Coaxial Dynamics
A CDI INDUSTRIES, INC. COMPANY
SPECIALISTS IN RF TEST EQUIPMENT & COMPONENTS

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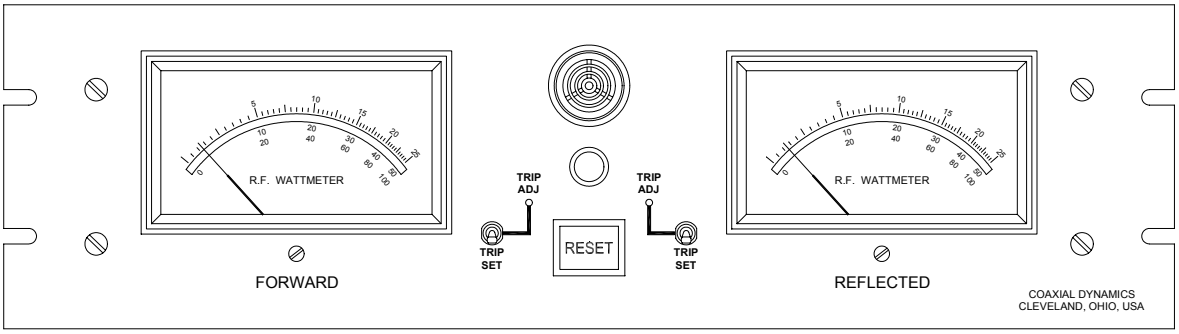
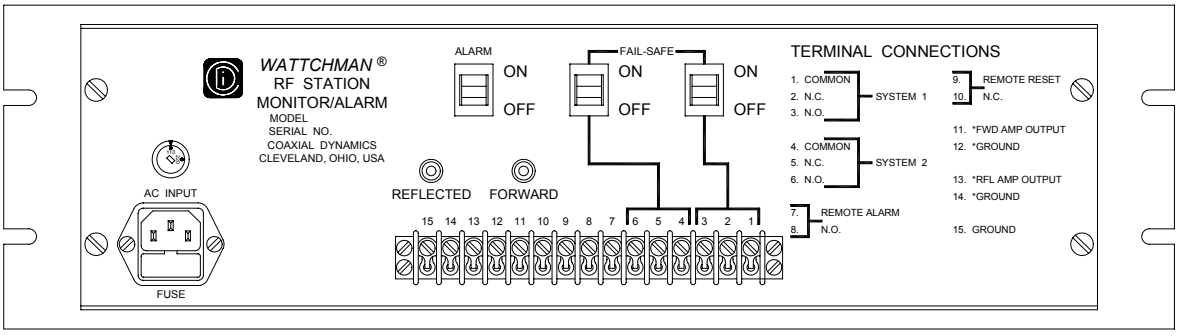
Instruction Manual

Model 81090 / 81091
Wattchman Station
Monitor / Alarm





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

Remove power to this unit before removing top cover. The possibility of accidental shock is present.

MODEL 81090 / 81091 SPECIFICATIONS

Meter Specifications		30 microamps ±1% full scale. 1400 Ohms resistance. 4-1/2" movement.
Controls	*Front Panel*	Push button reset. Trip set switches. Trip set adjustments.
	Rear Panel	Audible alarm switch. Fail-safe mode switches. Voltage selector switch.
	Connections	Meter inputs. N.O./N.C. control connections. Remote alarm turn on - N.O. Remote reset connections. Amplified D.C. outputs. AC power input. Fuse holder.
Contact Ratings		5 A at 120 VAC non-inductive.
System Accuracy		±5% full scale when used with proper Coaxial Dynamics Line Sections and Detecting Elements.
Power Requirements		115 / 230 VAC, 50 / 60 Hz

INTRODUCTION

The Coaxial Dynamics Model 81090/81091 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. The operating frequency and power range is determined by the elements and line section used.

The forward meter on the Model 81090/81091 will display forward power to the load while the system is in operation. It can be set to activate the shut down circuits if forward power drops below a preset level. The reflected meter will display power reflected from the load and will activate the shut down circuits if power reaches a preset level.

