

www.minicircuits.com









Mini-Circuits continues to expand our line of RF and microwave filters with more models and more capabilities to meet your needs. Our revolutionary line of reflectionless filters now features over 50 unique models with passbands up to 30 GHz in tiny QFN packages and bare die form to improve your system performance. We've added more models to our line of cavity filters with exceptional selectivity, and a brand new series of surface-mount lumped element filters with high rejection and small footprint, ideal for your pick-and-place assembly.



New additions to our amplifier line include connectorized low-noise bypass amplifiers and a connectorized, ultra-wideband LNA covering 0.5 to 12 GHz with a single matching circuit. We've also added a new, rugged 100W rack mount amplifier covering applications from 2500 up to 6000 MHz. Along with our popular HPA covering the 700 to 2700 band, this new model expands your high power test capability to cover all the primary wireless communications bands.



Building on the popularity of our rapidly growing line of test and measurement products, Mini-Circuits has added several highly flexible building blocks for your test lab. Latest additions include multi-channel programmable attenuators, N-port mesh networks, high order switch matrices, modular test systems and more!



To give you more options for your signal routing needs, we've expanded our lineup of tiny MMIC switches with new high-power and high-linearity models. Plus we've developed a new SP8T extra-long-life electromechanical switch, and a new family of connectorized solid state switches for applications where super-fast switching capability is a must.

SPLITTER COMBINERS



Need a solution for distributing signal at high frequency and over wide frequency range? We've expanded our lineup of coaxial splitter/combiners with a new series of models, all covering bandwidths greater than 3 octaves from 2 to 18 GHz! We've also developed a stripline-based surface-mount 90° hybrid capable of handling up to 90W in a miniature printed laminate form factor.

COUPLERS

Mini-Circuits' growing selection of bi-directional and dual-directional surface-mount stripline couplers spans bandwidths from VHF/UHF up to C-band with power handling up to 300W in miniature, printed laminate case styles. They're perfect for transmission signal monitoring, antenna reflection monitoring, and any application where sampling high-power signals without sacrificing space is needed.

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Mini-Circuits' new ultra-thin spaghetti cables are the perfect solution to reduce size, weight and bulk in your cable layout. They're super skinny (0.064" diameter), lightweight and flexible with excellent stability of performance in bends as tight as 0.25" for applications from DC to 18 GHz. We've also expanded our selection of armored, crush-resistant test cables with a new model with SMA to N-type connectors.

ATTENUATORS

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As the industry innovates the next generation of wireless applications, system requirements call for wider bandwidths up to higher frequencies into the millimeter wave range. Mini-Circuits is here to support you as wireless technology evolves and new requirements emerge. Our selection of fixed precision attenuators now includes coaxial models with outstanding accuracy and flatness from DC up to 50 GHz, and we've developed a new series of MMIC attenuator dice covering applications from DC up to 43.5 GHz.

NOTE: Prices shown herein are effective as of the first date of publication of this material and may be subject to change at any time. Please refer to pricing on www.minicircuits.com for real time pricing and availability of these and other products in our catalog.

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Mini-Circuits[®] ISO 9001 ISO 14001 AS 9100



Surface Mount Lumped Element Low Pass Filters

50 Ω DC to 1094 MHz

The Big Deal

- Small size, 0,25 x 0.25"
- Very sharp rejection,up to 92% slope from 3 dB cutoff to 20 dB rejection
- Passbands as wide as >1000 MHz

ULP-Series

from \$875 ea. (qty 10 - 49)

ZVBP-Series

from \$**199**95 ea.

Product Overview

Mini-Circuits' new ULP-series of surface-mount lumped element low pass filters adds 19 new models to our lineup, giving you more options for your needs. These designs offer very sharp rejection, up to 92% slope from the 3 dB cutoff to 20 dB rejection, in a very small package, occupying only 0.25" x 0.25" of board space. Designed using miniature, high-Q capacitors and chip inductors, they provide excellent reliability, repeatable performance across production lots and consistent performance across temperatures from -40°C to +100°C. ULP-series filters come mounted on printed wiring laminate with Mini-Circuits' TopHat feature to maximize speed and efficiency of pick-and-place assembly.

