

Engineering Development Model

Frequency Synthesizer

KSN-EDR9694

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : DK1171

ELECTRICAL SPECIFICATIONS 50Ω, over -45°C to +85°C				
Parameter	Min.	Typ.	Max.	Units
Frequency	2168		2232	MHz
Step size		100		kHz
Settling Time Within ±1kHz		11		msec
Output Power	-1	+3	+7	dBm
Phase Noise				
at 100 Hz offset		-72		dBc/Hz
at 1 kHz offset		-78		dBc/Hz
at 10 kHz offset		-110		dBc/Hz
at 100 kHz offset		-133		dBc/Hz
at 1000 kHz offset		-153		dBc/Hz
Integrated SSB Phase Noise		40		dBc
Reference Spurious Suppression		-99		dBc
Comparison Spurious Suppression		-42		dBc
Non-Harm. Spurious Suppression		-90		dBc
Harmonic Suppression		-37		dBc
Supply voltage				
VCO		5		V
PLL		5		V
Supply current				
VCO		31	39	mA
PLL		16	24	mA
Reference In (External)				
Frequency		10		MHz
Amplitude		1		Vp-p
Impedance		100		kΩ
Ph. N @ 1kHz		-145		dBc/Hz
Input Logic Levels				
Logic high	4		5	V
Logic Low			1	V
Digital Lock Detect				
Locked	4.6		5	V
Unlocked			0.4	V
Frequency Synthesizer PLL		ADF4113		

ABSOLUTE MAXIMUM RATINGS	
Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
VCO Supply Voltage	6V
PLL Supply Voltage	6V
Reference Frequency voltage	5.8Vp-p
Data, Clock & LE levels	5.3V

Power On sequence: Vcc VCO followed by Vcc PLL

Power Off sequence: Vcc PLL followed by Vcc VCO

PIN CONNECTIONS			
RF OUT	7	CLOCK	10
VCC VCO	5	DATA	11
VCC PLL	1	LATCH ENABLE	12
REF IN	3	GROUND	2,4,6,8,13,14
LOCK DETECT	9		

Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
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Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS						VCO CURRENT (mA)			PLL CURRENT (mA)		
				(dBc)											
	-45°C	+25°C	+75°C	F2			F3								
-45°C				+25°C	+75°C	-45°C	+25°C	+75°C							
2160	2.10	2.48	2.54	-33.17	-35.14	-38.69	-30.21	-32.33	-34.22	28.26	30.73	32.25	13.62	15.21	16.43
2168	2.23	2.62	2.66	-33.93	-35.86	-39.38	-30.84	-32.97	-34.04	28.36	30.78	32.28	13.66	15.25	16.49
2176	2.32	2.70	2.73	-34.41	-36.47	-40.19	-35.15	-37.60	-37.83	28.39	30.80	32.29	13.67	15.26	16.53
2184	2.41	2.79	2.81	-33.74	-35.92	-39.94	-33.33	-35.93	-38.10	28.40	30.80	32.28	13.68	15.27	16.56
2192	2.48	2.86	2.86	-33.69	-35.91	-39.80	-35.23	-37.65	-38.52	28.41	30.81	32.28	13.68	15.27	16.57
2200	2.52	2.90	2.91	-34.39	-36.69	-40.56	-39.66	-42.36	-42.63	28.40	30.79	32.27	13.69	15.28	16.60
2208	2.61	2.97	2.97	-34.19	-36.53	-40.67	-38.97	-40.63	-42.43	28.38	30.78	32.25	13.68	15.28	16.60
2216	2.64	2.99	2.97	-33.36	-35.56	-39.78	-42.54	-44.38	-44.50	28.35	30.74	32.21	13.69	15.29	16.62
2224	2.65	2.99	2.96	-33.96	-36.09	-40.18	-44.51	-44.32	-46.15	28.32	30.71	32.18	13.69	15.28	16.62
2232	2.70	3.03	2.97	-35.22	-37.51	-41.92	-45.62	-45.75	-45.61	28.28	30.66	32.14	13.70	15.29	16.63
2240	2.43	2.87	3.03	-35.66	-38.23	-42.30	-47.10	-44.75	-47.65	27.68	30.31	32.10	13.69	15.29	16.63

