DESCRIPTION

Demonstration Circuit 514 features the LT1738 switching regulator and demonstrates greatly reduced conducted and radiated EMI by controlling the voltage and current slew rates of the output switch. The LT1738 can be used in single switch topologies such as Boost, Flyback and Cuk converters reducing the high frequency EMI by as much as 40dB. The design is very well suited for noise sensitive systems such as medical instruments, industrial sensing and control, data conversion and wide band communications.

DC514 outputs 12V, 1A from a 5V +/- 10% input. Potentiometers set the slew rates of the power switch, allowing the user to observe the benefit of slew rate control, and to examine the tradeoff between noise performance and circuit efficiency.

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

QUICK START PROCEDURE

DC514 is easy to set up to evaluate the performance of the LT1738. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Connect the 0 – 1A load between the Vout and Gnd terminals on the right hand side of the board.
2. Apply 5V between the Vin and Gnd terminals on the left hand side of the board.
3. To measure the output noise, connect one end of a BNC cable to the BNC connector J1. Connect the other end of the BNC cable to an oscilloscope with a 50Ω input impedance … refer to Application Note AN70 for more precise techniques for measuring the output noise.

Notes:

1. The temperature of MOSFET Q1 should be monitored if the potentiometers R6 and R7 are adjusted from their factory settings.

