Coaxial Dynamics
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SPECIALISTS IN RF TEST EQUIPMENT & COMPONENTS

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Instruction Manual

Model 81094
Advanced Wattchman

Serial Number _____

Port 1: Forward _____ Reflected _____

Port 2: Forward _____ Reflected _____

Date: _____ Calibrated by: _____

SAFETY

Personnel operating high power or high voltage systems should use standard safety precautions at all times. Do not attempt to disconnect systems or replace parts while equipment is operating. Disconnect all supply power before servicing.

WARNING

There are no user serviceable parts inside this product.
The possibility of accidental shock is present.

MODEL 81094 SPECIFICATIONS

Meter Specifications		2-line LCD Display ±1% full scale.
Controls	*Front Panel*	Push button reset.
	Connections	RJ-45 connector AC power input. Fuse holder. Relay Contacts Serial connector
Contact Ratings		3 A at 120 VAC Resistive
System Accuracy		±5% full scale when used with proper Coaxial Dynamics Line Sections and Detecting Elements.
Power Requirements		115 / 230 VAC, 50 / 60 Hz Less than 2 A

INTRODUCTION

The Coaxial Dynamics Model 81094 Advanced Watchman is intended for use as a continuous performance monitor and protection device for use in RF transmission systems. It is designed to be used with 50-Ohm dual socket line sections, and will read power from two independent line sections. The operating frequency and power range is determined by the elements and line sections used. With the proper selection of elements it may also be used to monitor the combined transmitter power and power to the reject load with one display unit.

The Model 81094 can be used to measure both analog and digital signals, depending on which types of elements are used.

The forward display on the Model 81094 will indicate forward power to the load while the system is in operation. It can be set to activate the shut down circuits if forward power changes outside a preset range. The reflected display will indicate power reflected from the load, and will activate the shut down circuits if power exceeds a preset level. Each channel operates independently of each other and the alarms may be set for each system separately.

The Model 81094 is made with high quality components. Used and maintained properly, it will provide years of dependable service.

Figure 1

SECTION 1 - INSTALLATION

1.1 Mounting

The Model 81094 is designed to be mounted in a standard 19" relay rack. Control and input wire lengths are not critical so the unit can be mounted in a convenient location offering easy accessibility and viewing.

When mounting, be sure to use proper grounding techniques. Interlock wiring should be shielded and the chassis ground connection on the Watchman should be attached to a good earth ground.

Place the unit in the rack and secure with (4) four screws located in the slots provided. The line section may be mounted in the transmission line between the transmitter output and the antenna or between the driver and final output transmitter. The latter provides protection in the event a malfunction in the input circuits of the final transmitter.

The Model 81094 is designed to work with a series of specialized line sections from 7/8" to 6-1/8" and standard Coaxial Dynamics elements for either analog or digital applications. Elements are available from 1 W to 100 kW and from 2 MHz to 2.3 GHz. A typical system normally consists of a dual socket line section with the appropriate elements for each transmission line to be monitored. Each line section comes with a 10-foot telecommunications style cable to interface with the 81094. No additional power supply or cabling is required at the line section other than an RF source and load.

