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CUSTOMIZED SMA WRENCHES

Easily removes cable connections from tight spots.

From $24.95 ea.

Patent Pending

Custom Modules Upon Request

Mini-Circuits engineers will design and build
to meet any of your custom requirements.
Attenuators
DC to 26 GHz

Surface Mount Fixed Models

YAT Series
Precision
DC – 18 GHz, 50Ω
Models from 0 – 30 dB
Flatness, ±1 dB
P_{MAX}, 2W

RCAT Series
Fixed Hermetic LTCC
DC – 20 GHz, 50Ω
Models from 0 to 30 dB
Flatness, ±1 dB
P_{MAX}, 2W

HAT Series
Precision, BNC Connector
DC – 2000 MHz, 50Ω & 75Ω
Models from 1 to 30 dB
Flatness, ±1 dB
P_{MAX}, up to 1W

Variable Models

VAT Series
Wideband
DC – 6 GHz, 50Ω
Models from 1 – 30 dB
Flatness, ±2 dB
P_{MAX}, up to 2W

UNAT Series
Wideband, N-type Connector
DC – 6 GHz, 50Ω
Models from 1 – 30 dB
Flatness, ±2 dB
P_{MAX}, up to 1W

RCAT Series
Fixed Hermetic LTCC
DC – 20 GHz, 50Ω
Models from 0 to 30 dB
Flatness, ±2 dB
P_{MAX}, up to 1W

DAT Series
Surface Mount Digital Step
DC – 4 GHz, 50Ω & 75Ω
Attenuation range, 15.5 – 31.5 dB
Step size, 0.5 dB
Accuracy, 0.1 dB

ZX73-2500+
Coaxial Voltage Variable
10 – 2500 MHz, 50Ω
Attenuation range, 5 – 40 dB
Power supply, 3 – 5V, 5mA
Control voltage, 0 – 17V

RVA-2500+
Surface Mount Voltage Variable
DC – 2500 MHz, 50Ω & 75Ω
Attenuation range, 5 – 40 dB
Power supply, 3 – 5V, 5mA
Control voltage, 0 – 17V

DAT Series
Surface Mount Digital Step
DC – 4 GHz, 50Ω & 75Ω
Attenuation range, 15.5 – 31.5 dB
Step size, 0.5 dB
Accuracy, 0.1 dB

ZX76-Series
Coaxial Digital Step
DC – 4 GHz, 50Ω
Attenuation range, up to 31.5 dB
Step size, 0.5 dB
Accuracy, 0.1 dB typ.

ZX73-2500+
Coaxial Voltage Variable
10 – 2500 MHz, 50Ω
Attenuation range, 5 – 40 dB
Power supply, 3 – 5V, 5mA
Control voltage, 0 – 17V

SATCOM PRODUCTS
For detailed performance specs & shopping see www.minicircuits.com
## Amplifiers

**DC to 20 GHz**

### Monolithic Models – GVA Series, InGaP HBT Technology, Unconditionally Stable

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Frequency Range</th>
<th>Gain</th>
<th>P1dB</th>
<th>IP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVA-60+</td>
<td>Flat Gain, High IP3</td>
<td>0.01 – 5 GHz, 50Ω</td>
<td>18.5 dB</td>
<td>20 dBm</td>
<td>33.5 dBm</td>
</tr>
<tr>
<td>GVA-62+</td>
<td>Flat Gain, High IP3</td>
<td>0.01 – 6 GHz, 50Ω</td>
<td>15.5 dB</td>
<td>19 dBm</td>
<td>33.5 dBm</td>
</tr>
<tr>
<td>GVA-63+</td>
<td>Flat Gain, High IP3</td>
<td>0.1 – 6 GHz, 50Ω</td>
<td>20.4 dB</td>
<td>19 dBm</td>
<td>35 dBm</td>
</tr>
<tr>
<td>GVA-64+</td>
<td>Flat Gain, High IP3</td>
<td>0.1 – 6 GHz, 50Ω</td>
<td>20.5 dB</td>
<td>18.5 dBm</td>
<td>37 dBm</td>
</tr>
</tbody>
</table>

### Monolithic Models – PHEMT Technology, 50Ω & 75Ω

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Frequency Range</th>
<th>Gain</th>
<th>P1dB</th>
<th>IP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>YSF-2151+</td>
<td>Ultra Flat Gain</td>
<td>0.9 – 2.15 GHz, 50Ω</td>
<td>20 dB</td>
<td>20 dBm</td>
<td>35 dBm</td>
</tr>
<tr>
<td>CMA Series</td>
<td>Ceramic, Hi-Rel</td>
<td>0.01 – 6 GHz, 50Ω</td>
<td>Gain up to 31.5 dB</td>
<td>P1dB up to 23.7 dBm</td>
<td>IP3 up to 39 dBm</td>
</tr>
</tbody>
</table>

### CMA Series – CMA Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Frequency Range</th>
<th>Gain</th>
<th>P1dB</th>
<th>IP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGA-105+</td>
<td>Flat Gain, Low Noise</td>
<td>0.04 – 2.6 GHz, 50Ω</td>
<td>15.2 dB</td>
<td>20.5 dBm</td>
<td>39.3 dBm</td>
</tr>
<tr>
<td>PHA-1+</td>
<td>Ultra High Dynamic Range</td>
<td>0.05 – 6 GHz, 50Ω</td>
<td>13.5 dB</td>
<td>22.4 dBm</td>
<td>42 dBm</td>
</tr>
</tbody>
</table>

### Wideband Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Frequency Range</th>
<th>Gain</th>
<th>P1dB</th>
<th>IP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMA-5451+</td>
<td>Ultra Low Noise, 1.0 dB</td>
<td>0.4 – 2.2 GHz, 50Ω</td>
<td>31.3 dB</td>
<td>22 dBm</td>
<td>33.6 dBm</td>
</tr>
<tr>
<td>PMA-5452+</td>
<td>Low Noise, High IP3</td>
<td>0.5 – 6 GHz, 50Ω</td>
<td>19 dB</td>
<td>18.3 dBm</td>
<td>32 dBm</td>
</tr>
<tr>
<td>PHA-11+</td>
<td>Dual Matched for Push-Pull Configuration</td>
<td>0.05 – 3 GHz, 50Ω &amp; 75Ω</td>
<td>Gain, 16 dB</td>
<td>P1dB, 22 dBm</td>
<td>IP3, 41 dBm</td>
</tr>
<tr>
<td>YSF-2151+</td>
<td>Ultra Flat Gain</td>
<td>0.9 – 2.5 GHz, 50Ω</td>
<td>20 dB</td>
<td>20 dBm</td>
<td>35 dBm</td>
</tr>
<tr>
<td>PMA-183A+</td>
<td>Wideband, Integrated Matching</td>
<td>5 – 18 GHz, 50Ω</td>
<td>Gain, 13.7 dB</td>
<td>P1dB, 19 dBm</td>
<td>IP3, 29 dBm</td>
</tr>
</tbody>
</table>
Amplifiers – Rugged Coaxial Connectorized Models

**ZX60-24+**
- **Wideband, Unconditionally Stable**
- 5 – 20 GHz, 50Ω
- Gain, 24 dB
- P1dB, 18.0 dBm
- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra High IP3**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

**ZX60-V63+**
- **High Gain, High IP3**
- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm

**ZX60-2411BM+**
- **Wideband, Unconditionally Stable**
- 5 – 20 GHz, 50Ω
- Gain, 24 dB
- P1dB, 18.0 dBm
- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra Flat Gain**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

**ZX60-V63+**
- **High Gain, High IP3**
- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm

**ZX60-2411BM+**
- **Wideband, Unconditionally Stable**
- 5 – 20 GHz, 50Ω
- Gain, 24 dB
- P1dB, 18.0 dBm
- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra Flat Gain**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

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- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm

**ZX60-2411BM+**
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- Gain, 24 dB
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- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra Flat Gain**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

