

## DESCRIPTION

Demonstration circuit 556 is a high efficiency, high frequency buck converter, incorporating the LTC3414 monolithic synchronous regulator. The DC556 has an input voltage range of 2.5V to 5.5V and an output voltage range from 0.8V to 5V. The operating frequency range of the DC556 is either set with an external resistor or synchronized to an external clock, with a range between 300kHz and 4Mhz. Due to these features, the DC556 is ideal for Li-Ion battery voltage (2.7V to 4.2V) applications, such as PDAs, cellular phones, and digital

cameras. DC556 can deliver high power – up to 4A of output current - in a relatively small circuit, thanks to 67milliohm high current power switches in the LTC3414. The LTC3414 also incorporates OPTI-LOOP compensation, so that the DC556 can be optimized to provide fast transient response over a wide range of line and load conditions. All these features make the DC556 perfectly suited for batter-powered, hand-held applications.

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

## QUICK START PROCEDURE

Demonstration circuit 556 is easy to set up to evaluate the performance of the LTC3414EFE. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

**NOTE:** When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the VIN or VOUT and GND terminals. See Figure 2 for proper scope probe technique.

1. Place jumper JP2 in the FORCED CONTINUOUS position, JP1 in the ON position.
2. Connect Jumper JP3 for 1.8V Output Voltage. Leave JP4, JP5 and JP6 unconnected.
3. With power off, connect the input power supply VIN to VIN and GND.
4. Apply input power at the VIN slowly, by increasing VIN from 0V to 5.5V.

**NOTE:** Make sure that the input voltage VIN does not exceed 5.5V.

5. Check for the output voltage VOUT = 1.8V  
If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
6. Once the proper output voltage is established, adjust the load within the 4A range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
7. To test Burst Mode™ operation, Set JP2 in the BURST MODE Position and JP1 in the ON position, and repeat the procedure 2 to 7.
8. To test 2.5V output voltage, connect JP4 and leave JP3, JP5 and JP6 unconnected. Repeat the procedure 3 to 7. Follow a similar procedure for other output voltage tests.

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT DC556 4A MONOLITHIC SYNCHRONOUS STEP-DOWN REGULATOR

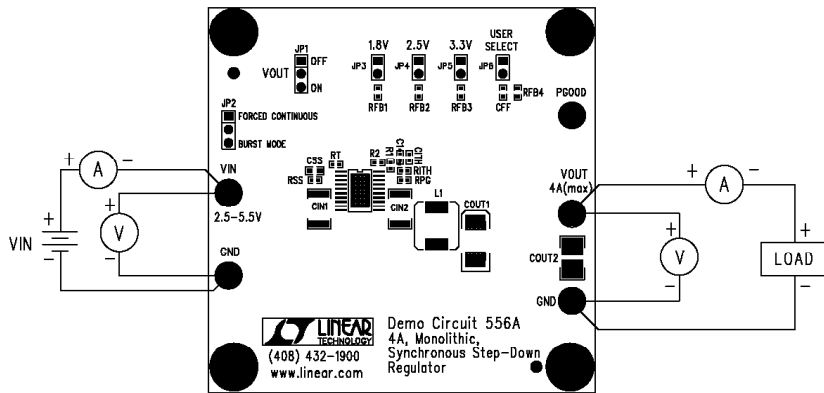


Figure 1. Proper Measurement Equipment Setup

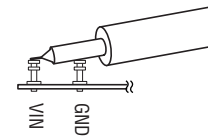


Figure 2. Scope Probe Placement for Measuring Input or Output Ripple

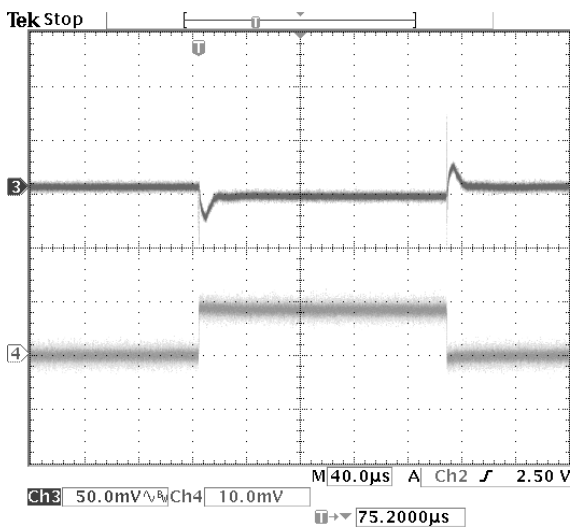


Figure 3. Ch3: VOUT (50mV / Div) Transient Response for 0 to 4A load Step. Ch4: IOUT (5A / Div) ( $V_{IN} = 3.3V$ ,  $V_{OUT} = 1.8V$ )

