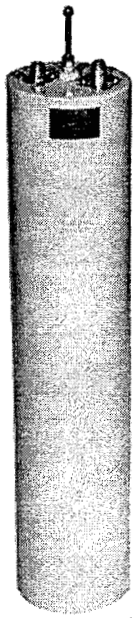
Bob Campbell Nov. 2006

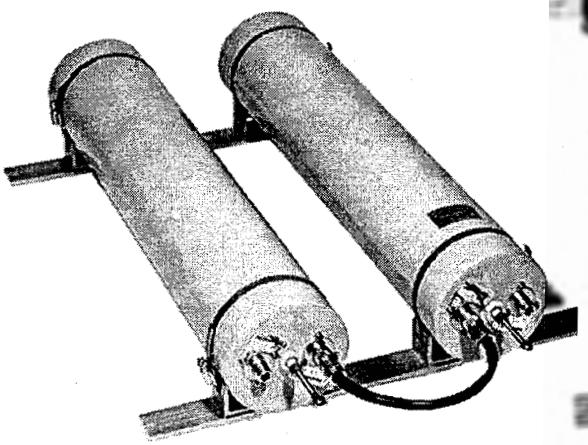
TELEWAVE, INC.®

118 - 148 MHz

TWPC-1405-1, 2, 3

BANDPASS CAVITIES





TWPC-1405-1 **TWPC-1405-2** **TWPC-1405-3**

Telewave TWPC-1405 cavities have 1/4" aluminum top plates which are fully welded to the aluminum outer-conductor. This improvement, along with silver-plated copper tuners, berylium copper fingers stock contactors, and threaded Invar rod, assures temperature-stable, High-Q operation.

All cavities are tuned prior to the shipping when frequencies are specified; no further adjustments should be necessary. If frequency changes are required, the positive locking mechanism allows for easy field tuning by rotating the threaded Invar tuning rod. Selectivity and insertion loss may also be adjusted by rotating the calibrated connector loops; no special equipment is required when making these adjustments.

The Telewave Model TWPC-1405 is a 5" diameter, High-Q cavity filter for use in highly congested RF environments. The Model TWPC-1405-2 dual-cavity and the TWPC-1405-3 triple-cavity filter provide additional protection as required for more severe RF environments. (See reverse side for typical selectivity characteristics.) All dual and triple-cavity combinations are supplied complete with interconnecting cables and mounting rails.

This bandpass cavity is ideal for use in any frequency congested area where maximum protection is needed from transmitter spurious radiation, and receiver desensitization.

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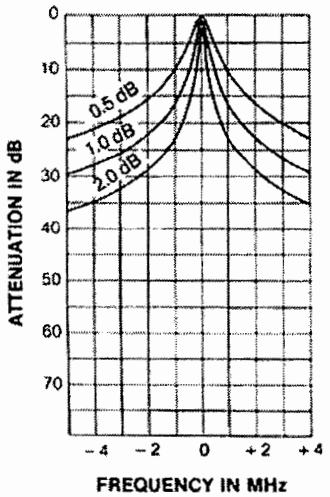
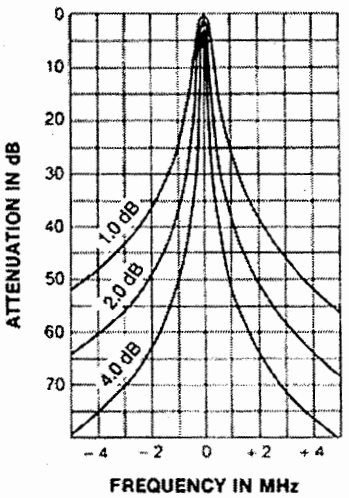
TWPC-1405-1, 2, 3

FIGURE 1.



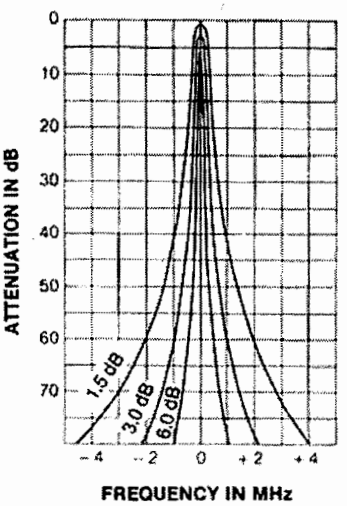
TWPC-1405-1 SINGLE CAVITY

FIGURE 2.



