

**FREQUENCY COMPONENTS AND
ANTENNAS FOR
GNSS APPLICATIONS**



Feb. 2024

RALTRON

What is GNSS ?

GNSS stands for Global Navigation Satellite System. It includes GPS (US), Galileo (Europe), GLONASS (Russia) and Beidou (China) as the principle satellite systems. It provides users with positioning, navigation, and timing (PNT) services. The GNSS has functions to help locate such as :

Satellite Navigation: Uses signals from 24 orbiting satellites to pinpoint your location anywhere on Earth (with clear view).

Signal & Distance: Device measures time for signals to arrive, calculating distance from each satellite.

Triangulation: With distances from 3+ satellites, triangulates your precise position on Earth.

Frequency: Satellites transmit on L1 frequency (1575.42 MHz), L2 (1227.6 MHz) and L5 (1176 MHz) for improved accuracy.



What are the Benefits of GPS?

Location Services

GPS pinpoints your exact Earth location, powering navigation apps.

Using a GPS navigation app to find your way in an unfamiliar location.

Navigation Aid

GPS offers step-by-step guidance for efficient travel.

Using GPS while driving to ensure you stay on the right route.

Tracking and Monitoring

GPS enables real-time tracking, used in logistics and safety.

Monitoring the delivery status of your package through a mobile app.

Cartography and Mapping

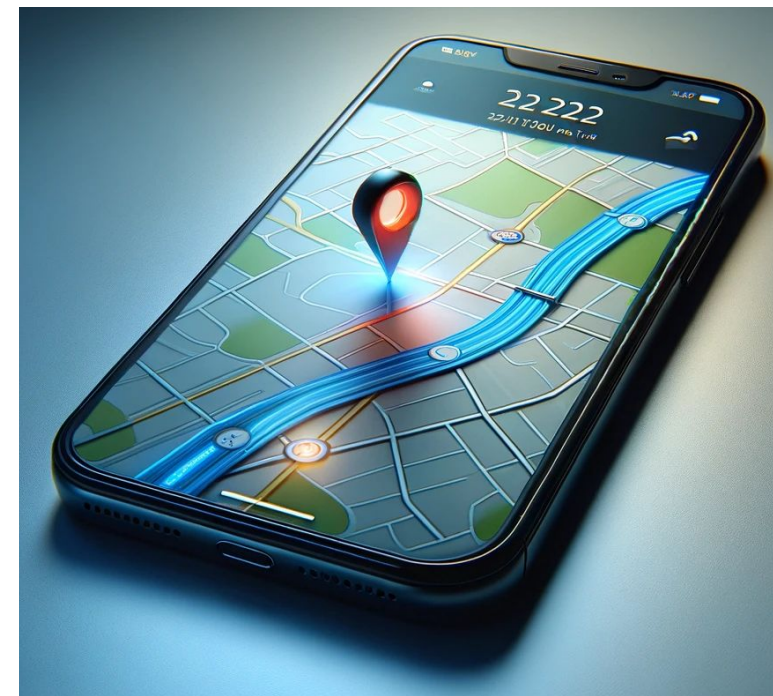
GPS creates precise maps.

Creating detailed hiking maps with GPS.

Precise Timing

GPS synchronizes global time accurately.

Ensuring accurate timestamps for financial transactions.

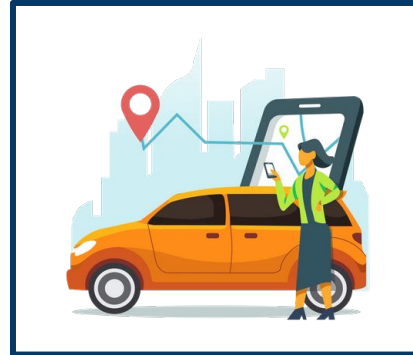


GPS Applications



Automatic Farming Equipment

- Inserted in the equipment to enable the automation of vehicles such as tractors to perform tasks independently.