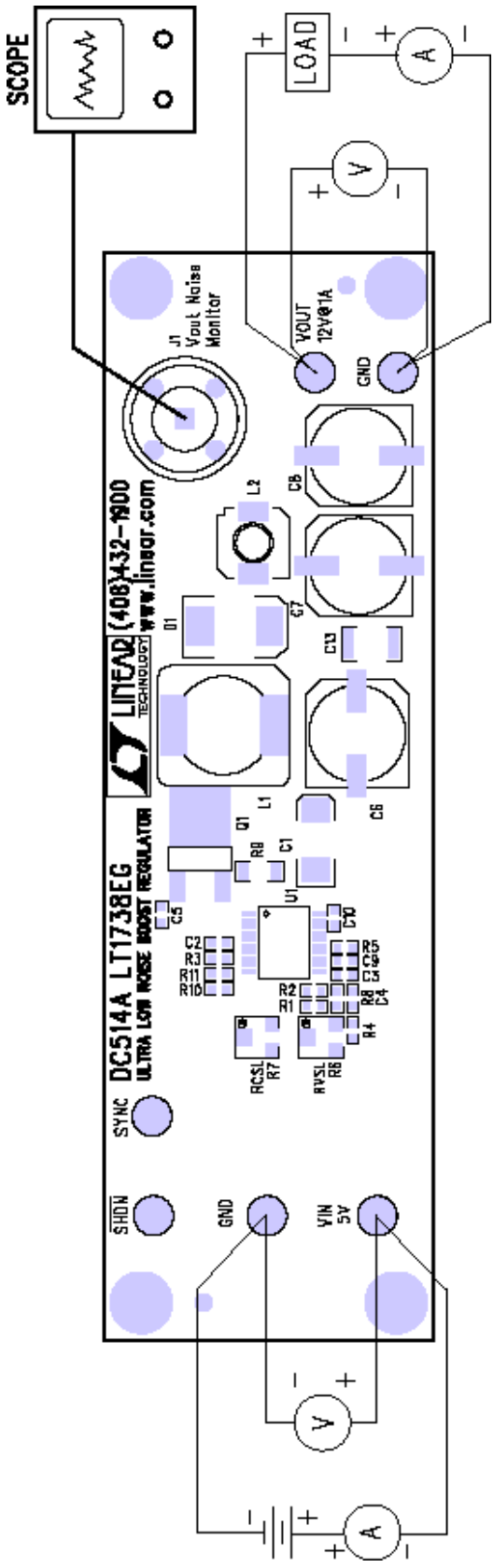
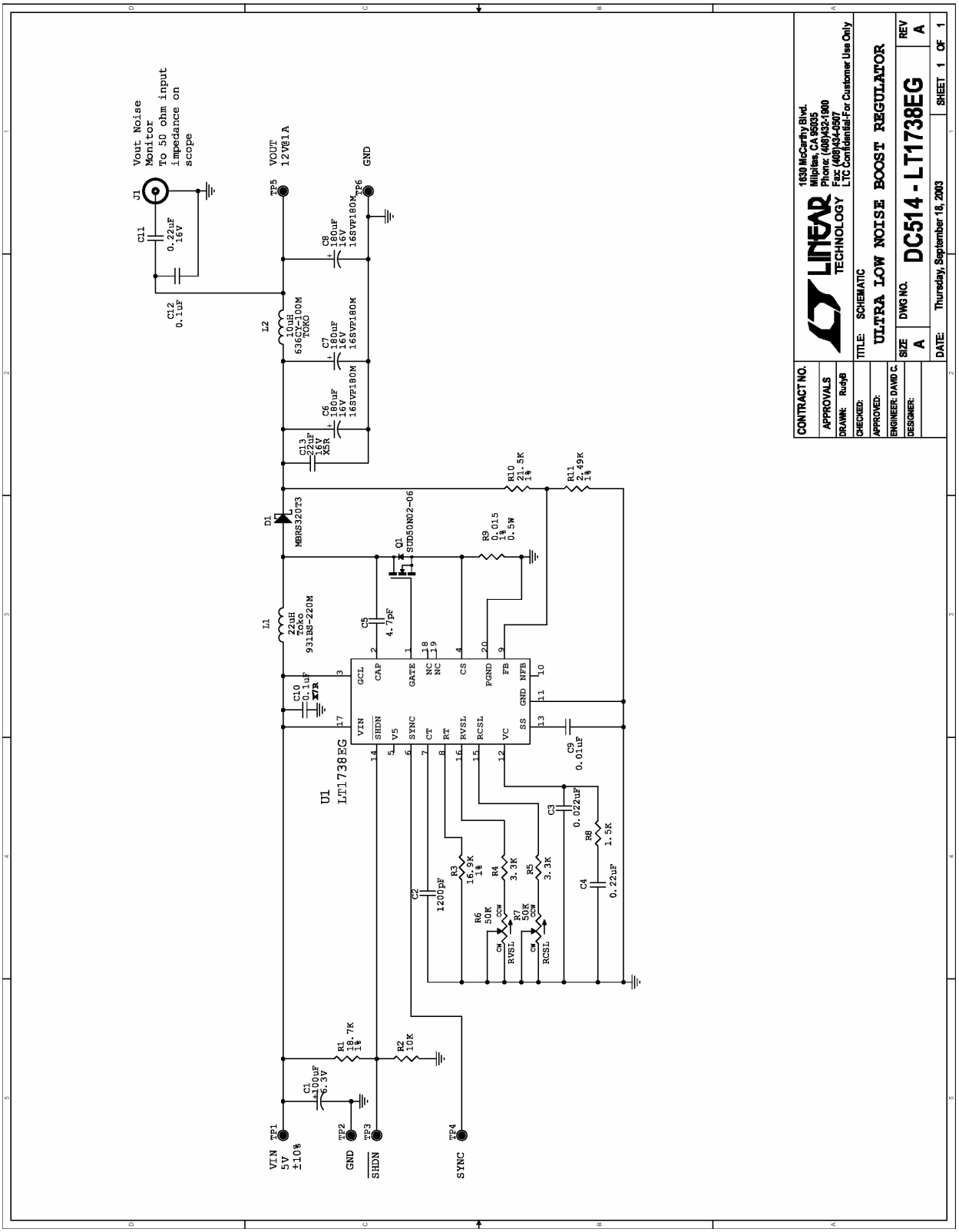