Cavity Filters

50Ω **902 to 11400 MHz**

The Big Deal

- Outstanding selectivity Typ. 80 dB rejection <1 octave from passband Typ. 40 dB rejection within 100 MHz from passband
- Bandwidths as narrow as 1%
- Low passband insertion loss, from 0.5 dB

Product Overview

Now with 7 models, Mini-Circuits continues to expand our offering of cavity filters for applications requiring precise bandwidth definition and high selectivity. Our ZVBP-series cavity filters can provide bandwidths as narrow as 1% with very high selectivity and excellent low noise floor. They include a unique mechanical feature that prevents accidental detuning that might other wise require costly replacement or factory return for re-tuning. This makes them very handy for field and lab applications where hard use is common. They come in rugged packages with a special powder-coated finish which provides excellent protection against corrosion, tarnishing and scratching. They've been performance qualified for use in extreme temperatures up to 100°C. Standard models are available off the shelf in a growing range of passbands from 900 MHz to 12 GHz, and custom models are available by request. Contact apps@minicircuits.com with your custom requirements!

MMIC Reflectionless Filters

50 Ω **DC to 30 GHz**

The Big Deal

- Patented design eliminates spurs*
- Impedance matched in passband, stopband and transition
- Cascadable
- Now stopband rejection up to 50 dB!
- RF power handling up to 2W



X-Series

Now 43 models in stock in 3x3mm and 2x2mm QFN \$7⁴⁵ ea. (qty 500)

Product Overview

Now Mini-Circuits' revolutionary X-series reflectionless filters give you even more options to improve your system performance. We've added 15 new 2- and 3- section models with stopband rejection up to 50 dB for applications where suppression of large spurious signals is needed. Unlike conventional filters, reflectionless filters are matched to 50Ω in the passband, stopband, and transition, eliminating intermods, ripples and other problems caused by reflections in the signal chain. They're perfect for paring with non-linear devices such as mixers and multipliers, significantly reducing unwanted signals and increasing dynamic range without isolation amplifiers or attenuators. With 28 unique high pass, low pass and band pass models in 3x3mm and 2x2mm QFN packages, they cover passbands from DC to 30 GHz. Need a custom design? Reach out to apps@minicircuits.com to talk to our engineers about a reflectionless filter for your system requirements.

*Protected by US Patent No. 8,392,495

Reflectionless Filters in Bare Die Form

50 Ω **DC to 40 GHz**

The Big Deal

- 27 models in stock in Gel-Paks of 5, 10, 50 and 50 KGD
- Partial and full production wafers available by request
- Integrate directly into hybrids, minimizing size and weight
- Ideal for chip & wire designs

Product Overview

To support customers working with chip and wire designs, Mini-Circuits has expanded our offering of reflectionless filters to include 27 high pass, low pass, and band pass models in bare die form. Reflectionless filter dice are available from stock in gel-paks of 5, 10, 50 and 100 KGD and in partial and full production wafers by request.

Protected by US Patent No. 8,392,495



from \$25⁹⁵ ea. (gty 10 KGD)

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Coaxial Low Noise Bypass Amplifer

500 0.5 to 5 GHz

The Big Deal

- Ultra-flat gain, ±0.6 dB from 700 to 2000 MHz
- Low noise over full band, 1.2 dB typ.
- Internal bypass switching extends usable dynamic range
- High IP3, +34 dBm in LNA mode; +48 dBm in bypass mode

Product Overview

With ultra-wide frequency range and excellent gain flatness, Mini-Circuits' ZX60-53LNB+ is ideal for broadband and multi-band applications from military and commercial wireless to instrumentation and more! Its integrated, switchable bypass circuit allows you to protect the LNA in the presence of large signals and extend the usable dynamic range. This model comes in a rugged, nickel-plated brass package (1.2 x 0.75 x 0.46") featuring unibody construction with SMA-F RF connectors.

ZX60-53LNB+



from \$13955 ea. (qty 1-9)

100W Rack Mount Amplifier

50Ω **700 to 2700 MHz**

The Big Deal

- High output power, 100W at Psat
- High gain, 48 dB
- High reverse isolation, 89 dB
- Excellent gain flatness, ±1.7 dB
- Operates from AC line power, 85 to 264V
- Built-in cooling fans and over-temperature protection

Product Overview

Mini-Circuits' HPA-272+ high power amplifier is capable of amplifying signals up to 100W across its entire operating bandwidth from 700 to 2700 MHz. It delivers 48 dB gain with ±1.7 dB flatness, supporting a wide range of test applications including EMI, reliability testing, RF stress testing and more. The amplifier operates on a self-contained, 85-264V AC power supply, making setup quick and easy in most lab environments. Extensive safety features include over-temperature protection with automatic shut-off and the ability to withstand open and short loads while delivering saturated output power.

