



E&I 100S1

Broadband Power Amplifier



HIGH RF VOLTAGES MAY BE PRESENT AT THE OUTPUT 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 100S1 is a broadband solid state amplifier covering the frequency spectrum from 20 to 1 MHz. It is rated at 100 watts of RF power with low harmonic and intermodulation distortion. A Class D design, the 100S1 will amplify inputs of AM, FM, SSB, pulse and any complex modulation signals within the bandwidth of the amplifier. The amplifier has 50 dB gain, it is unconditionally stable and will not oscillate even with combinations of mismatched source and load impedance. It is protected against failure due to output load mismatch and/or overdrive.

1.2 INSTRUMENTATION IDENTIFICATION

Each amplifier 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

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Table 1-1. SPECIFICATIONS

FREQUENCY COVERAGE:	20 to 1000 KHz
GAIN:	50 dB min, ± 1.0 variation.
CLASS D LINEAR OUTPUT:	Nominal 100 watts.
INPUT IMPEDANCE	50 ohms, VSWR, 1.5:1 Maximum.
OUTPUT IMPEDANCE:	50 ohms, VSWR, 2.5:1 Maximum
STABILITY:	Continuous operation into any load or source impedance.
DRIVE LEVEL FOR 100 W	0 dBm or 0.22 Vrms
PROTECTION:	Unit will withstand a + 24 dBm input signal, without damage.
POWER REQUIREMENTS:	110 – 240 VAC 50 / 60 Hz
SIZE:	3 1/4 X 10 X 15 inches 8.27 X 25.4 x 38.1 cm.
WEIGHT:	15 pounds 6.8 kg
CONNECTORS:	BNC (power) BNC (sample ports)
OPERATING TEMPERATURE:	0 – 40 C
RACK MOUNTING:	2 U Chassis

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Chapter 2 Operation

2.1 INTRODUCTION

The 100S1 RF amplifier is used to amplify the RF level of signal sources in the 20 to 1 MHz. No tuning or any other form of adjustment is required.

The 100S1 produces rated power output at its output connector into 50 Ohms. It will produce less power at other load impedances. Therefore, although the output impedance is 50 ohms, the amplifier will work into any load impedance.

On the front of the unit there are BNC connectors for current and voltage monitors. These monitors provide a scaled down representation of the output waveform.

Scaling:

Voltage monitor into 50 Ohms 1V = 50 V at amplifier output

Current monitor into 50 Ohms 1V = 0.5 A at amplifier output

Note: Signal processing of these monitors can provide information such as VSWR, load impedance, phase etc., as the phase relationship between V and A is maintained.

2.2 RACK INSTALLATION

This unit is 2U high.

2.2.1 Input Voltage

The unit requires 110 – 240 VAC 50/60 Hz

2.3 OPERATION

The AC input is an IEC 60320 C20 receptacle. A line cord is supplied to provide a connection between the supply and the rear of the unit.

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) Connect the output via a 50 ohm coaxial lead and N connector to the load.
- (iii) Connect the AC supply to the rear of the unit.
- (iv) Connect the input signal via a 50 ohm coaxial lead and N connector to the input connector.

