PRODUCT SELECTION GUIDE

- Crystals
- Clock Oscillators
- RF Ceramic Filters
- VCXO, VCSO
- TCXO, OCXO
- GPS Synchronization
- VCO
- SAW Devices
- Ceramic Resonators
- Microwave Filters
RALTRON MIAMI – R&D and Manufacturing of High End Frequency Management Products

- Research and Development
- Manufacturing and NPI
- Automated Calibration and Test
- Environmental Test Lab
- Failure Analysis Lab
- Isolated Aging Room
- Sales & Marketing

Headquarters – Miami, Florida USA

RAMI Technology China – Mass Manufacturing of Crystals, Oscillators, and High End Frequency Management Products

- ISO 9001:2008 Manufacturing and Design
- High Volume Manufacturing
- Clock Oscillators
- Metal Can and Ceramic Package Crystals
- Precision Oscillator Design & Manufacturing
- Class 10K Clean Rooms
- Automated Production Lines

World class Engineering Support

- Knowledgeable Personnel and Resources
- Circuit Design and Modification at any Stage
- Product Analysis and Custom Development
- Quick-Turn Prototype Available
- Technical Papers and Application Notes
- Software for Oscillator Circuit
- Technical Seminars
- Web based Engineering and Design Tools
Broader Line of Frequency Control Products

- Crystals –
  - Microprocessor Crystals
  - High Accuracy Crystals
- Automotive Grade Crystals
- Tuning Forks
- Clock Oscillators
- SAW Devices
- Ceramic Resonators
- LTCC RF Ceramic Products
- Antennas
- Temperature Compensated Crystal Oscillators – TCXO
  - Stratum 3 – TCXO
- Oven Controlled Crystal Oscillators – OCXO
- Voltage Controlled Crystal Oscillators – VCXO
  - Voltage Controlled SAW Oscillators – VCSO
- IEEE 1588 Compatible Oscillators
- Crystal Filters
- Voltage Controlled Oscillators – VCO
- Microwave Filters
- GPS Clock Synchronization Modules

Markets Served

- Alarm & Security
- Bluetooth, Zigbee
- Computer & Storage
- Consumer – Entertainment
- Fiber Infrastructure
- Gigabit / 10 Gigabit Ethernet
- Industrial Control
- Instrumentation
- Medical
- Microwave Radio / Base Stations
- Solar Technology
- Utility Metering and Smart Grid
- VoIP
- WLAN, WiMax
- Wearable Technology

Worldwide Presence

Sales by Market Sector

- Americas 25%
- Asia 60%
- Europe & ME 15%

Worldwide Distribution Network

- Global Subcontracting Support
- Worldwide Market Recognition
- Dedicated Supply Management Team
- Shipping hubs in HK and Miami, FL
**Crystals**

Frequency Range: 1.8432 MHz to 300.00 MHz
Frequency Tolerance: ±5 ppm to ±30 ppm
Frequency Stability: ±5 ppm to ±50 ppm
Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
Available Packages: Thru-Hole and SMD configuration
  - HC-49/U, HC-49/S, UM-1, UM-4 and UM-5
  - Ceramic: 11.8 x 5.5 to 1.6 x 1.0 mm (SMD)
  - Cylindrical: 10 x 3 and 9 x 3 mm

**Automotive Grade Crystals**

AEC Q200 Reliability Program
ISO TS-16949
Frequency Range: 3.579545 MHz to 50.00 MHz
Frequency Tolerance: ±10 ppm to ±25 ppm
Frequency Stability: ±15 ppm to ±100 ppm
Operating Temperature Range:
  - Standard: -40°C to +85°C
  - Extended 1: -40°C to +105°C
  - Extended 2: -40°C to +125°C
Available Packages: HC-49/S-SMD, Ceramic: 3.2 x 2.5