The Model 81090/81091 also provides, on the rear panel, a 0 to 2.0 VDC output proportional to the RF power.

The Model 81090/81091 is made with high quality components. Used and maintained properly, it should provide years of dependable service.

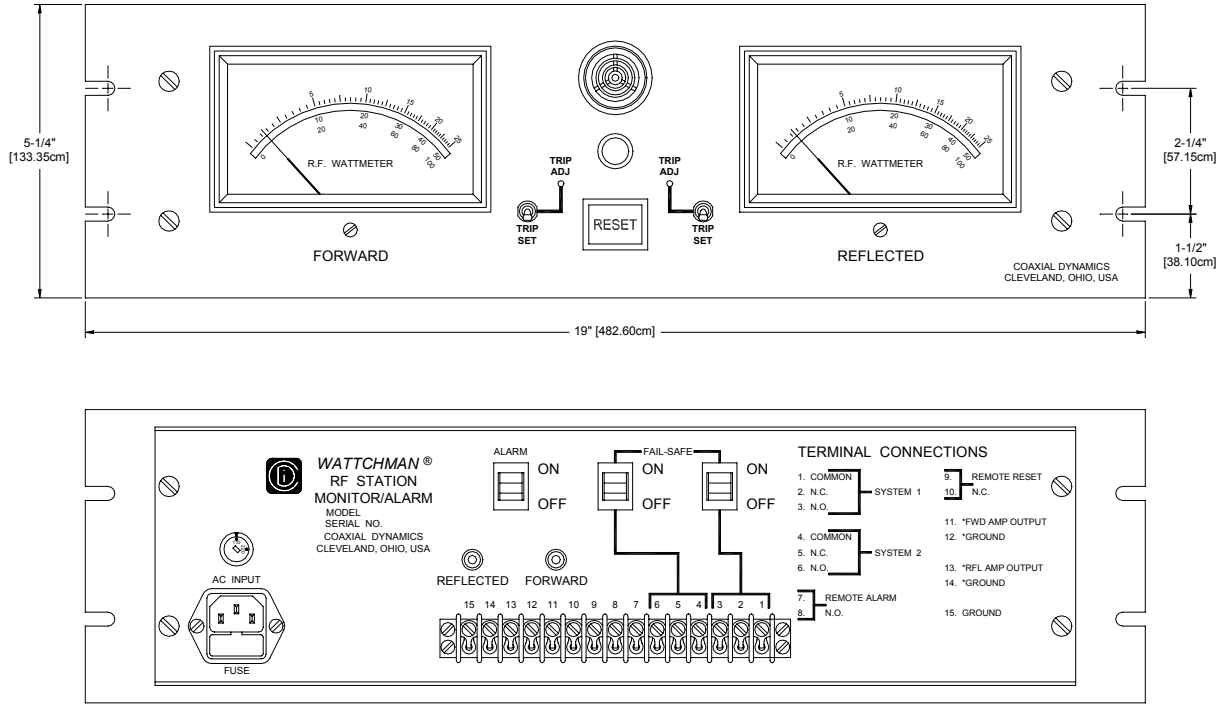


Figure 1

SECTION 1 - INSTALLATION

1.1 Mounting

The Model 81090 is designed to be mounted in a standard 19" relay rack *(Refer to Figure 1 for dimensions).* 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 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 81090/81091 is designed to be used with all Coaxial Dynamics 50-ohm dual socket line sections. These line sections have dual sockets so that both forward and reflected elements may be placed in the system using only one line section.

Model 81090/81091 comes supplied with two (2) 25' cables for connecting the line section to the unit. Cables up to 200' can be ordered from Coaxial Dynamics.