**ZX60-V63+**
- **High Gain, High IP3**
- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm

**ZX60-2411BM+**
- **Wideband, Unconditionally Stable**
- 5 – 20 GHz, 50Ω
- Gain, 24 dB
- P1dB, 18.0 dBm
- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra Flat Gain**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

**ZX60-V63+**
- **High Gain, High IP3**
- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm

**ZX60-2411BM+**
- **Wideband, Unconditionally Stable**
- 5 – 20 GHz, 50Ω
- Gain, 24 dB
- P1dB, 18.0 dBm
- IP3, 26.4 dBm

**ZX60-H242+**
- **Ultra Flat Gain**
- 700 – 2400 MHz, 50Ω
- Gain, 14.5 dB
- P1dB, 23 dBm
- IP3, 46 dBm

**ZX60-V62+**
- **Ultra Flat Gain**
- 0.05 – 6 GHz, 50Ω
- Gain, 15.4 dB
- P1dB, 19 dBm
- IP3, 33.4 dBm

**ZX60-V63+**
- **High Gain, High IP3**
- 0.05 – 6 GHz, 50Ω
- Gain, 20 dB
- P1dB, 17.8 dBm
- IP3, 31.2 dBm
Bias-Tees
Satellite MuxTee & Bias-Tee/Diplexers
100 kHz to 10 GHz

TCBT Series
Extremely Wideband Bias Tee
RF / RF + DC / DC
10 MHz – 10 GHz, 50Ω
Insertion loss, <1 dB
Current, up to 200 mA

JEBT Series
Extremely Wideband Bias Tee
RF / RF + DC / DC
10 – 4200 MHz, 50Ω
Insertion loss, 0.6 dB
Current, 500 mA

ZFBT-282-1.5A+
Extremely Wideband Bias Tee
RF / RF + DC / DC
10 MHz – 2.8 GHz, 50Ω
Insertion loss, 0.6 dB
Current, 1.5A

ZABT-2R15G+
Satellite MuxTee
RF / RF + REF + DC / REF / DC
10 MHz – 2150 MHz, 50Ω
Insertion loss, 0.4 dB
Current, 3A

ZABT-2R15G-4+
Bias Tee / 10 MHz Diplexer
RF / REF + REF + DC / REF
10 MHz – 2150 MHz, 50Ω
Insertion loss, 0.4 dB
Current, 3A

Z2BT-2R15G-X+
High Current Bias Tee
RF/DC/RF + DC
10 MHz – 2150 MHz, 50Ω
Insertion loss, 1.5 dB (max.)
Current, 5A

Z4BT-2R15G-X+
High Current Bias Tee
RF/RF + REF + DC/REF/DC
10 MHz – 2150 MHz, 50Ω
Insertion loss, 1.5 dB (max.)
Current, 5A

Surface Mount Models
Coaxial Models
System Interconnect & Test Cables
DC to 40 GHz

Test Cables, Performance Qualified to 20,000 Flexures, 50Ω & 75Ω

- **CBL Precision**
  - **L, C & Ku Band**
  - DC – 18 GHz, 50Ω
  - SMA (M/F), N-Type (M)
  - Return Loss, 27 dB
- **APC Armored**
  - **L, C & Ku Band**
  - DC – 18 GHz, 50Ω
  - N-Type (M) Connectors
  - Return Loss, 27 dB
- **FLC Super Flexible**
  - **L, C, Ku & K Band**
  - DC – 26 GHz
  - SMA (M) Connectors
  - Return Loss, 28.5 dB

- **CBL 75Ω**
  - **L Band**
  - DC – 3000 MHz, 75Ω
  - F-Type (M)
  - Return Loss, 26 dB
- **CBL 75Ω**
  - **L Band**
  - DC – 3000 MHz, 75Ω
  - N-Type (M)
  - Return Loss, 26 dB

- **KBL 40 GHz**
  - **Phase Stable**
  - **L, C, Ku, K & Ka Band**
  - DC – 40 GHz, 50Ω
  - 2.92mm (M) Connectors
  - Return Loss, 17 dB @ 40 GHz
  - Phase 3° typ. @ 40 GHz

- **CBL Precision**
  - **L Band**
  - DC – 18 GHz, 50Ω
  - SMA (M/F), N-Type (M)
  - Return Loss, 27 dB

- **System Interconnect Cables**

- **KBL 40 GHz**
  - **Low Loss**
  - **L, C, Ku, K & Ka Band**
  - DC – 40 GHz, 50Ω
  - 2.92mm (M) Connectors
  - Return Loss, 17 dB @ 40 GHz
  - Insertion Loss, 3.1 dB @ 40 GHz / 1M
- **QBL E-Z Lock**
  - **L, C & Ku Band**
  - DC – 18 GHz, 50Ω
  - SMA (M) or N-Type (M)
  - Return Loss, 27 dB

- **QBL E-Z Lock**
  - **L, C & Ku Band**
  - DC – 18 GHz, 50Ω
  - SMA (M) or N-Type (M)
  - Return Loss, 27 dB

- **086 Series**
  - 0.086” diameter
  - 141 Series
  - 0.141” diameter
  - **L, C & Ku Band**
  - DC – 18 GHz, 50Ω
  - SMA (M) or N-Type (M)
  - Straight or right-angle
**Directional Couplers**

*0.1 to 9700 MHz*

---

**Coaxial Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Pass Band</th>
<th>Frequency Range</th>
<th>Coupling</th>
<th>Directivity</th>
<th>Power Max</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZFDC-10-3-S+</td>
<td>10 MHz Pass</td>
<td>1 – 2000 MHz</td>
<td>30 dB</td>
<td>20 dB</td>
<td>0.5W</td>
<td></td>
</tr>
<tr>
<td>ZFDC-20-5-S+</td>
<td>10 MHz Pass</td>
<td>0.2 – 250 MHz</td>
<td>10 dB</td>
<td>30 dB</td>
<td>1.0W</td>
<td></td>
</tr>
<tr>
<td>ZFDC-20-4L</td>
<td>10 MHz Pass</td>
<td>10 – 1000 MHz</td>
<td>20 dB</td>
<td>20 dB</td>
<td>1.0W</td>
<td></td>
</tr>
<tr>
<td>ZFDC-20-50-S+</td>
<td>10 MHz Pass</td>
<td>20 – 2000 MHz</td>
<td>20 dB</td>
<td>20 dB</td>
<td>1.0W</td>
<td></td>
</tr>
<tr>
<td>ZFX30-17-5-S+</td>
<td>10 MHz Pass, All Welded</td>
<td>5 – 2000 MHz</td>
<td>17 dB</td>
<td>18 dB</td>
<td>1.0W</td>
<td></td>
</tr>
<tr>
<td>ZFX30-20-4-S+</td>
<td>10 MHz Pass, All Welded</td>
<td>5 – 1000 MHz</td>
<td>20 dB</td>
<td>20 dB</td>
<td>1.0W</td>
<td></td>
</tr>
<tr>
<td>ZFX30-14-972HP+</td>
<td>High Power, DC Pass</td>
<td>8300 – 9700 MHz</td>
<td>14 dB</td>
<td>7 dB</td>
<td>20W</td>
<td></td>
</tr>
<tr>
<td>ZFX30-14-972HP+</td>
<td>High Power, DC Pass</td>
<td>8300 – 9700 MHz</td>
<td>14 dB</td>
<td>7 dB</td>
<td>20W</td>
<td></td>
</tr>
<tr>
<td>ZFDC6-362HP+</td>
<td>High Power, DC Pass</td>
<td>380 – 3600 MHz</td>
<td>6 dB</td>
<td>28 dB</td>
<td>250W</td>
<td></td>
</tr>
<tr>
<td>ZFDC10-362HP+</td>
<td>High Power, DC Pass</td>
<td>380 – 3600 MHz</td>
<td>10 dB</td>
<td>27 dB</td>
<td>250W</td>
<td></td>
</tr>
<tr>
<td>ZGDC20-33HP+</td>
<td>High Power, DC Pass</td>
<td>300 – 3000 MHz</td>
<td>20 dB</td>
<td>25 dB</td>
<td>20W</td>
<td></td>
</tr>
<tr>
<td>ZGDC35-93HP+</td>
<td>High Power, DC Pass</td>
<td>900 – 9000 MHz</td>
<td>35 dB</td>
<td>25 dB</td>
<td>20W</td>
<td></td>
</tr>
</tbody>
</table>