This model has become popular for cost-effective HTOL testing where it's often desirable to test large numbers of units simultaneously. The HPA-272+ can be used to drive up to 80 test channels for high-throughput production testing where parallel processing of many DUTs is a requirement.

Ultra-Wideband Coaxial LNA

50 Ω **0.5 to 12 GHz**

The Big Deal

- Flat gain, 17 ±2.4 dB over full band
- Low noise figure, 2.4 dB
- High IP3, +28 dBm



ZX60-123LN+

from \$19455 ea. (qty 1-9)

Product Overview

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Our new ZX60-123LN+ is an ultra-wideband coaxial LNA covering a broad range of applications from 0.5 to 12 GHz, all with a single matching circuit! This model provides a unique combination of low noise figure, high IP3, and flat gain, making it ideal for sensitive, high-dynamic range receivers, instrumentation, defense systems, LTE, WiFi, S-Band, C-Band, and X-band radar, SatCom and more! Housed in a rugged, compact connectorized package (0.75 x 0.75 x 0.46") with SMA connectors and patented unibody construction, it's a perfect fit for dense cable assemblies where saving space is a requirement.

100W Rack Mount Amplifier

50Ω **2500 to 6000 MHz**

The Big Deal

- High output power, 100W at Psat
- High gain, 58 dB
- High reverse isolation, 93 dB
- Excellent gain flatness, ±2.0 dB
- Operates from AC line power, 85 to 264V
- Built-in cooling fans and over-temperature protection

Product Overview

Now you have another high-power workhorse amplifier for your high power testing needs up to 6 GHz! Mini-Circuits new HPA-100W-63+ delivers 100W saturated output power from 2500 to 6000 MHz, expanding the capability of the popular HPA-272+ through all the primary wireless communications bands. Incorporating built-in safety features including over-temperature protection and immunity to open and short loads while delivering saturated output power, it's the perfect addition to your test rack for high power tests such as EMI, stress testing, and reliability testing and for driving multiple test channels for high-throughput applications such as burn-in.



\$8,995 ea

HPA-272+

HPA-100W-63+



\$18,995 ea.





RC4DAT-6G-95

USB/Ethernet 4-Channel Programmable Attenuator

50 Ω 1 to 6000 MHz, 0 to 95 dB

The Big Deal

- 4 independently programmable channels in one compact device
- Attenuation range from 0 to 95 dB
- Small step size, 0.25 dB



\$2765 ea

Product Overview

Mini-Circuits' RC4DAT-6G-95 USB/Ethernet controlled programmable attenuator provides four independently programmable channels in one device, supporting a wide range of test applications such as 4x4 MIMO testing, handover system evaluation and more. This model supports applications from 1 to 6000 MHz with an attenuation range from 0 to 95 dB in 0.25 dB steps. The device provides excellent attenuation accuracy of ±0.4 dB and fast attenuation transition time of just 650ns. USB interface allows easy control from any Windows[®] or Linux[®] computer, while Ethernet control supports HTTP and Telnet protocols, allowing easy remote control and setup flexibility. Mini-Circuits' user-friendly GUI software (included) provides independent point-and-click control of each of the four channels. Sweep and hop attenuation levels and even save and recall your own test profiles with specific attenuation patterns for R&D and production testing. DLLs for 32- and 64-bit systems and complete programming instructions for Windows and Linux environments are also included, allowing the same capabilities through your native test software. The device comes supplied everything you need to use it right out of the box – just plug and play!

RC4DAT-6G-60

USB/Ethernet 4-Channel Programmable Attenuator

50 Ω 1 to 6000 MHz, 0 to 63 dB

The Big Deal

- 4 independently programmable channels in one compact device
- Attenuation range from 0 to 63 dB
- Small step size, 0.25 dB

\$2610 ea.

