

DESCRIPTION

Demonstration circuit 1077A is a Mean-Squared RF/IF detector featuring the LT[®]5570 IC.

The LT5570 is a wide dynamic range Mean Squared RF Power detector, operational from 40MHz to 2700MHz. The input dynamic range at 880MHz, with ± 1 dB nonlinearity, is 61dB (from -48 dBm to $+13$ dBm, single-ended 50Ω input). The detector output voltage slope is normally 37mV/dB, and the typical output variation over temperature is ± 0.4 dB at 880MHz.

The 1077A Demo Board is optimized for wide frequency range of 40MHz to 880MHz.

Design files for this demo board are available. Call the LTC factory.

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Table 1. Typical Performance Summary ($V_{CC} = 5V$, $ENBL = 5V$, $T_A = 25^\circ C$, unless otherwise noted. Test circuit shown in Figure 2.)

PARAMETER	CONDITION	VALUE
Supply Voltage		4.75V to 5.25V
Supply Current		26.5mA
Shutdown Current	ENBL = Low	0.1 μ A
ENBL Voltage	Low, Chip Disabled	1V max
	HIGH, Chip Enabled	2V min
ENBL Input Current	$V_{ENBL} = 0V$	0 μ A
	$V_{ENBL} = 5V$	68 μ A
Output Start Voltage	No Input Signal Present	0.1V
Rise Time	0.2V to 1.6V, 10% to 90%, $C_1 = 22nF$, $F_{RF} = 2140$ MHz	1 μ s
Fall Time	1.6V to 0.2V, 90% to 10%, $C_1 = 22nF$, $F_{RF} = 2140$ MHz	8 μ s
Input Frequency Range	Optimized for DC1077A demo board	40MHz to 880MHz
f = 500MHz		
Linear Dynamic Range	± 1 dB linearity error	62 dB
Slope		36.9mV/dB
Logarithmic Intercept		-54.8dBm
Output Variation vs Temperature	$P_{IN} = -50$ to $+13$ dBm	± 0.5 dB
Deviation from CW Response	12 dB peak-to-average ratio (4 carrier WCDMA)	0.3 dB
f = 880MHz		
Linear Dynamic Range	± 1 dB linearity error	62 dB
Slope		36.9mV/dB
Logarithmic Intercept		-54.8dBm
Output Variation vs Temperature	$P_{IN} = -50$ to $+13$ dBm	± 0.5 dB
Deviation from CW Response	12 dB peak-to-average ratio (4 carrier WCDMA)	0.2 dB

QUICK START PROCEDURE

Demonstration circuit 1077A is easy to set up to evaluate the performance of the LT5570. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Connect voltmeter's negative (-) lead to demo board GND test point (TP2).
2. Connect voltmeter's positive (+) lead to the demo board OUTPUT test point (TP4).
3. Connect DC power supply's negative (-) output to demo board GND test point (TP2).
4. Connect DC power supply's positive (+) output (4.75V to 5.25V) to demo board V_{CC} test point (TP1).

Do not exceed 5.5V, the absolute maximum supply voltage.

5. Connect signal generator's output to demo board INPUT port (SMA connector J1) via coaxial cable.

A 3dB attenuator may be inserted to improve input match.

6. Using a jumper cable, connect demo board V_{CC} test point (E3) to ENBL test point (TP3). Now the detector is enabled (on) and is ready for measurement.

Make sure that the power is not applied to ENBL before it is applied to V_{CC}. The voltages on the ENBL test point must never exceed V_{CC} + 0.2V.

NOTE: Make sure that the power is not applied to Enable (EN) test point before it is applied to V_{CC}. The voltage on the EN test point must never exceed V_{CC} + 0.2V.

7. Apply RF input signal and measure OUTPUT DC voltages.

Do not exceed +15dBm, the absolute maximum RF input power.

