTORS - [RCN-3F-3108-K-001](#)

MCX CONNECTORS - [RCN-4F-28012-K-001](#)

MMCX CONNECTORS - [RCN-5F-33106-K-001](#)

TNC CONNECTORS - [RCN-9M-16205-K-001](#)

N CONNECTORS - [RCN-17M-12816-K-001](#)

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

SMA TO IPEX CABLE - [RCB-16-F-95-11-SD](#)

MCX TO MCX CABLE - [RCB-21-174-150-DO-001](#)

MCX TO SMA CABLE - [RCB-14-H-100-12-SD](#)

MMCX TO SMA CABLE - [RCB-15-A-100-12-SD](#)

TNC TO SMA CABLE - [RCB-13-J-600-13-SD](#)



[CABLE ASSEMBLIES SHORT FORM CATALOG](#)

# CONTACT

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<http://www.raltron.com>

Raltron Electronics

10400 N.W. 33rd Street

Miami, FL 33172, U.S.A.

Phone: 305 593 6033

Fax: 305 594 3973