**Tuning Forks**

Frequency Range: 32.768 kHz and 24 to 615 kHz
Frequency Tolerance: ±5 ppm to ±20 ppm
Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
Available Packages:
  - 8.0 x 3.8, 7.3 x 4.3, 7.0 x 1.4, 4.1 x 1.5, 3.2 x 1.5, 2.0 x 1.2 mm
  - Cylindrical: 8.2 x 3.1, 6.2 x 2.1, 5.1 x 1.5 mm

**Clock Oscillators**

Frequency Range: 1.0 MHz to 1200.00 MHz
Frequency Stability: ±5 ppm to ±100 ppm
Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
Voltage: +1.8, +2.5, +3.3 and +5 VDC
Output: TTL, HCMOS, LVDS, ECL, PECL, and LVPECL
Low RMS Jitter down to 0.3 ps
Available Packages:
  - 8 pin or 14 pin DIP or Gullwing configuration
  - Ceramic: 7x5, 5x3.2, 3.2x2.5, 2.5x2, 2.0x1.6 mm

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SAW Resonators and Filters
Frequency: IF: 32~975 MHz   RF: 139~2675 MHz
Excellent Thermal Stability
Operating Temperature Range:
Standard: -20°C to +70°C
Extended: -40°C to +85°C
Voltage: Up to +12.0 VDC
Customized Designs Available
Available Packages:
Metal Can: TO39 and various sizes
Ceramic: 5 x 5, 3.8 x 3.8 and 3 x 3 mm footprints

SAW Devices

Ceramic Resonators
Frequency Range: 2.00 MHz to 50.00 MHz
Frequency Tolerance: ±0.3% to ±0.5%
Frequency Stability: ±0.3% to ±0.5%
Operating Temperature Range: -20°C to +70°C
Aging per Year: ±0.3% to ±0.5%
Drive Level: 0.1 mW to 1.0 mW
Capacitance: 8 pF to 30 pF
Available Packages:
Plastic-Epoxy: 10 x 10 to 7 x 9 mm
Ceramic: 7.2 x 3.7, 3.7 x 3.1, 2.5 x 2, 1.6 x 1.0 mm

LTCC RF Ceramic Products
Low Temperature Co-fired Ceramic (LTCC)
RF Ceramics Products
Band Pass Filters, Low-Pass Filters, High-Pass Filters,
Baluns, Diplexers, Common Mode Filters
Applications: Bluetooth, Bluetooth LE, Wi-Fi, ZigBee,
WiMAX, LTE, and other RF standards

Frequency Range:
900 MHz; 2.3 to 2.6 GHz, 3.5 GHz, 5 GHz
Available Packages:
Ceramic: 2.5 x 2.0, 2.0 x 1.2, 1.6 x 0.8 (0603),
1.0 x .05 (0402)

Antennas
Antennas: Stub Antennas, Patch Antennas, Chip Antennas
Frequencies:
GPS (1.575 GHz);
GLONASS (1.602 GHz)
Bluetooth / Wi-Fi (2.4 / 5 GHz),
ZigBee (2.45 GHz);
WiMAX (2.6 / 3.5 GHz)
Available Packages:
Chip: 6.0 x 5.0 mm to 3.2 x 1.6 mm
Stub: Length 5 to 17 cm; Straight, Right Angle or Swivel
Patch with or without LNA: 12 mm sq to 27 mm sq

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TCXO & Stratum 3 TCXO

- Frequency Range: 1.00 MHz to 800.00 MHz
- Overall Frequency Stability ±4.6 ppm (Stratum 3)
- Frequency Stability: down to ±0.1 ppm
- Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
- Voltage: +1.8, +2.5, +3.3 and +5.0 VDC
- Available Packages:
  - Metal Can: 11 x 9 to 38 x 38 mm
  - Ceramic: 7x5, 5x3.2, 3.2x2.5, 2.5x2.0, 2.0x1.6 mm

VCXO/VCSO

- Frequency Range: 1.00 MHz to 700.00 MHz
- Frequency Tolerance: ±5 ppm to ±30 ppm
- Frequency Stability: ±5 ppm to ±50 ppm
- Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
- Absolute Pull Range (APR): ±30 to ±500 ppm
- Available Packages: 8 pin or 14 pin DIP-Metal Can
  - Ceramic: 14 x 9, 5 x 7, 5 x 3.2, and 3.2 x 2.5 mm
  - FR4/5: 14 x 9 and 5 x 7 mm