1.2 Connections

Connections to the Model 81090/81091 barrier strip are printed on the back panel of the unit. They are:

Pin #1	System 1, Control relay – common to 2 and 3
Pin #2	System 1, Control relay – N.C.
Pin #3	System 1, Control relay – N.O.
Pin #4	System 2, Control relay – common to 5 and 6
Pin #5	System 2, Control relay – N.C.
Pin #6	System 2, Control relay – N.O.
Pin #7 & 8	Remote alarm relay – N.O.
Pin #9 & 10	Remote reset
Pin #11	0 to 2.0 VDC Forward output
Pin #12	Ground
Pin #13	0 to 2.0 VDC Reflected output
Pin #14	Ground
Pin #15	Ground

Input connectors are provided for connection to the Line Section. Make sure these connections are made to the proper line section socket *(Refer to Figure 1).*

1.3 Alarm

Model 81090 is equipped with an audible alarm. When a fault is detected and the system is tripped, the alarm will sound. A switch is provided on the rear panel if an audible alarm is not desired

A set of relay contacts is also provided for operation of a remote alarm. These contacts are normally open and close during a fault condition. These contacts have a rating of 5 Amps at 115 VAC.

1.4 Remote Reset

If a remote reset is desired, remove the jumper on pins 9 and 10 and connect a normally closed momentary switch to these terminals.

1.5 AC Power

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.

1.6 Control Contacts

Two sets of control contacts are provided. They are labeled System 1 (pins 1, 2 and 3) and System 2 (pins 4, 5 and 6). This allows protection for combined transmitter systems or shutdown of drive and final amplifier simultaneously. Fail-Safe or Non-Fail-Safe modes can be selected for each system and operate independently.

Connect the systems control line configuration as desired (i.e. N.O. or N.C.).

1.7 DC Output

Pins 11 and 13 provide an amplified DC output for both forward and reflected power respectively, proportional to R.F power *(Refer to Figure 2).* The amplified outputs are calibrated at the factory so that at full scale meter indication, 2.0 VDC is available to drive remote monitoring equipment.

SECTION 2 - OPERATION

2.1 Adjustments

The two panel meters should be checked for zero with no power applied. If the zero set needs adjustment, it can be reset with the screwdriver adjustment on the front of the meter. The forward power trip is set at the factory for zero. To avoid low power alarm and trip during start up, make sure the forward power trip is set to zero. After adjusting the transmitter to the desired level, the trip point may be set to trip if forward power drops below the set point. To set the trip point, depress the proper toggle switch on the front panel and adjust the meter for the desired point using the appropriate adjustment potentiometer.

The reflected power trip adjustment is made in the same manner as the forward. This meter will initiate an alarm and the shut down circuitry should power rise above the preset level.

2.2 Mode Selection

Model 81090/81091 can be set to operate in one of two modes, Fail-Safe and Non-Fail-Safe. In the Fail-Safe mode, the unit will shut down the system in the event AC Power to the unit is lost. This prevents unprotected operation. In the Non-Fail-Safe mode, systems stay on in the event AC power is lost to the unit. The alarm and shut down systems will operate normally as long as there is AC power present.

!! WARNING !!

In the Non-Fail-Safe mode, there
will be no protection if AC power is lost.

2.3 Unit Operation

Make sure all connections, adjustments and mode selections are correct before operation of the unit. When power is present, the unit will operate as a power meter displaying both forward and reflected power. These measurements may be used to calculate VSWR quickly (Refer to Figure 3).

When the reflected power rises above the preset level (or when forward power drops below the preset level) the Model 81090/81091 will sound the alarm. The systems protected will be shutdown and the reset button will be illuminated red. To reset the unit, press the red reset button until the illumination goes out***. Note: this resets only the Model 81090/81091. The fault needs to be corrected before restarting the transmitter.***

To prevent a false alarm after AC power failures, a two (2) second delay circuit has been incorporated in the trip lines.

2.4 Load Adjustments

If adjustment at the load is required without interruption by the Model 81090/81091, remove the jumper on the barrier strip terminals 9 and 10. If a remote reset is being employed, disconnect the switch until the adjustments are complete.

After completion of the adjustments, reconnect the jumper or switch for normal operation.

