ANALOG DEVICES

LTC6952
Ultralow Jitter, 4.5GHz PLL with 11 Outputs and JESD204B Support

DESCRIPTION

Demonstration circuit 2609A features the LTC6952, an Ultralow Jitter, 4.5GHz PLL with 11 Outputs and JESD204B Support.

By default, the DC2609A is powered from two supplies. The 9V-12V supply input powers the onboard reference and VCO circuitry, along with the LTC6952 5V supply pin. The 4V-6V supply input powers the LTC6952 3.3V supply pins. A reduced power option is provided that allows the LTC6952's output supply pins to connect to an LTC Silent Switcher® and the LTC6952 input supply pins to connect to a low noise LDO.

All differential inputs and six of the differential outputs are populated with 0.5" spaced SMA connectors. These outputs are AC-coupled with 50Ω transmission lines making them suitable to drive 50Ω impedance instruments. The remaining five differential outputs are terminated with 100Ω.

The LTC6952's EZSync™ and SYSREF request functions are made available via the LTC6952 SPI interface or the EZS_SRQ SMA/turret connectors. The DC2609A, DC2610A, and DC2611A SMA placement was designed for ease of connection for all multi-part synchronization and SYSREF request modes.

The V_{TUNE} and VCO SMAs can mate directly with the DC2664A VCO rider board. This options allows for a quick method to evaluate multiple VCOs.

A DC2026 USB serial controller board is used for SPI communication with the LTC6952, controlled by the supplied LTC6952Wizard™ software.

DC2609 Design files are available.

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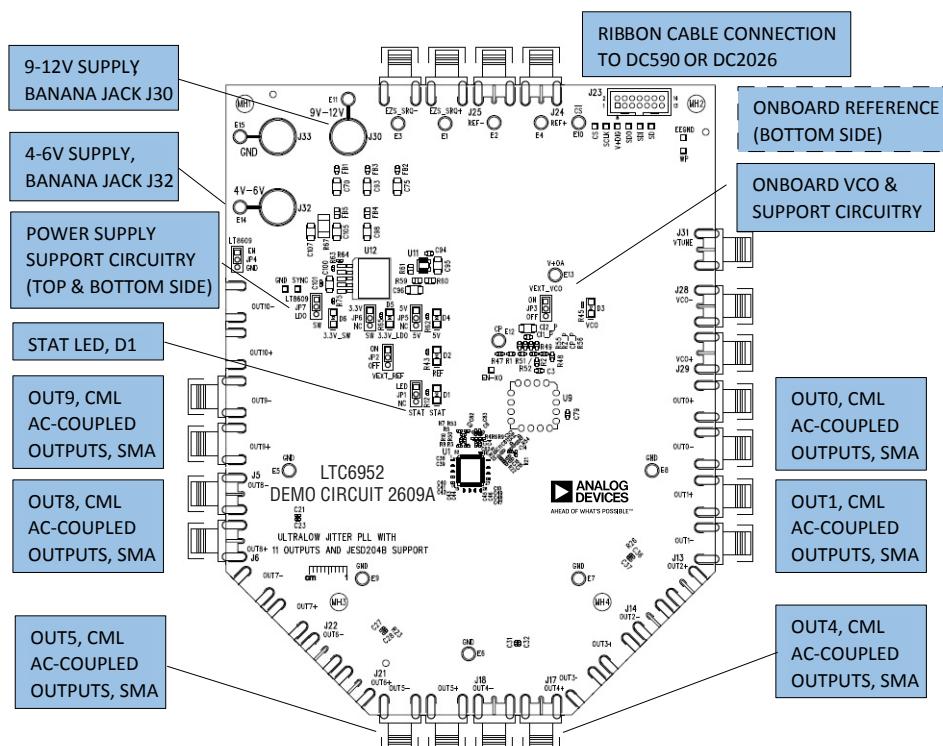

Figure 1. DC2609A Connections

QUICK START PROCEDURE

The DC2609A is easy to set up to evaluate the performance of the LTC6952. Follow the procedure below.

The LTC6952Wizard and the DC2026 are required to control the DC2609A through a personal computer (PC).

DC2026 CONFIGURATION

Refer to Figure 2. Set the JP3 jumper to the 3.3V (preferred) or 5V position.

Connect the DC2026 to one of your computer's USB ports with the included USB cable.

The DC2026 has the ability to run Linduino code, refer to Design Center and the Frequently Asked Question section (Question #2) for more details.

LTC6952WIZARD INSTALLATION

The LTC6952Wizard software is used to communicate with the LTC6952. It uses the DC2026 to translate between USB and SPI-compatible serial communications formats. It also includes advanced design and simulation capabilities. The following are the LTC6952Wizard system requirements:

- Windows Operating System: Windows XP, Windows 2003 Server, Windows Vista, Windows 7

- Microsoft.NET 3.5 SP1 or later

- Windows Installer 3.1 or later

- Linear Technology's DC2026 (with the DC590B emulator sketch loaded)

The DC2026 arrives from the factory with the DC590B Emulator sketch loaded. If this is not the case refer to the Troubleshooting section.
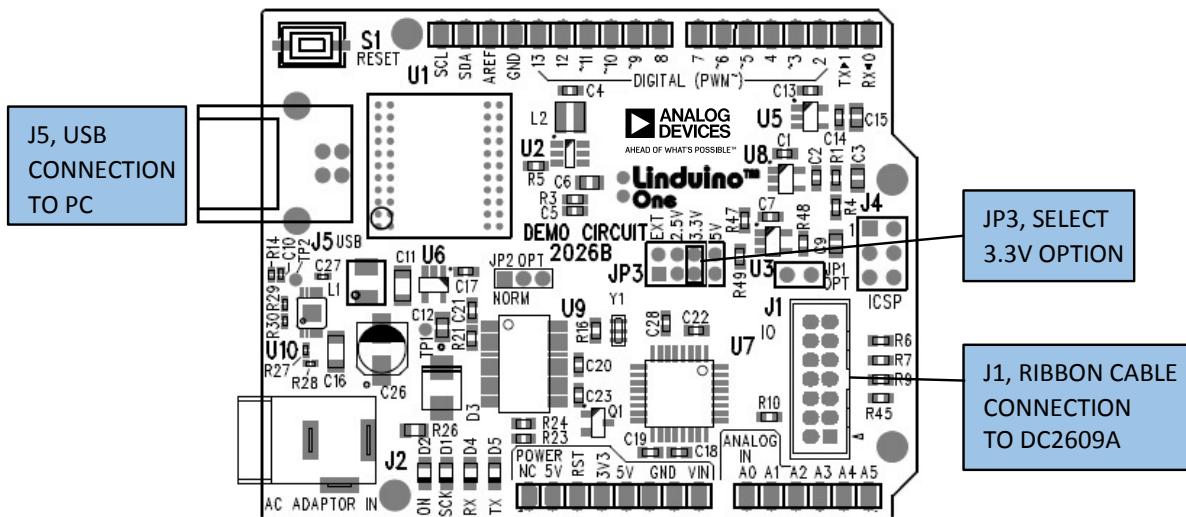

Figure 2. DC2026 Connector Location

QUICK START PROCEDURE

Download the LTC6952Wizard setup file.