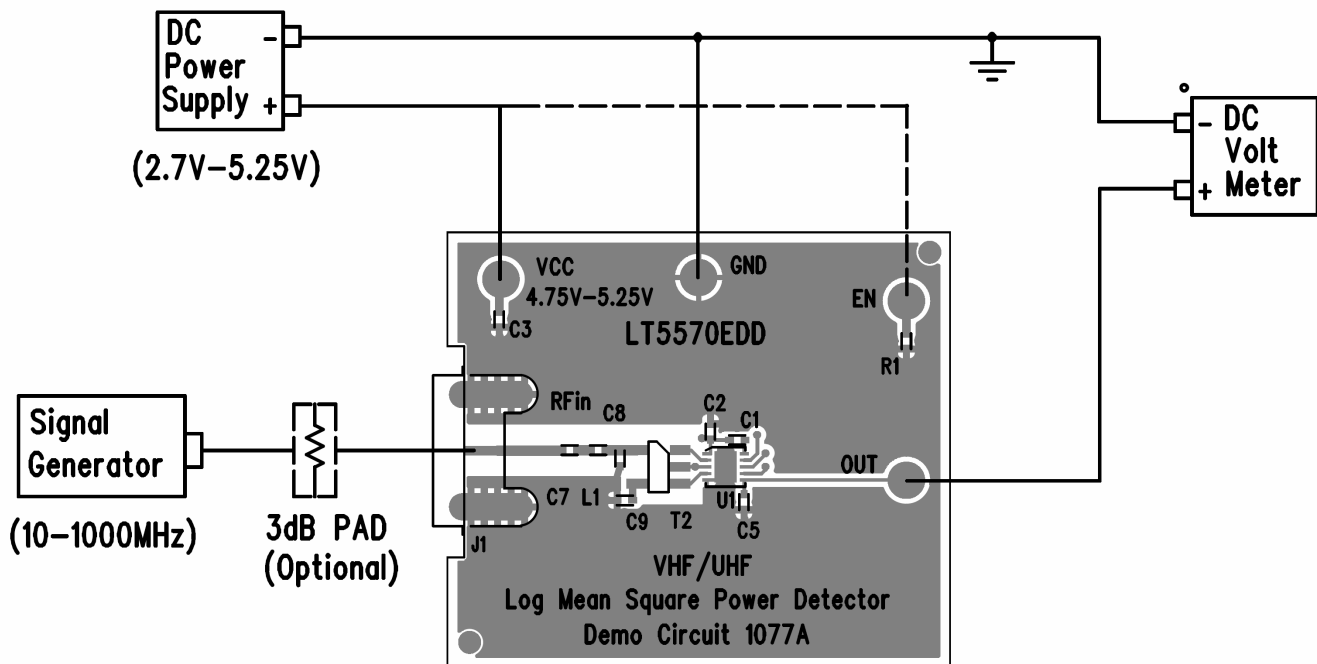
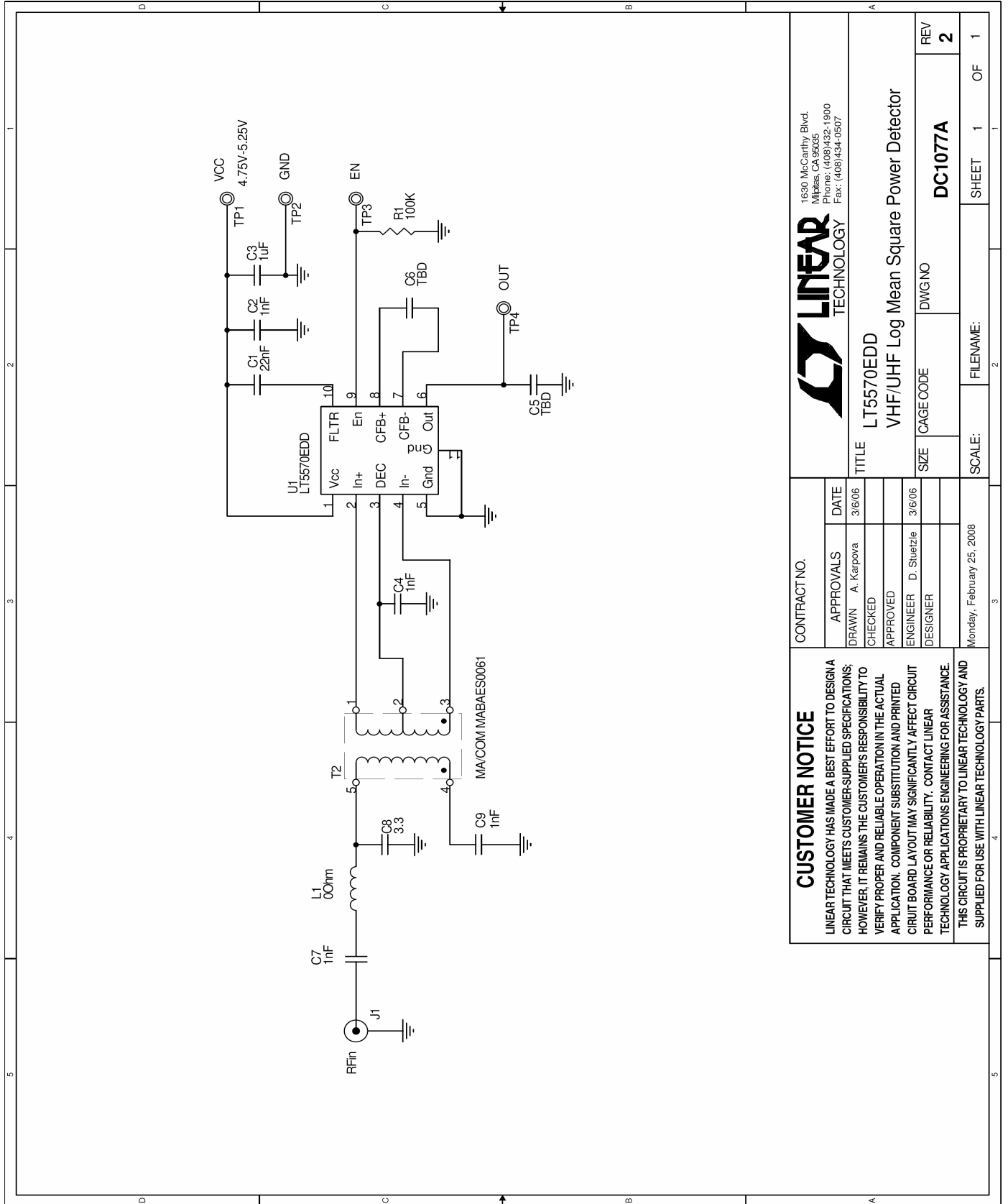