Product Overview

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To give you more options for your test setup, Mini-Circuits has added the RC4DAT-6G-60 4-channel programmable attenuator to our lineup of multi-channel programmable attenuators. This model features an attenuation range from 0 to 63 dB in 0.25 dB steps for applications from 1 to 6000 MHz, with the same features and versatile capability of the RC4DAT-6G-95. This model is ideal for applications where attenuation control up to 63 dB is sufficient, giving you the performance you need at a great value.

USB/RS232/SPI Programmable Attenuators

RUDAT-13G-60 RUDAT-13G-90

50 Ω 10 to 13000 MHz

The Big Deal

Product Overview

- Ultra-wideband, 10 to 13000 MHz
- Attenuation range from 0 to 60 dB or 0 to 90 dB
- Small step size, 0.5 dB
- USB, RS232 and SPI control



from \$1145 ea.

Now Mini-Circuits popular line of programmable attenuators supports even more applications, covering all your needs up to 13 GHz. Our new RUDAT-13G series offers models with attenuation range from 0 to 60 or 0 to 90 dB in 0.5 dB steps, giving you precise attenuation control for a wide range of test applications. They're perfect for fading simulators, handover system evaluation, and automated test equipment up to C-Band and X-Band. USB control allows easy control from any Windows[®] or Linux[®] computer, while RS232 and SPI control options allow serial synchronous or asynchronous communication. Like all our test devices, RUDAT-13G series programmable attenuators come supplied with Mini-Circuits' user-friendly GUI software, DLLs for 32- and 64-bit Windows systems and complete programming instructions for Windows and Linux environments, giving you full control capability through you native test software.

USB/Ethernet Benchtop SP6T Switch Box

50 Ω 2500 to 6000 MHz

The Big Deal

- USB and Ethernet control
- 0.2 dB insertion loss
- 90 dB isolation
- Compact, benchtop case, 6.0 x 4.5 x 2.25"



RC-1SP6T-A12

from \$1495 ea

Product Overview

Mini-Circuits' RC-1SP6T-A12 USB/Ethernet controlled benchtop SP6T switch box provides 1 RF input and 6 outputs, supporting a variety of signal routing requirements for your test lab. The unit contains an ultra-reliable electromechanical SP6T switch operating over DC to 12 GHz with 0.2 dB insertion loss, 90 dB isolation, and extra-long switching life, of 10-million switch cycles*. This model is designed into a rugged metal housing small enough to fit in your laptop case (6.0 x 4.5 x 2.25"). It features SMA-F connectors at all RF ports and LED indicators on the front panel, indicating the active switch state. It even provides a built-in switch cycle counting function with automatic calibration interval alerts, improving reliability and saving maintenance costs over time. The switch box comes supplied with an AC/DC 24VDC power adaptor, AC power cord, USB cable, RJ45 cable, and a download with Mini-Circuits' easy-to-install GUI, and DLLs for 32- and 64-bit Windows® and Linux® environments.

*Capable of extended life up to 100-million cycles with factory cleaning. See application note AN83-001 on our website for details.



Download our complete test solutions product guide! https://www.minicircuits.com/WebStore/literature.html



ZTVX-Series

N-Port Mesh Networks

50 Ω 350 to 6000 MHz

The Big Deal

- Allows simultaneous connection of up to 36 devices
- Independently programmable attenuation on every path
- USB and Ethernet control

Product Overview

Mesh networks allow simultaneous interconnection of 3 to n devices or test systems. Common applications include testing of Bluetooth and Zigbee devices, wireless handsets and Wi-Fi systems. Mini-Circuits' ZTMN series of multi-port mesh networks covers all the key telecoms bands from 350 to 6000 MHz with independently variable attenuation on every path. This concept allows simulation of a "real-world" mesh communication network in the confined space of a production environment. Path loss can be varied independently between any pair of devices on the network without affecting any other combination of devices, allowing simulation of a complex range of test cases. Number of paths, operating frequency and path attenuation range (up to 120dB) can be tailored to your specific test requirements. ZTMN-series units come housed in a rugged, 19" rack mount chassis and can be controlled via USB or Ethernet. Full software support is provided, including our user-friendly GUI for Windows® and a full API with programming instructions for Windows and Linux® environments (both 32- and 64-bit systems).