Run the LTC6952Wizard setup file and follow the instructions given on the screen. The setup file will verify and/or install Microsoft.NET and install the LTC6952Wizard. Refer to the LTC6952Wizard Help menu for software operation.

DC2609A CONFIGURATION

1. Connect J30, J32 and J33 to the appropriate power supplies and apply power (see Figure 1 and the Typical DC2609A Requirements and Characteristics table).

2. Connect the DC2026 to the DC2609A with the provided ribbon cable.

3. Run the LTC6952Wizard application.

4. In LTC6952Wizard, click File → Load Settings and select file "LTC6952 EZSync StandAlone.6952set". The DC2609A's red STAT LED (D1) should illuminate.

5. Synchronize outputs by toggling the LTC6952 SSYNC bit on then off from the LTC6952Wizard.

6. Connect desired output (OUT9, OUT8, OUT5, OUT4, OUT1 or OUT0) to a test instrument or other demo board to evaluate performance.

Be sure to power down or terminate any unused RF output with 50Ω, or poor spurious performance may result.
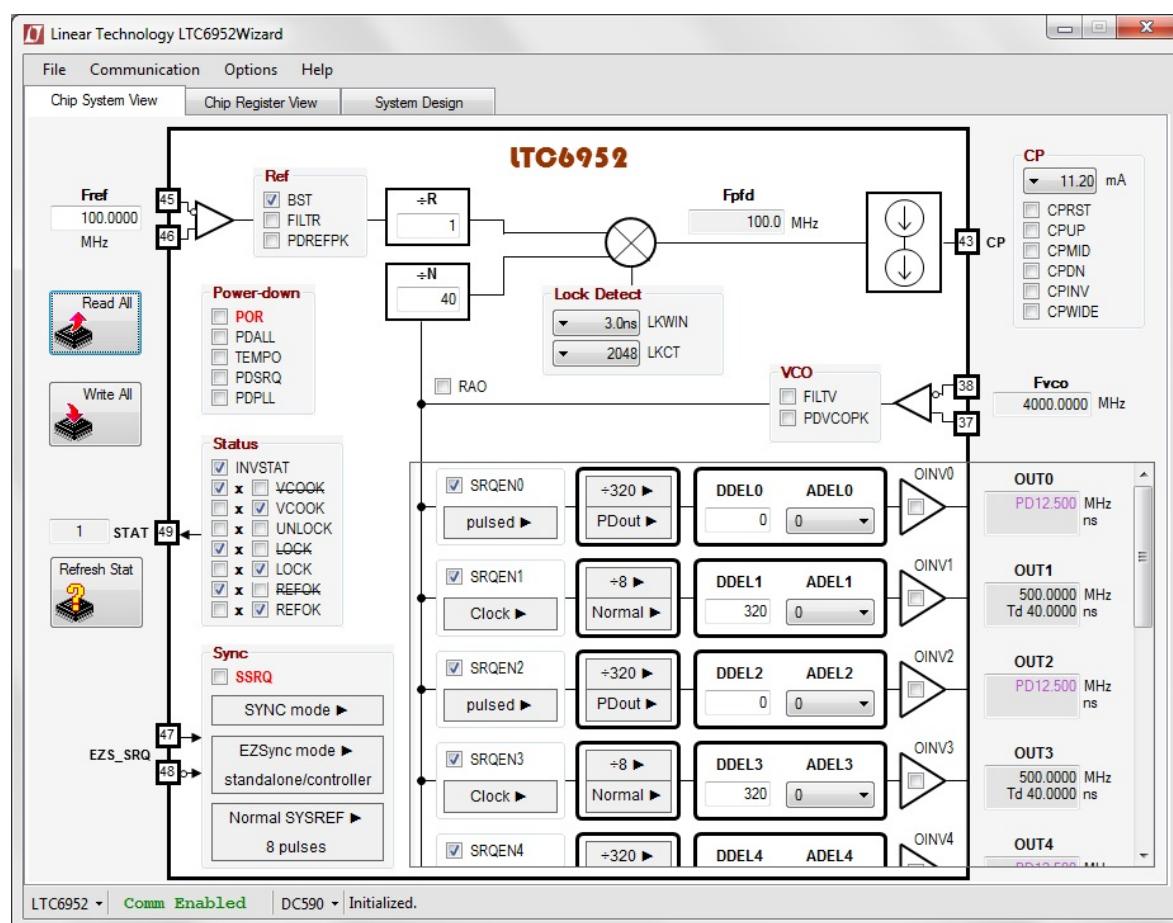
Figure 3. LTC6952Wizard Screenshot

TROUBLESHOOTING

If the green LEDs (D2, D3, or D4) do not illuminate:

1. Verify J30 measures between 9V and 12V (see the Typical DC2609A Requirements and Characteristics table)

2. Verify the JP3 and JP5 jumpers are installed correctly (refer to the DC2609A schematic sheet 3)

3. Verify the output voltages at pin 10 of U7, U8, and U11 are correct

   a. U7 = 3.3V

   b. U8 = 8V

   c. U11 = 5V

If the green LED (D5) does not illuminate:

1. Verify J32 measures between 4V and 6V (see the Typical DC2609A Requirements and Characteristics)

2. Verify JP4, JP6, and JP7 jumpers are installed correctly (refer to the DC2609A schematic sheet 3)

3. Verify the voltages at jumper JP6 and JP7 are correct

   a. JP6 = 3.3V

   b. JP7 = 3.3V

If the red LED (D1) does not illuminate:

1. In LTC6952Wizard's System tab click "Read All". LTC6952Wizard should match Figure 3. If not, see "Verify DC2609A and LTC6952Wizard Communication"

Verify DC2609A and LTC6952Wizard Communication:

To verify communication with the DC2609A. The bottom status line in LTC6952Wizard should read "LTC6952" and "Comm Enabled" as shown in Figure 3. If not, then perform the following steps:

1. Ensure the DC2026 is connected to PC

2. Disconnect and Reconnect DC2026 to PC

3. Ensure DC2026 is connected to DC2609A

4. Close LTC6952Wizard and restart

5. Verify the DC2026 has the DC590B Emulator sketch loaded by contacting the factory or following these steps.

   a. Download QuikEval™

   b. Run QuikEval (Linduino connected to the PC)

If QuikEval does not find a DC590B, reload the DC590 Linduino sketch. To use the LTSketchbook refer to the Linduino Design Center for instructions on how to start using Linduino.