TWPC-1405-2 DUAL CAVITY

FIGURE 3.



TWPC-1405-3 TRIPLE CAVITY

ELECTRICAL DATA

	TWPC-1405	TWPC-1405-2	TWPC-1405-3
Tuning Range	118-148 MHz	118-148 MHz	118-148 MHz
Insertion Loss (Adjustable)	0.5 to 2.0 dB	1.0 to 4.0 dB	1.5 to 6.0 dB
Attenuation:	See Fig. 1	See Fig. 2	See Fig. 3
Nominal Impedance:	50 Ohms	50 Ohms	50 Ohms
VSWR at Resonance (max)	1.5:1	1.5:1	1.5:1
Input Power (max)			
0.5 dB insertion loss	350 Watts	350 Watts	350 Watts
1.0 dB insertion loss	250 Watts	250 Watts	250 Watts
2.0 dB insertion loss	150 Watts	150 Watts	150 Watts
Temperature Range	-30°C to +70°C	-30°C to +70°C	-30°C to +70°C
Cavity Electrical Length:	1/4 wavelength	1/4 wavelength	1/4 wavelength

MECHANICAL DATA

Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
Contactors, fingerstock	Berylium copper	Berylium copper	Berylium copper
End Plates	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Silver plated copper	Silver plated copper	Silver plated copper
Dimensions in (cm) (individual cavity)	5" dia. x 30" L (13 x 76)	5" dia. x 30" L (13 x 76)	5" dia. x 30" L (13 x 76)
Max. outside dim. in (cm) (with tuning rod extended)	5 x 35 (13 x 89)	5.25 x 19 x 35 (13 x 48 x 89)	5.25 x 19 x 35 (13 x 48 x 89)
Connector Terminations:	N or UHF female	N or UHF female	N or UHF female
Finish	Acrylic Enamel	Acrylic Enamel	Acrylic Enamel
Net Weight lb (kg)	6 (2.7)	12.5 (5.7)	20 (9.1)
Shipping Weight lb (kg)	9 (4.1)	15.5 (7)	23 (10.4)

WHEN ORDERING BE SURE TO SPECIFY EXACT FREQUENCY AND MODEL NUMBER.
Contact the factory if additional information or assistance is required.

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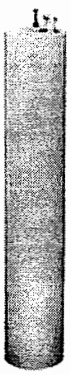
TELEWAVE, INC.

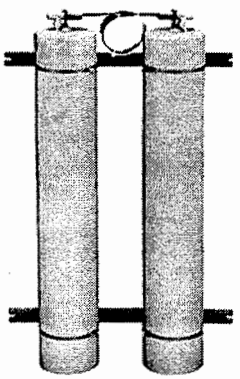
148 - 174 MHz

TWNC-1505-1,2

NOTCH CAVITIES



TWNC-1505-1



TWNC-1505-2

Telewave 5" Notch Cavities TWNC-1505-1 and TWNC-1505-2 are available in various configurations to meet your exacting filtering needs. When closer spacing is required, 8" or 10" cavities are available for a higher "Q". Notch cavities are often used in conjunction with pass cavities in complex filtering designs.

TUNING RANGE

Telewave Notch Cavities TWNC-1505-1 and TWNC- 1505-2 are shipped tuned and tested at 148-174 MHz from the factory. They can also be tuned to a single frequency specified by the customer. If field tuning is required, the positive locking mechanism makes tuning to another frequency simple. Cavities are tuned standard at 50 ohms impedance.

FREQUENCY STABILITY

Frequency stability, which is critical in cavities of high "Q" design, is engineered to close tolerances by the use of a specially machined compensator and a threaded invar rod. The pass frequency is temperature stable from -30 C to +60 C. Some configurations allow use of up to 350 Watts.

RUGGED CONSTRUCTION

Heavy duty materials are used throughout the cavity to insure top performance and long life. The top plate is machined from 1/4" aluminum, and heliarc welded to the aluminum outer conductor. An acrylic enamel finish is applied to prevent corrosion. The use of similar metals and alodined aluminium prevents galvanic corrosion. Silver plated tuners and beryllium copper finger stock assure a long life and Higher "Q." Mounting rails are provided for all multiple-cavity filters.