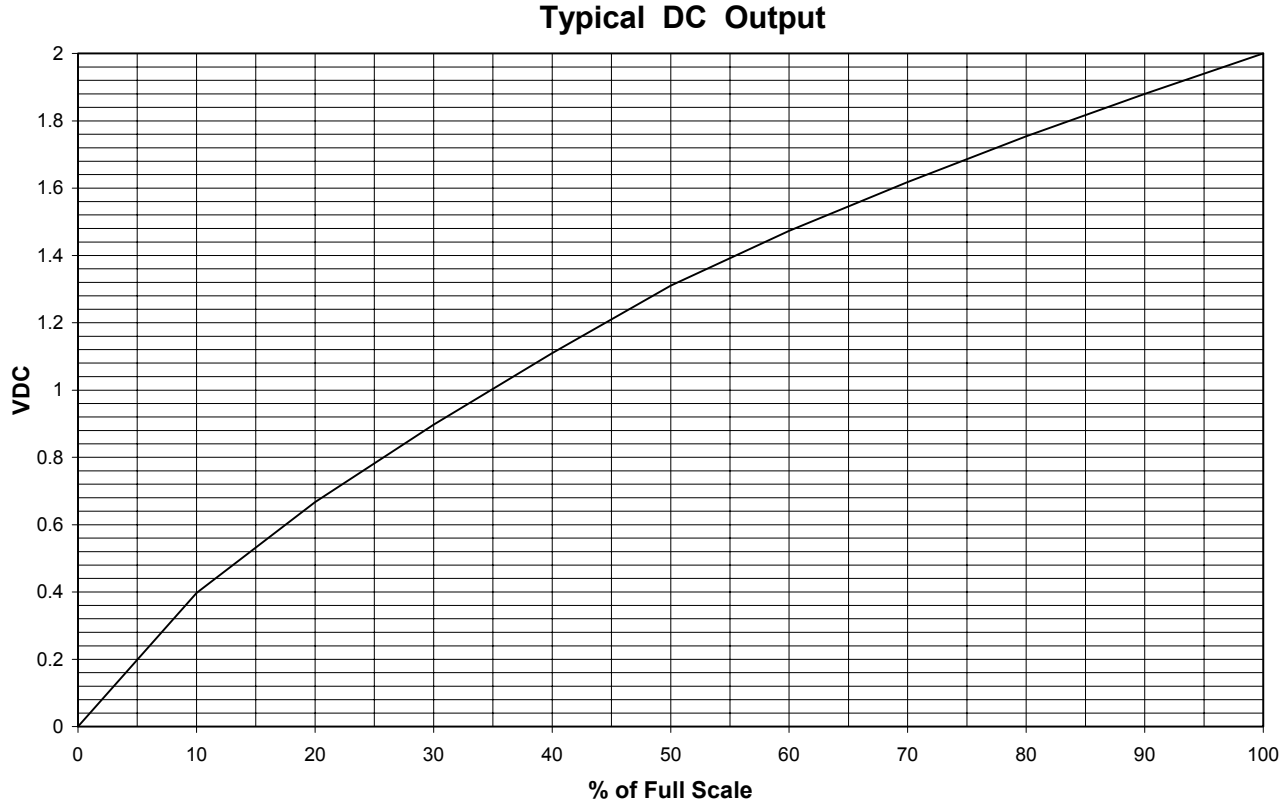


Figure 2