If DC2609A performance is less than the LTC6952 data sheet specifications:

1. For unexpected spurious response, verify power supplies are low noise and spurious free power supplies. Power supplies that are based off a switching regulator architecture are known to generate spurs on low jitter clock outputs.

2. For poor phase noise results, verify the phase noise specifications of the input signal and the phase noise measurement instrument. Traditional signal sources and spectrum analyzers have higher phase noise than the LTC6952 and will degrade measurement results. To measure phase noise performance it is recommended to use a low jitter oscillator and a signal source analyzer, such as Keysight's (previously Agilent/HP) E5052.

3. Contact the factory for further troubleshooting.

DC2609A RECONFIGURATION

The following covers the hardware reconfiguration of the DC2609A. Refer to LTC6952Wizard and the LTC6952 data sheet to better understand how to change programmed parameters on the DC2609A.

LTC6952 3.3V POWER SUPPLY OPTIONS

Table 1 provides the 3.3V power supply options for DC2609A. By default the DC2609A is setup to use the LDO only supply option. An alternative jumper selectable supply option is provided that uses an LDO and Silent Switcher supply. The LDO + Silent Switcher option powers the higher current LTC6952 output supply pins from an LTC Silent Switcher, such as the LT8609S. The LTC Silent Switcher improves the power efficiency over the low noise LDO. A low noise LDO is required on the LTC6952's V_{VCO}^+ and V_{REF}^+ supply pins for acceptable in-band performance.

Table 1. Power Supply Options

Default	Option	Jumper Settings		
		JP4	JP6	JP7
X	LDO Only	2-3	1-2	2-3
	LDO + Silent Switcher	1-2	1-2	1-2

VCO SMA: INPUT TERMINATION OPTIONS

Table 2 provides the single-ended and differential SMA input termination options. By default the DC2609A is setup for onboard VCO input and does not use the J28 and J29 SMAs.

Table 2. VCO SMA Input Termination Options (*)

SMA Inputs	Termination	R18 Ω	R22 Ω	R20 Ω	R21 Ω	C14 µF	C16 µF
J28	SE, IN⁻	75	30	DNI	DNI	0.1	DNI
J29	SE, IN⁺	30	75	DNI	DNI	DNI	0.1
J28 & J29	DIFF, CML or PECL	DNI	DNI	160	DNI	0.1	0.1
	DIFF, LVDS	DNI	DNI	DNI	160	0.1	0.1

* SE = Single-Ended, DIFF = Differential, DNI = Do Not Install

LTC6952 6952SET FILES

The LTC6952Wizard provides a 6952set file for all LTC6952 data sheet application examples and typical application circuits. After loading a 6952set file a pop-up window will detail any user actions and board modifications required for the selected file.

SYNC OPTIONS

The LTC6952 data sheet describes several synchronization modes. After selecting the desired synchronization mode, refer to Table 3 to identify the required DC2609A board modifications. Refer to the LTC6952 data sheet for SYNC timing and level requirements.

CML OUTPUTS, OUT[10:0]

The DC2609A has 11 CML outputs. OUT[9:0] have matching trace lengths, which are optimized for skew measurements. OUT10's trace lengths are longer than the other outputs traces due to the shape of the DC2609A.

Six of these outputs are AC-coupled and brought out to SMAs (OUT9, OUT8, OUT5, OUT4, OUT1, and OUT0). To drive 50Ω impedance instruments connect OUTx⁺ to the instrument and OUTx⁻ to a 50Ω termination, or vice versa.

The remaining five outputs (OUT10, OUT7, OUT6, OUT3, and OUT2) are terminated with a 100Ω resistor onboard. To connect these outputs to a 50Ω instrument, remove the 100Ω termination, and install the appropriate SMAs and AC blocking capacitors.

Refer to LTC6952 data sheet for differential termination options.

DC2609A RECONFIGURATION

Table 3. LTC6952 Sync Mode Programming Options

SYNC/SYSREF Method	EZS_SRQ Pins State	Board Modifications (DNI = Do Not Install)						
		R53 (Ω)	R7 (Ω)	R5 (Ω)	R50 (Ω)	R10 (Ω)	R3 (Ω)	R8 (Ω)
EZS_SRQ Pin	Differential, CML or LVPECL	DNI	DNI	100	0	0	DNI	DNI
	Differential LVDS	100	100	750	50	50	130	130
	EZS_SRQ$^+$: CMOS EZS_SRQ$^-$: GND	200k	0	DNI	0	0	DNI	DNI
SSRQ Register Bit	EZS_SRQ$^+$: GND EZS_SRQ$^-$: GND	200k	0	DNI	0	0	DNI	DNI

FREQUENTLY ASKED QUESTIONS

1. Can the LTC6952Wizard control a LTC6952 on a board other than the DC2609A?

Yes, follow these steps.

Step 1: Configure the DC2026 for 3.3V SPI as shown in Figure 2

Step 2: Connect the DC2026 J1 connector SPI pins to the LTC6952 SPI pins. Refer to page two of the DC2609A schematic for pin assignments.

2. Does the LTC6952 have Linduino Code available?

Yes, download the LTC6953 sketch in the LTSketchbook. To use the LTSketchbook and for instructions on how to start using Linduino refer to the Linduino Design Center. This will give programmers a head start in writing code for the LTC6952. It is recommended to use the LTC6952Wizard to create the best possible register settings for all conditions. These LTC6952 register settings from LTC6952Wizard can be programmed in a lookup table.