---

**Mini-Circuits**

P.O. BOX 350166, Brooklyn, New York 11235-0003  (718) 934-4500  sales@minicircuits.com
Bi-Directional Couplers

400 to 2525 MHz

**Surface Mount Models, 50Ω & 75Ω**

**BDCA-10-25+**  
L Band 10 MHz / DC Pass  
800 – 2500 MHz, 50Ω  
10 dB coupling  
Directivity, 22 dB  
$P_{\text{MAX}}$, 50W

**BDCN-17-25+**  
Four Port, LTCC,  
0.126 x 0.063" DC Pass  
824 – 2525 MHz, 50Ω  
17 dB coupling  
Directivity, 22 dB  
$P_{\text{MAX}}$, 7W

**SYBD Series**  
High Power, DC Pass  
400 – 6000 MHz, 50Ω  
8 to 30 dB coupling  
Directivity up to 35 dB  
$P_{\text{MAX}}$, 100W

**Coaxial Models**

**ZABDC20-2400+**  
DC Pass, SMA Connector  
1500 – 2400 MHz, 50Ω  
20 dB coupling  
Directivity, 25 dB  
$P_{\text{MAX}}$, 10W

**ZABDC20-25H75+**  
DC Pass, N-Type Connector  
700 – 2500 MHz, 75Ω  
20 dB coupling  
Directivity, 25 dB  
$P_{\text{MAX}}$, 100W

SATCOM PRODUCTS  For detailed performance specs & shopping see  www.minicircuits.com
Equalizers
950 to 2150 MHz

**Surface Mount Voltage Variable Equalizer**

**VAEQ-2150+**
- L Band, Adjustable Attenuation Slope
- 950 – 2150 MHz, 50Ω
- VSWR, 1.37
- ±0.05 dB deviation from linear loss

**Coaxial Slope Equalizers, SMA**

**ZEQ-3-222S+**
- L Band, Attenuation Slope: 3
- 950 – 2150 MHz, 50Ω
- VSWR, 1.1
- ±0.4 dB deviation in attenuation slope

**ZEQ-8-222S+**
- L Band, Attenuation Slope: 8
- 950 – 2150 MHz, 50Ω
- VSWR, 1.1
- ±0.4 dB deviation in attenuation slope

**Coaxial Slope Equalizers, N-Type**

**ZEQ-3-222N+**
- L Band, Attenuation Slope: 3
- 950 – 2150 MHz, 50Ω
- VSWR, 1.1
- ±0.4 dB deviation in attenuation slope

**ZEQ-8-222N+**
- L Band, Attenuation Slope: 8
- 950 – 2150 MHz, 50Ω
- VSWR, 1.1
- ±0.4 dB deviation in attenuation slope
High Pass Filters
54 to 5000 MHz

Surface Mount Models

HFCN-1320+
LTCC, 1206 Package
1400 – 5000 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection: 30 dB @ 42 MHz

SXHP-48+
Sharp Rejection
54 – 1000 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection: 30 dB @ 42 MHz

THP-1050+
Low Insertion Loss
1050 – 4000 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection: 30 dB @ 620 MHz

HFCN-740+
LTCC, 1206 Package
780 – 2800 MHz, 50Ω
Pass band IL, 1.1 dB
Stop band rejection: 23 dB @ 550 MHz

SXHP-76+
Sharp Rejection
81 – 1000 MHz, 50Ω
Pass band IL, 1.1 dB
Stop band rejection: 30 dB @ 65 MHz

THP-1225+
Low Insertion Loss
1224 – 4000 MHz, 50Ω
Pass band IL, 0.5 dB
Stop band rejection: 30 dB @ 720 MHz

Coaxial Models

SHP-900+
Low Insertion Loss
910 – 3000 MHz, 50Ω
Pass band IL, 0.7 dB
Stop band rejection: 25 dB @ 660 MHz

SXHP-108+
Sharp Rejection
108 – 1000 MHz, 50Ω
Pass band IL, 1.0 dB
Stop band rejection: 30 dB @ 85 MHz

VHF-1300+
Sharp Rejection
1400 – 5000 MHz, 50Ω
Pass band IL, 2 dB
Stop band rejection: 27 dB @ 930 MHz

HFCN-1326+
LTCC, 1206 Package
1400 – 5000 MHz, 50Ω
Pass band IL, 1.1 dB
Stop band rejection: 23 dB @ 550 MHz

SXHP-760+
Sharp Rejection
810 – 1000 MHz, 50Ω
Pass band IL, 1.1 dB
Stop band rejection: 30 dB @ 65 MHz

THP-1500+
Low Insertion Loss
1500 – 4000 MHz, 50Ω
Pass band IL, 0.7 dB
Stop band rejection: 30 dB @ 1030 MHz

SATCOM PRODUCTS  For detailed performance specs & shopping see www.minicircuits.com
Low Pass Filters & Diplexers

DC to 4400 MHz

Surface Mount Low Pass Filters

LFCN-400+
LTCC, 1206 Package
DC – 400 MHz, 50Ω
Pass band IL, 1.0 dB
Stop band rejection: 40 dB @ 680 MHz

LFCN-1400+
LTCC, 1206 Package
DC – 1400 MHz, 50Ω
Pass band IL, 1.0 dB
Stop band rejection: 30 dB @ 2100 MHz

LFCN-4400+
LTCC, 1206 Package
DC – 4400 MHz, 50Ω
Pass band IL, 1.0 dB
Stop band rejection: 30 dB @ 6280 MHz

LFCN-2250+
LTCC, 1206 Package
DC – 2200 MHz, 50Ω
Pass band IL, 1.2 dB
Stop band rejection: 30 dB @ 3000 MHz

LFCN-3800+
LTCC, 1206 Package
DC – 3800 MHz, 50Ω
Pass band IL, 1.5 dB
Stop band rejection: 30 dB @ 5700 MHz

LFCN-1525+
LTCC, 1206 Package
DC – 1525 MHz, 50Ω
Pass band IL, 1.2 dB
Stop band rejection: 30 dB @ 2120 MHz

SLP-2400+
Sharp Roll-Off
DC – 2200 MHz, 50Ω
Pass band IL, 0.2 dB
Stop band rejection: 30 dB @ 3200 MHz

Coaxial Low Pass Filters

ZX75-2R15+
DC – 20 MHz and 950 – 2150 MHz, 50Ω
Low pass IL, 0.4 dB
High pass IL, 0.6 dB
Stop band isolation: Low pass, 30 dB @ 70 MHz
High pass, 32 dB @ 250 MHz

ZDPLX-2150+
DC – 10 MHz and 50 – 2150 MHz, 50Ω
Low pass IL, 0.9 dB
High pass IL, 0.5 dB
Stop band isolation: Low pass, 31 dB @ 40 MHz
High pass, 33 dB @ 18 MHz

Surface Mount Diplexers

RDP-2R15+
DC – 20 MHz and 950 – 2150 MHz, 50Ω
Low pass IL, 0.5 dB
High pass IL, 0.6 dB
Stop band isolation: Low pass, 30 dB @ 70 MHz
High pass, 32 dB @ 250 MHz

SDP-2R15+
DC – 800 MHz and 1500 – 2150 MHz, 50Ω
Low pass IL, 0.4 dB
High pass IL, 0.5 dB
Stop band isolation: Low pass, 30 dB @ 1300 MHz
High pass, 29 dB @ 930 MHz