Taxi Services

- Allows taxis to pinpoint the customer's location and destination point. The customer must have a phone with GPS system active.



Bicycle Rentals

- Used to prevent theft and to locate the bicycle itself. The GPS application in the phone will indicate the closest bicycle available.

GPS Applications



Geofencing

- The use of GPS or RFID technology to create a virtual geographic boundary, enabling software to trigger a response when a mobile device enters or leaves a particular area.



Asset Tracking

- Asset tracking is the method used to track a company's physical assets either by scanning barcode labels attached to the assets or by using tags using GPS or RFID, which broadcast their location.



Safety and Security

- Checks employees' safety, especially for hazardous work environments.

Examples of GPS IC solutions and Applicable Raltron Products

STMicroelectronics - STA8089G

32.768 kHz Crystal

[RSE-32.768-12.5-H14-TR](#)

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

[RSM200S-32.768-12.5-TR](#)

24 MHz Crystal Clock Oscillator

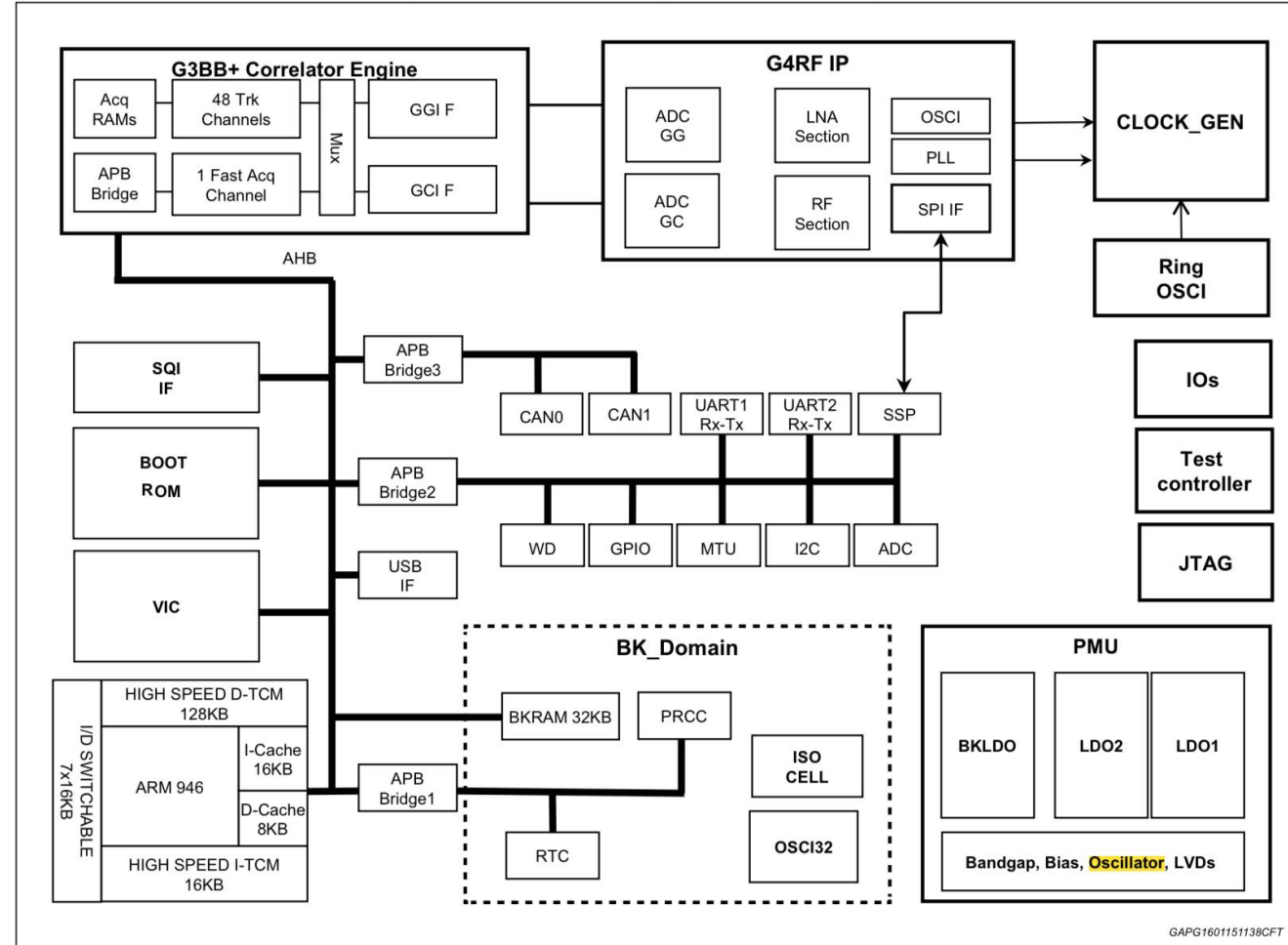
[RH100-24.000-9-1010-TR](#)