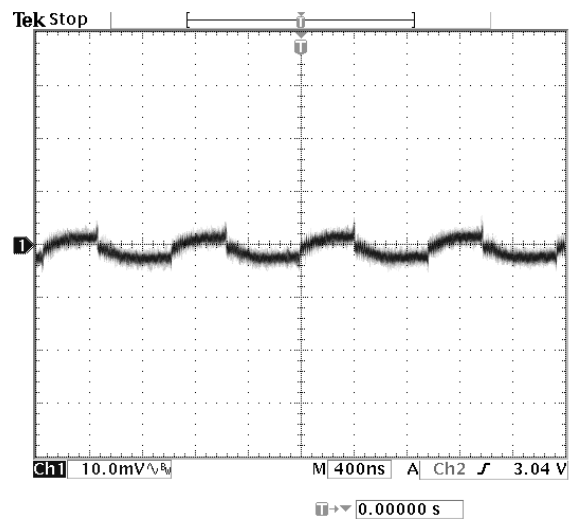
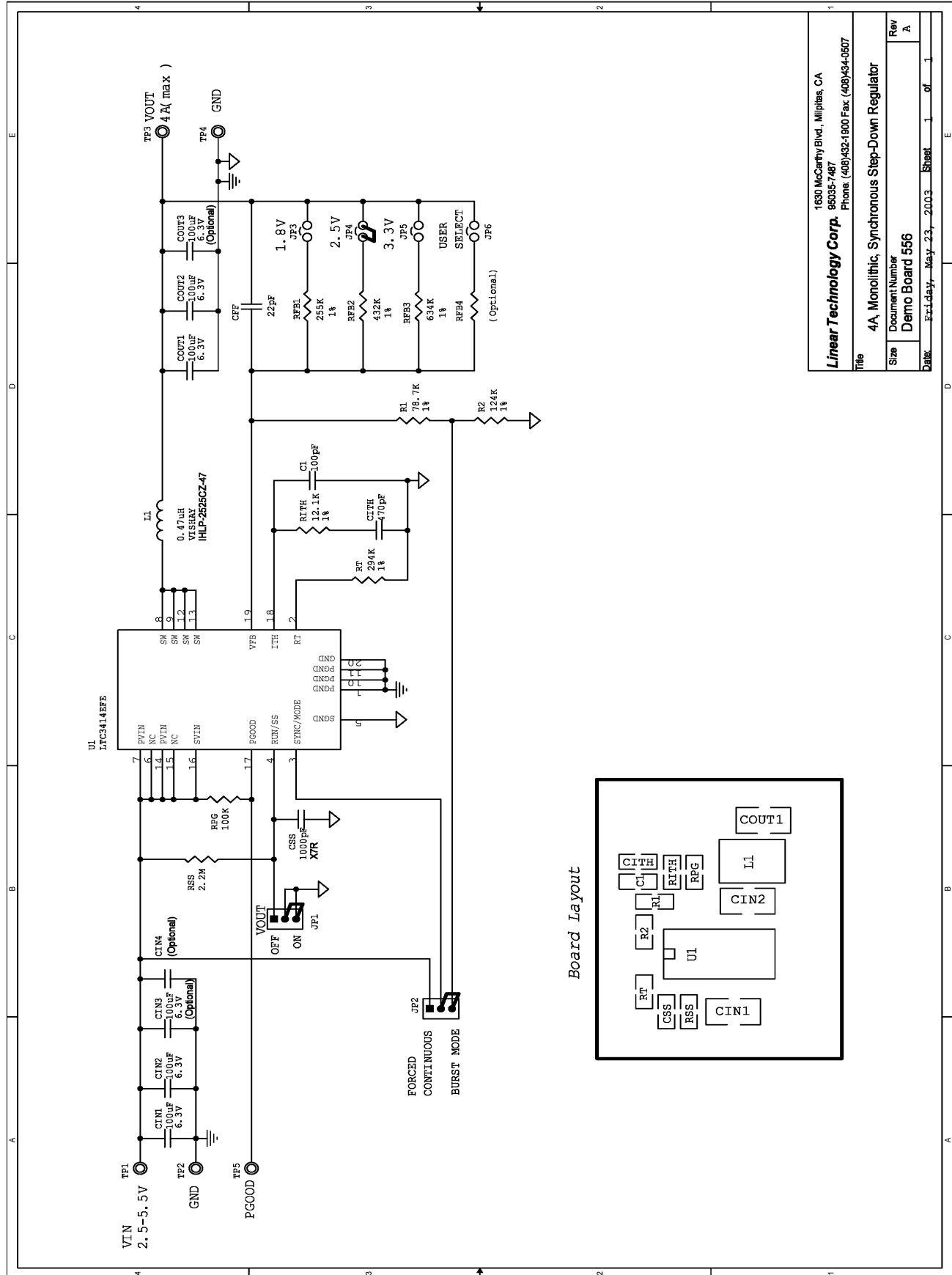