1.2 Connections

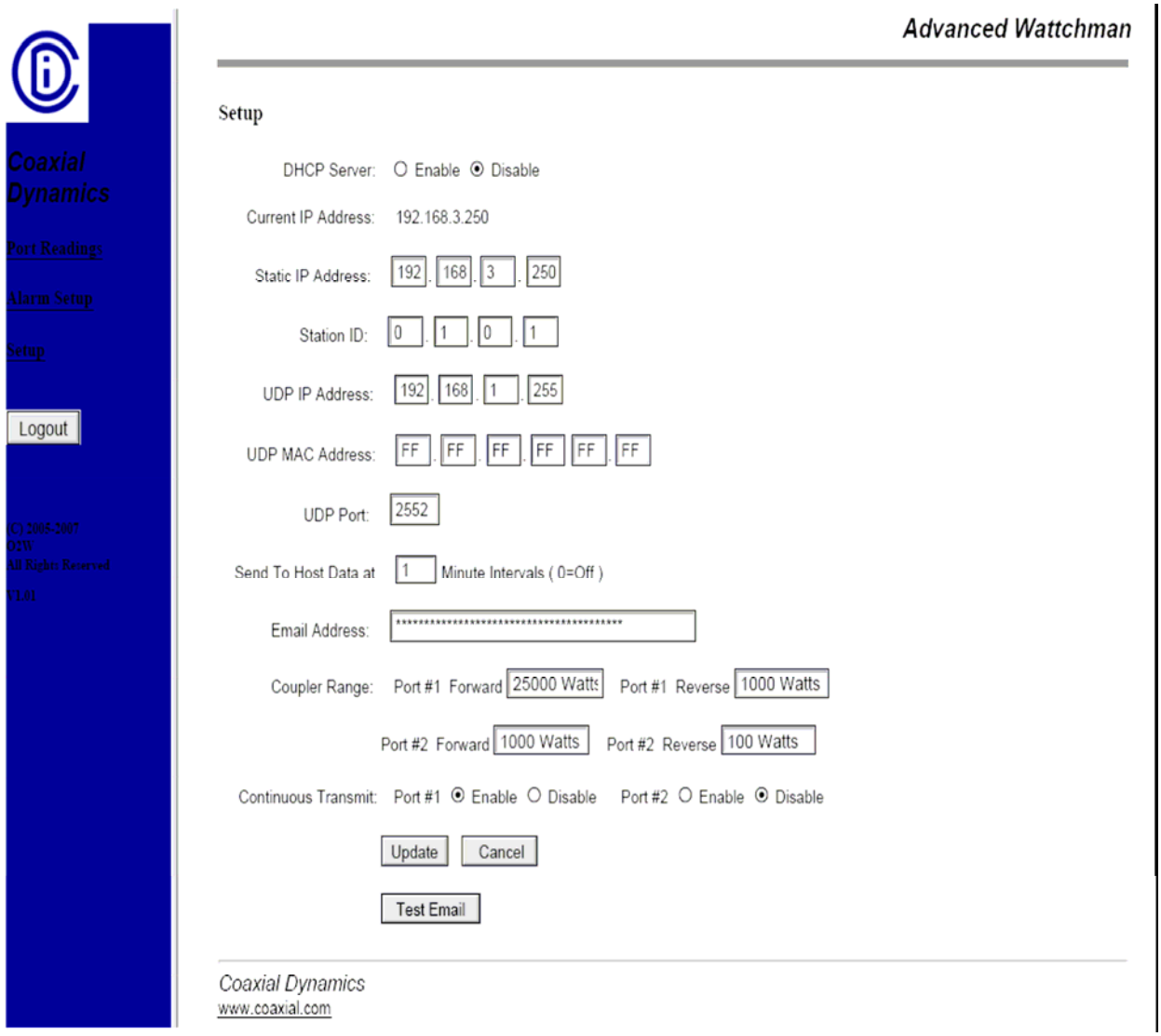
Connections to the Model 81094 strip are as follows:

Pin #1	Remote Reset – Momentary to Ground
Pin #2	+5 VDC @ .25 A
Pin #3	System Ground
Pin #4	Common System, Control relay – common to 5 and 6
Pin #5	Common System, Control relay – N.C.
Pin #6	Common System, Control relay – N.O.
Pin #7	System 1, Control relay – common to 8 and 9
Pin #8	System 1, Control relay – N.C.
Pin #9	System 1, Control relay – N.O.
Pin #10	System 2, Control relay – common to 11 and 12
Pin #11	System 2, Control relay – N.C.
Pin #12	System 2, Control relay – N.O.

The RJ-45 Input connectors are provided for connection to the Line Sections.

AC power is applied through the fused receptacle on the rear panel. The mating power cord is supplied. Power requirements are 115/230 VAC, 50/60 Hz.

