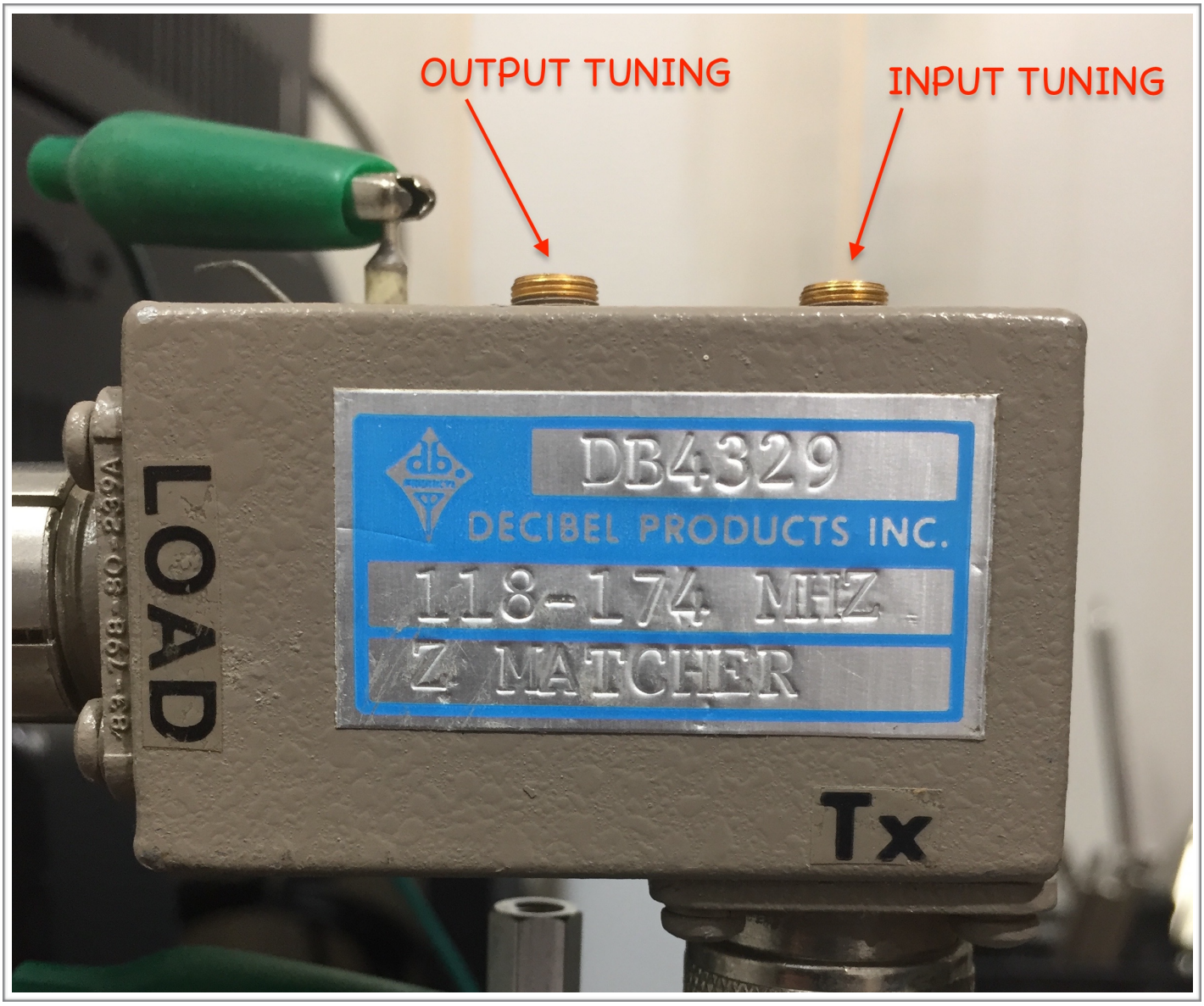
The final output of a transmitter should be a nominal 50 Ohms impedance. “should” and “nominal” are key words because often the P.A. is between 40 and 60 Ohms.

In the case of a repeater, a properly tuned duplexer is very close to 50 Ohms impedance. If it is not then tuning is required.

A P.A. not at 50 operating into a 50 Ohm load will result in reflected power - a bad thing. Reflected power can be handled with a circulator, but there is a better way.

A properly tuned Z-Matcher will transfer more of that power to the antenna and less of it back into your radio as heat.

Small and simple, this is a 2-meter Z-Matcher.