TYPICAL DC2609A REQUIREMENTS AND CHARACTERISTICS

PARAMETER	INPUT OR OUTPUT	PHYSICAL LOCATION	DETAILS
9V-12V Power Supply	Input	J30 Banana Jack	Powers the onboard 8V VCO, the onboard 3.3V reference and the LTC6952 5V V_{CP+} supply pins.
			Power down onboard reference (U2) by setting jumper JP2 to position 2-3.
			Power down onboard VCO (U9) by setting jumper JP3 to position 2-3.
4V-6V Power Supply	Input	J32 Banana Jack	Powers the LTC6952 3.3V supply pins (V_{OUT}^+, V_{REF}^+, V_{VCO}^+, and V_D^+). Option available to power supplies from single LDO, or an LDO and an LTC Silent Switcher. Refer to Table 1.
GND	Output	J33 Banana Jack	Pair with J30 and J32
OUT9$^+$; OUT9$^-$		J3 and J4 SMA Connectors*	CML, AC-Coupled, 800mVpk Differential
OUT8$^+$; OUT8$^-$		J5 and J6 SMA Connectors*	
OUT5$^+$; OUT5$^-$		J19 and J20 SMA Connectors*	
OUT4$^+$; OUT4$^-$		J17 and J18 SMA Connectors*	
OUT1$^+$; OUT1$^-$		J11 and J12 SMA Connectors*	
OUT0$^+$; OUT0$^-$		J9 and J10 SMA Connectors*	
OUT10$^+$; OUT10$^-$	Two Outputs (Not Connected)	J1 and J2 (SMA Not Populated)	Onboard Differential 100Ω termination
OUT7$^+$; OUT7$^-$		J7 and J8 (SMA Not Populated)	
OUT6$^+$; OUT6$^-$		J21 and J22 (SMA Not Populated)	
OUT3$^+$; OUT3$^-$		J15 and J16 (SMA Not Populated)	
OUT2$^+$; OUT2$^-$		J13 and J14 (SMA Not Populated)	
VCO$^+$; VCO$^-$	Input (Not connected)	J28 and J29 SMA Connector	Default: Not Connected (see Table 2, for correct input termination options)
REF$^+$; REF$^-$	Input (Not connected)	J24 and J25 SMA Connector	Default: Not Connected
EZS_SRQ$^+$	Input	J27 SMA Connector/E1 Turret	Default: Preferred Single-Ended Input
EZS_SRQ$^-$	Input	J26 SMA Connector/E3 Turret	Default: Shorted to GND
ISD	Input	Test Point	3.3V(Default): Device Active, set by pull-up resistor GND: Shut Down Device
STAT	Output	JP1 Jumper	Red LED D1 illuminates when STAT pin in high state

*Any unused RF output must be powered down or terminated with 50Ω, or poor spurious performance may result.

ASSEMBLY OPTIONS

Table 5. DC2609A Options

Assembly Version	Part Number
DC2609A-A	LTC6952IUKG

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	0	CI1_A, C3, CP_A (OPT)	CAP, OPTION, 0603	OPT
2	1	CI1_P	CAP, 0.68µF, X7R, 16V, 10%, 0603, AEC-Q200	SAMSUNG, CL10B684KO8VPNC
3	0	CI2_A (OPT)	CAP, OPTION, 1206	OPT
4	1	CI2_P	CAP, 1µF, X7R, 25V, 10%, 1206, AEC-Q200	SAMSUNG, CL31B105KAPWPNE
5	1	CP_P	CAP, 0.033µF, X7R, 50V, 10%, 0603	MURATA, GRM188R71H333KA61D
6	18	C1, C4, C6, C9, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C110, C112	CAP, 1µF, X5R, 16V, 10%, 0402	MURATA, GRM155R61C105KE01D
7	1	C2	CAP, 0.022µF, X7R, 50V, 10%, 0603	MURATA, GRM188R71H223KA01D
8	25	C5, C11, C17, C18, C19, C20, C21, C22, C23, C24, C26, C29, C30, C31, C32, C63, C64, C65, C66, C67, C81, C88, C89, C101, C111	CAP, 0.1µF, X7R, 10V, 10%, 0402	MURATA, GRM155R71A104KA01D AVX, 0402ZC104KAT2A
9	1	C7	CAP, 0.01µF, X7R, 16V, 10%, 0402	AVX, 0402YC103KAT2A
10	0	C8, C12, C14, C15, C16, C25, C27, C28, C33, C34, C35, C36, C37, C82, C83, C84, C85	CAP, OPTION, 0402	OPT
11	14	C10, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C62	CAP, 0.01µF, X7R, 6.3V, 10%, 0201	MURATA, GRM033R70J103KA01D
12	1	C13	CAP, 10pF, C0G, 50V, 10%, 0402	AVX, 04025A100KAT2A
13	3	C68, C91, C106	CAP, 22µF, ALUM., 63V, 20%, SMD 6.3 × 7.7mm, CE-BS Series	SUN ELECTRONIC INDUSTRIES CORPORATION, 63CE22BS
14	4	C69, C74, C92, C97	CAP, 10µF, ALUM., 63V, 20%, SMD 6.3 × 5.4mm, CE-BS Series	SUN ELECTRONIC INDUSTRIES CORPORATION, 63CE10BS
15	13	C70, C72, C73, C75, C77, C78, C93, C95, C96, C98, C104, C105, C107	CAP, 4.7µF, X7R, 50V, 10% 1206	MURATA, GRM31CR71H475KA12L AVX, 12065C475KAT2A NIC, NMC1206X7R475K50TRPLPF
16	6	C71, C76, C79, C86, C94, C103	CAP, 0.1µF, X7R, 16V, 10%, 0603	MURATA, GRM188R71C104KA01D YAGEO, CC0603KRX7R7BB104
17	3	C80, C87, C90	CAP, 47µF, TANT, 35V, 10%, 7361	AVX, TAJV476K035RNJ
18	1	C99	CAP, 330µF, TANT, 10V, 10%, 7343	AVX, TPME337K010R0035
19	1	C100	CAP, 10µF, X7R, 25V, 10%, 1206	MURATA, GRM31CR71E106KA12L
20	1	C102	CAP, 1µF, X7R, 50V, 10%, 0805	TDK, C2012X7R1H105K125AB
21	1	C108	CAP, 47µF, X5R, 25V, 20%, 1206	TDK, C3216X5R1E476M160AC
22	1	C109	CAP, 4.7µF, X7R, 16V, 10%, 0805	MURATA, GRM21BR71C475KA73L AXV, 0805YC475KAT2A
23	1	D1	LED, RED, CLEAR, 3020 (1208)	ROHM, SML-012V8TT86
24	5	D2, D3, D4, D5, D6	LED, GREEN, CLEAR, 3020 (1208)	ROHM, SML-012P8TT86
25	15	E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15	TEST POINT, TURRET, 0.064", MTG. HOLE	MILL-MAX, 2308-2-00-80-00-00-07-0
26	3	FB1, FB2, FB3	IND., 330Ω at 100MHz, FERRITE BEAD, 25%, 0.8A, 0.21Ω, 0603	TAIYO YUDEN, FBMH1608HL331-T