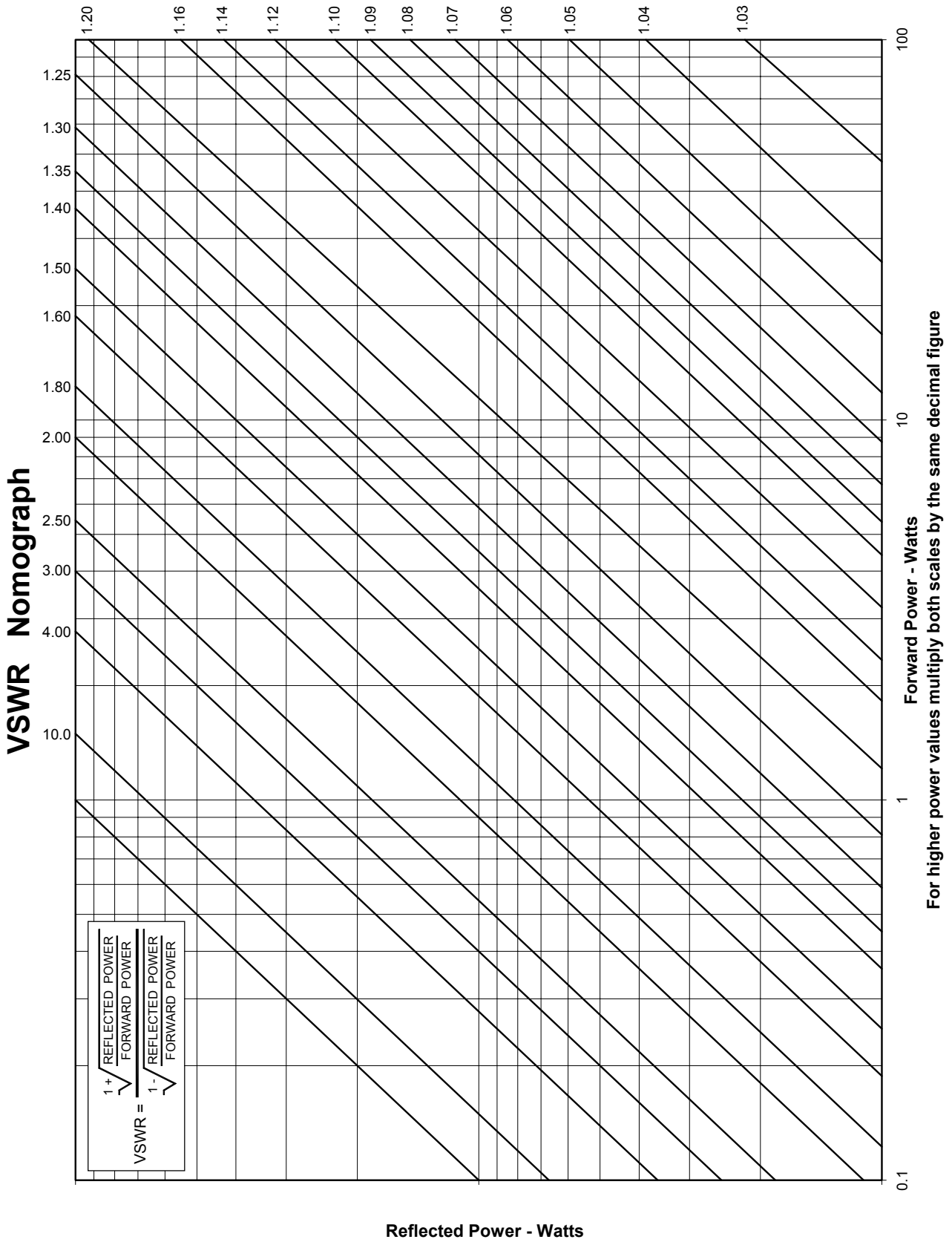
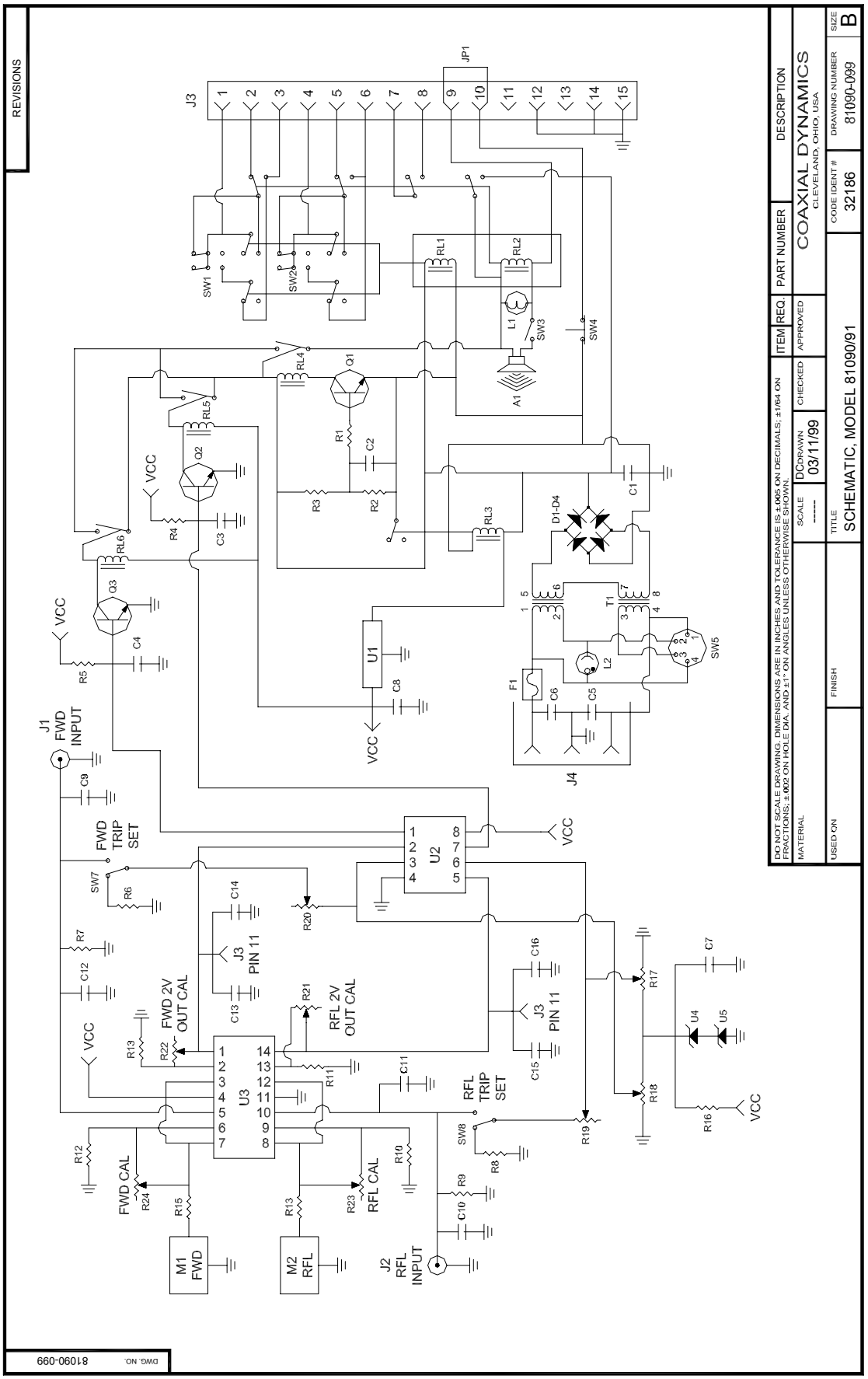