26 MHz Crystal Clock Oscillator

[R1612-26.000-8-F-2020-EXT-TR](#)

[R1612-26.000-10-F-1010-TR-NS1](#)

Figure 1. STA8089G system block diagram



GAPG1601151138CFT

Examples of GPS IC solutions and Applicable Raltron Products

Maxim Integrated - MAX2769

16 MHz Crystal Clock Oscillator

[R2016-16.000-10-1015-TR-NS1](#)

[R2016-16.000-12-1020-TR](#)

[R2016-16.000-18-3030-EXT-TR](#)

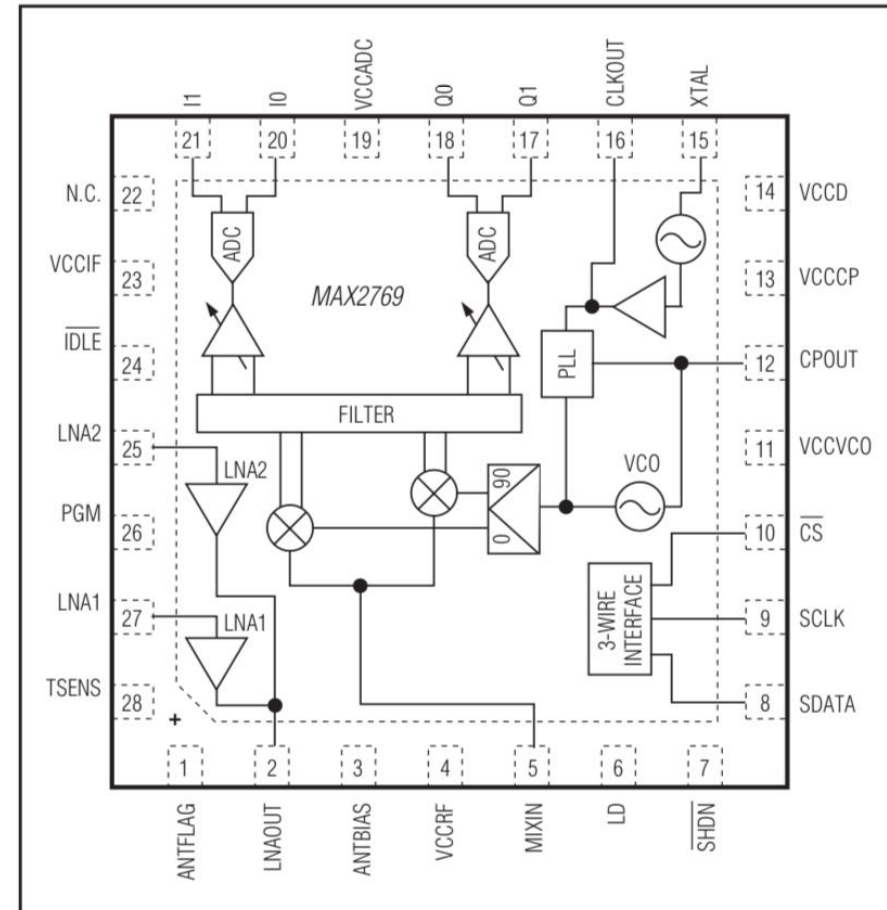
32.768 KHz Crystal

[RSE-32.768-12.5-H14-TR](#)