Multi-Channel **Programmable Attenuators**

50 Ω 1 to 6000 MHz

The Big Deal

- 8 to 24 channels per unit
- 0 to 95 dB attenuation range
- Small step size, 0.25 dB
- USB, Ethernet, and SPI control ports
- Cascadable via SPI connection allowing control of hundreds of channels from a single interface

Product Overview

Mini-Circuits' ZTDAT series of multi-channel programmable attenuator systems are suitable for a wide range of signal level control applications from 1 to 6000 MHz. Each independently controlled channel provides 0 to 95 dB attenuation in 0.25 dB steps with more than 100 dB isolation between channels. The programmable attenuators in the system maintain linear attenuation change per dB, even at the highest attenuation settings. Each model is housed in a compact 19-inch rack chassis with SMA or N-type RF connectors on the front and rear panels. A series of standard model options are provided, from 8 to 24 attenuator channels, with custom configurations available on request. The series also includes Mini-Circuits' novel SPI interface which allows multiple ZTDAT attenuator systems to be cascaded together into a master/slave chain. The full chain effectively becomes one system with every attenuator channel (from 8 to several hundred) controlled through the single USB or Ethernet connection and software interface of the master unit.

ZTMN-Series



testsolutions@minicircuits.com

2 by N Port Switch Matrices

50 Ω DC to 18 GHz

The Big Deal

- Ideal for VNA port expansion
- Improves test throughput by minimizing cable disconnection/reconnection
- Bi-directional switches support routing for complex signal traffic patterns

Product Overview



Request a quote: testsolutions@minicircuits.com

Mini-Circuits' ZTVX-Series 2 x N port switch matrices are capable of routing signal from two input ports to any of up to 16 output channels through a network of low-loss, high-isolation electromechanical switches. Models are available with various output port counts and frequency ranges of DC to either 12 GHz or 18 GHz to meet your needs. The switches in the system are bidirectional, and all ports may be used as inputs or outputs as needed. This capability allows easy management of complex signal traffic in test environments. ZTVX systems have proved particularly useful for testing of multiple DUTs in parallel as well is testing of DUTs with higher port counts without repeatedly disconnecting and reconnecting test cables, significantly reducing test time and increasing throughput.

Modular Switching and Attenuation Systems

ZTM-Series RCM-Series

50 Ω **DC to 18 MHz**

The Big Deal

- 19-inch rack mount or compact benchtop chassis
- 3 or 6 customizable hardware windows
- Fast turnaround shipment within 3 weeks from order or less!



Product Overview

Mini-Circuits ZTM-series rack-mountable modular test systems and RCM-series

www.minicircuits.com/products/RackMountedTestSystems.html

Configure Your System Online

Now for a Fast Quote

compact, benchtop modular test systems are designed to simplify and accelerate the development of custom test solutions. The modular chassis structure provides either 3 or 6 customizable hardware windows, each of which may be configured with your choice of SPDT, SP4T, SP6T, SP8T, or transfer switches or programmable attenuators with attenuation ranges spanning 0 to 120dB. This format allows hundreds of possible hardware configurations to be built and shipped to you with extremely fast turnaround – within 3 weeks of your order or less!

ZTDAT-Series

Configured to Your Needs!

Request a quote:

testsolutions@minicircuits.com

SWITCHES HOT NEW PRODUCTS

High Power MMIC SPDT RF Switch

50 Ω 30 to 2700 MHz

The Big Deal

- High power handling, 32W (pulsed)
- High IIP3, +81 dBm
- Immune to latch-up
- Internal driver
- Single supply voltage, +2.3V to +5.5V

Product Overview

Mini-Circuits' HSW2-272VHDR+ is a MMIC SPDT reflective switch with an internal driver designed for wideband operation from 30 to 2700 MHz. This model is capable of handling up to 32W pulsed RF power and 20W CW power with 0.25 dB typical insertion loss. It provides high linearity with +85 dBm IIP3, minimizing unwanted intermods, and 41µs switching time. The switch is produced using a unique CMOS process on silicon, offering the performance of GaAs with the advantages of conventional CMOS devices. Housed in a tiny 5x5mm 32-lead MCLP package HSW2-272VHDR+ provides a high level of ESD protection and excellent repeatability. It operates on a single positive supply voltage with very low current consumption of 120µA (typical).