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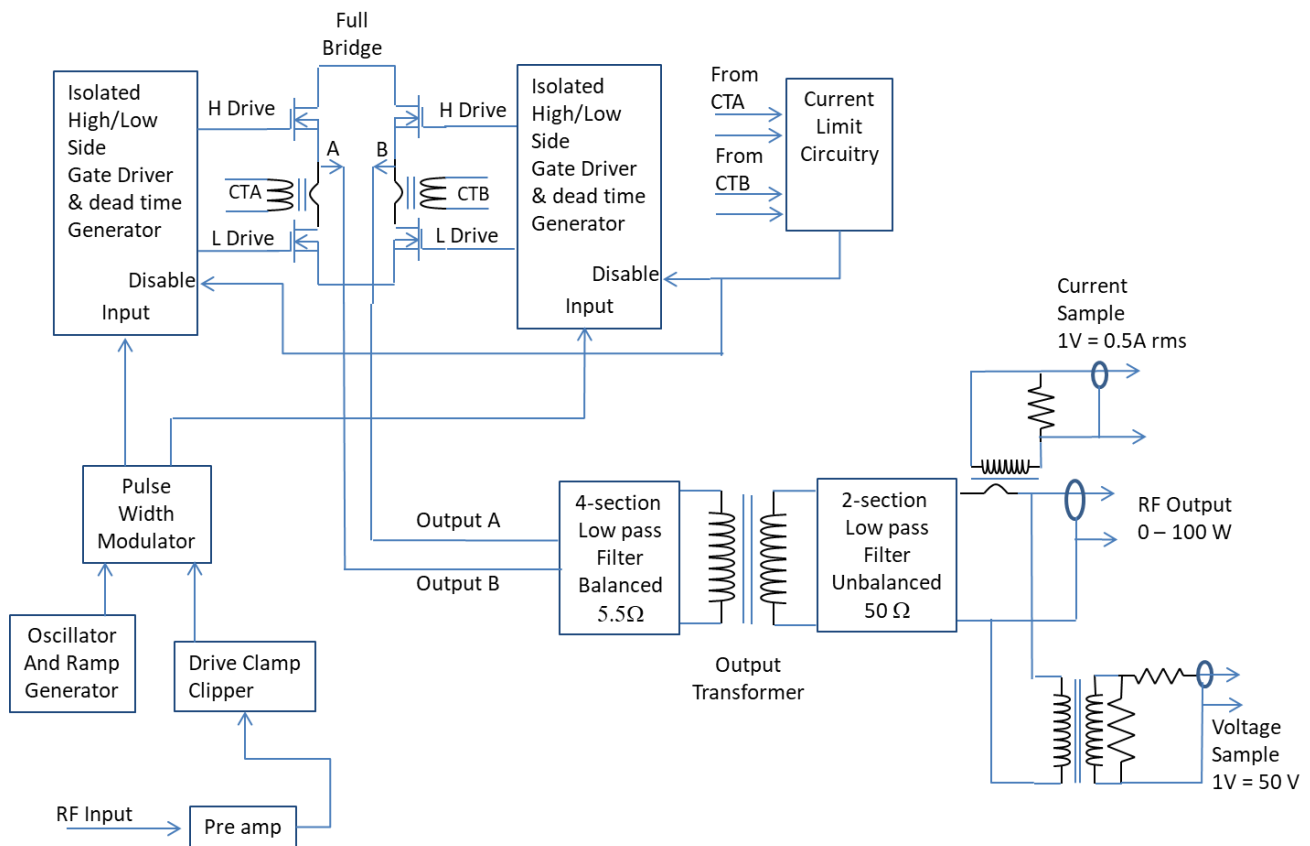
Chapter 3 Technical Description

3.1 GENERAL DESCRIPTION

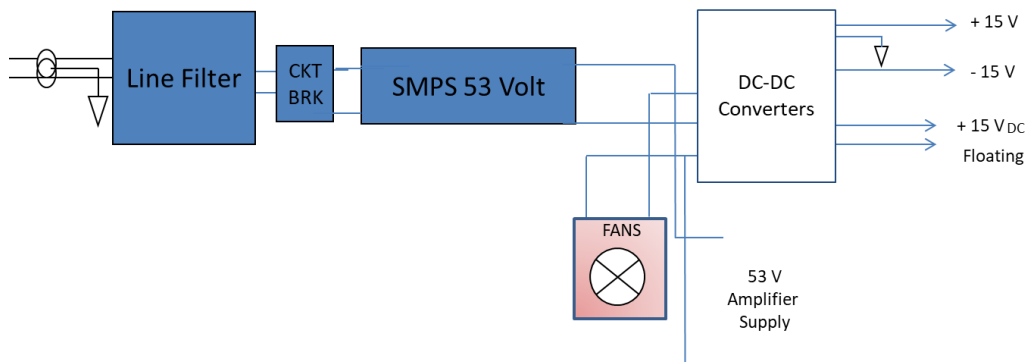
The 100S1 is designed to amplify signals by 50 dB in the frequency band of 20 to 1 MHz. The signal from the front panel RF connector is fed into the input of the pre-amplifier module. The pre-amplifier provides voltage gain and signal conditioning to prevent overdrive of the pulse width modulators. The signal from the output of the pre-amplifier is fed into the pulse width modulators (PWM) that are fed from the outputs of the oscillator and ramp generator. The output of the bridge is then fed through the low pass filter network to recover the signal waveform; then fed to the N connector at the output.

There is a current limit protection circuit to protect the unit, in addition to the input drive clamp. Current and voltage samples are taken from the output and fed to the BNC connectors on the front panel for monitoring purposes.

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The AC supply is fed through an EMI filter to the power supply that converts the AC to 53 Vdc for the amplifier and for the cooling fan and additional DC-DC converters to supply the floating + 15 V for the gate drivers and +/- 15 volt rails, for the control circuitry.



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Chapter 4 Maintenance

4.1 INTRODUCTION

The E&I 100S1 RF amplifier requires no periodic maintenance. The instrument is unconditionally stable and is fail-safe under all load conditions. Damage can only be externally caused by overdrive in excess of 2 watts (+33 dBm) or back-feeding the output of the unit from another high power source or incorrect connection to the AC input.

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 voltages are present. The cover protects against electrical shock due to hazardous supply voltages, high DC, RF voltages and RF fields. Further the cover provides part of the cooling system design. Components will over heat and cause eventual failure if the unit is operated without the cover in place.

N.B. Removal of cover will void warranty.

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.

Operation of AC voltage above 264 V could severely damage the unit and present a hazard.

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