PARTS LIST

| ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
27	2	FB4, FB5	IND., 220Ω at 100MHz, FERRITE BEAD, 3A, 0.04Ω, 0805	TDK, MPZ2012S221AT000
28	7	JP1, JP2, JP3, JP4, JP5, JP6, JP7	CONN., HDR, MALE, 1 × 3, 2mm, THT, STR	Wurth Elektronik, 62000311121
29	0	J1, J2, J7, J8, J13, J14, J15, J16, J21, J22 (OPT)	CONN., SMA, JACK, RCPT, END LAUNCH, STR, 50Ω	OPT
30	19	J3, J4, J5, J6, J9, J10, J11, J12, J17, J18, J19, J20, J24, J25, J26, J27, J28, J29, J31	CONN., SMA, JACK, RCPT, END LAUNCH, STR, 50Ω	CINCH CONNECTIVITY SOLUTIONS, 142-0701-851
31	1	J23	CONN., HDR., MALE, 2 × 7, 2mm, THT, VERT, SHROUDED	MOLEX, 87831-1420
32	3	J30, J32, J33	CONN., BANANA JACK, FEMALE, THT, NON-INSULATED, SWAGE, 0.218"	KEYSTONE, 575-4
33	1	L1	IND., 0Ω, 1/8W, 0805	VISHAY, CRCW08050000Z0EA YAGEO, RC0805JR-070RL
34	1	L2	IND., 2.2μH, PWR, 20%, 8A, 23.5mΩ, 4.3mm × 4.3mm, AEC-Q200	"COILCRAFT, XFL4020-222MEB COILCRAFT, XFL4020-222MEC"
35	2	R1, RZ_P	RES., 48.7Ω, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW060348R7FKEA
36	4	R2, R39, R51, R52	RES., 0Ω, 1/10W, 0603	VISHAY, CRCW06030000Z0EA NIC, NRC06ZOTRF
37	0	R3, R8, R11, R13, R14, R15, R17, R20, R35, R64, R69 (OPT)	RES., OPTION, 0402	OPT
38	2	R4, R73	RES., 49.9Ω, 1%, 1/16W, 0402	VISHAY, CRCW040249R9FKED NIC, NRC04F49R9TRF
39	0	R5, R6, R21 (OPT)	RES., 100Ω, 1%, 1/16W, 0402	OPT
40	8	R7, R9, R10, R42, R50, R54, R63, R70	RES., 0Ω, 1/16W, 0402	VISHAY, CRCW04020000Z0ED NIC, NRC04ZOTRF YAGEO, RC0402JR-070RL
41	1	R12	RES., 330Ω, 1%, 1/16W, 0402, AEC-Q200	VISHAY, CRCW0402330RFKED
42	11	R16, R19, R23, R24, R25, R26, R29, R30, R33, R34, R40	RES., 100Ω, 1%, 1/16W, 0402	VISHAY, CRCW0402100RFKED KOA SPEER, RK73H1ETTP1000F PANASONIC, ERJ2RKF1000X ROHM, MCR01MZPF1000
43	1	R18	RES., 75Ω, 1%, 1/16W, 0402, AEC-Q200	VISHAY, CRCW040275R0FKED
44	1	R22	RES., 30Ω, 1%, 1/16W, 0402, AEC-Q200	VISHAY, CRCW040230R0FKED
45	6	R27, R28, R31, R32, R41, R53	RES., 200k, 1%, 1/16W, 0402	VISHAY, CRCW0402200KFKED PANASONIC, ERJ2RKF2003X YAGEO, RC0402FR-07200KL
46	5	R36, R37, R38, R57, R58	RES., 4.99k, 1%, 1/16W, 0402	VISHAY, CRCW04024K99FKED NIC, NRC04F4991TRF YAGEO, RC0402FR-074K99L
47	4	R43, R62, R65, R75	RES., 619Ω, 1%, 1/16W, 0402, AEC-Q200	VISHAY, CRCW0402619RFKED
48	1	R44	RES., 33.2k, 1%, 1/4W, 0805, AEC-Q200	VISHAY, CRCW080533K2FKEA
49	1	R45	RES., 1.21k, 1%, 1/16W, 0402	VISHAY, CRCW04021K21FKED KOA SPEER, RK73H1ETTP1211F ROHM, MCR01MZPF1211
50	1	R46	RES., 80.6k, 1%, 1/4W, 0805, AEC-Q200	VISHAY, CRCW080580K6FKEA
51	0	R47, R48, R49, R55, R56, RZ_A (OPT)	RES., OPTION, 0603	OPT
52	2	R59, R61	RES., 49.9k, 1%, 1/8W, 0805, AEC-Q200	VISHAY, CRCW080549K9FKEA PANASONIC, ERJ6ENF4992V
53	1	R60	RES., 698k, 1%, 1/8W, 0805, AEC-Q200	VISHAY, CRCW0805698KFKEA
54	2	R66, R67	RES., 0Ω, 3/4W, 2010, AEC-Q200	VISHAY, CRCW20100000Z0EF
55	2	R68, R74	RES., 1MΩ, 1%, 1/10W, 0603	VISHAY, CRCW06031M00FKEA NIC, NRC06F1004TRF PANASONIC, ERJ3EKF1004V

