

TNF400 Tuneable Notch Instruction Sheet

1.0 Introduction

The TNF400 series of notch filters are designed to provide a deep yet narrow notch. Units are available covering 10 Mhz to 500 MHz

2.0 Description

The TNF400 is contained in a small nickel plated brass case. Two adjustments are provided **FREQ** and **PEAK**. The first adjustment is **FREQ**: This adjusts the notch to the desired frequency. The second adjustment is **PEAK**: This sets the depth of the notch and the width.

It is usually possible to set the notch outside of the specified range of frequencies; however the notch may not meet all of its specifications. Also, the notch depth may be considerably deeper than specified but it is so narrow as to be unusable.

3.0 Bench Tests

Before installing the unit it is advisable to run performance tests to verify that the TNF400 is operating properly. Also, units that are suspect can be verified by these performance tests.

A network analyzer is required to run performance tests on the filter. Connect the output (generator portion) to one port on the filter. Connect the input (receiver portion) to the other port. The ports are symmetrical so it doesn't matter which port is connected to which device.

NOTE: Due to the narrow notch width of the TNF400 filters some network or spectrum analyzers may not display the correct notch depth when using wide sweeps. This especially applies to digital analyzers. Refer to the operators manual of your particular equipment. It is advisable to use minimal frequency dispersion, such as $\pm 10\%$ of center frequency, when checking the notch characteristics. Also, if the equipment allows setting of the number of measurement points use the highest setting.

Set the analyzer to cover more than the tuning range of the filter. The tuning range is specified on the label.

Set a marker on the analyzer to the highest notch frequency of the filter.

Set the **PEAK** trimmer to minimum capacity (slug CCW at top). Using the **FREQ** control so the center of notch is at the marker.

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3.0 Bench Tests-continued

Adjust the **PEAK**, by increasing the capacity, for notch depth of 30 dB below the input power level, e.g. if input level from analyzer is 0 dBm then notch should be -30 dBm or lower. The insertion loss at frequencies >10% from the notch should be <7.0dB. The notch width should be <0.7% at the -3 dB point below the insertion loss.

Increase the upper frequency of the sweep oscillator to beyond the useable range and check that insertion loss <7.5 dB at maximum useable frequency.

Set a marker for the lower notch frequency of the TNF400. Using the **FREQ** control tune the notch to the lower frequency and adjust the notch depth to -30 dB using the **PEAK** control; increasing the capacity, clockwise rotation, should accomplish this.

Measure the -3 dB bandwidth is <0.7%. Increase the upper frequency limit to beyond the useable range. Check that insertion loss over the useable range <7.5 dB.

This completes the performance tests, if the TNF400 passes all of these it is an acceptable unit.

4.0 Operation

If the TNF400 is being connected in a system where the effects of the notch are observable the TNF400 can be tuned after installation. If the effects are not observable then the TNF400 must be tuned to the desired notch frequency before installation.

Tuning

1. Connect a signal generator that will generate the desired frequency to one of the ports of the TNF400.
2. Connect a power meter, spectrum analyzer or network analyzer to the other port.
3. Adjust the signal generator to the the frequency to be notched.
4. Set the **FREQ** control for minimum power indication; this will be the center of the notch.

If a smaller notch width at less notch depth is desired then adjust the **PEAK** control for a narrower bandwidth.

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4.0 Operation-continued

NOTE: When adjusting the PEAK control for narrower bandwidth first adjust for maximum notch depth than adjust for desired bandwidth by decreasing capacity, turning the trimmer CCW.

Depending on the particular frequency it is possible to obtain a 3 dB bandwidth of +/-0.5%.

Connect the TNF400 in series between the source and the load devices. Insure that the impedance of the system is relatively close to 50 ohms. If there is any doubt it is advisable to measure the TNF400 performance in circuit.

5.0 Maintenance

The TNF400 is designed to be maintenance free, however the following precautions will assist in preventing corrosion or mechanical damage: If the unit is in damp or corrosive atmospheres store the filter in a closed plastic bag, with desiccant, when not in use.

Keep protective covers on connectors when the filter is not in use to prevent entry of foreign materials or damage from foreign objects.

The filter may be cleaned using any of the commercially available solvents. The nickel plate and stainless hardware will resist damage from all but the most corrosive of chemicals.

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5.0 Maintenance-continued

NOTE: some filters are supplied with connectors having a silver plate. Extra caution should be taken to insure that no damage occurs to the silver plating.

The trimmer capacitors are supplied with a conductive lubrication to improve the smoothness. Care should be taken not to allow solvents or other liquids to enter the trimmer as these may dilute the lubrication.

6.0 Specifications

Please see the attached product data sheet for a complete list of specifications for the TNF400.

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