IEEE 1588 Compatible Oscillators

- IEEE 1588 Compatible TCXO and OCXO;
  - Meets Telcordia GR-1244 Standard for Wander (MTIE and TDEV)
- Frequency Range: 1.00 MHz to 125.00 MHz
- Stability TCXO’s: down to ±0.1 ppm
- Stability OCXO’s: down to ±0.5 ppb
- Excellent Phase Noise and Jitter performance
- Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
- Available Packages:
  - OCXO: Euro Package, 50x50, 14x9
  - TCXO: 5x3.2, 7x5 SMD

OCXO

- Frequency Range: 1.00 MHz to 200.00 MHz
- Frequency Stability: ±0.5 ppb to ±0.1 ppm
- Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +105°C
- Voltage: +3.3, +5.0, +12.0 and +15 VDC
- Output: TTL, HCMOS, Sine and Clipped Sine
- Available Packages:
  - Metal Can: 14 Pin DIP to 38 x 38 mm
  - Metal Can SMD: 22 x 25.4 mm and 14 x 9 mm
**Crystal Filters**

- Frequency Range: 10.7 MHz to 150.00 MHz
- Pass Bandwidth: ±3.5 kHz to ±15 kHz
- Poles: 2 to 10 or Customized Design
- Operating Temperature Range:
  - Standard: -20°C to +70°C
  - Extended: -40°C to +85°C
- Available Packages:
  - Metal Can: HC-49/U, UM-1, UM-4 and UM-5,
  - 12 x 15 mm Multi-pole, 65 x 20 x 13 mm
  - Ceramic: 7 x 5, 6 x 3.5, 3.8 x 3.8, 3 x 3 mm

**VCO**

- Frequency Range up to 6.00 GHz
- Low Phase Noise and Fast Settling Time
- Excellent Return Loss
- Voltage: +2.2 to +12.0 VDC
- Ultra wide tuning ranges
- Applications:
  - Point-to-Point, Point-to-Multipoint for PLL transmission, WCDMA, GSM and UMTS, WiMAX base stations, Instrumentation
- Available Packages: 8x6 to 20x20 mm footprint

**Microwave Filters**

- **MONO BLOCK AND ARRAY**
  - Frequency Range: 100.00 MHz to 3900.00 MHz
  - Low Insertion Loss
  - High attenuation
  - Temperature Compensated
  - Applications: Cellular Base Station, Cordless and DECT phones, Repeaters, Transceivers

**GPS Clock Synchronization**

- Frequency Range: 10.00 MHz and other frequencies
- Accurate GPS referenced time with coherent 1 PPS signal
- Output optimized for low phase noise
- Very flexible hardware implementation in FPGA
- Application areas include: WiMAX, LTE, DVB-T, UMTS, Satellite communications equipment and cellular infrastructure timing needs

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RAMI TECHNOLOGY GROUP

RALTRON ELECTRONICS is a member of the RAMI TECHNOLOGY GROUP

With worldwide operations and controlled from its main business center in Miami, Florida, RAMI TECHNOLOGY GROUP is one of the fastest growing manufacturers of frequency components. The company offers one of the broadest lines of quartz crystals and crystal based products from simple resonators to precision oscillators, such as VCXO, TCXO and OCXO. The company has also recently introduced RF products such as LTCC Filters, Baluns, Band-Pass Filters, and both Chip Antennas and Stub / Patch Antennas.

RAMI TECHNOLOGY is interacting with its customers worldwide through its sales offices, reps and distributors. Most sales personnel are veterans of the frequency component market, who share their experience with the customers. The company is offering full technical support with two application engineering teams and failure analysis labs based in Miami and Shenzhen (China).

RAMI TECHNOLOGY GROUP is committed to excellence in its complete interaction with its customers, suppliers, employees and the communities where it is operating.

Worldwide Facilities

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