1.3 Setup



The Model 81094 needs to be setup for the proper IP address for your system as well as the proper element power ranges for your transmitter. The unit may be addressed using a crossover cable connected to the Ethernet connector on the rear panel. The initial IP address of the Model 80194 is 192.168.3.250 and the initial password is “123456”. The password may be changed by using the RS-232 connection and a terminal program. Connect at 19200,8-N-1 flow control should be set for Xon/Xoff and press enter to access the set-up menu. *To reset the unit to original factory settings, turn the unit off. Press and hold the reset switch when turning the power on.*

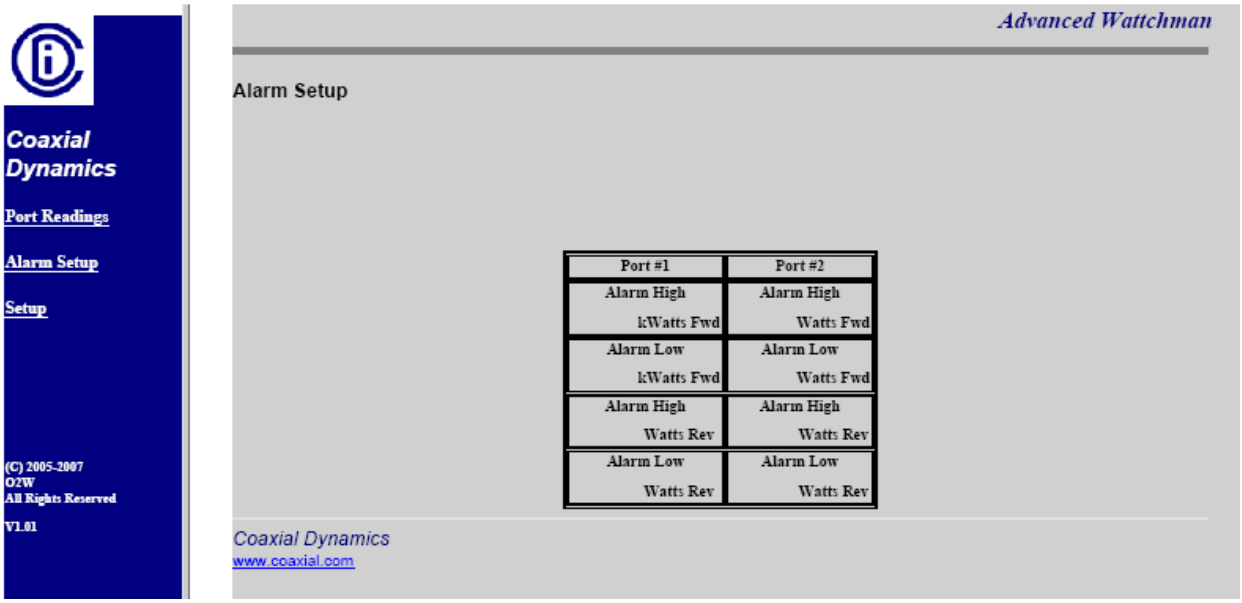
Both the forward and reflected power ranges must be set for each port to match the elements in use.

If elements are ordered with the Model 81094, the ranges will be set at the factory on port 1 and noted on the front of this manual.

If you are only using one port, the setting of other power ranges does not matter, but set the “continuous transmit” to disable. This will prevent the alarm from triggering at “zero” power. If

AC power to the unit fails, the Model 81094 will maintain the proper settings in the nonvolatile memory. To use the e-mail function, set the static IP address to work within your system. Set the UDP IP address to 208.186.16.7. Set the UDP MAC address to the MAC address of the last device connected to the internet, usually the modem. Enter the e-mail address you want e-mail sent to and be sure to have your junk folder set to accept the e-mail. If you are using a router, make sure that the router will accept traffic on port 2552. After all settings are complete, click on the" update" button to reset the system. Click on the "test e-mail" button to verify proper performance

1.4 Alarm Setup



Model 81094 is equipped with an audible alarm. When a fault is detected and the system is tripped, the alarm will sound. Terminals 4,5 and 6 will switch if either system one or two faults and can be used for an external alarm. These contacts are normally open and close during a fault condition. These contacts have a rating of 2 Amps at 115 VAC. The alarms are set using an Ethernet crossover cable.
If you do not want the alarm operational for low forward power, set the low limit to zero. If you do not want the alarm to function on high forward power, set the alarm to the power rating of the element.