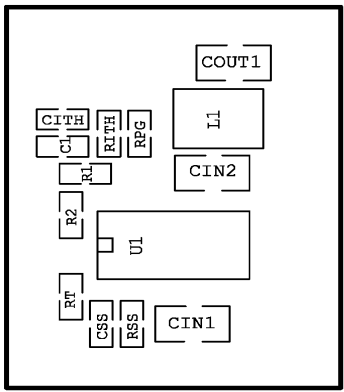
Figure 4. 1.8V Output Ripple ( $V_{IN} = 5.0V$ ,  $I_{OUT} = 4A$ )

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT DC556

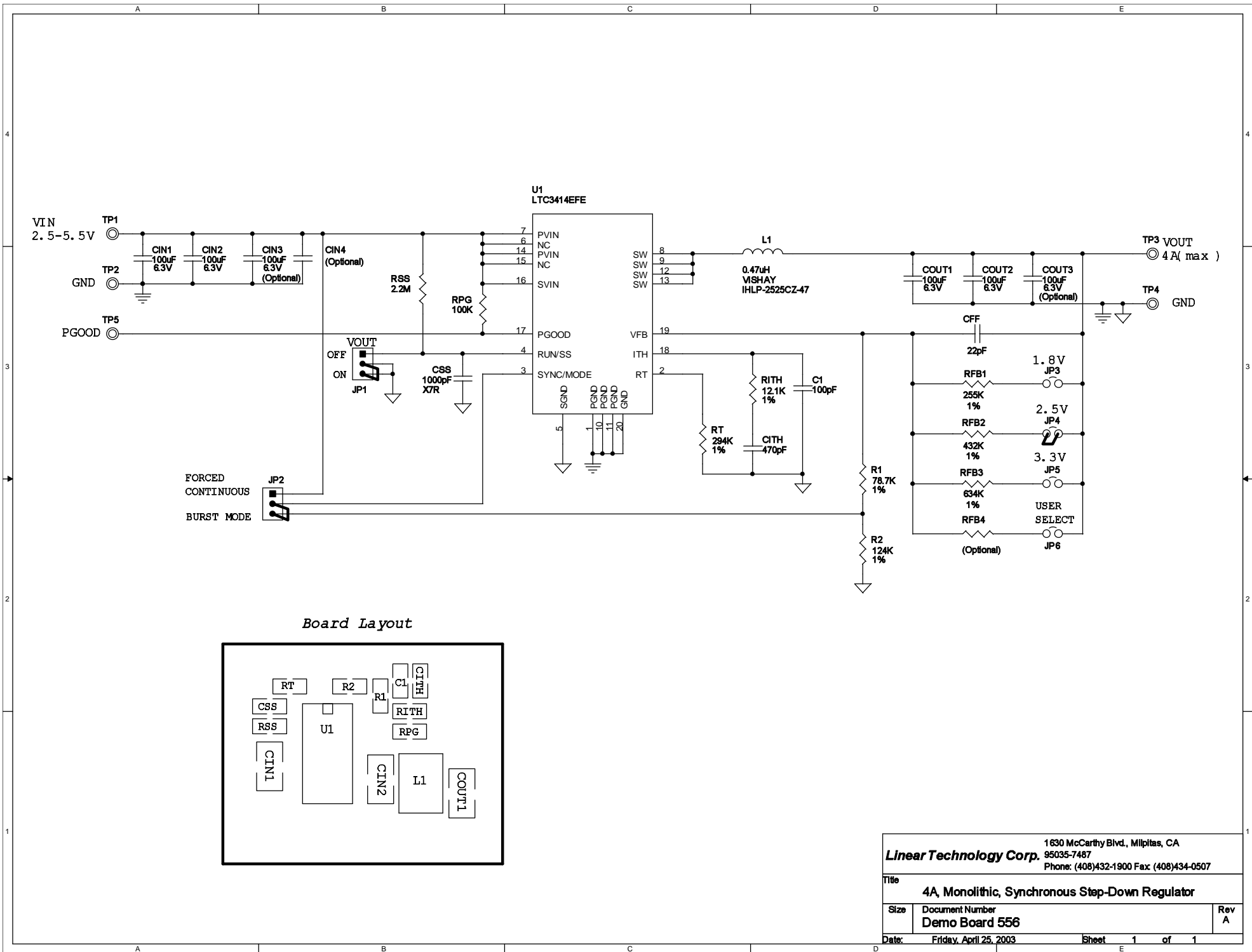
## 4A MONOLITHIC SYNCHRONOUS STEP-DOWN REGULATOR



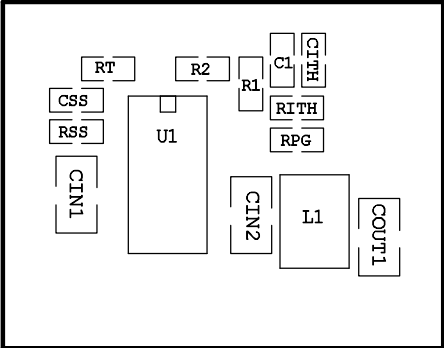
Board Layout



1630 McCarthy Blvd., Milpitas, CA 85035-7487 Phone: (408)432-1900 Fax: (408)434-0507	
<b>Linear Technology Corp.</b> 4A Monolithic Synchronous Step-Down Regulator	
Title Demo Board 556	Rev A
Size Document Number	Date Friday, May 23, 2003
Sheet 1 of 1	Page 1 of 1



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6/17/2005

<b>Item</b>	<b>Qty</b>	<b>Reference</b>	<b>Part Description</b>	<b>Manufacture / Part #</b>
1	1	CFF	Cap., NPO 22pF 25V 10%	AVX 04023A220KAT2A
2	3	CIN1,COU2,CIN2	Cap., X5R 100uF 6.3V 20%	TDK C4532X5R0J107M
3	0	CIN3 (Optional)	Cap., X5R 100uF 6.3V 20%	TDK C4532X5R0J107M
		OR		SANYO POSCAP 6TPE150M
4	0	COU3,CIN4 (Optional)	Cap., X5R 100uF 6.3V 20%	TDK C4532X5R0J107M
5	1	CITH	Cap., X7R 470pF 25V 20%	AVX 04023C471MAT2A
6	1	COU1	Cap., X5R 100uF 6.3V 20%	TDK C4532X5R0J107M
		OR		SANYO POSCAP 6TPE150M
7	1	CSS	Cap., X7R 1000pF 50V 10%	AVX 06035C102KAT1A