ADJUSTABLE SELECTIVITY

The TWNC-1505-1 & TWNC-1505-2 are quarter-wavelength cavities with an adjustable coupling loop and tuning capacitor. Insertion loss can be easily set from less than 0.5 dB to 2 dB or more with corresponding increases in selectivity. This allows for optimum settings of insertion loss and close frequency rejection. For severe RF environments, the TWNC-1505-2 dual cavity filter further increases "Q" to provide greater selectivity. Telewave uses ground loop technology which places the center pin of the loop at DC ground potential.

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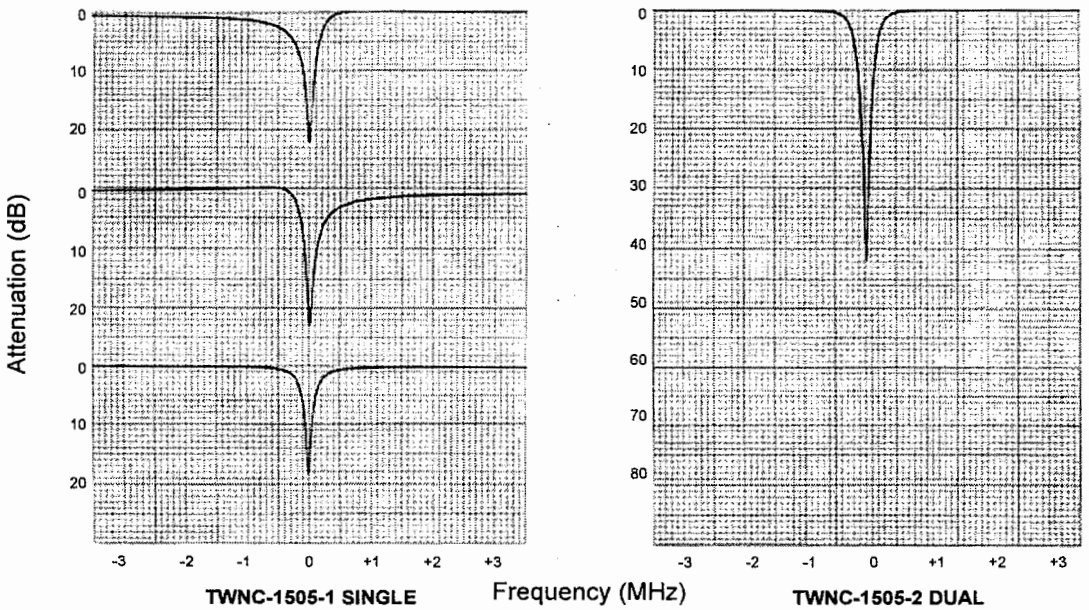
TWNC-1505-1,2



ELECTRICAL DATA

	TWNC-1505	TWNC-1505-2
Tuning Range	148-174 MHz	148-174 MHz
Nominal Impedance:	50 Ohms	50 Ohms
VSWR at Resonance (max)	1.5:1	1.5:1
Input Power (max)		
0.5 dB insertion loss	350 Watts	350 Watts
1.0 dB insertion loss	250 Watts	250 Watts
2.0 dB insertion loss	150 Watts	150 Watts
Temperature Range	-30°C to +70°C	-30°C to +70°C
Cavity Electrical Length:	1/4 wavelength	1/4 wavelength

MECHANICAL DATA

Materials:		
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar
Contactors, fingerstock	Berylium copper	Berylium copper
End Plates	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Silver plated copper	Silver plated copper
Dimensions in (cm) (individual cavity)	5" dia. x 23.5" L (13 x 60)	5" dia. x 23.5" L (13 x 60)
Max. outside dim. in (cm) (with tuning rod extended)	5 x 28 (13 x 71)	5.25 x 19 x 28 (13 x 48 x 71)
Connector Terminations:	N or UHF female	N or UHF female
Finish	Acrylic Enamel	Acrylic Enamel
Net Weight lb (kg)	5 (2.3)	11 (5)
Shipping Weight lb (kg)	8 (3.6)	14 (6.5)