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
56	1	R71	RES., 18.2k, 1%, 1/10W, 0603	VISHAY, CRCW060318K2FKEA MOUSER ELECT., 71-CRCW0603-18.2K-E3
57	1	R72	RES., 309k, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW0603309KFKEA
58	1	U1	IC., ULTRALOW JITTER PLL, QFN-52(UKG) 7 × 8	LINEAR TECH., LTC6952IUKG#PBF LINEAR TECH., LTC6952IUKG#TRPBF
59	1	U2	OSC., 100MHz, 15pF, ±25ppm, 5 × 7.5mm SMD, 3.3V, HCMOS,	CRYSTEK CORPORATION, CCHD-575-25-100.000
60	1	U3	IC., MEMORY, EEPROM, 2Kb (256 x 8), TSSOP-8, 400kHz	MICROCHIP, 24LC025-I /ST
61	2	U4, U5	IC., TinyLogic UHS Dual Buffer, SC70-6	FAIRCHILD SEMI., NC7WZ17P6X
62	1	U6	IC., Dual Supply Receiver, SOT363-6 (SC-88), Single Bit, 3-State Outputs	NXP SEMI., 74LVC1T45GW,125
63	3	U7, U8, U11	IC., PSRR RF LINEAR REGULATOR, DFN-10(DD)	LINEAR TECH., LT3042EDD#PBF LINEAR TECH., LT3042EDD#TRPBF
64	1	U9	OSC. COAXIAL RESONATOR, 4000-4000MHz, 10pF, 50Ω, 0.50" SQ SMD, VCO, PS = 8V, MAX V_{TUNE} = 4.7V	CRYSTEK, CVCO55CC-4000-4000
65	1	U10	IC., DUAL/QUAD LOW NOISE OP AMPS, SO8	LINEAR TECH., LT1678IS8#PBF LINEAR TECH., LT1678IS8#TRPBF
66	1	U12	IC., 3A, 3.3V, LDO REGULATOR, DDPAK5Q	LINEAR TECH., LT1764A-3.3#PBF LINEAR TECH., LT1764A-3.3#TRPBF
67	1	U13	IC,Silent Switcher 2 Synchronous, LGA-16 (3 × 3)	LINEAR TECH., LT8609SIV#PBF LINEAR TECH., LT8609SIV#TRPBF
68	7	JP1, JP2, JP3, JP6, JP6 PINS 1&2; JP4 AND JP7 PINS 2&3	CONN., SHUNT, FEMALE, 2 POS, 2mm	Wurth Elektronik, 60800213421
69	4	MH1, MH2, MH3, MH4	STANDOFF, NYLON, SNAP-ON, 0.50"	Wurth Elektronik, 702935000

SCHEMATIC DIAGRAM

Note: The buffers shown on sheet 2 of 4 of the schematic are used to protect the LTC6952 when connected to the DC2026 before the LTC6952 is powered up. There is no need for such circuitry if the SPI bus is not active before powering up the LTC6952. The EEPROM is for identification and is not needed to program the LTC6952.

SCHEMATIC DIAGRAM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS AND CAPACITORS ARE 0402.

[2]. REFER TO DEMO MANUAL.

ALL INPUT AND OUTPUT CONNECTIONS ARE
SAME LENGTH, 50 OHM CONTROLLED
IMPEDANCE, USING 20 MIL TRACES, 20 MIL GAP.
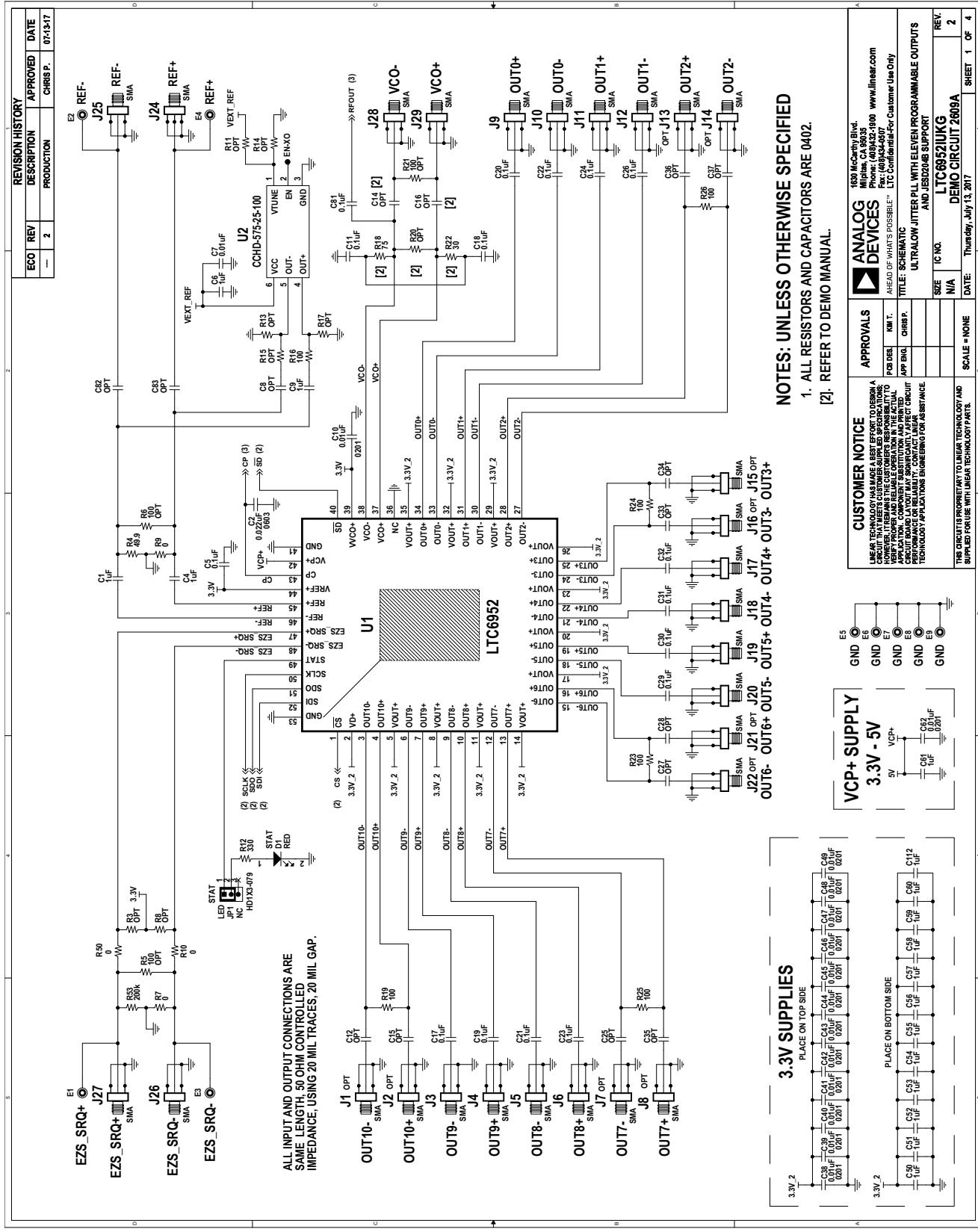
SCHEMATIC DIAGRAM