HSW2-272VHDR+



from 27^{75} ea. (qty. 20)

Extra-Long-Life Electromechanical SP8T Switch

50 Ω **DC** to 12 GHz

The Big Deal

- Extra-long life, 5-million cycles
- Capable of extended life up to 50 million cycles*
- Low insertion loss, 0.2 dB
- High isolation, 90 dB
- Reliable sleep-mode switching

Product Overview

Mini-Circuits' MSP8TA-12-12D+ gives you even more options for your signal routing needs. This ultra-reliable, rugged-duty, absorptive fail-safe SP8T switch is designed in break-before-make configuration and operates from DC to 12 GHz. Our patented design utilizes advanced technology to provide extremely long switch life up to 5 million cycles without failure. This model features a 15-pin D-Sub connector enabling easy and reliable connection and disconnection without soldering and eliminating connection errors. Powered by +12VDC, this model provides low insertion loss of 0.2 dB and high isolation of 90 dB. The MSP8TA-12-12D+ is suitable for use across a wide range of applications, including switching for automated test equipment and redundancy switching. It comes housed in a rugged aluminum case (2.63 \times 2.48 \times 2.45") with SMA female connectors.

^{*}With factory cleaning services. See application note AN83-001 on our website for more information.

MSP8TA-12-12D+

\$**1395**⁰⁰ ea.

High-Dynamic Range MMIC **SPDTSwitches**

50 Ω 5 to 6000 MHz

The Big Deal

- High power handling, 2.5W
- High IIP3, +75 dBm
- Low insertion loss, 0.4 dB
- Fast switching, 2µs
- Tiny size, 2x2mm

Product Overview

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Mini-Circuits' JSW2-63VHDRG+ and JSW2-63VHDRP+ are reflective, symmetric MMIC SPDT switches with internal CMOS drivers designed for wideband operation from 5 to 6000 MHz. These switches provide power handling up to 2.5W with low insertion loss, high dynamic range, and fast switching in tiny 2x2mm 12-pad MCLP packages. They operate on a single positive supply voltage with low current consumption of just 120µA. Produced using a silicon-on-insulator process, they provide a high level of ESD protection and excellent repeatability. The switches are available in two variants to accommodate your PCB layout. The switching logic for JSW2-63VHDRG+ sets the switch from COM to RF2 with control voltage in the low state and COM to RF1 in the

JSW2-63VHDRG+ sets the switch from COM to RF2 with control voltage in the low state and COM to RF1 in the high state. Alternative model JSW2-63VHDRP+ has the opposite switching logic to minimize power consumption in designs where the primary signal path is routed via the RF1 port.

JSW2-63VHG+ JSW2-63VHP+ USB/SPI Solid State Switches

50Ω **DCto8000MHz**

The Big Deal

- Extremely fast switching, as fast as 250ns
- Low insertion loss
- Up to 90 dB isolation
- Up to +35 dBm input power handling
- User-friendly GUI and API included

Product Overview

To respond to the growing demand for extremely fast switching capability in test systems for next generation applications like 5G and Massive MIMO, Mini-Circuits has developed a new family of high-speed, solid-state switch modules with control via USB or SPI interfaces. With frequency ranges spanning DC to 8000 MHz, these switches cover all the key telecom application bands and provide very high isolation and fast switching speed. USB control allows easy connection from almost any PC and automation from most common programming environments. Alternatively, SPI-SP10T-63 supports a simple 3-wire SPI interface that allows connection of many switches along the same control line, cascaded in a "daisy-chain" configuration.

These solid-state switches can be readily integrated into a self-contained switching system with Mini-Circuits proprietary firmware and user-friendly control software, allowing many possible configurations for your signal routing needs.



from \$**27.**⁷⁵ ea. (qty.20)



SPLITTER COMBINERS

ZNxPD-02183+Series

Ultra-Wideband Splitter/Combiners

50 Ω **2** to 18 GHz

The Big Deal

- Ultra-wideband, >3 octaves
- Low insertion loss, from 0.5 dB
- High power handling, 10W or higher
- Low unbalance
- High isolation, 20 dB

Product Overview

Need a solution for distributing signal at high frequency and over wide frequency range?

Mini-Circuits has you covered! We've expanded our lineup of coaxial splitter/combiners with a new series of models, all covering greater than 3 octaves! Our ZNxPD-02183+ series includes 2-, 3-, 4-, 6-, and 8-way models supporting a wide range of applications from 2 to 18 GHz. All models give you low insertion loss across the full band, low unbalance, and power handling up to 10W or greater. They come housed in rugged, aluminum alloy cases with SMA connectors at all ports. As your broadband needs expand, we're here to support you with more options and greater capabilities.