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

[RSM200S-32.768-12.5-TR](#)

Pin Configuration/Block Diagram



Raltron Solutions - MHz Crystals









Available Crystal Packages

| Part # | Size(mm) |
|--|--------------------|
| R2016-32.000-6-F-2020-EXT-TR | 2.00 x 1.60 x 0.50 |
| R2520-12.000-8-1030-EXT-TR | 2.50 x 2.00 x 0.60 |
| RH100-24.000-9-1010-TR | 3.20 x 2.50 x 0.70 |

Typical Frequencies:

12 MHz, 24 MHz, 26 MHz, 32 MHz

Stock at our Distributors

| Product Series | Datasheet | Image | Contact Us / Buy Now |
|--|---|---|-------------------------|
| R1612 View products in stock |  |  | Buy Now |
| R2016 View products in stock |  |  | Buy Now |
| 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) |
|--|-----------|
| RSE-32.768-12.5-H14-TR | 6.9 x 1.4 |
| RT1610-32.768-12.5-TR | 1.6 x 1.0 |
| 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



[See All Crystal Products](#)

Stock at our Distributors

| Product Series | Datasheet | Image | Contact Us / Buy Now |
|--|---|---|-------------------------|
| RT1210 View products in stock |  |  | Buy Now |
| RT1610 View products in stock |  |  | Buy Now |
| RT2012 View products in stock |  |  | Buy Now |
| RT3215 View products in stock |  |  | Buy Now |
| RSE H14 |  |  | Buy Now |
| RSM200S View products in stock |  |  | Buy Now |




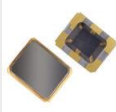

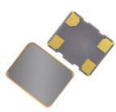


Raltron Solutions - TCXOs and VCTCXOs

Raltron TCXOs Solutions

| Part # | Size(mm) |
|--|-----------|
| RTXE-104EF133-C-24.000-TR | 3.2 x 2.5 |
| RTX-2016AD333-S-26.000-TR | 2.0 x 1.6 |
| RTX-2520AF32-S-48.000-TR | 2.5 x 2.0 |
| RTX-1612KD3X-C-0.032768-TR | 1.6 x 1.2 |

Stock at our Distributors

| Product Series | Datasheet | Image | Contact Us / Buy Now |
|---|---|---|-------------------------|
| RTX-1612 View products in stock |  |  | Buy Now |
| RTV-2016 View products in stock |  |  | Buy Now |
| RTX-2520 View products in stock |  |  | Buy Now |










[See All TCXOs Products](#)

Raltron Solutions - Clock Oscillators

Available Oscillators Packages

| Part # | Size(mm) |
|---|-----------|
| CO2016-32.000-3.3-50-EXT-TR | 2.0 x 1.6 |
| CO2520-24.000-3.3-50-EXT-T-TR | 2.5 x 2.0 |
| CO2016-0.032768-3.3-25-X-T-TR | 2.0 x 1.6 |
| CO2520-0.032768-3.3-50-X-TR | 2.5 x 2.0 |

Stock at our Distributors











| Product Series | Datasheet | Product Series | Datasheet |
|---|--|--|-------------------------|
| CO2016 View products in stock |  |  | Buy Now |
| CO2520 View products in stock |  |  | Buy Now |
| COM1 View products in stock |  |  | Buy Now |
| COM2 View products in stock |  |  | Buy Now |

[See All Products for Oscillators](#)