DC2026 (DC590) SPI INTERFACE
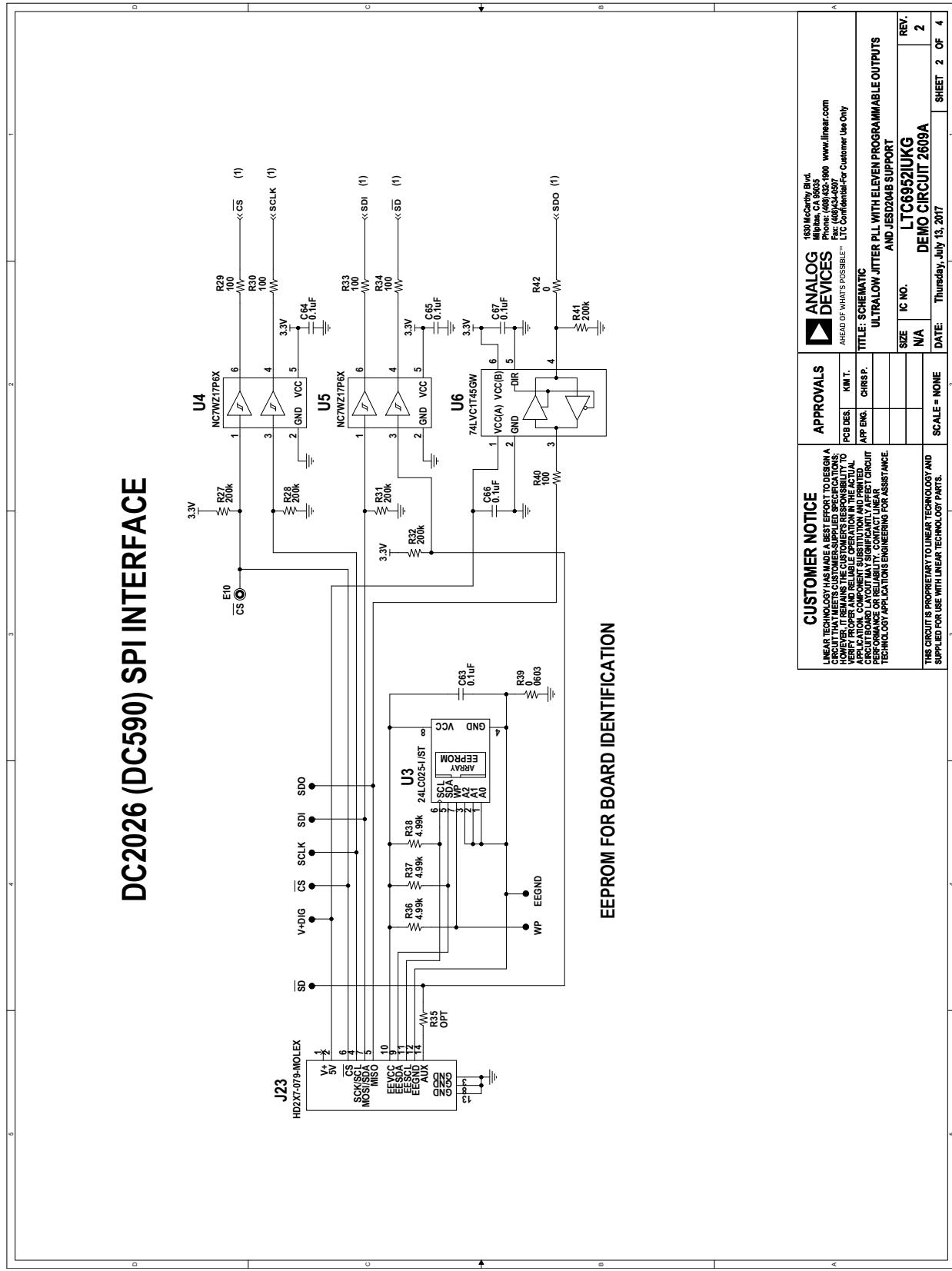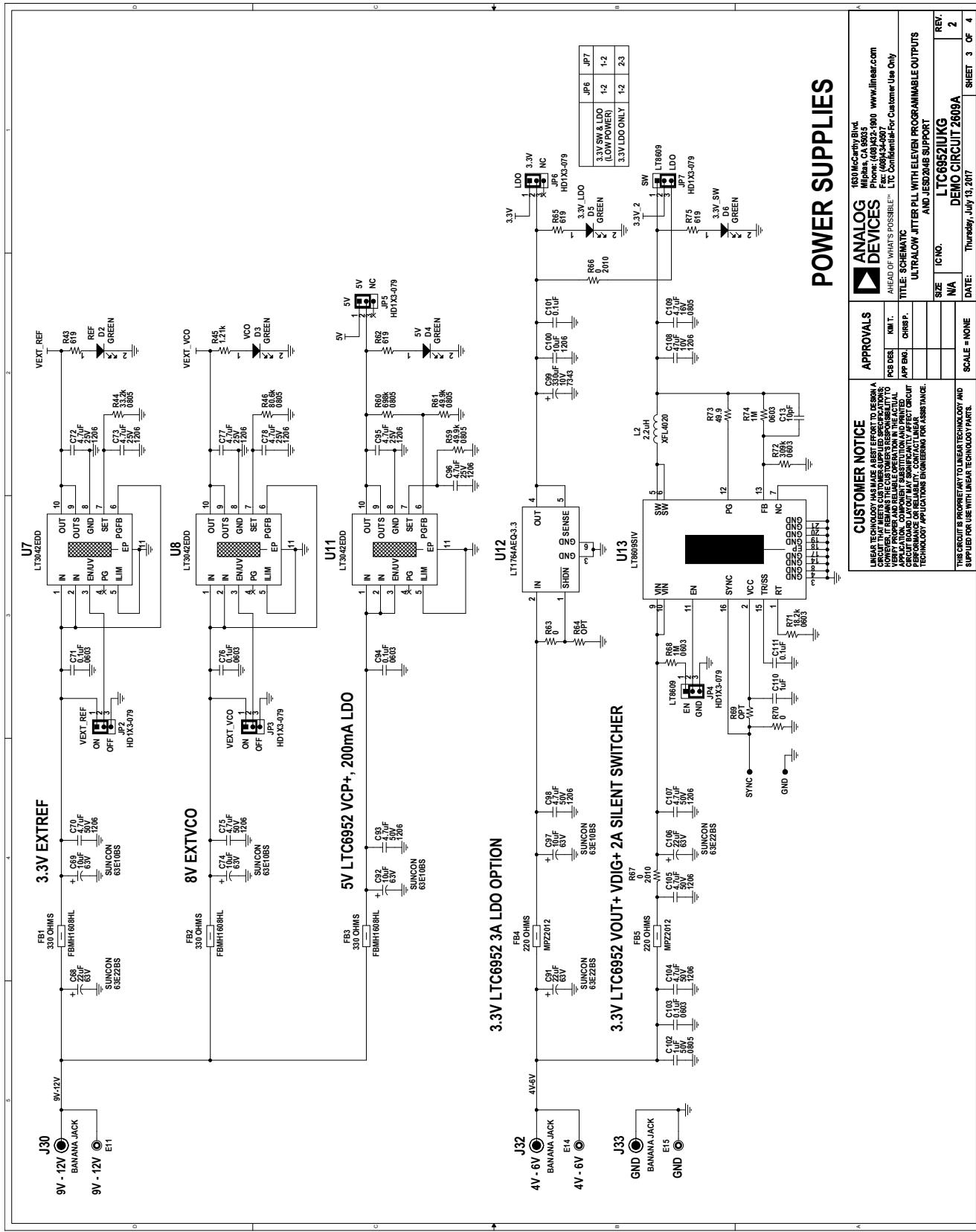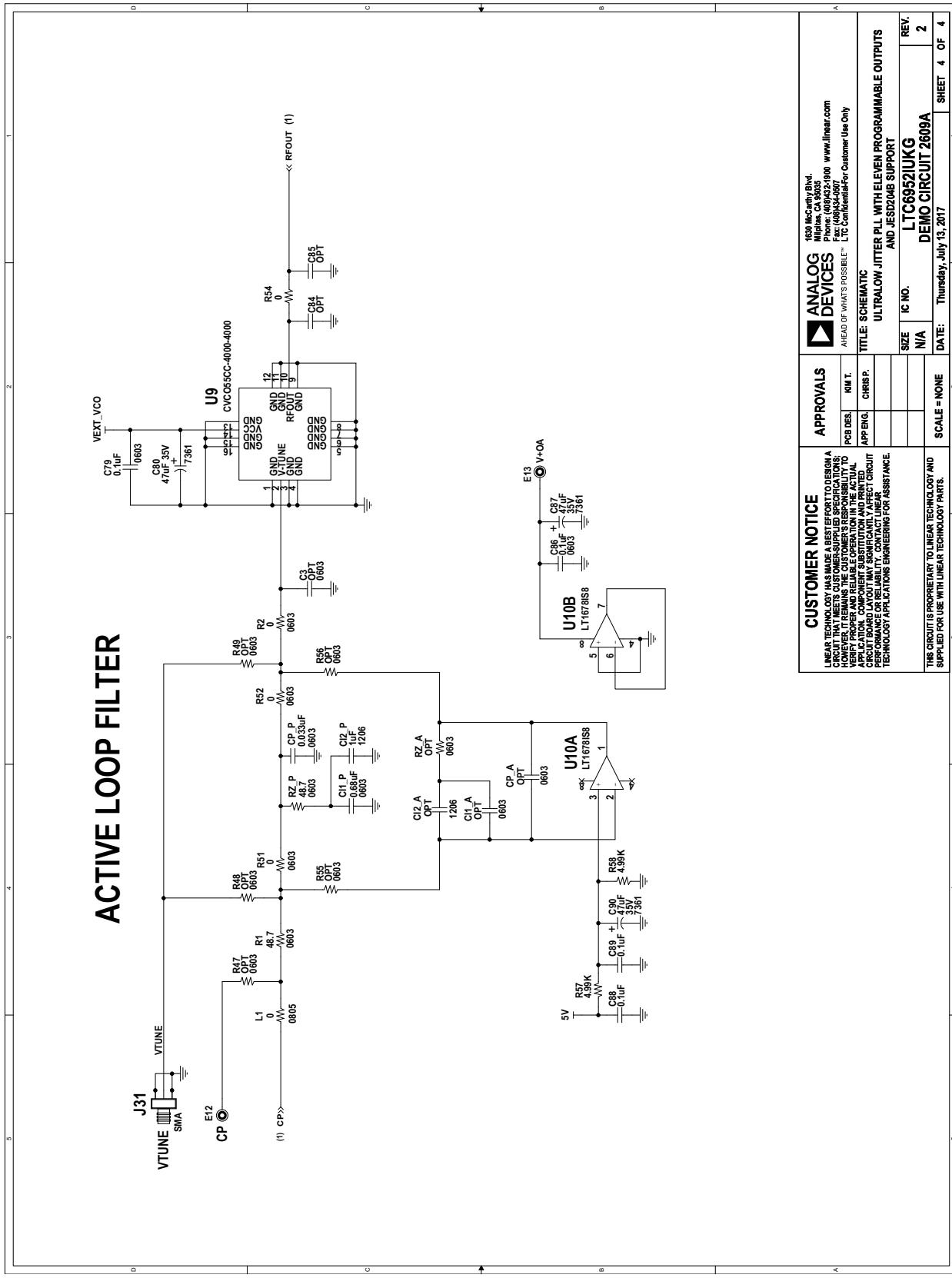
U4 NC7WZ17P6X
R29 100
R30 100
C64 0.1uF
3.3V
CS (1)
SCLK (1)
R27 200k
3.3V
R28 200k

