



Two-Port Splitter/Combiner

RSC-2

DXE-RSC-2-INS-Revision 1



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P.O. Box 1491 · Akron, OH 44309-1491
Phone: (800) 777-0703 · Tech Support and International: (330) 572-3200
Fax: (330) 572-3279 · E-mail: DXEngineering@DXEngineering.com

Introduction

The DX Engineering RSC-2 can be used to combine two receiving antennas to form an array or to split the signal from an antenna to feed two receivers. The RCS-2 can reduce problems and performance shortfalls caused by impedance errors in less-than-perfect antenna systems.

Features

- Metal housing for superior shielding and longer life
- High quality components
- Internal spark gaps and large ground planes for improved lightning protection
- Reliable type F connectors
- Broad 300 kHz to 30 MHz operating range with 75 Ω systems
- Economical solution to potential impedance errors

Operation

Like all passive splitters and combiners, maximum isolation between port 1 and 2 occurs when the common port is terminated or sourced at 75 Ω . **If you disconnect or do not use one of the ports, it is important that you terminate that port at 75 Ω .**

Note: The RSC-2 will not pass-through feedline control voltages.

Combining

The RSC-2 can be used to combine, with negligible loss, two 75 Ω antenna systems into a single 75 Ω feedline. Unlike feedline or hybrid combiners, the RSC-2 is not frequency dependent and can operate over a broad frequency range.

The RSC-2 provides equal voltage, equal current, or equal power to matched or unmatched loads on ports 1 and 2. By forcing equal currents, a 1/2-wavelength transmission line can be used to feed a directional array instead of the more typical odd-1/4-wavelength line. With a 2:1 resistive load unbalance, less than 0.1 dB current error was measured in such an application.

There are also a number of advantages of using the RSC-2 for combining antenna systems compared to standard parallel connections:

- The RSC-2 matches the entire antenna system to 75 Ω . A parallel connection divides the impedance to 37.5 Ω .
- Unlike 1/4-wavelength matching sections that only work on one band, the RCS-2 has an extremely wide bandwidth of 300 kHz to 30 MHz
- With antennas connected in parallel, if either one develops a high impedance open, becomes shorted, falls down, or has a feedline problem, the entire antenna system may become unusable. When combining antennas using the RSC-2, only the problem antenna is unusable because of the built-in isolation and balancing. The antenna on the other port can still be used because the RSC-2 limits the total signal loss to approximately 6 dB
- The RSC-2 provides very high isolation between ports 1 and 2. This prevents either antenna from interfering with the other during normal operation

Splitting

The RSC-2 can also be used to split an antenna signal in two, typically to feed two receivers.

The primary advantage of the RSC-2, when feeding multiple receivers from one antenna, is each individual receiver will not seriously affect the signal level of the other receiver. This prevents receiver band filters attached to one port from “shorting” or loading the signal of another receiver tuned to a different band. In addition, any spurious signals generated in one receiver are greatly attenuated by the RSC-2 before reaching the second receiver.

When used as a splitter, typical signal level loss through the RSC-2 is just over 3 dB per port. This is because each port receives half the available input power, and the RSC-2 has a very small additional loss in its internal components. When splitting in-phase signals, the loss is somewhat less.

Like many receiving systems, losses are based on source and load impedances being 75 Ω .

Installation

The RSC-2 is a passive device and therefore requires no power to operate. When used as a combiner, the RSC-2 is typically located near the antenna field. Any location with ambient temperatures below 150°F (65°C) is acceptable.

Connect the antennas (combining) or receivers (splitting) to connectors 1 and 2. If only one antenna or receiver is used, the unused port must be terminated at 75 Ω . Connect the feedline to the Common port.

In outdoor applications, a bead of non-corrosive, marine grade silicone, like DX Engineering part number **DXE-RTV598335**, should be used along the seams of the enclosure. Be sure to leave a small opening in the bead, at the lowest point, for a condensation drain. Silicone which contains acetic acid has a vinegar-like smell, is corrosive to aluminum and should be avoided.

We recommend using a 75 Ω high quality, “flooded” RG-6 type coax (part number **DXE-F6-SPL**, available from DX Engineering). Flooded style cables have the distinct advantage of automatically sealing small accidental cuts or lacerations of the jacket. Flooding also prevents shield contamination and can be direct-buried. Moisture ingress into the shield often occurs at the connector and can cause increased system noise and poor or intermittent performance so care should be taken to ensure the coax connections are moisture-free. Snap-N-Seal connectors are long-lasting and weather-tight. (DX Engineering part number **DXE-SNS6-25** contains 25 Snap-N-Seal connectors)

Snap-N-Seal connectors cannot be installed with normal crimping tools or pliers, so an installation tool like the **DXE-SNS-CT1**, also available from DX Engineering, is essential for proper installation.

Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also E-mail us at DXEngineering@DXEngineering.com.

For best service, please take a few minutes to review this manual before you call.

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