Coaxial Diplexers

ZX75-2R15+
DC – 20 MHz and 950 – 2150 MHz, 50Ω
Low pass IL, 0.4 dB
High pass IL, 0.6 dB
Stop band isolation: Low pass, 30 dB @ 70 MHz
High pass, 32 dB @ 250 MHz

ZDPLX-2150+
DC – 10 MHz and 50 – 2150 MHz, 50Ω
Low pass IL, 0.9 dB
High pass IL, 0.5 dB
Stop band isolation: Low pass, 31 dB @ 40 MHz
High pass, 33 dB @ 18 MHz

Mini-Circuits
P.O. BOX 350166, Brooklyn, New York 11235-0003   (718) 934-4500   sales@minicircuits.com
Band Pass Filters
175 to 2600 MHz

Surface Mount Models 50Ω & 75Ω

**CBP-2400A+**
Ceramic Resonator
2200 – 2600 MHz, 50Ω
Pass band IL, 1.1 dB
Stop band rejection:
Lower, 31 dB @ 1780 MHz
Upper, 31 dB @ 3450 MHz

**CBP-B1230C+**
Ceramic Resonator
1120 – 1340 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection:
Lower, 30 dB @ 910 MHz
Upper, 30 dB @ 1750 MHz

**CBP-1400E+**
Ceramic Resonator
1320 – 1480 MHz, 50Ω
Pass band IL, 1.7 dB
Stop band rejection:
Lower, 42 dB @ 1150 MHz
Upper, 31 dB @ 1600 MHz

**SXBP-176+**
Narrow Band
175 – 177 MHz, 50Ω
Pass band IL, 3.3 dB
Stop band rejection:
Lower, 30 dB @ 155 MHz
Upper, 31 dB @ 199 MHz

**SXBP-1500+**
Fast Roll-Off on Upper Band Edge
1350 – 1650 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection:
Lower, 30 dB @ 75 MHz
Upper, 29 dB @ 2160 MHz

**SXBP-1940+**
Fast Roll-Off on Upper Band Edge
1710 – 2170 MHz, 50Ω
Pass band IL, 2.0 dB
Stop band rejection:
Lower, 30 dB @ 145 MHz
Upper, 28 dB @ 2900 MHz

**SXBP-1430+**
Fast Roll-Off on Upper Band Edge
950 – 2150 MHz, 50Ω
Pass band IL, 0.6 dB
Stop band rejection:
Lower, 28 dB @ 575 MHz
Upper, 29 dB @ 2800 MHz

**SXBP-1430-75+**
Fast Roll-Off on Upper Band Edge
950 – 2150 MHz, 75Ω
Pass band IL, 0.6 dB
Stop band rejection:
Lower, 29 dB @ 540 MHz
Upper, 29 dB @ 2800 MHz

**ZX75BP-1500+**
Sharp Roll-Off on Upper Band Edge
1350 – 1650 MHz, 50Ω
Pass band IL, 0.7 dB
Stop band rejection:
Lower, 30 dB @ 85 MHz
Upper, 29 dB @ 2030 MHz

**ZX75BP-1940+**
Sharp Roll-Off on Upper Band Edge
1710 – 2170 MHz, 50Ω
Pass band IL, 0.7 dB
Stop band rejection:
Lower, 30 dB @ 150 MHz
Upper, 31 dB @ 2800 MHz

Coaxial Models

SATCOM PRODUCTS  For detailed performance specs & shopping see www.minicircuits.com
Frequency Mixers
5 MHz to 20 GHz

Surface Mount Models

SIM-153+
Level 7, Ceramic
3.4 – 15 GHz, 50Ω
50mW RF power
Conversion loss, 6.8 dB
L-R isolation, 36 dB

SIM-153LH+
Level 10, Ceramic
3.2 – 15 GHz, 50Ω
50mW RF power
Conversion loss, 6.1 dB
L-R isolation, 36 dB

SIM-24MH+
Level 13, Ceramic
7.3 – 20 GHz, 50Ω
250mW RF power
Conversion loss, 5.7 dB
L-R isolation, 36 dB

SIM-153MH+
Level 13, Ceramic
3.2 – 15 GHz, 50Ω
50mW RF power
Conversion loss, 6.5 dB
L-R isolation, 36 dB

SIM-193H+
Level 17, Ceramic
7.3 – 19 GHz, 50Ω
120mW RF power
Conversion loss, 6.2 dB
L-R isolation, 33 dB

ADE-30W
Level 7
300 MHz – 4 GHz, 50Ω
50mW RF power
Conversion loss, 6.8 dB
L-R isolation, 35 dB

LAVI-17VH+
Level 21
470 – 1730 MHz, 50Ω
125 mW RF power
Conversion loss, 6.8 dB
L-R isolation, 52 dB

MAC series
Levels 4 – 17
Ultra-Rel Hermetic LTCC
300 MHz – 12 GHz, 50Ω
50 – 100mW RF Power
Conversion loss from 5.8 dB
L-R isolation as high as 40 dB

Rugged Coaxial Models, ZX05 Series

ZX05-30W-S+
Level 7
300 – 4000 MHz, 50Ω
50mW RF power
Conversion loss, 6.8 dB
L-R isolation, 35 dB

ZX05-5S+
Level 7
5 – 1500 MHz, 50Ω
50mW RF power
Conversion loss, 6.6 dB
L-R isolation, 40 dB

ZX05-83-S+
Level 7
2300 – 8000 MHz, 50Ω
50mW RF power
Conversion loss, 6.0 dB
L-R isolation, 29 dB

ZX05-42MH-S+
Level 13
5 MHz – 4.2 GHz, 50Ω
200mW RF power
Conversion loss, 7.5 dB
L-R isolation, 26 dB
## Limiters

### 0.2 to 8200 MHz

### Surface Mount Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Low Output Power</th>
<th>Recovery time</th>
<th>Max Input Power</th>
<th>Recovery Time</th>
<th>Output Power @ 30 dBm input</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLM-23+</td>
<td>950 – 2050 MHz, 50Ω</td>
<td>8 nsec.</td>
<td>P_{in}, 1.5W</td>
<td>30 dBm input</td>
<td>0 dBm</td>
</tr>
<tr>
<td>RLM-23-1WL+</td>
<td>100 – 2500 MHz, 50Ω</td>
<td>8 nsec.</td>
<td>P_{in}, 1.5W</td>
<td>30 dBm input</td>
<td>0 dBm</td>
</tr>
<tr>
<td>RLM-23-2W+</td>
<td>0.2 – 3000 MHz, 50Ω</td>
<td>22.5 nsec.</td>
<td>P_{in}, 2.5W</td>
<td>13 dBm</td>
<td></td>
</tr>
<tr>
<td>RLM-33+</td>
<td>30 – 3000 MHz, 50Ω</td>
<td>10 nsec.</td>
<td>P_{in}, 2W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>RLM-33-1W+</td>
<td>30 – 7000 MHz, 50Ω</td>
<td>5 nsec.</td>
<td>P_{in}, 1.5W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>RLM-33-2W+</td>
<td>30 – 6000 MHz, 50Ω</td>
<td>5 nsec.</td>
<td>P_{in}, 2.5W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>RLM-63-2W+</td>
<td>30 – 6000 MHz, 50Ω</td>
<td>10 nsec.</td>
<td>P_{in}, 2W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>ZFLM-252-1WL+</td>
<td>100 – 2500 MHz, 50Ω</td>
<td>8 nsec.</td>
<td>P_{in}, 1.5W</td>
<td>6 dBm</td>
<td></td>
</tr>
</tbody>
</table>