FREQ. (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS														
	-45°C					+25°C					+75°C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
2160	-71.46	-79.87	-110.32	-133.58	-153.38	-73.94	-80.25	-111.41	-133.48	-153.54	-71.17	-79.83	-110.82	-132.58	-152.37
2168	-72.83	-81.14	-110.53	-133.47	-153.65	-73.00	-81.05	-111.00	-133.51	-153.93	-74.50	-78.57	-110.38	-132.66	-152.73
2176	-71.55	-78.88	-111.49	-134.05	-153.45	-75.95	-78.63	-111.69	-133.57	-153.57	-70.46	-76.47	-110.68	-132.41	-153.12
2184	-72.28	-80.46	-110.69	-134.13	-153.79	-75.36	-78.97	-111.44	-133.42	-153.04	-70.45	-79.23	-110.70	-132.58	-152.26
2192	-71.74	-77.76	-110.69	-134.01	-154.06	-74.08	-79.58	-110.58	-133.77	-154.48	-69.73	-79.07	-110.21	-132.41	-152.57
2200	-72.03	-79.46	-110.91	-134.18	-154.38	-72.39	-79.45	-111.39	-133.60	-153.49	-71.65	-77.64	-109.80	-132.36	-152.50
2208	-72.48	-79.81	-110.76	-134.19	-155.27	-70.82	-79.05	-111.13	-133.59	-153.51	-69.93	-79.90	-109.42	-132.16	-152.45
2216	-70.70	-78.35	-110.69	-133.97	-153.78	-72.44	-78.95	-110.75	-133.34	-153.01	-70.03	-79.15	-108.66	-131.90	-152.35
2224	-69.66	-79.54	-109.94	-133.43	-153.05	-70.59	-78.48	-109.91	-132.89	-153.31	-68.51	-76.8	-108.37	-131.79	-151.27
2232	-68.02	-77.67	-109.13	-132.50	-152.28	-69.12	-79.55	-109.68	-132.24	-152.00	-67.22	-78.4	-108.15	-131.16	-150.63
2240	-73.43	-78.08	-110.33	-132.48	-154.47	-70.85	-79.95	-109.71	-131.96	-148.44	-66.05	-78.48	-107.41	-130.72	-150.51

REFERENCE & COMPARISON SPURIOUS ORDER	REFERENCE SPURIOUS @ Fcarrier 2200 MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @ Fcarrier 2200 MHz± (n*Fcomparison) (dBc) NOTE 2		
	-45°C	+25°C	+75°C	-45°C	+25°C	+75°C
-5	-123.06	-124.96	-118.47	-107.22	-112.8	-110.44
-4	-124.61	-127.01	-126.39	-103.06	-107.2	-105.22
-3	-126.23	-128.59	-128.27	-94.15	-101.06	-100.75
-2	-125.42	-127.63	-128.02	-85.49	-93.81	-95.98
-1	-118.04	-119.65	-127.58	-87.68	-83.92	-84.95
0 note 3	-	-	-	-	-	-
+1	-122.85	-118.21	-121.88	-84.69	-83.14	-84.21
+2	-128.00	-124.83	-127.51	-87.57	-96.85	-92.96
+3	-127.81	-130.11	-129.15	-102.59	-101.16	-104.14
+4	-126.64	-125.73	-125.11	-106.58	-106.34	-107.19
+5	-119.04	-121.08	-116.96	-108.60	-112.92	-110.81

Note 1: Reference frequency 10 MHz.

Note 2: Comparison frequency 0.1 MHz.

Note 3: All spurs are referenced to carrier signal (n=0).