8	1	C1	Cap., NPO 100pF 25V 10%	AVX 04023A101KAT2A
9	2	JP2,JP1	Headers, 3 Pins 2mm Ctrs.	CommConn Con. Inc. 2802S-03G2
10	4	JP3,JP4,JP5,JP6	Jumper, 2pins 2mm Ctrs.	CommConn Con. Inc. 2802S-02G2
11	3	XJP1,XJP2,XJP4	Shunt, 2 Pins 2mm Ctrs.	CommConn Con. Inc. CCIJ2MM-138G
12	1	L1	Inductor, 0.47uH	VISHAY IHLP-2525CZ-47
13	1	RFB1	Res., Chip 255K 1/16W 1%	AAC CR05-2553FM
14	1	RFB2	Res., Chip 432K 1/16W 1%	AAC CR05-4323FM
15	1	RFB3	Res., Chip 634K 1/16W 1%	AAC CR05-6343FM
16	0	RFB4 (Optional)	Jumper, Chip 0 1/16W 5%	AAC CJ05-000M
17	1	RITH	Res., Chip 12.1K 1/16W 1%	AAC CR05-1212FM
18	1	RPG	Res., Chip 100K 0.06W 5%	AAC CR05-104JM
19	1	RSS	Res., Chip 2.2M 1/16W 5%	AAC CR05-225JM
20	1	RT	Res., Chip 294K 0.06W 1%	AAC CR05-2943FM
21	1	R1	Res., Chip 78.7K 1/16W 1%	AAC CR05-7872FM
22	1	R2	Res., Chip 124K 1/16W 1%	AAC CR05-1243FM
23	5	TP1,TP2,TP3,TP4,TP5	Turret, Testpoint	Mill Max 2501-2
24	1	U1	I.C., Step-Down Reg.	Linear Tech. Corp. LTC3414EFE
25	4		SCREW, #4-40, 1/4"	ANY
26	4		STANDOFF, #4-40 1/4"	MICRO PLASTICS 14HTSP101
27	1		PRINTED CIRCUIT BOARD	DEMO CIRCUIT 556A
28	1		STENCIL	STENCIL DC556A

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