### Coaxial Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Low Output Power</th>
<th>Recovery time</th>
<th>Max Input Power</th>
<th>Recovery Time</th>
<th>Output Power @ 30 dBm input</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLM-73-1W+</td>
<td>30 – 7000 MHz, 50Ω</td>
<td>5 nsec.</td>
<td>P_{in}, 2W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>VLM-33+</td>
<td>30 – 3000 MHz, 50Ω</td>
<td>5 nsec.</td>
<td>P_{in}, 2W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>VLM-63-2W+</td>
<td>30 – 6000 MHz, 50Ω</td>
<td>5 nsec.</td>
<td>P_{in}, 2.5W</td>
<td>11.5 dBm</td>
<td></td>
</tr>
<tr>
<td>ZFLM-252-1WL+</td>
<td>100 – 2500 MHz, 50Ω</td>
<td>8 nsec.</td>
<td>P_{in}, 1.5W</td>
<td>6 dBm</td>
<td></td>
</tr>
</tbody>
</table>
2 Way, 0° and 180° Power Splitters/Combiners

**DC to 18 GHz**

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Band</th>
<th>Frequency Range</th>
<th>Insertion Loss</th>
<th>Ampl. Unb.</th>
<th>Phase Unb.</th>
<th>Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZX10-2-42+</td>
<td>0°, S Band</td>
<td>1900 – 4200 MHz, 50Ω</td>
<td>0.2 dB</td>
<td>0.03 dB</td>
<td>1°</td>
<td>23 dB</td>
<td></td>
</tr>
<tr>
<td>ZX10-2-71+</td>
<td>0°, C Band</td>
<td>2950 – 7100 MHz, 50Ω</td>
<td>0.25 dB</td>
<td>0.06 dB</td>
<td>0.5°</td>
<td>23 dB</td>
<td></td>
</tr>
<tr>
<td>GP2S1+</td>
<td>0°, L Band</td>
<td>500 – 2500 MHz, 50Ω</td>
<td>Insertion loss, 0.9 dB</td>
<td>0.02 dB</td>
<td>0.9°</td>
<td>20 dB</td>
<td></td>
</tr>
<tr>
<td>TCP-2-25+</td>
<td>0°, L Band</td>
<td>200 – 2500 MHz, 50Ω</td>
<td>Insertion loss, 0.7 dB</td>
<td>0.02 dB</td>
<td>1°</td>
<td>25 dB</td>
<td></td>
</tr>
<tr>
<td>ZX10-2-12+</td>
<td>0°, VHF/UHF</td>
<td>2 – 1200 MHz, 50Ω</td>
<td>Insertion loss, 0.35 dB</td>
<td>0.05 dB</td>
<td>1°</td>
<td>21 dB</td>
<td></td>
</tr>
</tbody>
</table>

**Surface Mount 2 Way 0° Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Band</th>
<th>Frequency Range</th>
<th>Insertion Loss</th>
<th>Ampl. Unb.</th>
<th>Phase Unb.</th>
<th>Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZX10-2-222+</td>
<td>0°, L Band</td>
<td>800 – 2200 MHz, 50Ω</td>
<td>0.8 dB</td>
<td>0.01 dB</td>
<td>1°</td>
<td>24 dB</td>
<td></td>
</tr>
<tr>
<td>ZX10R-14-S+</td>
<td>0° Resitive, L Band, C Band</td>
<td>DC – 10 GHz, 50Ω</td>
<td>Insertion loss, 0.7 dB</td>
<td>0.02 dB</td>
<td>1°</td>
<td>6 dB</td>
<td></td>
</tr>
</tbody>
</table>

**Coaxial 2 Way 0° Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Band</th>
<th>Frequency Range</th>
<th>Insertion Loss</th>
<th>Ampl. Unb.</th>
<th>Phase Unb.</th>
<th>Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZX10-2-98-S+</td>
<td>0°, C Band</td>
<td>4750 – 9800 MHz, 50Ω</td>
<td>0.3 dB</td>
<td>0.1 dB</td>
<td>1°</td>
<td>23 dB</td>
<td></td>
</tr>
<tr>
<td>ZX10-2-12+</td>
<td>0°, VHF/UHF</td>
<td>2 – 1200 MHz, 50Ω</td>
<td>Insertion loss, 0.35 dB</td>
<td>0.05 dB</td>
<td>1°</td>
<td>21 dB</td>
<td></td>
</tr>
</tbody>
</table>
**SATCOM PRODUCTS** For detailed performance specs & shopping see www.minicircuits.com
3, 4, 8, 12, 16, and 24 Way, 0°
Power Splitters/Combiners

0.25 to 3600 MHz

Coaxial Models

**ZCSC-3-R3+**
3 Way, 0°
2 – 300 MHz, 50Ω
Insertion loss, 0.4 dB
Amp. unb., 0.1 dB
Phase unb., 1°
Isolation, 31 dB

**ZN4PD-272+**
4 Way, 0°, L Band
500 – 2700 MHz, 50Ω
Insertion loss, 0.9 dB
Amp. unb., 0.2 dB
Phase unb., 1°
Isolation, 25 dB

**ZB3PD1-222+**
3 Way, 0°, L Band
500 – 2200 MHz, 50Ω
Insertion loss, 0.3 dB
Amp. unb., 0.2 dB
Phase unb., 1°
Isolation, 25 dB

**ZB8PD-362+**
8 Way, 0°, L Band
600 – 3600 MHz, 50Ω
Insertion loss, 1 dB
Amp. unb., 0.2 dB
Phase unb., 4°
Isolation, 20 dB

**ZC16PD-2185**
16 Way, 0°
1800 – 2600 MHz, 50Ω
Insertion loss, 0.5 dB
Amp. unb., 0.2 dB
Phase unb., 4°
Isolation, 30 dB

**ZC24PD-222+**
24 Way, 0°, L Band
650 – 2200 MHz, 50Ω
Insertion loss, 1.8 dB
Amp. unb., 0.5 dB
Phase unb., 10°
Isolation, 25 dB

**ZB4PD1-2000+**
4 Way, 0°, L Band
800 – 2000 MHz, 50Ω
Insertion loss, 0.8 dB
Amp. unb., 0.1 dB
Phase unb., 1°
Isolation, 25 dB

**ZFSC-12-1+**
12 Way, 0°
1 – 200 MHz, 50Ω
Insertion loss, 1.1 dB
Amp. unb., 0.2 dB
Phase unb., 1°
Isolation, 35 dB
Surface Mount Models, 50Ω & 75Ω

SBTC-2-10-75X+
2 Way, 0°
10 – 1000 MHz, 75Ω
Insertion loss, 0.8 dB
Amp. unb., 0.15 dB
Phase unb., 1°
Isolation, 25 dB

SEPS-4-272+
4 Way, 0°, L-Band
690 – 2700 MHz, 50Ω
Insertion loss, 1.0 dB
Amp. unb., 0.4 dB
Phase unb., 4°
Isolation, 20 dB

SYPS-2-282-75+
8 Way, 0°, L Band
5 – 2750 MHz, 75Ω
Insertion loss, 0.8 dB
Amp. unb., 0.1 dB
Phase unb., 0.5°
Isolation, 25 dB

ZB8PD-22-75+
8 Way, 0°, L Band
950 – 2200 MHz, 75Ω
Insertion loss, 0.5 dB
Amp. unb., 0.1 dB
Phase unb., 5°
Isolation, 24 dB

Coaxial Models, 75Ω

ZFSC-2-1-75+
2 Way, 0°
0.25 – 300 MHz, 75Ω
Insertion loss, 0.4 dB
Amp. unb., 0.1 dB
Phase unb., 0.2°
Isolation, 30 dB

ZAPD-2-22-75+
2 Way, 0°, L Band
910 – 2150 MHz, 75Ω
Insertion loss, 0.2 dB
Amp. unb., 0.1 dB
Phase unb., 0.5°
Isolation, 30 dB

ZB4PD-222-75+
4 Way, 0°, L Band
950 – 2200 MHz, 75Ω
Insertion loss, 0.9 dB
Amp. unb., 0.3 dB
Phase unb., 2.7°
Isolation, 23 dB

For detailed performance specs & shopping see www.minicircuits.com

SATCOM PRODUCTS

SATCOM PRODUCTS

SATCOM PRODUCTS
Surface Mount Models, 50Ω & 75Ω

**JSW2-33DR-75+**
- SPDT, Reflective Internal Driver
- DC – 3 GHz, 50Ω
- Insertion loss, 1.25 dB
- Isolation, 26 dB
- Rise/fall time, 2 nsec