1.5 Control Contacts

Three sets of control contacts are provided. They are labeled on the rear panel. Terminals 1 and 3 provide a remote reset function, terminal 2 is a 5 V supply rated at 0.5A. Terminals 4,5 and 6 will switch if either system faults and could be used for an external alarm. Terminals 7,8 and 9 are for the transmitter monitored by port 1; terminals 10,11 and 12 are for the transmitter monitored by port 2. This allows protection for combined transmitter systems or shutdown of drive and final amplifier simultaneously.

SECTION 2 - OPERATION

2.1 Unit Operation

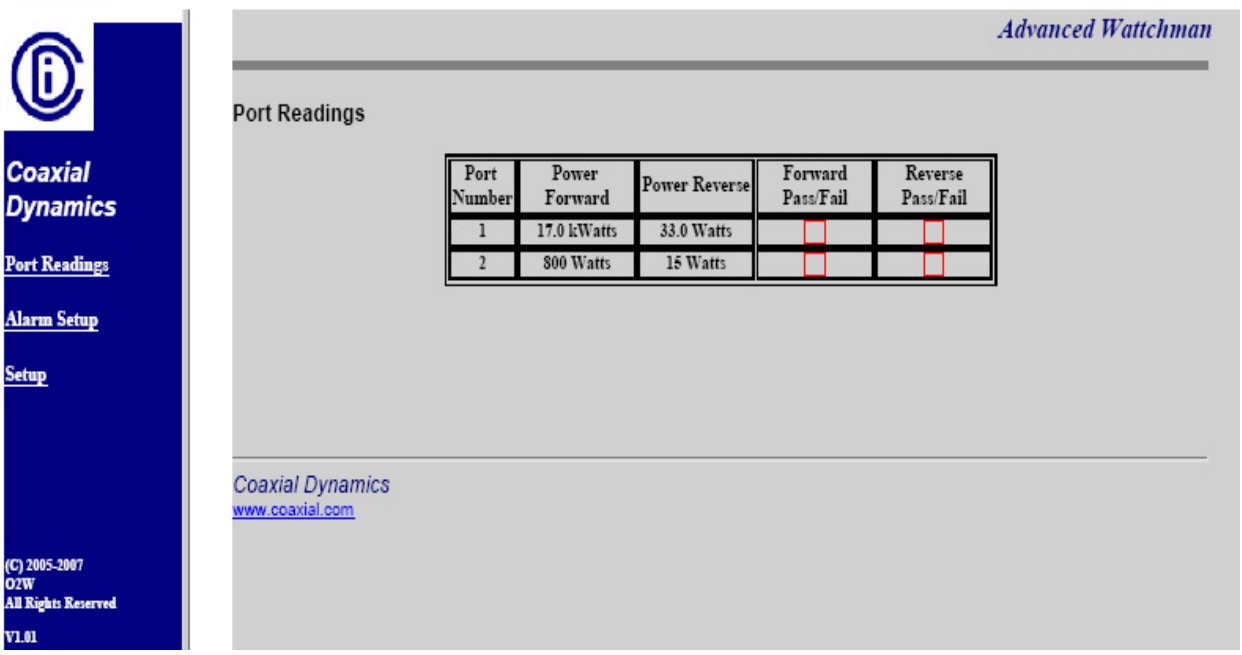
Make sure all connections; adjustments and settings are correct before operation of the unit. When RF power is present, the unit will operate as a power meter displaying both forward and reflected power for each port, if they are connected to a line section.