U5 NC7WZ17P6X
R33 100
R34 100
C65 0.1uF
3.3V
SDI (1)
SD (1)
R31 200k
R32 200k
3.3V

U6 74LVC1T45GW
VCC(A) VCC(B)
GND -DIR
C67 0.1uF
3.3V
R42 0
R41 200k
SDO (1)
C66 0.1uF
R40 100

E10 CS

EEPROM FOR BOARD IDENTIFICATION

J23 HD2X7-079-MOLEX
V+ 5V
CS
SCK/SCL
MOSI/SDA
MISO
EEVCC
EESDA
EESCL
EEGND
AUX
GND
GND
GND

SD
SDO
SCLK
SDI
CS
V+DIG

R35 OPT
R36 4.99k
R37 4.99k
R38 4.99k

U3 24LC025-I/ST
SCL
SDA
WP
A2
A1
A0
EEPROM ARRAY
VCC GND

C63 0.1uF
R39 0 0603

WP EEGND

APPROVALS
PCB DES. | KIM T.
APP ENG. | CHRIS P.

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ULTRALOW JITTER PLL WITH ELEVEN PROGRAMMABLE OUTPUTS
AND JESD204B SUPPORT

SIZE: N/A
IC NO. LTC6952IUKG
DEMO CIRCUIT 2609A
REV. 2

DATE: Thursday, July 13, 2017
SCALE = NONE
SHEET 2 OF 4

SCHEMATIC DIAGRAM

POWER SUPPLIES

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IC NO. LTC6952IUKG
DEMO CIRCUIT 2609A

REV. 2

SIZE: N/A

DATE: Thursday, July 13, 2017

SHEET 3 OF 4

SCALE = NONE

SCHEMATIC DIAGRAM

LAYOUT TOP LAYER

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