**JSW2-63DR+**
- SPDT, Reflective Internal Driver
- DC – 6 GHz, 50Ω
- Insertion loss, 0.33 dB
- Isolation, 37 dB
- Rise/fall time, 25 nsec

**JSW6-23DR-75+**
- SPDT, Reflective Internal Driver
- DC – 2 GHz, 75Ω
- Insertion loss, 0.95 dB
- Isolation, 50 dB
- Rise/fall time, 2 msec

**RSW-2-25P+**
- SPDT, Reflective
- DC – 2500 MHz, 50Ω
- Insertion loss, 1.1 dB
- Isolation, 50 dB
- Rise/fall time, 10 nsec

**VSW2-33-10W+**
- SPDT, Reflective
- DC – 3 GHz, 50Ω
- Insertion loss, 0.5 dB
- Isolation, 26 dB
- Rise/fall time, 150 nsec

**VSW2A-63DR+**
- SPDT, Absorptive With Internal Driver
- DC – 6 GHz, 50Ω
- Insertion loss, 1.0 dB
- Isolation, 65 dB
- Rise/fall time, 23 nsec

**GSWA-4-30DR+**
- SPDT, Absorptive
- DC – 3 GHz, 50Ω
- Insertion loss, 0.46 dB
- Isolation, 26 dB
- Rise/fall time, 150 nsec

**VSWA2-63DR+**
- SPDT, Absorptive
- DC – 6 GHz, 50Ω
- Insertion loss, 0.8 dB
- Isolation, 29 dB
- Rise/fall time, 1 msec

**MSW1-30DR+**
- SPDT, Reflective
- DC – 3 GHz, 50Ω
- Insertion loss, 1.1 dB
- Isolation, 26 dB
- Rise/fall time, 25 nsec

**MSWT-4-20+**
- 50W Transfer
- DC – 2 GHz, 50Ω
- Insertion loss, 1.25 dB
- Isolation, 26 dB
- Rise/fall time, 2 nsec

**JSW2-63DR+**
- SPDT, Reflective Internal Driver
- 10 – 6000 MHz, 50Ω
- Insertion loss, 0.33 dB
- Isolation, 37 dB
- Rise/fall time, 25 nsec

**RSW-2-25P+**
- SPDT, Reflective
- 10 – 2000 MHz, 50Ω
- Insertion loss, 0.8 dB
- Isolation, 29 dB
- Rise/fall time, 1 msec

**RSW-2-25P+**
- SPDT, Reflective
- 0.25 x 0.21 x 0.08" (6.4 x 5.3 x 0.2 mm)

**GSWA-4-30DR+**
- SPDT, Absorptive
- 0.49 x 0.49 x 0.06" (12.4 x 12.4 x 0.15 mm)

**VSWA2-63DR+**
- SPDT, Absorptive
- 0.157 x 0.157 x 0.35" (4 x 4 x 0.9 mm)

**VSW2A-63DR+**
- SPDT, Absorptive
- 0.118 x 0.079 x 0.035" (3 x 2 x 0.09 mm)

**VSW2-33-10W+**
- SPDT, Reflective
- DC – 3 GHz, 50Ω
- Insertion loss, 0.95 dB
- Isolation, 50 dB
- Rise/fall time, 25 nsec

**VSW2A-63DR+**
- SPDT, Absorptive
- 0.157 x 0.157 x 0.35" (4 x 4 x 0.9 mm)

**VSW2-33-10W+**
- SPDT, Reflective
- 0.118 x 0.079 x 0.035" (3 x 2 x 0.09 mm)

**VSWA2-63DR+**
- SPDT, Absorptive
- 0.157 x 0.157 x 0.35" (4 x 4 x 0.9 mm)

**VSW2A-63DR+**
- SPDT, Absorptive
- 0.157 x 0.157 x 0.35" (4 x 4 x 0.9 mm)
Synthesizers
700 to 3500 MHz

Surface Mount Models, Robust Design and Construction

M3SW-2-50DR+
SPDT, Reflective Integral TTL Driver
M3SWA-2-50DR+
SPDT, Absorptive Integral TTL Driver
DC – 4500 MHz, 50Ω
Insertion loss, 0.7 dB
Isolation, 60 dB
Rise/fall time, 5 nsec

0.13 x 0.13 x 0.04”

SWM-2-50DR+
SPDT, Reflective Integral TTL Driver
SWM-2-50DR+
SPDT, Absorptive Integral TTL Driver
DC – 4500 MHz, 50Ω
Insertion loss, 0.7 dB
Isolation, 55 dB
Rise/fall time, 5 nsec

0.24 x 0.19 x 0.04”

Coaxial, Hi-Rel Mechanical Switches

MSP Series
SPDT, SP4T & Transfer
100 Million Cycles Guaranteed!
DC – 18 GHz, 50Ω
Insertion loss, 0.25 dB
Isolation, 80 dB
Switching time, 20 msec

0.13 x 0.13 x 0.04”

Dimensions Vary

DSN-3019A-119+
Integrated VCO+ PLL
1788 – 3019 MHz, 50Ω
Step size, 100 kHz
Phase Noise:-83 dBc/Hz @ 10 kHz offset

1.00 x 1.25 x 0.20”

KSN-860A-119+
Integrated VCO+ PLL
856.6 – 858.6 MHz, 50Ω
Step size, 5 kHz
Phase noise:-101 dBc/Hz @ 10 kHz offset

0.80 x 0.58 x 0.15”

KSN-3500A-119+
Fractional N Synthesizer
3000 – 3450 MHz, 50Ω
Step size, 1000 kHz
Phase noise:-95 dBc/Hz @ 10 kHz offset

KSN-3301A-119+
Fractional N Synthesizer
3210 – 3310 MHz, 50Ω
Step size, 2500 kHz
Phase noise:-93 dBc/Hz @ 10 kHz offset

KSN-2825A-219+
Fractional N Synthesizer
2435 – 2825 MHz, 50Ω
Step size, 2500 kHz
Phase noise:-94 dBc/Hz @ 10 kHz offset

KSN-1470A-1+
Integrated VCO+ PLL
930 – 1470 MHz, 50Ω
Step size, 0.3 Hz
Phase noise:-83 dBc/Hz @ 10 kHz offset

KSN-700A-3C19+
Integrated Microcontroller
Fixed Frequency
700 MHz, 50Ω
Comparison freq., 5 MHz
Phase noise:-110 dBc/Hz @ 10 kHz offset

KSN-3263A-1
Integrated VCO+ PLL
3000 – 3600 MHz, 50Ω
Step size, 1 MHz
Phase noise:-95 dBc/Hz @ 10 kHz offset

For detailed performance specs & shopping see www.minicircuits.com
Transformers
DC to 3000 MHz

Surface Mount Models, 50Ω & 75Ω

**TC1-1-13MX+**
Top Hat Feature
4.5 – 3000 MHz, 50Ω secondary/primary, 1 Phase unb., 2°
Insertion loss, 0.9 dB
Max. input power, 0.25W

**TC1.5-1X+**
Top Hat Feature
0.5 – 2200 MHz, 50Ω secondary/primary, 1.5 Phase unb., 3°
Insertion loss, 0.6 dB
Max. input power, 0.25W

**TC1.33-282X+**
Top Hat Feature
5 – 2800 MHz, 50Ω secondary/primary, 1.33 Phase unb., 6°
Insertion loss, 1.4 dB
Max. input power, 0.25W

**TCN4-22+**
LTCC Balun
1200 – 2200 MHz, 50Ω secondary/primary, 4 Phase unb., 10° (rel. to 180°)
Insertion loss, 1 dB
Max. input power, 5W

**TR2-252+**
Ceramic
4 – 2500 MHz, 100Ω to 50Ω secondary/primary, 2 Phase unb., N/A
Insertion loss, 1.2 dB
Max. input power, 0.35W