I set up a test using an antenna analyzer through this Z-matcher into a dummy load and adjusted the tuning to get this:

. . . essentially a perfect match. Keep in mind, the tuning must take place on the actual P.A. you will be using. Use of this antenna analyzer was just a demo to show what could be done.

Following are the instructions for this Z-matcher.

Z-Matcher
Impedance Matching Network

Tuning Instructions

PRODUCT DESCRIPTION

The Z-Matcher is an impedance matching network designed by Decibel for use with any transmitter that is within the design frequencies of the device. The Z-Matcher allows the transmitter to operate at a maximum efficiency by matching the source impedance (transmitter output impedance) to the load impedance (antenna, duplexer, isolator, etc.).

The following outlines the tuning procedure for the Z-Matcher.

1. Using a 50-ohm coaxial cable, connect the transmitter to a wattmeter and a load as shown in Figure 1.
2. Key the transmitter and adjust the power adjustment control on the transmitter to approximately 80 percent of the desired power level.
3. Insert the Z-Matcher into the transmission line, as close as possible to the transmitter. Connect a voltmeter (VOM) with a low D.C. scale to the feed-thru capacitor on the Z-Matcher (negative ground).
4. Key the transmitter and alternately adjust the two tuning capacitors on the Z-Matcher to achieve maximum output power. (Note: The wattmeter or VOM may also peak.)
5. Once the Z-Matcher is optimally tuned, readjust the transmitter power control (located in the final power amplifier) to the desired output power level. Note the voltage reading on the VOM and record this reading versus the wattmeter reading.
6. Remove the wattmeter from the system and readjust the Z-Matcher for optimum output power as shown on the VOM attached to the Z-Matcher.
7. The transmitter will now operate at maximum efficiency. (This can be proven by monitoring P.A. voltage and current both before and after installing and tuning the Z-Matcher.)

Note: Some systems may be connected in such a way that little or no increase in efficiency can be achieved. In such cases, insert a small piece of transmission line – approximately one-quarter wavelength – between the Z-Matcher and the load, and repeat steps 4 through 7.

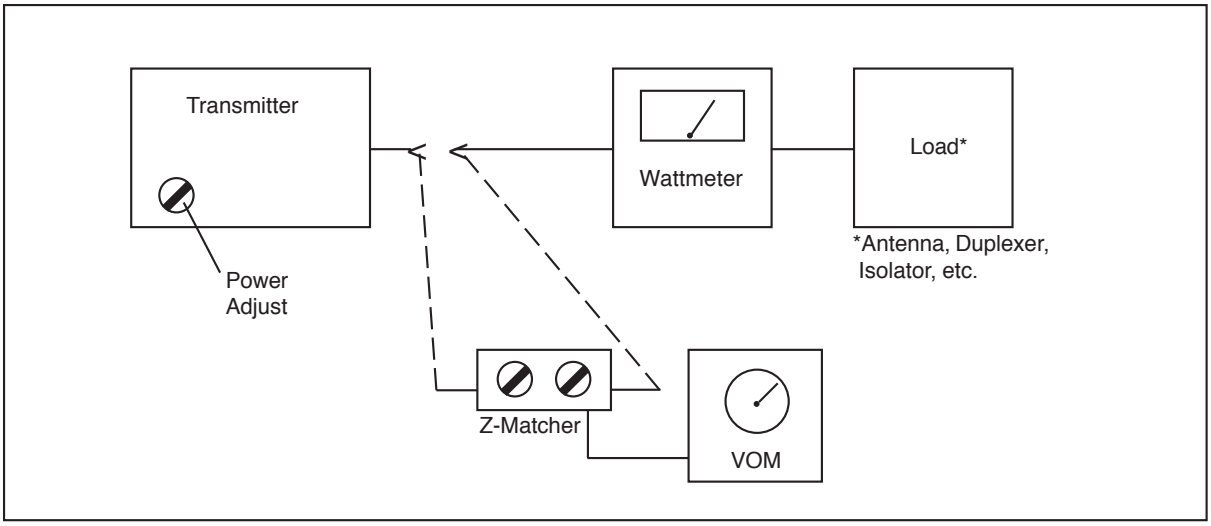


Figure 1 - Block Diagram

DECIBEL PRODUCTS
A Division of Allen Telecom Inc.
8635 Stemmons Freeway • P. O. Box 569610 • Dallas, Texas 75356-9610
214 / 631-0310 • Fax: 214 / 631-4706