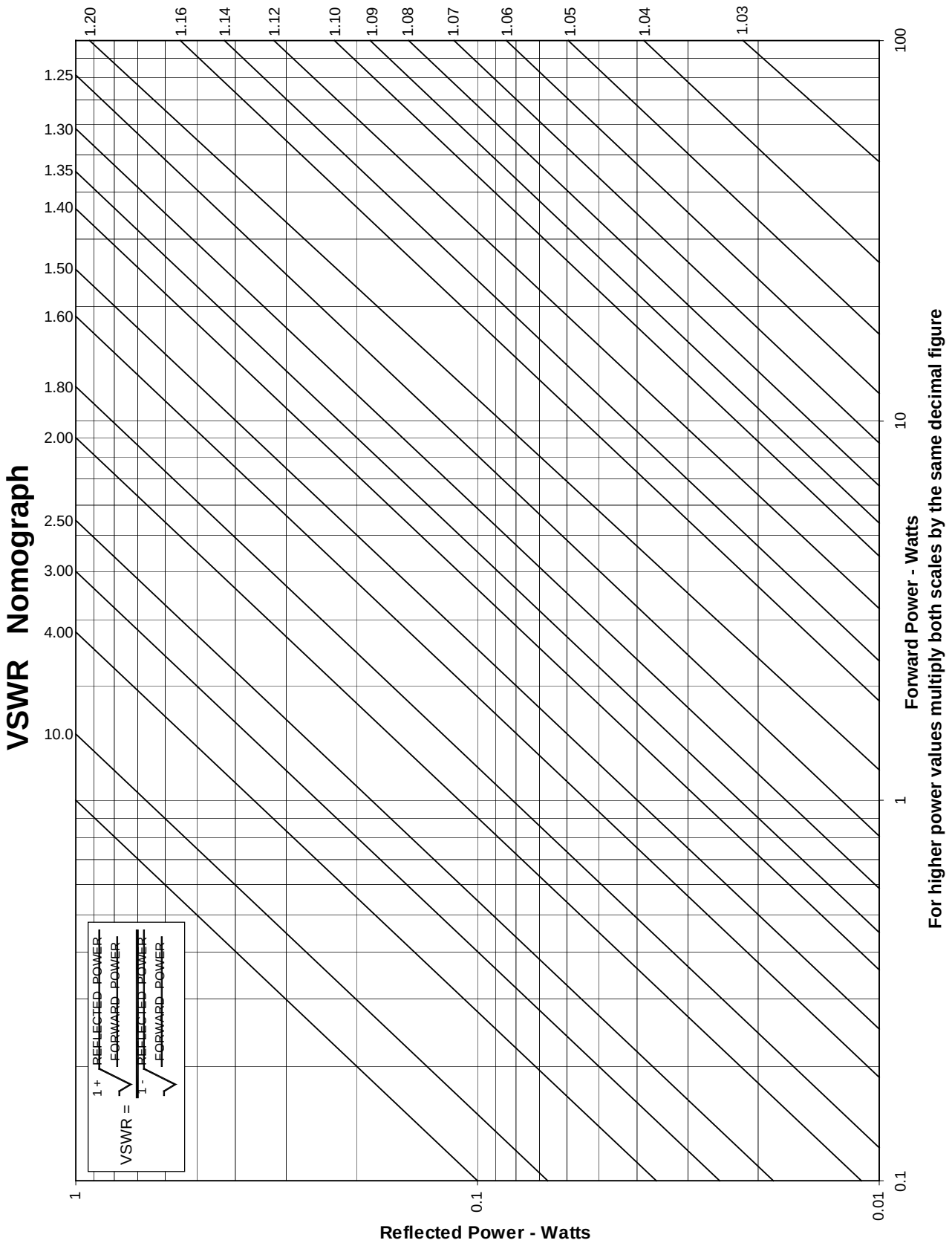
If you add port 2 after the initial setup, you will need to shut down the unit and enter the power and alarm settings before connecting the new line section cable to the Model 81094. (See section 1.3 Setup)

When the reflected power rises above the preset level (or when forward power drops below the preset level) the Model 81094 will sound the alarm. If the systems are connected to an interlock circuit the protected unit will be shutdown and the display will hold the fault condition until the unit is reset. To reset the unit, press the reset button until the display indicates "Sending E-Mail"**.** ***Note: this resets only the Model 81094. The fault needs to be corrected before restarting the transmitter.***

2.2 Load Adjustments

If adjustment at the load is required without interruption by the Model 81094, set the alarm points outside the range expected to be measured.




VSWR Nomograph
1.20
1.16
1.14
1.12
1.10
1.09
1.08
1.07
1.06
1.05
1.04
1.03
1.25
1.30
1.35
1.40
1.50
1.60
1.80
2.00
2.50
3.00
4.00
10.0
100
10
1
0.1
1
0.1
0.01
VSWR = (1 + √(REFLECTED POWER / FORWARD POWER)) / (1 - √(REFLECTED POWER / FORWARD POWER))
Reflected Power - Watts
Forward Power - Watts
For higher power values multiply both scales by the same decimal figure

NOTES