**TRS2-252+**
Ceramic
4 – 2500 MHz, 100Ω to 50Ω secondary/primary, 2 Phase unb., N/A
Insertion loss, 1.2 dB
Max. input power, 0.35W

**TCN4-22+**
LTCC Balun
1200 – 2200 MHz, 50Ω secondary/primary, 4 Phase unb., 10° (rel. to 180°)
Insertion loss, 1 dB
Max. input power, 5W

**TC1.33-282X+**
Top Hat Feature
5 – 2800 MHz, 50Ω secondary/primary, 1.33 Phase unb., 6°
Insertion loss, 1.4 dB
Max. input power, 0.25W

**TC1.33-282X+**
Top Hat Feature
5 – 2800 MHz, 50Ω secondary/primary, 1.33 Phase unb., 6°
Insertion loss, 1.4 dB
Max. input power, 0.25W

**TC1-33-75G2+**
Top Hat Feature
5 – 3000 MHz, 75Ω secondary/primary, 1 Phase unb., 3°
Insertion loss, 1.4 dB
Max. input power, 0.25W

**NCS1-222-75+**
LTCC Balun
950 – 2200 MHz, 75Ω secondary/primary, 1 Phase unb., 5° (rel. to 180°)
Insertion loss, 1.0 dB
Max. input power, 3W

**SEMP-5075-1+**
L Band Matching Pad
950 – 2150 MHz, 50Ω secondary/primary, 2 Phase unb., 10°
Insertion loss, 0.2 dB
Max. input power, 0.25W

**Z7550-FMSF+**
DC Passing
DC – 2300 MHz, 50Ω to 75Ω Phase unb., N/A
Insertion loss, 0.5 dB
Max. input power, 2W

Coaxial Models
Voltage Controlled Oscillators
950 to 4360 MHz

Surface Mount Models

ROS-2150VW+
L Band
970 – 2150 MHz, 50Ω
Phase noise:-96 dBc/Hz @ 10 kHz offset
Linear tuning, 30 – 70 MHz
Power output, +4 dBm

ROS-1700-919+
L Band
950 – 1620 MHz, 50Ω
Phase noise:-100 dBc/Hz @ 10 kHz offset
Linear tuning, 10 – 110 MHz
Power output, +6 dBm

ROS-2500W-319+
L Band
1000 – 2400 MHz, 50Ω
Phase noise:-93 dBc/Hz @ 10 kHz offset
Linear tuning, 80 – 95 MHz
Power output, +3.5 dBm

ROS-3044+
5V Tuning for PLL ICs
2885 – 3044 MHz, 50Ω
Phase noise:-104 dBc/Hz @ 10 kHz offset
Linear tuning, 64 – 72 MHz
Power output, +8 dBm

ROS-2050-719+
L Band
1020 – 1980 MHz, 50Ω
Phase noise:-99 dBc/Hz @ 10 kHz offset
Linear tuning, 57 – 105 MHz
Power output, +4 dBm

ROS-3730C+
L Band
3575 – 3730 MHz, 50Ω
Phase noise:-103 dBc/Hz @ 10 kHz offset
Linear tuning, 55 – 70 MHz
Power output, +2.5 dBm

ZX95-3360-S+
Low Pushing, Low Pulling
2120 – 3360 MHz, 50Ω
Phase noise:-95 dBc/Hz @ 10 kHz offset
Linear tuning, 65 – 113 MHz
Power output, +8.5 dBm

Coaxial, Patented Unibody Construction

SATCOM PRODUCTS For detailed performance specs & shopping see www.minicircuits.com
Much more than catalog products

Mini-Circuits has a well-established history of supporting customers with custom integration to achieve highly functional systems and sub-systems. Leveraging our wealth of standard components, our application and systems engineers work directly with customers at the engineering level following our proven framework to accurately define your design requirements up front, ensuring a successful development effort.

The following examples illustrate just some of the capabilities we offer that may be implemented or adapted for use in satcom systems and subsystems.

**ZT-100**
*2 x 10 Switch Matrix*
*DC to 8.5 GHz, 50Ω*

With cross bar configuration, this switch matrix can connect the 2 input ports to any 2 of the 10 output ports with the push of a button using the Mini-Circuits GUI (included). This versatile module offers an efficient solution for L, S, and C band signal routing.

**ZT-101**
*Amplifier with Dual Switched Outputs*
*0.7 to 18 GHz, 50Ω*

Housed in a space-efficient 1U height rack, this module integrates a super ultra wideband, unconditionally stable amplifier with a high isolation absorptive electro-mechanical SPDT switch. The ZT-101 offers the convenience of dual switched outputs for line amplification over L, S, C, X, and Ku bands.

**ZT-103**
*12 x 3 Switch Matrix*
*DC to 18 GHz, 50Ω*

With 3 high-isolation SP4T electro-mechanical switches independently controlled via Mini-Circuits user-friendly GUI (included), the ZT-103 greatly enhances efficiency where multiple TX and RX signals need to be processed. This unit offers outstanding capability for switching needs in earth station subsystems.
Where multiple splitters or combiners are required to distribute signals, optimizing your system layout is often a challenge for complex configurations. The ZT-117 is designed with 9 six-way splitter/combiners to provide 54 RF channels in neat arrangement allowing easy portability and repeatable configuration. Different splitters and combiners can be used to extend to the frequency range of your choice.

Push button control allows users to switch in signal from various antennae to receivers via multiple output channels on the front panel. Additional frequency ranges are available upon request as well as remote control via USB/Ethernet.

Where a tone needs to be directed to 1 or more outputs simultaneously, the ZT-122 provides an array of 6 momentary push buttons on the front panel for change-on-the-fly situations. Output connector types can be chosen from TNC, SMA and N Type. USB/Ethernet control for remote operation is also available.
Satellite Antenna H Switch Control Module

19" Rack Mount Assembly for Band Satellite Antenna Rx and Tx Path Control

10 to 4200 MHz

Designed specifically to control satellite transmit and receive antennas, the Mini-Circuits H Switch control module is configured with two receive modules and one transmit module. It can also easily be configured for other antenna options. It has a self-contained 10 MHz Rubidium clock with lock detect, operates on 24VDC supply, and comes contained in a 3.5 x 19 x 20" rack mountable case. All RF connections are PDK style multi-connector, and all control lines are D Sub connectors. BNC front panel test ports are available for transmit and receive paths.

Fig.1: Overall Schematic
THE ZT-110 high performance switch matrix is designed to handle 40W of transmit (Tx) power from an RRH and simultaneously work with the receive (Rx) path of another channel. This configuration eliminates the need to turn off the high output power in the Tx path during channel swapping. A built-in isolator provides additional signal isolation between the Tx and Rx paths. Current configuration operates over 2000 – 3800 MHz. Other frequency bands are also available upon request.
The Mini-Circuits J Box is an L band diplexer featuring two receive paths and two transmit paths. The receive paths have approximately 30 dB of forward gain, and both are designed with a 2 way power splitter on their inputs to drive multiple modems.

Each of the receive and transmit paths contains a 10 MHz diplexer, which feeds the 10 MHz reference back to the receive and transmit antennas via their respective coaxial cables. The 10 MHz path features an active buffer stage to increase isolation between the receive and transmit paths.

The unit also features a separate 10 MHz monitor port, a compact 6” x 4” x 0.5” case with SMA connectors, and operates from a 24 VDC supply.
Active L Band
8 Way Power Splitter

19" Rack Mount Assembly

The Mini-Circuits RZ8PD-222DC-X+ is an active L Band 8 way power splitter housed in a 1U high rack mounted assembly. It contains an 8 way splitter, an amplifier, and an internal AC-DC power supply.

This design provides 0 dB insertion loss (±0.5 dB) while still maintaining excellent port-to-port amplitude and phase matching (see figure below). All RF input and output connections are SMA and accessible from the front panel.

