LT3042
PLL/VCO Supply and Reference Board

DESCRIPTION

Demonstration Circuit 2429A is a PLL/VCO Supply and Reference Board that features the LT®3042, an ultralow noise and ultrahigh PSRR RF linear regulator. When powered from any lab or wall wart supply, the DC2429A produces four ultralow noise supplies and an ultralow noise 100MHz reference that ensures PLL/VCO evaluation meets data sheet performance.

Functionally, this circuit produces four separate ultralow noise supplies from a single 6V to 20V supply input. These supplies provide a fixed 3.3V/800mA supply, a fixed 5V/200mA supply, a variable voltage/200mA supply and a fixed 3.3V/200mA supply that powers an onboard 100MHz reference. The variable supply is ideal for powering external VCOs, by providing a jumper option that selects between seven common VCO power supply voltages.

The onboard 100MHz reference is capable of providing a signal which is clean enough to produce data sheet performance from a PLL/VCO. The default reference output mates directly with the LTC®6945, LTC6946, LTC6947 and LTC6948 demo board reference inputs. For evaluation of PLL/VCOs with other references, the DC2429A can be modified to accommodate different onboard reference frequencies, signal types and package footprints.

Design files for this circuit board are available at http://www.linear.com/demo/DC2429A

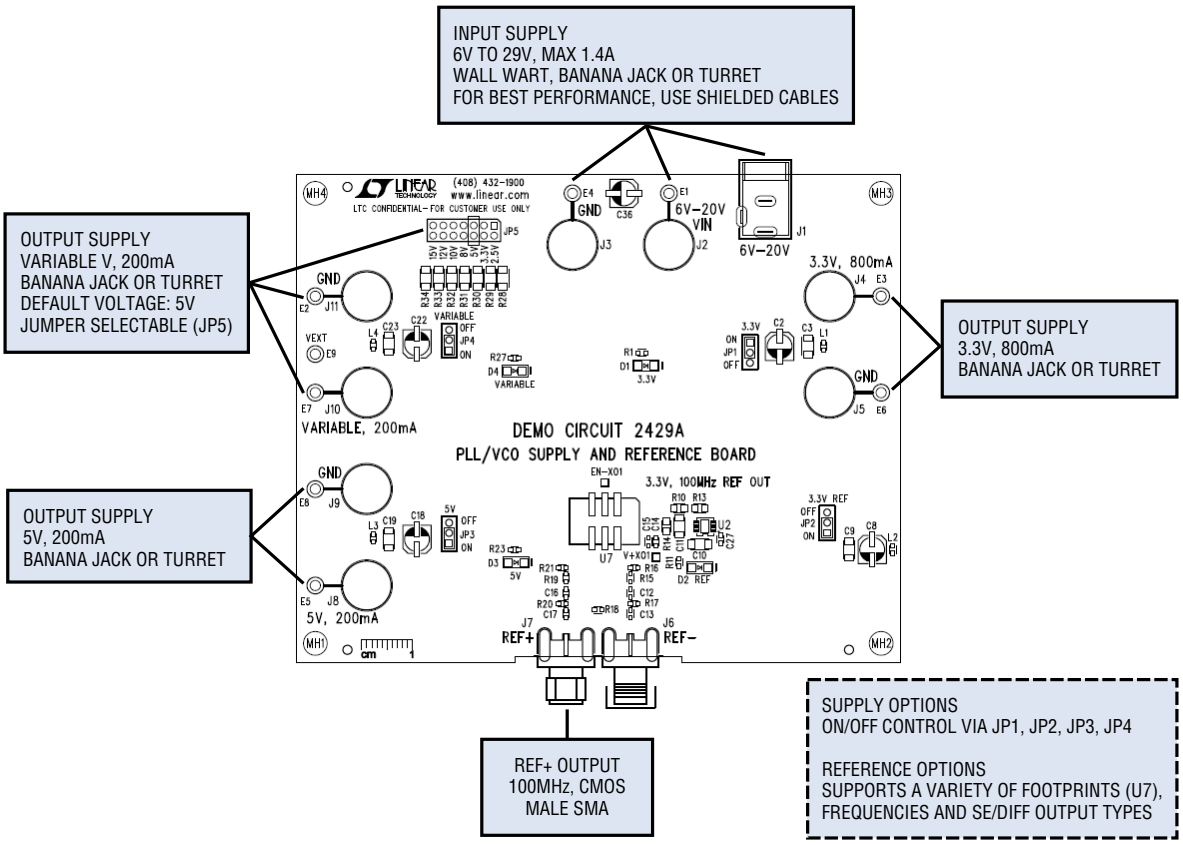


Figure 1. DC2429A Connections

QUICK START PROCEDURE

SETUP

Follow the steps provided in Figure 2 below. When using a switching supply in Step 1, it is best to use a shielded BNC power supply cable with BNC to banana plug adaptors in Steps 1, 2, 3 and 6 to avoid coupling between the input supply and output supplies.

LEDs D1 to D4 should illuminate when power is applied in Step 1. If the LEDs do not illuminate, verify jumpers JP1 to JP4 are set to the ON position. If D4 does not illuminate, verify Step 1's input voltage is at least 350mV greater than the desired voltage on the Variable, 200mA supply.