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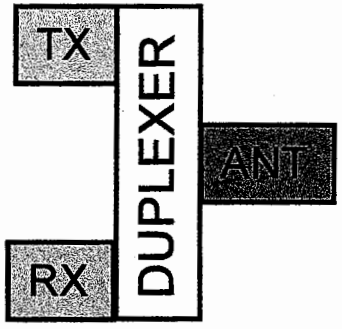
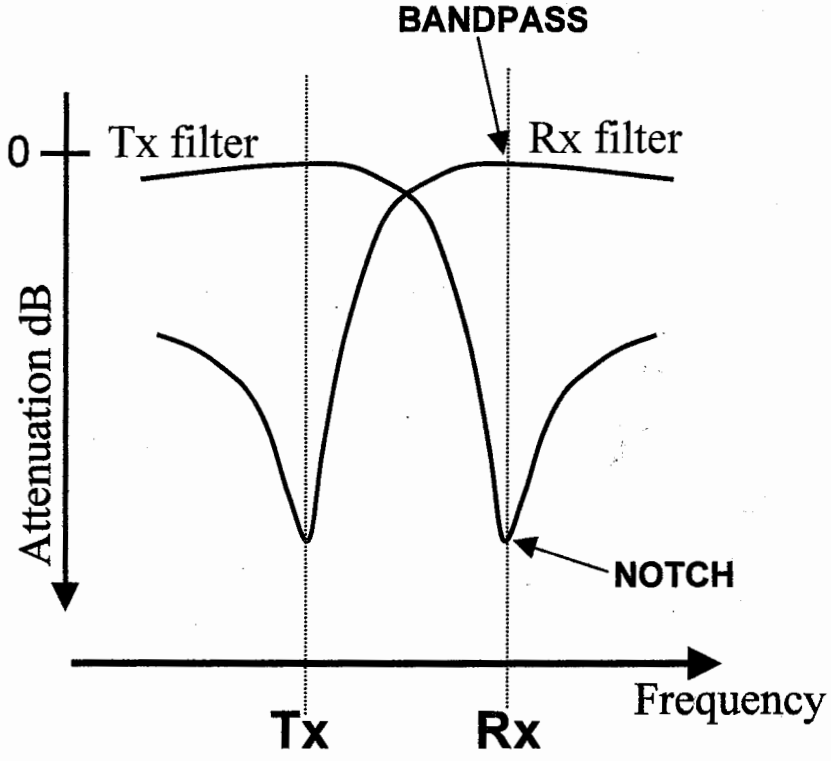
WHY USE DUPLEXERS ?