Notes

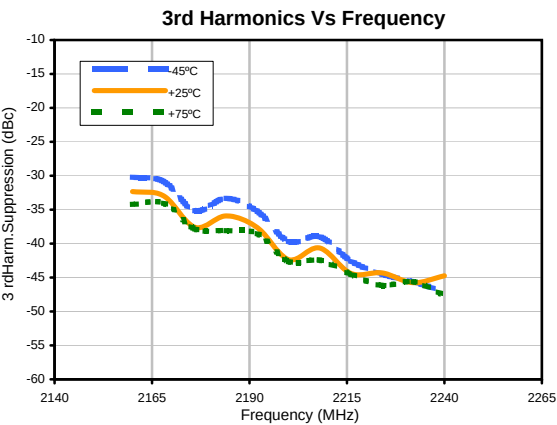
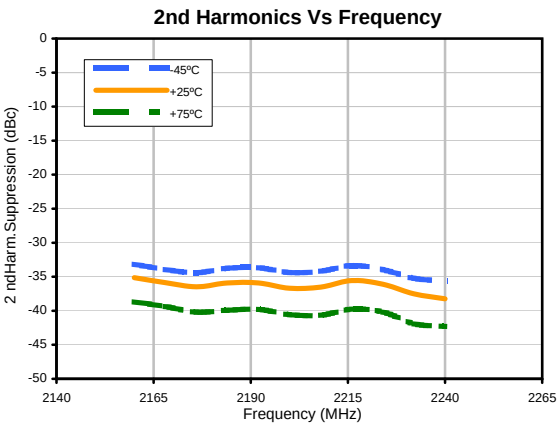
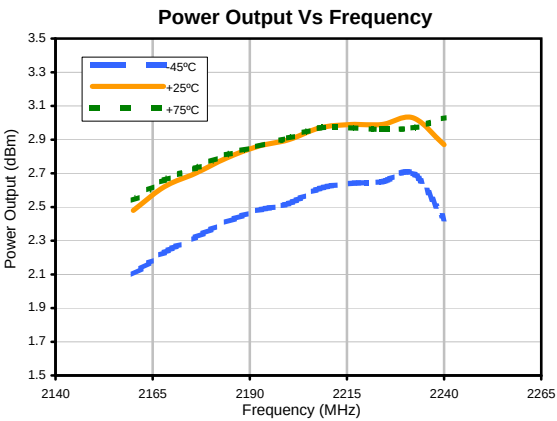
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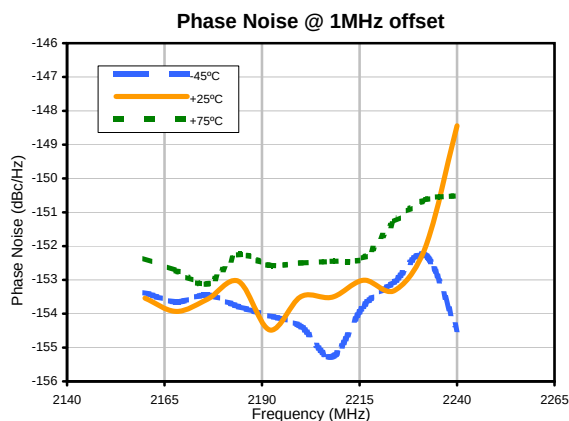
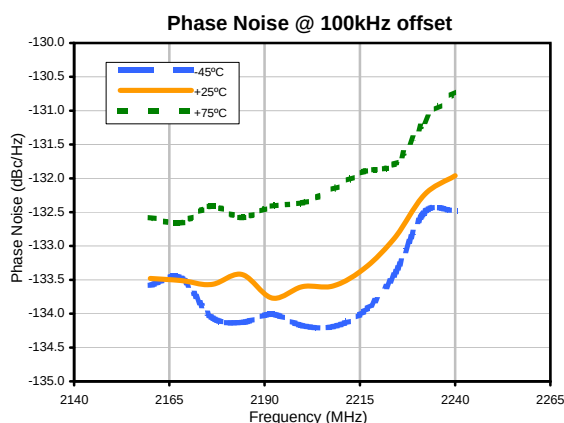
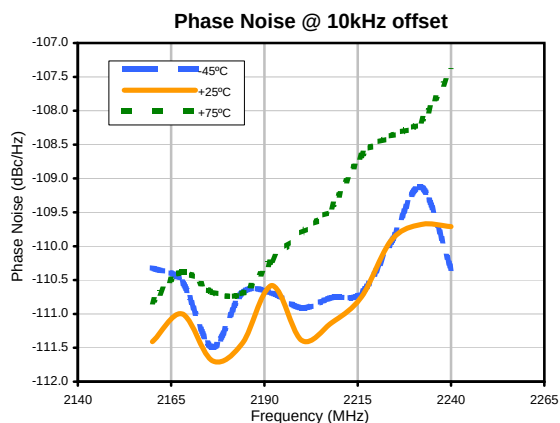
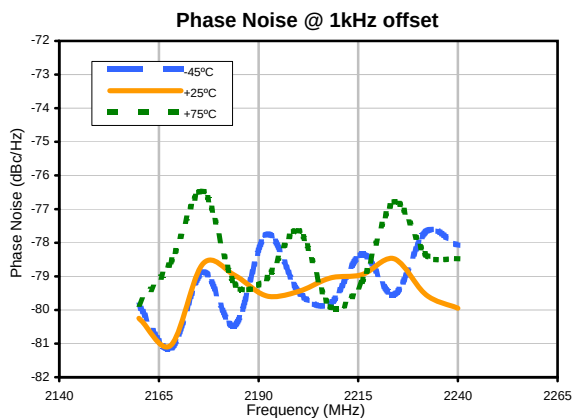
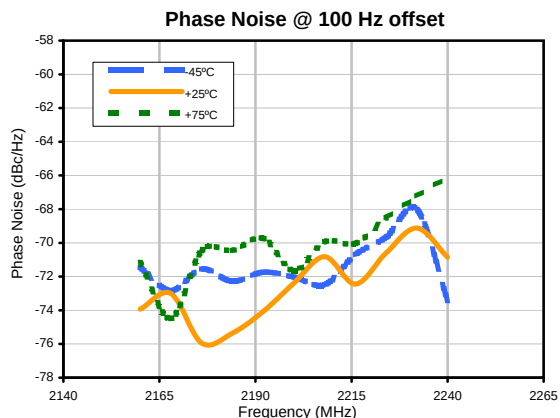
Typical Performance Data