2-Way ZN2PD-02183+ from \$266⁹⁵ ea. (qty 1-9)



3-Way ZN3D-02183+

from \$595⁹⁵ ea. (qty 1-9)



4-Way ZN4PD-02183+ from \$49595 ea. (qty 1-9)



6-Way ZN6PD-02183+ from \$895⁹⁵ ea. (qty 1-9)



8-Way ZN8PD-02183+ from \$795⁹⁵ ea. (qty 1-9)

High-Power Surface Mount 90° Hybrid

50 Ω 700 to 2700 MHz

The Big Deal

- High power, up to 200W
- Wide bandwidth
- Low insertion loss, 0.3 dB
- Small size, 1.8 x 0.4 x 0.19"



from \$59⁹⁵ea. (qty 1-9)

Product Overview

Mini-Circuits' QCH-272+ is a surface-mount 2-way, 90° hybrid capable of handling up to 200W RF input power. With a wide operating frequency range from 700 to 2700 MHz, it's a versatile building block for a wide variety of systems and sub-system designs from balanced amplifiers and antenna feeds to military radar and any application requiring 90° phase offset to insulate your circuit from reflective elements. The unit comes in a miniature, printed laminate form factor (1.8 x 0.4 x 0.19") with wraparound terminations for good solderability and easy visual inspection.

QCH-392+

High-Power Surface Mount **90° Hybrid**

50 Ω 600 to 3900 MHz

The Big Deal

High power, up to 90W
Wide bandwidth, >2 Octaves
Low insertion loss, 0.6 dB
Small size, 1.0 x 0.5 x 0.2"

from \$4995 ea.(qty 1-9)

Product Overview

Mini-Circuits' QCH-392+ is a surface-mount 2-way, 90° hybrid capable of handling up to 90W RF input power. With a wide operating frequency range from 600 to 3900 MHz, it's a versatile building block for a wide variety of systems and sub-system designs from balanced amplifiers and antenna feeds to military radar and any application requiring 90° phase offset to insulate your circuit from reflective elements. The unit comes in a miniature, printed laminate form factor $(1.0 \times 0.5 \times 0.2")$ with wraparound terminations for good solderability and easy visual inspection.

QCH-272+



CABLES

SLC-Series

Surface-Mount High-Power Bi-Directional Couplers

50 Ω 700 to 6000 MHz

The Big Deal

- High power handling, up to 150W
- Low mainline loss, 0.2 dB typ.
- Good VSWR, 1.2:1 typ.
- Case styles as small as 0.56 x 0.20 x. 0.08"



BDCH-Series

from \$**11**³⁵ ea. (qty 100)

Product Overview

Need to sample high-power signals without sacrificing space? Mini-Circuits' growing selection of bi-directional stripline couplers spans bandwidths from VHF/UHF up to C-Band, all with low insertion loss, good return loss, excellent directivity and power handling up to 150W. They're perfect for transmission signal monitoring, antenna reflection monitoring, power amplifiers, military communications and more! Now you have an alternative to existing options on the market, off-the-shelf for value prices.

Ultra-Thin Coaxial Cables

50 Ω **DC to 18 GHz**

The Big Deal

Ultra-thin, 0.064" diameter
Super-flexible, 0.25" minimum bend radius
Excellent stability of performance vs. flexure



Product Overview

Need to reduce size, weight, and bulk in your cable layout? Mini-Circuits' new SLC-series spaghetti cables are skinny, lightweight and super-flexible with excellent stability of phase and amplitude versus flexure in bends as tight as 0.25 inches. They've been performance qualified to 100,000 flexures and come with our 6-month product guarantee,* so you can be confident you're getting reliable performance and extra-long life for the most demanding environments. Use them with your environmental test chambers to test more units at once and improve throughput. Reduce size and weight in your cable assembly, and even minimize the effects of vibration on RF performance! They're available off the shelf in a variety of lengths to meet your needs. Place your order today and have them in hand as soon as tomorrow!

