



PI-2

Broadband Power Indicator



HIGH RF VOLTAGES MAY BE PRESENT AT THE PORTS OF THIS UNIT. All operating personnel should use extreme caution in handling these voltages and be thoroughly familiar with this manual.

Do not attempt to operate this unit prior to reading this manual.

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Warranty

Electronics & Innovation Ltd., (hereafter E&I) warrants for the period of three years from the date of original delivery, each unit to be free of defects in materials and workmanship. For the period of 36 months E&I will, at its option, repair or replace defective parts so as to render the unit fully operational such that it performs according to the original specifications; free of charge to the original purchaser.

Should warranty service be required, the unit must be returned to E&I, freight cost to be borne by the owner. If, in our opinion, the unit has been damaged by use outside the limits prescribed in this manual or by accident, then the warranty shall not be honored. In such a case E&I will provide an estimate for repair, assuming repair is possible and provide a quote at standard service rates.

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Chapter 1 Introduction

The PI-2 is a broadband solid state power indicator covering the frequency spectrum from 10 KHz to 2 MHz. It measures forward and reflected RMS power of the system that it is inserted into. This information is displayed via an integral liquid crystal display and additionally the information can be downloaded to a pc via the RS232 connector at the rear of the unit. The equipment is not suitable for measuring pulse power.

It is rated for a maximum input of 2000 watts of RF power. An integral power supply permits operation from 100/240 single phase AC power.

1.2 INSTRUMENTATION IDENTIFICATION

Each instrument is identified by a serial number tag on the back panel of the unit. Both the model number and the serial number should be quoted to identify specific unit.

1.3 SPECIFICATIONS

Physical and electrical specifications are listed in Table 1-1 below

For frequencies between 10 KHz and 100 KHz see table below for correction factors. To obtain accurate RMS power, increase the front panel readings by the percentage corresponding to the frequency of use as seen below.

Frequency	Corretion factor
MHz	%
0.01	13.0%
0.02	8.0%
0.03	5.8%
0.04	4.8%
0.05	4.5%
0.06	3.5%
0.07	3.0%
0.08	2.5%
0.09	2.8%
0.1	2.5%

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Table 1-1. SPECIFICATIONS

FREQUENCY COVERAGE:	10 KHz to 2 MHz.
INSERTION LOSS:	0.1 dB max
FORWARD PORT ACCURACY:	+/- 5% FSD 100 KHz – 2 MHz
REVERSE PORT ACCURACY:	+/- 5% FSD 100 KHz – 2 MHz
INPUT IMPEDANCE	50 ohms, VSWR, 1.5:1 Maximum.
OUTPUT IMPEDANCE:	50 ohms, VSWR, 1.5:1 Maximum
POWER REQUIREMENTS:	100 – 240 VAC 47-63 Hz.
SIZE:	6 X 3.75 X 10.5 inches 152.4 X 95.25 x 266.7 mm.
WEIGHT:	4 pounds 1.8 kg
CONNECTORS:	N
OPERATING TEMPERATURE:	0 – 40 C

Chapter 2 Operation

2.1 INTRODUCTION

The PI-2 RF power indicator is used to measure the RF level of signal sources in the 10 KHz to 2 MHz range. No tuning or any other form of adjustment is required.

The PI-2 displays forward and reflected power of the system that it is inserted into. The characteristic impedance of the instrument is 50 Ω .

2.2 MAINS VOLTAGE

The unit accommodates AC line voltages from 100 TO 240 VAC 47 – 63 Hz

2.3 OPERATION

A line cord is supplied to form a connection between the mains supply and the rear of the unit. Plug this into the AC input at the rear of the unit and the AC mains outlet.

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2.3.1 Proceed as follows:

- (i) Ensure that there is at least 3" or 7.5 cm clearance at the rear of the unit for air flow.
- (ii) Ensure RF input voltage is not excessive
 - a. Max input is 2000 Watts
- (iii) Connect the output via a 50 ohm coaxial lead and N plug to the load.
- (iv) Connect the input signal via a 50 ohm coaxial lead and N plug to the input connector.

2.3.2 Front Panel Display

The PI-2 front panel has a passive LCD display designed for simplicity and ease of use. During initialization, the LCD shows the software revision. After the meter is initialized, the LCD indicates Forward Power, Reflected Power, and instrument status (see figure 2.1).

Pf: ___ W Pr: ___ W
Status: _____

Figure 2.1 : Front Panel Display

Where Pf refers to forward power, Pr refers to reverse power, and Status indicates "OK".

2.3.3 RS 232 Interface

The PI-2 features a standard RS-232 serial interface suitable for connection to a PC or host system. The communication protocol is extremely simple to facilitate readback and control with readily available terminal programs such as Hyperterm. The RS-232 link has the following parameters:

Baud rate: 19200
Data bits: 8
Parity: none
Stop bits: 1
Flow control: none

An example configuration using HyperTerminal on a PC is shown in figure 2.2. The material contained in this document is the property of Electronics & Innovation Ltd., it is subject to change without notice.