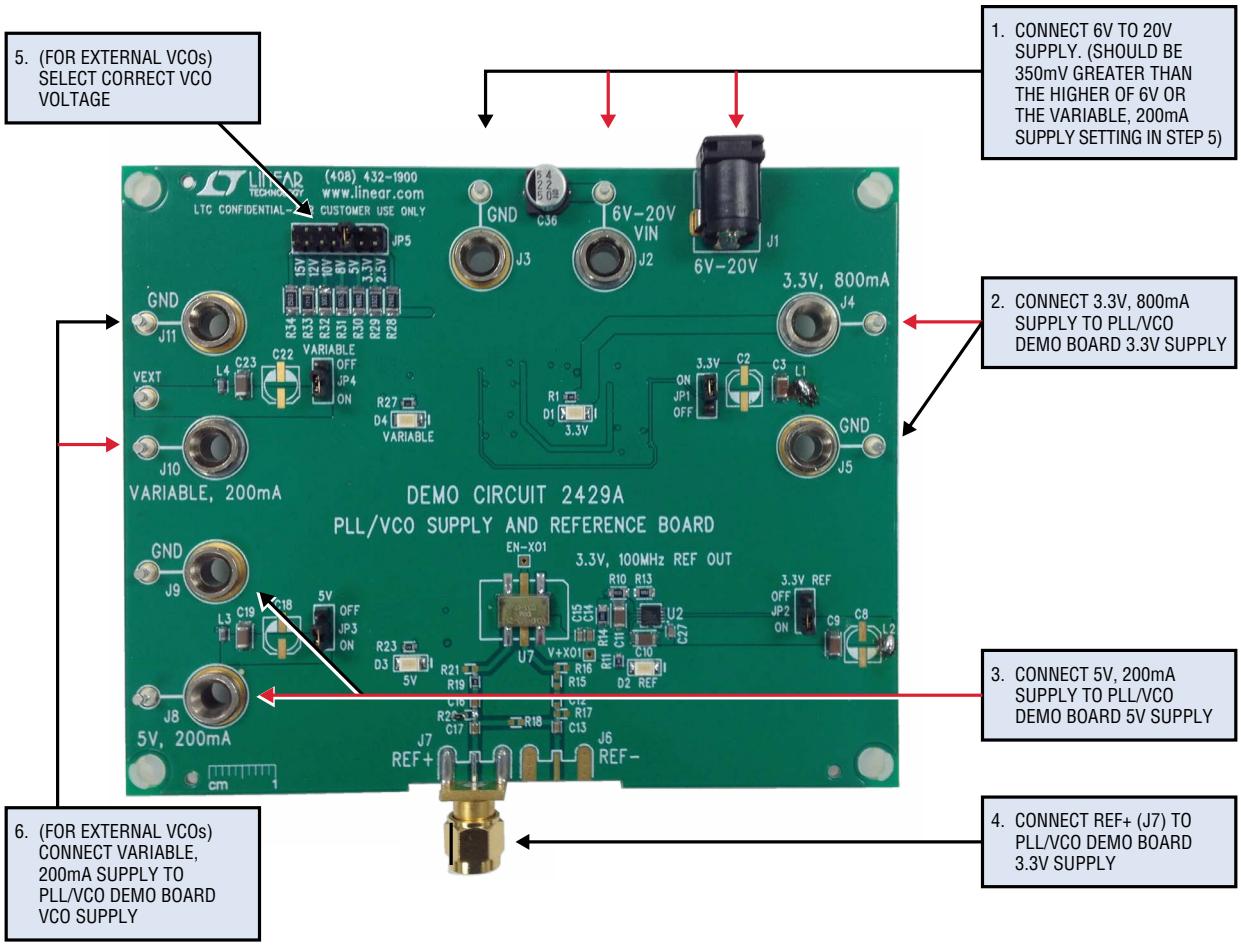


Figure 2. DC2429A Setup

TYPICAL DC2429A REQUIREMENTS AND CHARACTERISTICS

Table 1. DC2429A Assembly Options

PARAMETER	INPUT OR OUTPUT	PHYSICAL LOCATION	DETAILS
6V to 20V Power Supply	Input	J1 Wall Wart Connector or J2 and J3 BNC Banana Jacks	6V to 20V input power supply voltage must be 350mV greater than the higher of 6V or the desired variable, 200mA output voltage. Up to 1.4A current consumption. LEDs D1-D4 illuminate when power supplied. To avoid coupling between input and output supplies it is best to use shielded power supply cables.
3.3V, 800mA	Output	J4 and J5 BNC Banana Jacks	Load shares 4 LT3042 to achieve 800mA output current capability. See schematic.
5V, 200mA	Output	J8 and J9 BNC Banana Jacks	
Variable, 200mA	Output	J10 and J11 BNC Banana Jacks	JP5 selects output voltage 6V to 20V input power supply voltage must be 350mV greater than the higher of 6V or the desired variable, 200mA output voltage.
Variable, 200mA Output Voltage Selection	Input	JP5	Selects variable, 200mA supply output voltage (Options: 2.5V, 3.3V, 5V, 8V, 10V, 12V, 15V).
REF+	Output	J7	Male SMA connector. 100MHz, 3.3V CMOS thru 100Ω series, AC coupled.
REF–	Output	J6 (not installed)	Default: not installed. Install if differential reference is desired.
3.3V Jumper	Input	JP1	Default: set to ON. Connected to LT3042 EN/UV pin (U1, U4, U5 and U6).
3.3V_REF Jumper	Input	JP2	Default: set to ON. Connected to LT3042 EN/UV pin (U2).
5V Jumper	Input	JP3	Default: set to ON. Connected to LT3042 EN/UV pin (U3).
Variable Jumper	Input	JP4	Default: set to ON. Connected to LT3042 EN/UV pin (U8).