DUPLEXERS…

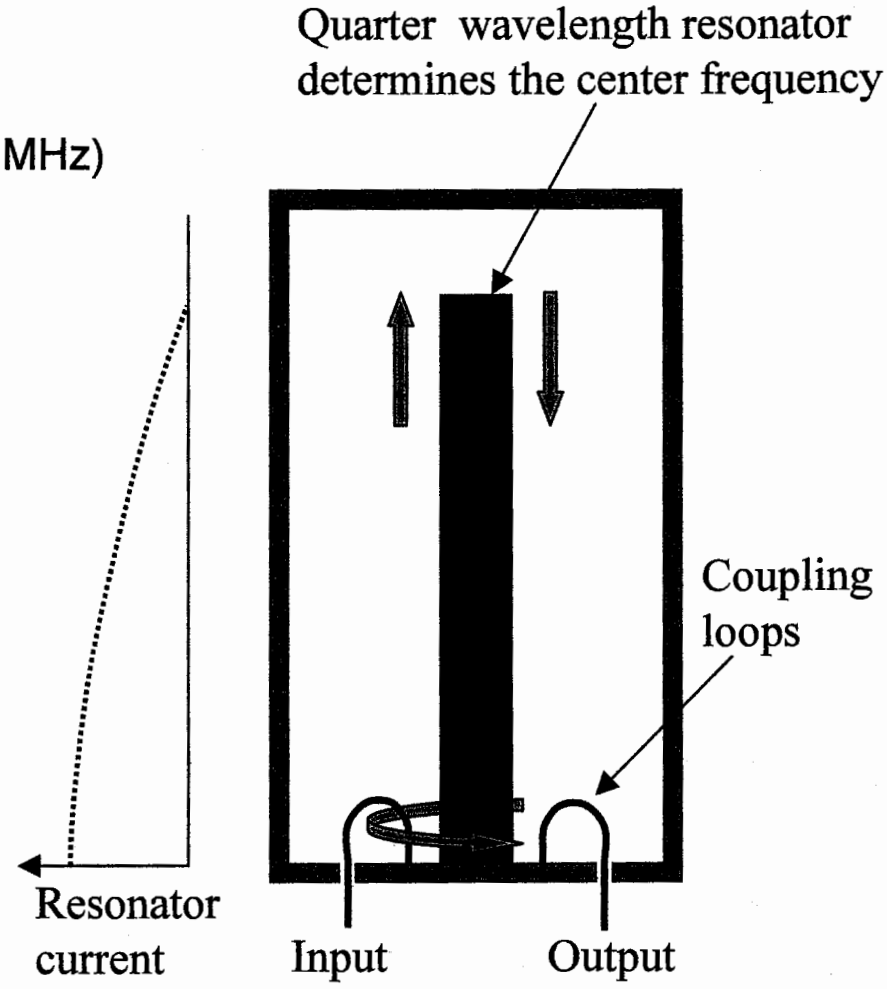
- Allow simultaneous transmit and receive on the same antenna
- The Rx filter attenuates the TX signal ~ 75 dB or more (approx 30 million times) and vice-versa
- The Tx filter attenuates the TX broadband noise being fed into the Rx by a similar amount
- Three port devices:





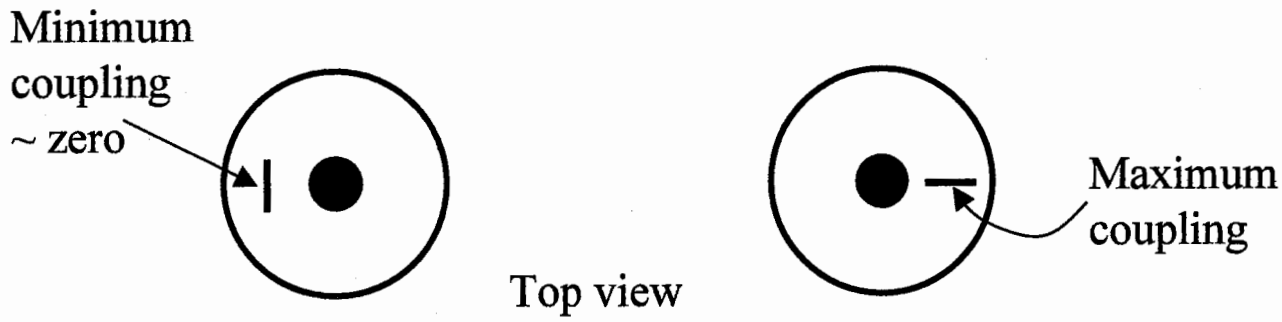
CAVITIES IN GENERAL

- Use a very low loss transmission line to improve selectivity (high Q)
  (~0.08 dB loss / 100 ft for a 6 in. cavity @ 150 MHz)
- The resonator acts as a quarter wave antenna inside a closed box, with max. current at the base
- In – out loops magnetically couple energy to the resonator
- Capacitive coupling may also used but not discussed here



LOOP COUPLING TO THE RESONATOR

- Loop orientation affects coupling:



- Loop size: increasing the loop size increases coupling and its inductance as well
- Loop proximity from the resonator: placing the loop closer will increase coupling.
- Loop coupling affects the insertion loss and selectivity in the bandpass region and the notch frequency in notch-bandpass designs.

BASIC TYPES OF DUPLEXERS

	TX – RX FREQ SEPARATION
❑ LO – HI PASS FILTERS	WIDE
➡ ❑ BANDPASS CAVITIES	MEDIUM
❑ NOTCH – BANDPASS CAVITIES	NARROW
❑ NOTCH CAVITIES	NARROW

PUTTING IT ALL TOGETHER

DUPLEXER BUILT WITH FOUR 6 in. SERIAL LOOP CAVITIES