

# Base Station Duplexers

## DB4036 (70-88 MHz); DB4044 and DB4046 (148-174 MHz)

### Installation and Alignment Instructions

#### PRODUCT DESCRIPTION

The **DB4036** duplexer is designed for use with 70-88 MHz repeaters. It is generally suitable for use in systems having 3 MHz or more separation between transmit and receive frequencies. It includes two bandpass cavities that are interconnected in a duplexer configuration; one cavity is located in the transmit section and one in the receive section.

The **DB4044** duplexer is designed for use with 148-174 MHz repeaters. It is generally suitable for use in systems having 3 MHz or more separation between transmit and receive frequencies. It includes four bandpass cavities that are interconnected in a duplexer configuration; two cavities are located in the transmit section and two in the receive section.

The **DB4046** duplexer is designed for use with 148-174 MHz repeaters. Providing greater isolation between frequencies than the DB4044, the DB4046 is generally suitable for use in systems having 2 MHz or more separation between transmit and receive frequencies. It includes six bandpass cavities that are interconnected in a duplexer configuration; three cavities are located in the transmit section and three in the receive section.

#### INSTALLATION

The duplexer can be mounted vertically or horizontally, but it is normally mounted vertically, with the tuning rods pointing upward. It can be installed either on, inside, or near the base station cabinet. Three connections, marked "Ant", "Trans", and "Rec", are made to the duplexer.

The transmission line (antenna) connects to the Tee connection marked "Ant". The interconnect cables (not supplied), which run from the transmitter and receiver chassis, connect to the appropriate connections marked "Trans" and "Rec".

The length of the interconnect cables is not critical, but they should be kept as short as possible to minimize loss. For best results, the interconnect cables should be the double-shielded type, such as RG9, RG55, or RG142. Once the duplexer is mounted, proceed with alignment of the cavities.

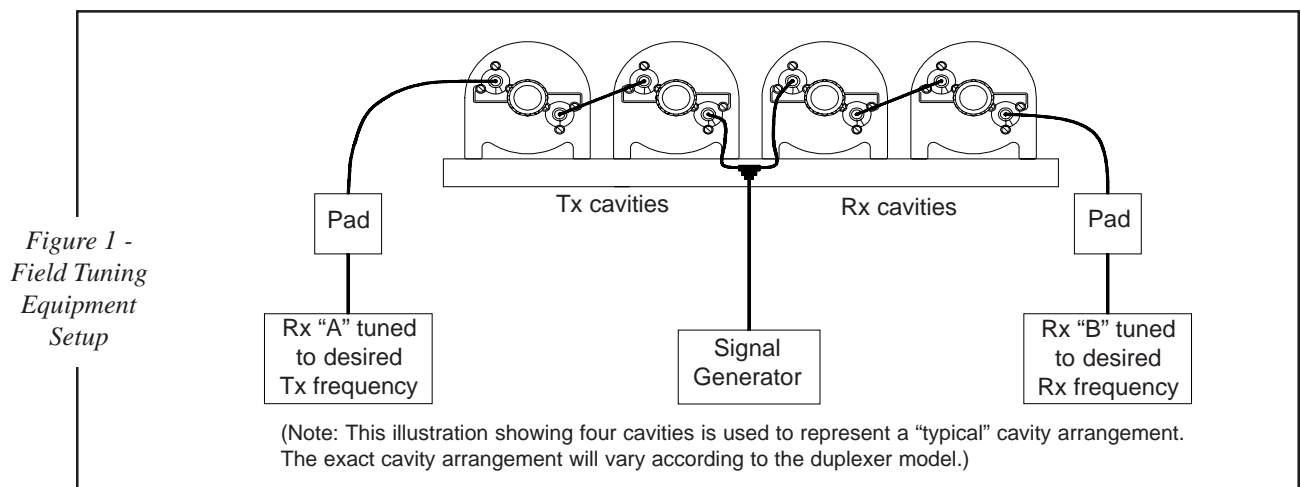
#### ALIGNMENT PROCEDURE

It is important that the duplexer be properly aligned. At resonance, the cavities present a 50 ohm impedance and pass the desired frequency with little loss. At all frequencies other than the resonant frequency, the cavities appear as a high impedance and thus attenuate the undesired frequencies.

The following equipment will be required to align the duplexer:

- A signal generator (50 ohms), with a 6 dB pad, capable of producing a signal at the transmitter and receiver frequencies.
  - A receiver tuned to the desired receive frequency.
  - A receiver tuned to the desired transmitting frequency.
  - Two 50 ohm pads (6 dB or more).
1. Connect the equipment as shown in Figure 1.
  2. Loosen the hex nut that locks the threaded tuning rod on each cavity.

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3. Tune the signal generator to the desired transmitter frequency. If the cavities are completely out of tune, it probably will be necessary to set the signal generator at maximum output.
4. Tune each of the cavities in the transmitter section of the duplexer while observing the limiter reading of receiver "A". Tune for a maximum limiter reading. To prevent receiver limiter saturation, adjust one cavity first, then adjust the other while reducing the signal generator output. To lower the resonant frequency of the cavity, turn the tuning rod clockwise; to raise the resonant frequency of the cavity, turn the tuning counterclockwise.
5. Tune the signal generator to the desired receiving frequency.
6. While observing the limiter reading of receiver "B", tune each of the cavities in the receiver section. Tune for maximum limiter reading. To prevent receiver limiter saturation, adjust one cavity first, then adjust the other while reducing the signal generator output.
7. Repeat Steps 3, 4, 5, and 6. This is necessary to compensate for slight interaction which exists between the adjustments. (As with any device having several interacting adjustments, it may be necessary to repeat Steps 3, 4, 5, and 6 three or four times to ensure proper final adjustment.)
8. Remove the signal generator, the pads, and receiver "A" from the duplexer circuit.
9. Connect the transmission line from the antenna to the Tee connector marked "Ant". Connect the interconnect cable from the transmitter and receiver to the appropriate connectors on the duplexer marked "Trans" and "Rec".
10. Place the "Tune-Operate" switch on the transmitter chassis in the "Tune" position.
11. Connect an in-line watt meter between the duplexer Tee connector and the antenna. Set the wattmeter for forward power. Tune the transmitter for maximum power output as indicated on the wattmeter.
12. Place the "Tune-Operate" switch on transmitter chassis in the "Operate" position (full power). If required, fine tune the transmitter final. Read the forward and reverse power on the wattmeter and record these readings for future reference. Note: It should not be necessary to retune any of the duplexer cavities.
13. Remove the wattmeter.
14. While receiving a weak signal (above noise level but below limiter saturation), tune the front end circuits of the receiver for a maximum limiter reading. Note: It should not be necessary to retune any of the duplexer cavities.

The duplexer should now be tuned for optimum performance.



## DECIBEL PRODUCTS

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