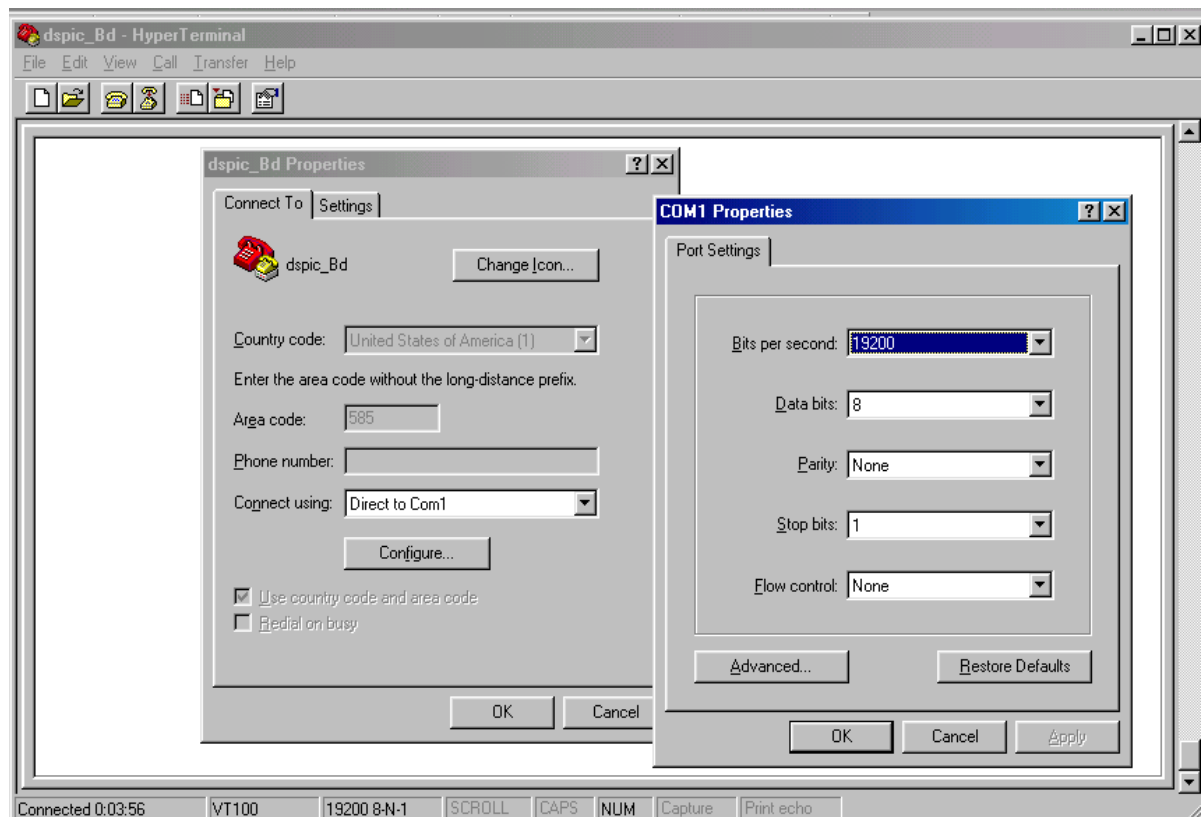


Figure 2.2: Example RS-232 setup using Hyper Terminal

In the default state, the RS-232 port will echo the same information sent to the front panel LCD display, allowing a running datalog to be stored to disk using the capture feature of the terminal program.

Single character commands can be sent to the amplifier to achieve the following:

"1" key enables telemetry (readback similar to LCD display) - this is the default mode at power up

"0" key disables telemetry (Complement to "1" key)