Raltron Solutions – Antennas

Raltron Antennas Solutions





| Part # | Datasheet | Image | Frequency(MHz) | Contact Us / Buy Now |
|-----------------------------------|---|--|----------------|-------------------------|
| RPA-GP-P-18-G |  PDF |  | 1574.5 ± 2.0 | Contact Us |
| RPA-GP-P-25-OPT-G |  PDF |  | 1575 | Contact Us |
| RPA-GPS-1515-2 |  PDF |  | 1575.42 | Contact Us |
| RPA-PB0-LA0-G-001 |  PDF |  | 1575 | Buy Now |
| RPA-PB2-G-001 |  PDF |  | 1575 | Buy Now |

[See All Antenna Products](#)



Raltron Products – LTCC Filters, Baluns and Diplexers

Raltron LTCC Filters, Baluns and Diplexers Solutions




| Part # | Datasheet | Size(mm) | Contact Us / Buy Now |
|---|---|--------------------|----------------------|
| RCDI-3200-7245-2012-W-001 |  | 2.00 x 1.25 x 0.70 | Contact Us |
| RCF-1580.000-60000-1109-W-001 |  | 1.10 x 0.90 x 0.60 | Contact Us |
| RCF-1681.000-2017000-1608-W-001 |  | 1.60 x 0.80 x 0.60 | Contact Us |
| RCF-1085.000-2170000-2012-W-001 |  | 2.00 x 1.25 x 1.00 | Contact Us |

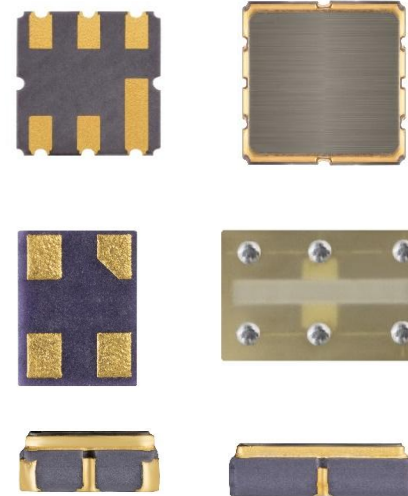
[See All LTCC Filters, Baluns and Diplexers Products](#)



Raltron Solutions – SAW Filters







Raltron SAW Filter IC Solution







| Part # | Datasheet | Size(mm) | Contact Us / Buy Now |
|--|--|------------------|-------------------------|
| RSF-1176.450-20460-1109-TR |  PDF | 1.1 x 0.9 x 0.55 | Buy Now |
| RSF-1582.400-46800-1109-TR |  PDF | 1.1 x 0.9 x 0.55 | Buy Now |
| RSF-1582.400-31200-1411-TR |  PDF | 1.4 x 1.1 x 0.6 | Contact Us |



[See All SAW Filters Products](#)

Raltron Solutions - RF Connectors and Cable Assemblies

| Product # | Datasheet | Image | Connector Family | Description |
|------------------------------------|---|---|----------------------|-----------------------------------|
| RCN-3F-3108-K-001 |  |  | BNC | BNC Straight Jack PCB Receptacle |
| RCN-4F-28012-K-001 |  |  | MCX | MCX Straight Jack PCB Receptacle |
| RCN-5F-33106-K-001 |  |  | MMCX | MMCX Straight Jack PCB Receptacle |

| Product # | Datasheet | Image | Cable Assemblies | Description |
|---------------------------------------|---|---|-----------------------------|--|
| RCB-16-F-95-11-SD |  |  | SMA to IPEX | RP SMA Jack S/T For RF1.13 Cable |
| RCB-21-174-150-DO-001 |  |  | MCX to MCX | MCX Plug to MCX R/A Plug For RG174 Cable |
| RCB-14-H-100-12-SD |  |  | MCX to SMA | SMA Jack to MCX Plug For RF1.37 Cable |



CONTACT

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