DDCH-50-521+

Surface-Mount, High-Power Dual-Directional Coupler

50 Ω 20 to 520 MHz

The Big Deal

- Very high power handling, up to 300W
- Low mainline loss, 0.07 dB
- Excellent return loss, 35 dB
- High directivity, 21dB
- Small size, 1.0 x 1.5 x 0.128"

from ^{\$}90⁹⁵ ea. (qty 100)

Armored **Test Cables**

50 Ω DC to 18 GHz

The Big Deal

Crush resistant armored construction
Excellent stability of insertion loss, VSWR, and phase vs. flexure.
Connects SMA to N-Type without adapters
Ideal for production floors where heavy machinery is used



APC-4FT-SMNM+

from \$169⁹⁵ ea. (qty 1-9)

Product Overview

Mini-Circuits DDCH-50-521+ surface-mount, high-power, dual-directional coupler provides 50 dB coupling on the through path and reflected path with very high power handling up to 300W for a wide variety of applications from 20 to 520 MHz. This model provides low insertion loss of 0.07 dB, 35 dB return loss and 21 dB directivity. The coupler is designed into an open printed laminate (1.0 x 1.5 x 0.128") with wraparound terminations for good solderability and easy visual inspection.

Product Overview

Mini-Circuits' APC-4FT-SMNM+ is a wideband, armored test cable supporting a wide range of applications from DC to 18 GHz. APC-series test cables feature extra-rugged, crush-resistant construction, ideal for demanding production floor environments where heavy machinery is used. This model is 4 ft. in length with SMA-Male to N-Male connectors and provides low insertion loss (0.8 dB @ 2.5 GHz; 2.5 dB @ 18 GHz), return loss of 22 dB or better, and superior stability of insertion loss, VSWR and phase versus flexure. Like all Mini-Circuits test cables, the APC-4FT-SMNM+ has been performance qualified to 20,000 bend cycles and comes with our 6-month product guarantee.*

*See product data sheet details.



Coaxial, Millimeter Wave Precision Fixed Attenuators

50 Ω DC to 50 GHz

The Big Deal

- Extremely wideband, DC to 50 GHz
- Outstanding attenuation flatness, ±1.5 dB
- Excellent VSWR, 1.2:1 typ
- 1W power handling

from \$239⁹⁵ ea. (qty 1-9)

Product Overview

Mini-Circuits' new BW-V series of precision fixed attenuators expands the coverage of our product line up to 50 GHz, supporting millimeter wave applications including 5G test systems, Ka-band SatCom and more! Available in a variety of attenuation values to meet your needs, all models provide outstanding attenuation accuracy, good VSWR and 1W RF input power handling. Measuring just 0.87" (I) x 0.36" (dia.), the attenuators feature rugged, passivated stainless steel construction with 2.4mm male to 2.4mm female connectors.

KAT-D Series

BW-V Series

Millimeter Wave Precision Fixed Attenuator Dice

50 Ω **DC to 43.5 GHz**

The Big Deal

- Ultra-wideband, DC to 43.5 GHz
- Contiguous ground plane for easy installation
- 2W power handling



from \$1295 ea. (qty. 10 KGD)

Product Overview

Mini-Circuits' KAT-D series of MMIC precision fixed attenuator dice extend coverage to a wide array of applications from DC to 43.5 GHz including 5G systems, microwave communications, satellite, defense and aerospace, and more. These fixed-value, absorptive attenuators are fabricated through highly repetitive MMIC processing with thin-film resistors on GaAs substrates. The series includes models with attenuation values from 0 to 10 dB in 1dB steps and 12, 15, 20 and 30 dB, all with 2W RF power handling, excellent attenuation accuracy and flatness, and excellent VSWR. KAT-series attenuator dice are available in gel-paks of 5, 10, 50 and 100 KGD as well as partial and full production wafers.



Mini-Circuits

Section Coaxial Adapters, Attenuators, Splitters, Terminations & Test Cables

Breaking Through Barriers to the Next Generation of Wireless Applications

From 5G test systems to Ka-Band SatCom and more, Mini-Circuits is your source for coaxial components from DC to 40 GHz and beyond. We're not just giving you more innovative products and greater capabilities with a growing selection of adapters, splitter/combiners, terminations and test cables to 40 GHz and attenuators to 50 GHz. We're giving you the speed, flexibility, and technical partnership you need in your development efforts to break through the barriers to higher frequencies and next generation wireless standards. Check out our latest additions on minicircuits.com today or give us a call for custom solutions with fast turnaround and industry-leading application support.



Want to see more?

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