VSWR Nomograph
1.20
1.16
1.14
1.12
1.10
1.09
1.08
1.07
1.06
1.05
1.04
1.03
1.25
1.30
1.35
1.40
1.50
1.60
1.80
2.00
2.50
3.00
4.00
10.0
100
10
1
0.1
Forward Power - Watts
For higher power values multiply both scales by the same decimal figure
Reflected Power - Watts
VSWR = (1 + √(REFLECTED POWER / FORWARD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

Figure 3


REVISIONS
DESCRIPTION
PART NUMBER
ITEM
REQ.
APPROVED
CHECKED
DRAWN
DO
03/11/99
SCALE

COAXIAL DYNAMICS
CLEVELAND, OHIO, USA
CODE IDENT #
32186
DRAWING NUMBER
81090-099
SIZE
B
TITLE
SCHEMATIC, MODEL 81090/91
FINISH
USED ON
MATERIAL
DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND TOLERANCE IS ±.005 ON DECIMALS; ±1/64 ON FRACTIONS; ±.002 ON HOLE DIA. AND ±1° ON ANGLES UNLESS OTHERWISE SHOWN.
DWG. NO. 81090-099
J1 FWD INPUT
J2 RFL INPUT
J3
J4
JP1
M1 FWD
M2 RFL
FWD CAL
RFL CAL
FWD TRIP SET
RFL TRIP SET
FWD 2V OUT CAL
RFL 2V OUT CAL
J3 PIN 11
J3 PIN 11
VCC
U1
U2
U3
U4
U5
SW1
SW2
SW3
SW4
SW5
SW7
SW8
RL1
RL2
RL3
RL4
RL5
RL6
Q1
Q2
Q3
D1-D4
T1
L1
L2
F1
A1

NOTES