![Figure 1: RZ8PD-222DC-X+ Insertion Gain (dB) vs. Frequency (MHz)](image)

**Typical Performance**
- Insertion Loss, 0 ± 0.5 dB
- Isolation, 25 dB
- AU, 0.5 dB
- PU, 10°
- RF Input P1dB, 24 dBm
- IP3, 24 dBm
Mini-Circuits offers a unique line of easy-to-configure test equipment providing convenient, cost-effective measurement capability. These units are small and light enough to carry in your laptop case and come standard with our user-friendly GUI control software, all available from stock at prices to fit your budget.

**Synthesized Signal Generators**

5 models with a practical range of capabilities to meet your needs.

- **SSG-4000HP**
  - High Output Power
  - 250 – 4000 MHz, 50Ω
  - P_{out}, -50 to +20 dBm
  - Frequency resolution, 5 kHz
  - Power resolution, 0.25 dB
  - Internal pulse modulation, triggered or continuous
  - Frequency/power sweeping (up, down, bi-directional)
  - USB control

- **SSG-4000LH**
  - Low Harmonics
  - 250 – 4000 MHz, 50Ω
  - P_{out}, -60 to +10 dBm
  - Frequency resolution, 5 KHz
  - Power resolution, 0.25 dB
  - Internal pulse modulation, triggered or continuous
  - Frequency/power sweeping (up, down, bi-directional)
  - Harmonics, -66 dBc
  - USB control

- **SSG-6000RC**
  - Expanded Frequency, USB/Ethernet
  - 250 – 6000 MHz, 50Ω
  - P_{out}, -60 to +10 dBm
  - Frequency resolution, 3 Hz
  - Power resolution, 0.25 dB
  - Internal pulse modulation, triggered or continuous
  - Frequency/power sweeping (up, down, bi-directional)
  - Frequency/power hopping
  - USB and Ethernet control

- **SSG-6400HS**
  - High Speed, High Capability
  - 0.25 – 6400 MHz, 50Ω
  - P_{out}, -75 to +10 dBm
  - Frequency resolution, 0.01 Hz
  - Power resolution, <0.01 dB
  - Internal AM, FM, PM, and pulse modulation, triggered or continuous
  - Tuning speed, <300μs
  - Frequency/power sweeping (up, down, bi-directional)
  - Frequency/power hopping
  - USB and Ethernet control

- **SSG-6000**
  - Expanded Frequency Range
  - 25 – 6000 MHz, 50Ω
  - P_{out}, -60 to +10 dBm
  - Frequency resolution, 3 Hz
  - Power resolution, 0.25 dB
  - Internal pulse modulation, triggered or continuous
  - Frequency/power sweeping (up, down, bi-directional)
  - Frequency/power hopping
  - USB control
Switch Matrices

Mini-Circuits switch matrices incorporate our patented mechanical switches with ultra-high reliability and extra-long life of 10 years/100 million switch cycles of guaranteed performance. This robustness makes them suitable for signal routing and redundancy switching relays in earth station systems where reliability is critical. USB and Ethernet control options are available on all models, and our intuitive GUI control screen allows you to set many different switch configurations for step-by-step control or full automation. Operating voltage may also be modified to fit your application requirements upon request.

**USB Control Switch Matrices**

<table>
<thead>
<tr>
<th>Model</th>
<th># Switches (SPDT)</th>
<th>IL (dB)</th>
<th>VSWR (1)</th>
<th>Isolation (dB)</th>
<th>RF PMAX (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB-1SP4T-A18</td>
<td>1 (SP4T)</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>USB-1SPDT-A18</td>
<td>1</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>USB-2SPDT-A18</td>
<td>2</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>USB-3SPDT-A18</td>
<td>3</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>USB-4SPDT-A18</td>
<td>4</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>USB-8SPDT-A18</td>
<td>8</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
</tbody>
</table>

**USB and Ethernet Control Switch Matrices**

<table>
<thead>
<tr>
<th>Model</th>
<th># Switches (SPDT)</th>
<th>IL (dB)</th>
<th>VSWR (1)</th>
<th>Isolation (dB)</th>
<th>RF PMAX (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-1SP4T-A18</td>
<td>1 (SP4T)</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>RC-1SPDT-A18</td>
<td>1</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>RC-2SPDT-A18</td>
<td>2</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>RC-3SPDT-A18</td>
<td>3</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>RC-4SPDT-A18</td>
<td>4</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td>RC-8SPDT-A18</td>
<td>8</td>
<td>0.25</td>
<td>1.2</td>
<td>85</td>
<td>10</td>
</tr>
</tbody>
</table>

*The mechanical switches within each model are offered with an optional 10 year extended warranty. Agreement required. See data sheets on our website for terms and conditions.

Smart Power Sensors, 50Ω & 75Ω

Mini-Circuits smart power sensors are pocket-sized, precision USB HID devices that provide highly accurate measurements of continuous wave (CW) as well as modulated and multi-tone signals. Built-in GUI measurement software enables the user to perform measurements on RF components such as couplers, filters, amplifiers, and more, and displays numerical data and graphs for a full range of data analysis options.

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency (MHz)</th>
<th>Type</th>
<th>Dynamic Range (dBm)</th>
<th>Measurement Speed (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR-2:5GH5-75</td>
<td>0.1 – 2500, 75Ω</td>
<td>CW only</td>
<td>-30 to +20</td>
<td>30</td>
</tr>
<tr>
<td>PWR-4GH5</td>
<td>0.009 – 4000, 50Ω</td>
<td>CW only</td>
<td>-30 to +20</td>
<td>30</td>
</tr>
<tr>
<td>PWR-4RMS</td>
<td>50 – 4000, 50Ω</td>
<td>True RMS</td>
<td>-35 to +20</td>
<td>30</td>
</tr>
<tr>
<td>PWR-6GH5</td>
<td>1 – 6000, 50Ω</td>
<td>CW only</td>
<td>-30 to +20</td>
<td>30</td>
</tr>
<tr>
<td>PWR-8GH5</td>
<td>1 – 8000, 50Ω</td>
<td>CW only</td>
<td>-30 to +20</td>
<td>30</td>
</tr>
<tr>
<td>PWR-8FS</td>
<td>2 – 8000, 50Ω</td>
<td>CW only</td>
<td>-30 to +20</td>
<td>10</td>
</tr>
</tbody>
</table>

Programmable Attenuators

Mini-Circuits’ USB and Ethernet controlled programmable attenuators provide precise level control for a wide range of field, test, and integration applications. They come housed in a pocket-sized, shielded metal case. Our unique design maintains linear attenuation change per dB over the entire range of attenuation settings.

**RUDAT-6000 Series**

Programmable, USB Controlled
1 MHz to 6 GHz, 50Ω
Max. attenuation, 30, 60, or 90 dB
Step size, 0.25 dB
Accuracy:
±0.3 dB @ 10 dB attenuation
±1.7 dB @ 90 dB attenuation

**RCDAT-6000 Series**

Programmable USB & Ethernet Controlled
1 MHz to 6 GHz, 50Ω
Max. Attenuation, 30, 60, or 90 dB
Step size, 0.25 dB
Accuracy:
±0.3 dB @ 10 dB attenuation
±1.7 dB @ 90 dB attenuation
SATCOM PRODUCT GUIDE

TECHNICAL SUPPORT

NORTH AMERICA
apps@minicircuits.com
1 718-934-4500

EUROPE
apps@uk.minicircuits.com
44 1252 832600

SINGAPORE, INDONESIA
MALAYSIA, THAILAND
sales@minicircuits.com.my
604 646 2828

SINGAPORE, INDONESIA
apps@minicircuits.com

ISRAEL
app@ravon.co.il
972 4 8749100

INDIA
apps@minicircuits.com
91 44 2 2622575

TAIWAN, PHILIPPINES
robert@min-kai.com.tw
886 3 318 4450

CHINA
sales@mitron.cn
0591-8787 0001
or
yuanzhong@minicircuits.com
20-8734 0992

For a complete listing of our global sales network, please visit
www.minicircuits.com