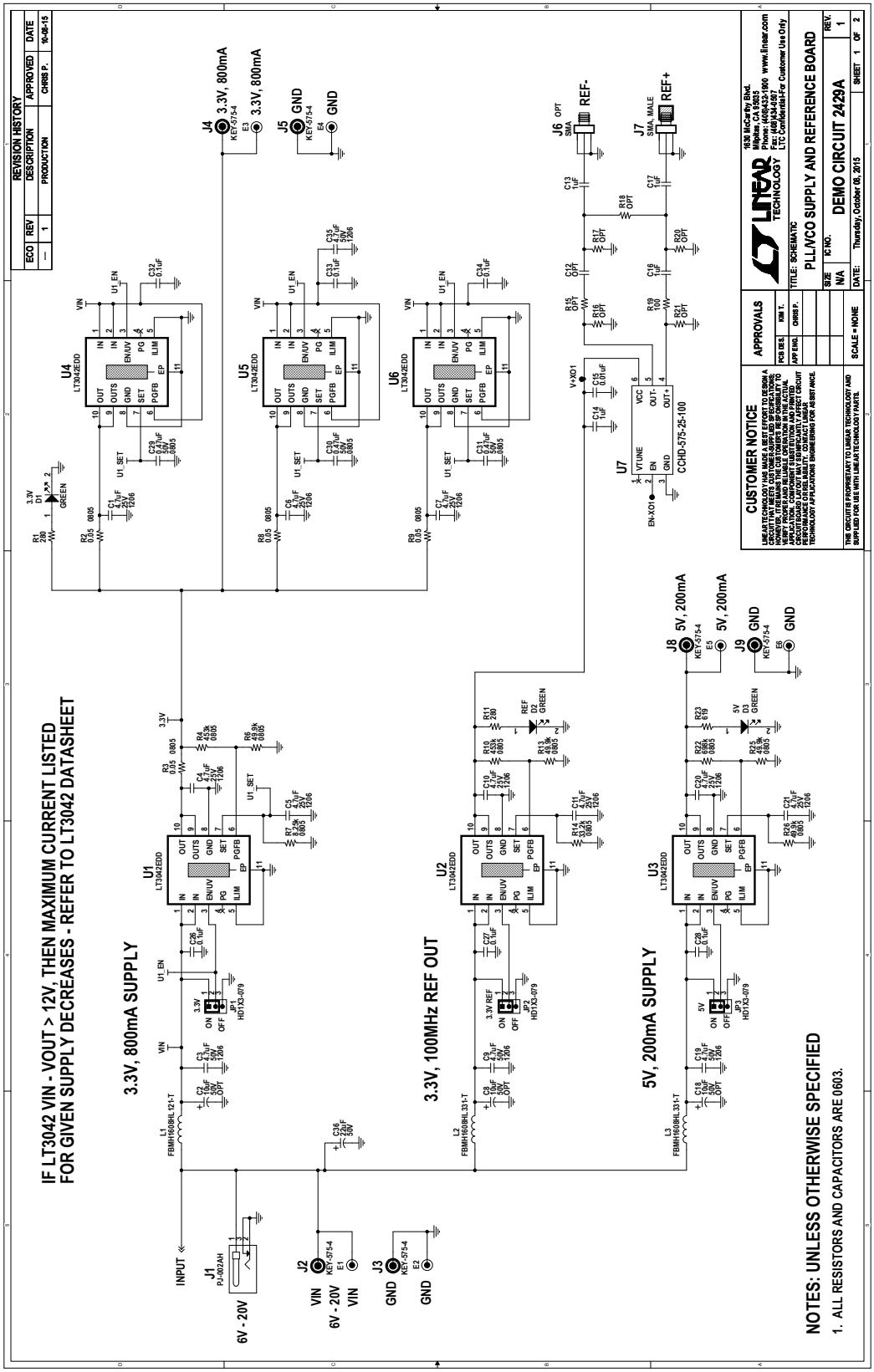
PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	16	C1, C3-C7, C9-C11, C19-C21, C23-C25, C35	CAP., X7R, 4.7µF, 50V, 10%, 1206	MURATA, GRM31CR71H475KA12L
2	0	C2, C8, C18, C22	CAP., ALUM. ELECT., 10µF, 50V, 10%, CE-BSS	SUN ELECT., 50CE10BSS
3	0	C12	CAP., 0603	OPT
4	4	C13, C14, C16, C17	CAP., X7R, 1µF, 16V, 10%, 0603	MURATA, GRM188R71C105KA12D
5	1	C15	CAP., X7R, 0.01µF, 16V, 10%, 0603	MURATA, GRM188R71C103KA01D
6	7	C26-C28, C32-C34, C37	CAP., X7R, 0.1µF, 16V, 10%, 0603	MURATA, GRM188R71C104KA01D
7	3	C29, C30, C31	CAP., X7R, 0.47µF, 50V, 10%, 0805	MURATA, GRM21BR71H474KA88L
8	1	C36	CAP., ALUM. ELECT., 22µF, 50V, 10%, CE-BSS	SUN ELECT., 50CE22BSS
9	4	D1, D2, D3, D4	LED, GREEN, LED-ROHM-SML-01	ROHM, SML-012P8TT86
10	9	E1-E9	TURRET, 0.064"	MILL-MAX, 2308-2-00-80-00-00-07-0
11	4	JP1-JP4	CONN., HEADER, 1x3, 2mm	WURTH ELEKTRONIK, 62000311121
12	1	JP5	CONN., HEADER, 2X7, 2mm	SULLINS, NRPN072PAEN-RC
13	1	J1	CONN., PWR JACK, CON-CUI-PJ002AH	CUI INC., PJ-002AH
14	8	J2-J5, J8-J11	JACK, BANANA	KEYSTONE, 575-4
15	0	J6	CONN., SMA 50-OHM EDGE-LAUNCH	OPT
16	1	J7	CONN., SMA 50-OHM EDGE-LAUNCH, MALE	EF JOHNSON, 142-0801-801
17	1	L1	IND, FERRITE BEAD, L-0603LS-1608	TAIYO YUDEN, FBMH1608HL121-T