Figure 1. Proper Measurement Equipment Setup

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1077A

MEAN-SQUARED RF/IF DETECTOR



CUSTOMER NOTICE		CONTRACT NO.	
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.		APPROVALS	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		DRAWN	DATE
		A. Karpava	3/6/06
		CHECKED	
		APPROVED	
		ENGINEER	DESIGNER
		D. Stuetzle	3/6/06
		Monday, February 25, 2008	
		SCALE:	FILENAME:
		SIZE	DWGNO
		CAGE CODE	DC1077A
		REV	2
		SHEET	1 OF 1



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TITLE
LT5570EDD
VHF/UHF Log Mean Square Power Detector

DATE
3/6/06

DESIGNER
D. Stuetzle

FILENAME:
DC1077A

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1077A MEAN-SQUARED RF/IF DETECTOR

DEMO BOARD MODIFICATIONS:

Modifications for Single-Ended RF Input configuration without RF Input Transformer:

Part	Value	Manufacturer Part Number	Notes
T2		MA-COM, MABAES0061	Remove T2 transformer
C8	3.3pF	AVX, 0402YA330KAT	Remove capacitor C8 Place 150 ohm resistor (0402 body size) instead
C10	1nF	0805 size capacitor from any supplier	Place 1nF capacitor between pins 5 & 1 of T2 transformer (refer to tr-r pin-out on schematic)
R2	0-ohm	0-ohm resistor (or copper jumper)	Place 0-ohm resistor between pins 2 & 3 of T2 transformer (refer to tr-r pin-out on schematic)

NOTE: Refer to the demo board schematic below

DC1077A Demo Board Schematic with modifications for Single-Ended RF Input without RF Input Transformer