Chapter 3 Technical Description

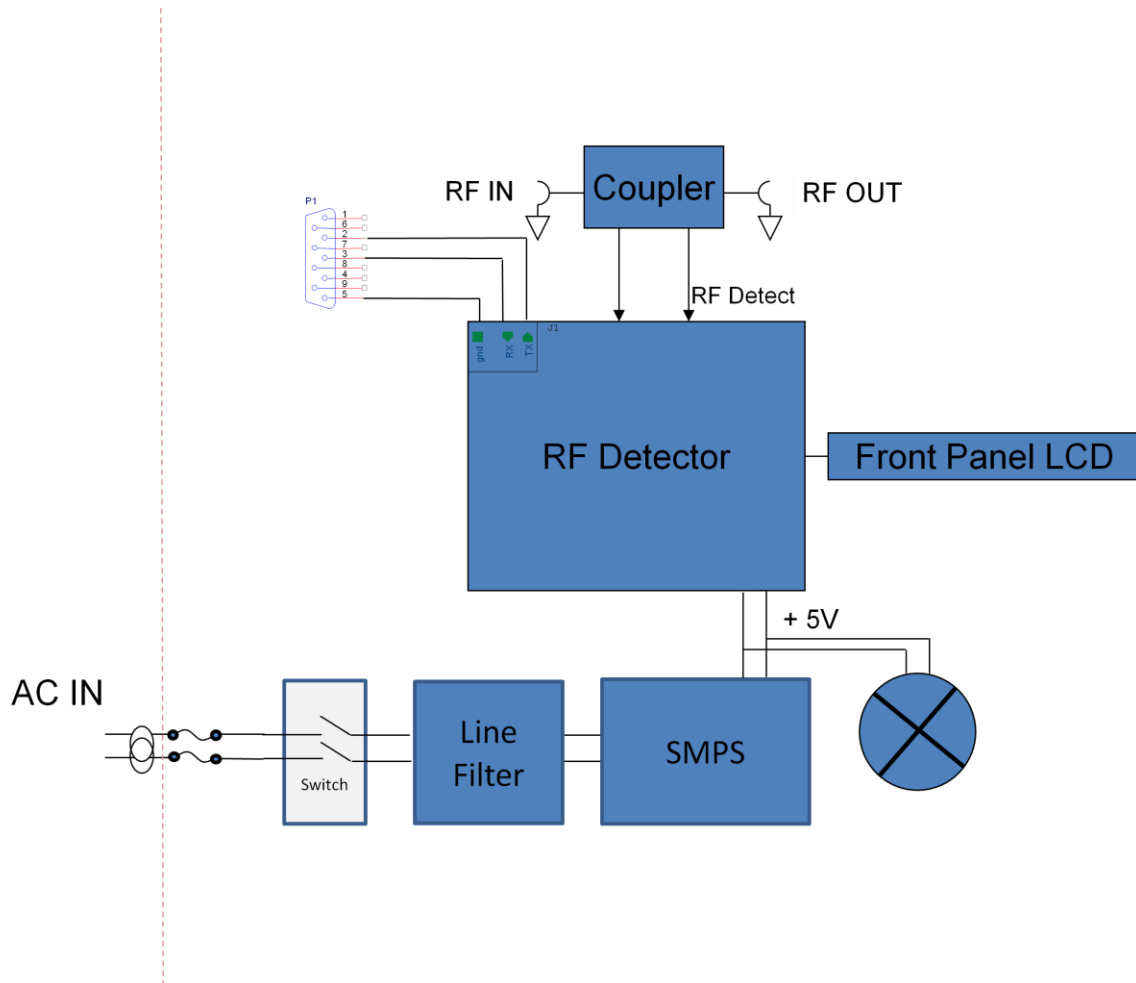
3.1 GENERAL DESCRIPTION

The PI-2 is designed to measure signals in the frequency band of 10 KHz to 2 MHz. The signal from the front panel N connector is fed via a length of 50 ohm coaxial cable into the RF bi-directional coupler. The output of the coupler is then fed directly to the N connector on the front panel, this is the unit output.

The forward and reverse coupled ports of the bi-directional coupler are fed to the RF detector which is situated on the control board. The RF detector feeds a The material contained in this document is the property of Electronics & Innovation Ltd., it is subject to change without notice.

voltage, which is representative of the true RMS power to the control board proper. The control board in turn drives the front panel display.

The switch mode power supply unit provides a 5 VDC output which feeds the control board.



Chapter 4 Maintenance

4.1 INTRODUCTION

The E&I PI-2 RF Power Indicator requires no periodic maintenance. The instrument is unconditionally stable and is fail-safe under all load conditions. Damage can only be externally caused by the incorrect selection of the AC supply voltage or by an input signal in excess of the specified 2000 W equivalent to a power level of 63dBm.

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4.2 PACKAGING FOR RESHIPMENT

In the event of the equipment being returned for servicing it should be packed in the original shipping carton and packing material. If this is not available, wrap the instrument in heavy paper or plastic and place in a rigid outer box of wood, fiberboard or very strong corrugated cardboard. Use ample soft packing to prevent movement. Provide additional support for projecting parts to relieve these of unnecessary shock. Close the carton securely and seal with durable tape. Mark the shipping container FRAGILE to ensure careful handling.

Chapter 5 Safety:

Do not attempt to operate this unit with the cover removed. High AC and DC voltages are present. The cover protects against electrical shock due to AC line voltages, high DC and RF fields. Further the cover provides part of the cooling system design. Components, specifically on the RF driver board are prone to over-heat and eventual failure if the unit is operated without the cover in place.

Ensure that the load is connected to the output prior to connecting the RF input to the unit. This will prevent high voltages being present and exposed at the output connector.

Only use the AC cord provided or equivalent.

Ensure that the mains outlet is properly grounded.

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