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Installation Manual

VHF–UHF Diplexer

TT-RF-FL-002

The VHF–UHF Diplexer is a passive radio frequency (RF) device designed to combine and separate signals operating in the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands. The diplexer consists of three ports: a **COMMON port**, a **VHF port**, and a **UHF port**. The COMMON port carries the combined signal, while the VHF and UHF ports handle their respective frequency bands. Proper identification of these ports is critical prior to installation, as incorrect connections may lead to signal loss or equipment damage.

A critical performance parameter of the diplexer is the isolation between the VHF and UHF ports. High isolation minimizes cross-coupling between the two frequency bands, thereby maintaining signal integrity and reducing interference. The diplexer achieves an isolation of better than 35dB between the VHF and UHF paths, ensuring robust and reliable performance in demanding RF environments.



Figure 1: Diplexer TT-RF-FL-002: Top view (left) and side view (right)



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The diplexer can be commonly used under three configurations discussed below:

Configuration 1: Signal Splitting (One Radio to Two Antennas)

In this configuration, the diplexer is used to combine signals from two separate RF sources into a single antenna. The **VHF transmitter** is connected to the VHF port, the **UHF transmitter** is connected to the UHF port, and the **COMMON port** is connected to the shared multiband antenna.

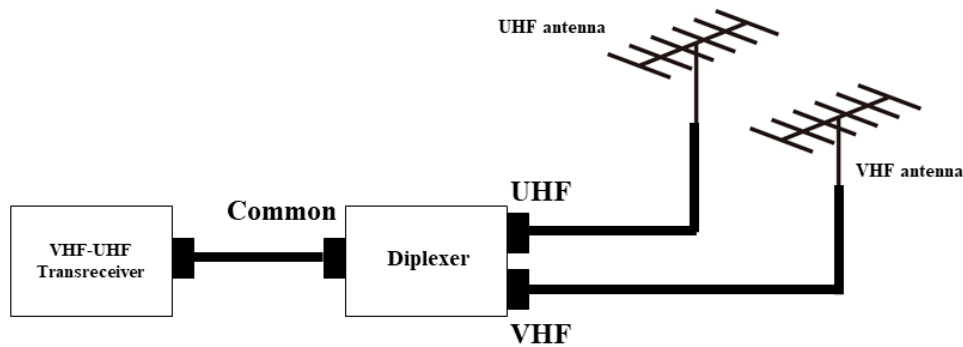


Figure 2: Configuration 1: Signal splitting

Configuration 2: Signal Combining (Two Radios to One Antenna)

In this configuration, the diplexer is used to split a broadband RF signal from a single source into two separate antennas. The **COMMON port** is connected to the RF source or transceiver, while the **VHF port** and **UHF port** are connected to their respective antennas.



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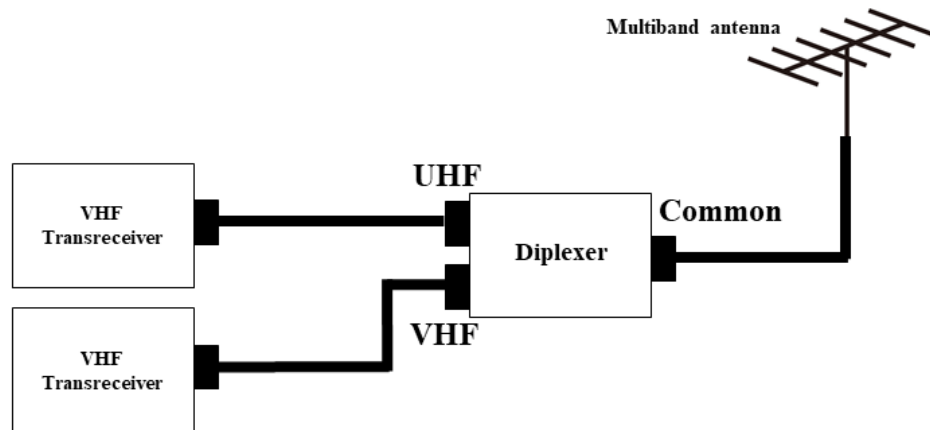


Figure 3: Configuration 2: Signal combining

Configuration 3: Remote Antenna Distribution (Two Radios to Two Antennas via Single Feedline)

In this configuration, two diplexers are used to enable transmission from two radios to two separate antennas through a single shared RF cable. This setup is particularly useful when the antenna system is located remotely, and only one feedline is available between the radio equipment and the antennas.

At the transmitter side, the **VHF radio** is connected to the VHF port of the first diplexer, and the **UHF radio** is connected to the UHF port. The **COMMON port** of this diplexer is connected to a single RF cable, which carries the combined VHF and UHF signals.

At the remote (antenna) side, a second diplexer is used to separate the signals. The **COMMON port** of the second diplexer is connected to the incoming RF cable. The **VHF port** is then connected to the VHF antenna, and the **UHF port** is connected to the UHF antenna.



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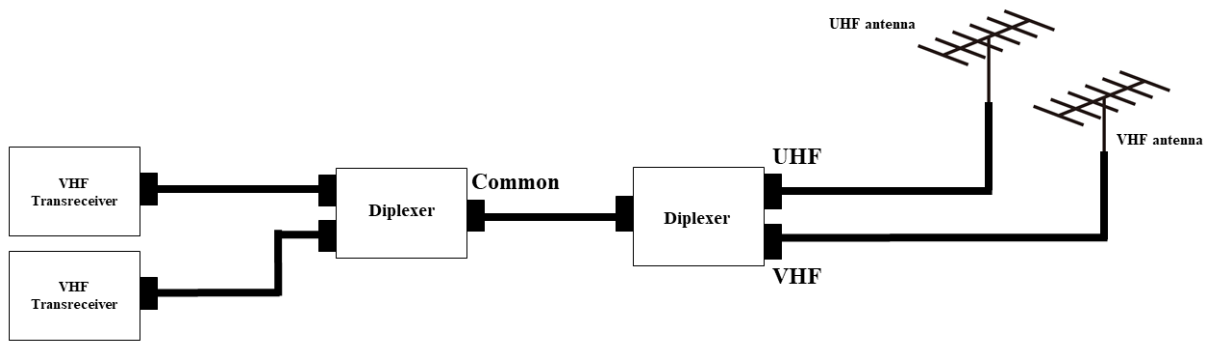


Figure 4: Configuration 3: Remote antenna distribution

Important Notes

- Ensure all connections are made using 50 Ω RF cables.
- Avoid incorrect port connections to prevent damage or performance degradation.
- Do not exceed specified power and frequency limits.
- Verify connections before powering the system.