Figure 1. Proper Measurement Equipment Setup


Vout Noise Monitor To 50 ohm input impedance on scope
J1
C11 0.22uF 16V
C12 0.1uF
TP5 VOUT 12V@1A
TP6 GND
L2 10uH COILCRAFT 0336-100M TOKO
C8 180uF 16V 16SVP180M
C7 180uF 16V 16SVP180M
C6 180uF 16V 16SVP180M
C13 22uF 16V X5R
D1 MBRS320T3
Q1 SUD50N02-06
R9 0.015 1% 0.5W
R10 21.5K 1%
R11 2.49K 1%
L1 22uH Toko 931BS-220M
C5 4.7pF
C10 0.1uF X7R
U1 LT1738EG
VIN GCL CAP GATE NC NC CS PGND FB NFB GND
SHDN V5 SYNC CT RT RVSL RCSL VC SS
C9 0.01uF
C3 0.022uF
R8 1.5K
C4 0.22uF
C2 1200pF
R3 16.9K 1%
R4 3.3K
R5 3.3K
R6 50K CCW
R7 50K CW
RVSL RCSL
C1 100uF 6.3V
R1 18.7K 1%
R2 10K
TP1 VIN 5V ±10%
TP2 GND
TP3 SHDN
TP4 SYNC
LINEAR TECHNOLOGY
1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507
LTC Confidential-For Customer Use Only
CONTRACT NO.
APPROVALS
DRAWN: Rudy B
CHECKED:
APPROVED:
ENGINEER: DAVID C.
DESIGNER:
TITLE: SCHEMATIC
ULTRA LOW NOISE BOOST REGULATOR
SIZE A
DWG NO. DC514 - LT1738EG
REV A
DATE: Thursday, September 18, 2003
SHEET 1 OF 1

Item	Qty	Reference	Part Description	Manufacture / Part #
1	1	C1	Cap., POSCAP 100uF 6.3V 20%	SANYO 6TPC100M
2	1	C2	Cap., X7R 1200pF 25V 10%	AVX 06033C122KAT1A
3	1	C3	Cap., X7R 0.022uF 25V 10%	AVX 06033C223KAT1A
4	2	C4,C11	Cap., X7R 0.22uF 16V 20%	Taiyo Yuden EMK107BJ224MA
5	1	C5	Cap., NPO 4.7pF 50V +/-.25PF	AVX 06035A4R7CAT
6	3	C6,C7,C8	Cap., Alum 180uF 16V 20%	OSCON 16SVP180M
7	1	C9	Cap., X7R 0.01uF 50V 10%	AVX 06035C103KAT1A
8	2	C12,C10	Cap., X7R 0.1uF 16V 10%	AVX 0603YC104KAT1A
9	1	C13	Cap., X5R 22uF 16V 20%	TAIYO YUDEN EMK432BJ226MM
10	1	D1	Diode Schottky, 3A/20V	ON SEMICONDUCTOR MBRS320T3
11	1	J1	BNC Connector	Connex 112404
12	1	L1	Inductor, 22uH D128C	TOKO 931BS-220M
13	1	L2	Inductor, 10uH	TOKO 636CY-100M
14	1	Q1	Mosfet, N-Channel 20V	Siliconix SUD50N02-06
15	1	R1	Res., Chip 18.7K 0.06W 1%	AAC CR16-1872FM
16	1	R2	Res., Chip 10K 0.1W 5%	AAC CR16-103JM
17	1	R3	Res., Chip 16.9K 0.1W 1%	AAC CR16-1692FM
18	2	R4,R5	Res., Chip 3.3K 0.1W 5%	AAC CR16-332JM
19	2	R6,R7	Pot. 11 Turns 50K	Bourns 3224W-1-503E (4 Reels)
20	1	R8	Res., Chip 1.5K 0.1W 5%	AAC CR16-152JM
21	1	R9	Res., LRC 0.015 0.5W 1%	IRC LR1206-01-R015-F
22	1	R10	Res., Chip 21.5K 0.1W 1%	AAC CR16-2152FM
23	1	R11	Res., Chip 2.49K 0.1W 1%	AAC CR16-2491FM
24	6	TP1-TP6	Turret, Testpoint	Mill Max 2501-2
25	1	U1	I.C., Ultralow Noise DC/DC Cont.	Linear Tech. Corp. LT1738EG
26	4		SCREW, #4-40, 1/4"	ANY
27	4		STANDOFF, #4-40 1/4"	MICRO PLASTICS 14HTSP101
28	1		PRINTED CIRCUIT BOARD	DEMO CIRCUIT 514A
29	1		TOP & BOTTOM STENCIL	STENCIL DC514A