18	3	L2-L4	IND, FERRITE BEAD, L-0603LS-1608	TAIYO YUDEN, FBMH1608HL331-T
19	2	R1, R11	RES., CHIP, 280, 1/10W 1%, 0603	VISHAY, CRCW0603280RFKEA
20	4	R2, R3, R8, R9	RES., CHIP, 0.05, 1/4W 5%, 0805	PANASONIC, ERJ-L06KJ50MV
21	2	R4, R10	RES., CHIP, 453k, 1/8W 1%, 0805	VISHAY, CRCW0805453KFKEA
22	4	R6, R13, R25, R26	RES., CHIP, 49.9k, 1/8W 1%, 0805	VISHAY, CRCW080549K9FKEA
23	1	R7	RES., CHIP, 8.25k, 1/8W 1%, 0805	VISHAY, CRCW08058K25FKEA
24	1	R14	RES., CHIP, 33.2k, 1/8W 1%, 0805	VISHAY, CRCW080533K2FKEA
25	0	R15-R18, R20, R21	RES., 0603	OPT
26	1	R19	RES., CHIP, 100, 1/10W 1%, 0603	VISHAY, CRCW0603100RFKEA
27	1	R22	RES., CHIP, 698k, 1/8W 1%, 0805	VISHAY, CRCW0805698KFKEA
28	1	R23	RES., CHIP, 619, 1/10W 1%, 0603	VISHAY, CRCW0603619RFKEA
29	1	R27	RES., CHIP, 1.21k, 1/10W 1%, 0603	VISHAY, CRCW06031K21FKEA
30	1	R28	RES., CHIP, 24.9k, 1/4W 1%, 1206	VISHAY, CRCW120624K9FKEA
31	1	R29	RES., CHIP, 33.2k, 1/4W 1%, 1206	VISHAY, CRCW120633K2FKEA
32	1	R30	RES., CHIP, 49.9k, 1/4W 1%, 1206	VISHAY, CRCW120649K9FKEA
33	1	R31	RES., CHIP, 80.6k, 1/4W 1%, 1206	VISHAY, CRCW120680K6FKEA
34	1	R32	RES., CHIP, 100k, 1/4W 1%, 1206	VISHAY, CRCW1206100KFKEA
35	1	R33	RES., CHIP, 121k, 1/4W 1%, 1206	VISHAY, CRCW1206121KFKEA

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
36	1	R34	RES., CHIP, 150k, 1/4W 1%, 1206	VISHAY, CRCW1206150KFKEA
37	7	U1-U6, U8	I.C., DFN10DD-3X3	LINEAR TECH., LT3042EDD
38	1	U7	I.C., 100MHz OSCILLATOR, OSC-VCXO/CVS575S	CRYSTEK, CCHD-575-25-100.000
39	5	SHUNT ON JP1-JP5 AS SHOWN ON ASSY DWG	SHUNT, 2mm	WURTH ELEKTRONIK, 60800213421
40	4	MH1-MH4	STANDOFF, NYLON, 0.5, 1/2"	WURTH ELEKTRONIK, 702935000

SCHEMATIC DIAGRAM



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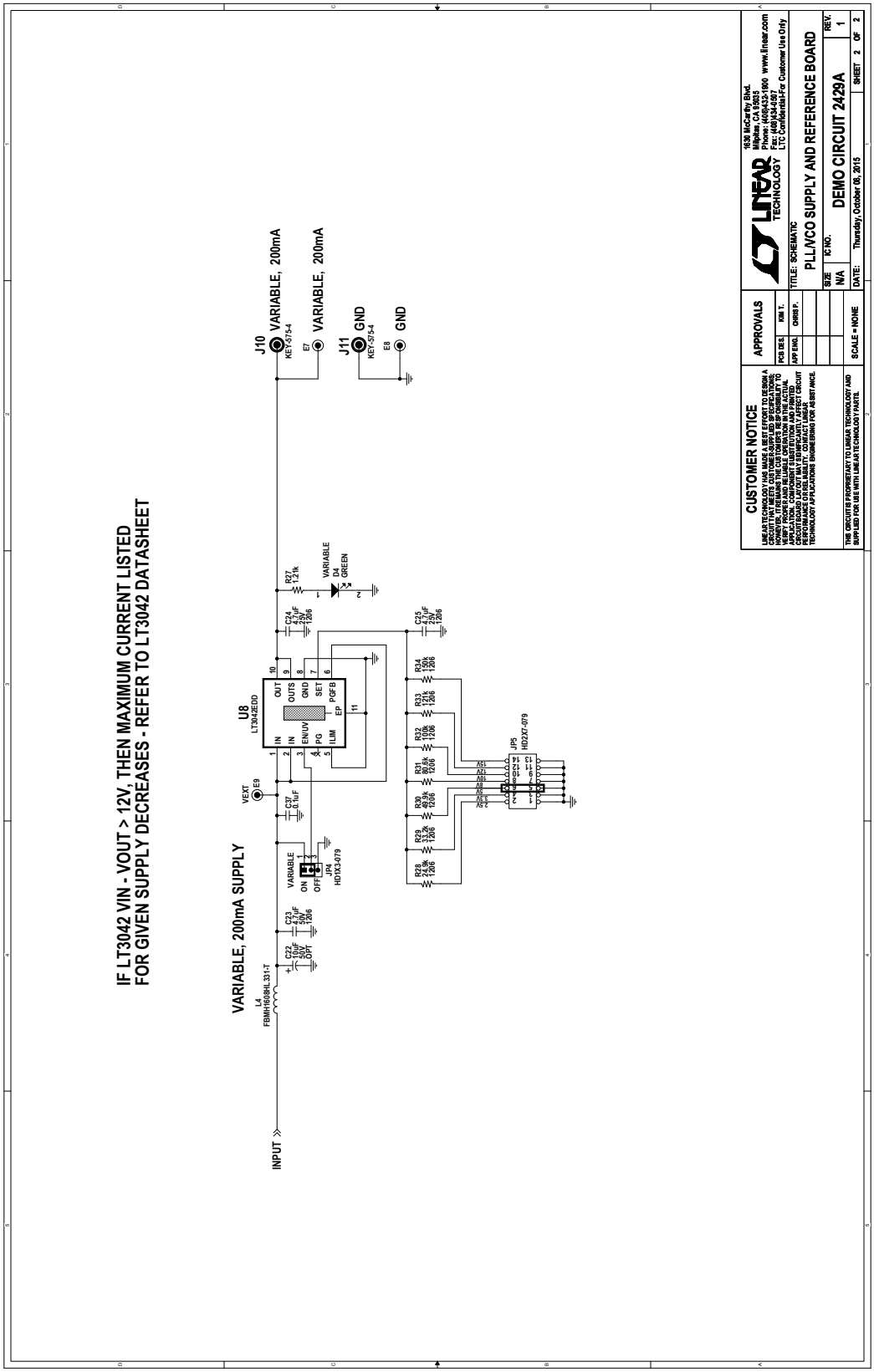

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