Frequency Synthesizer

Typical Performance Data

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Notes

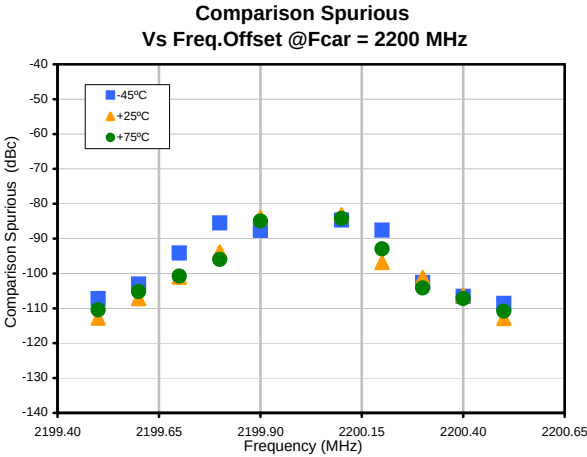
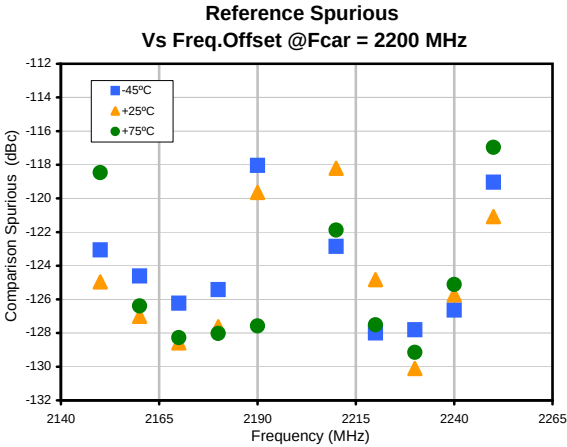
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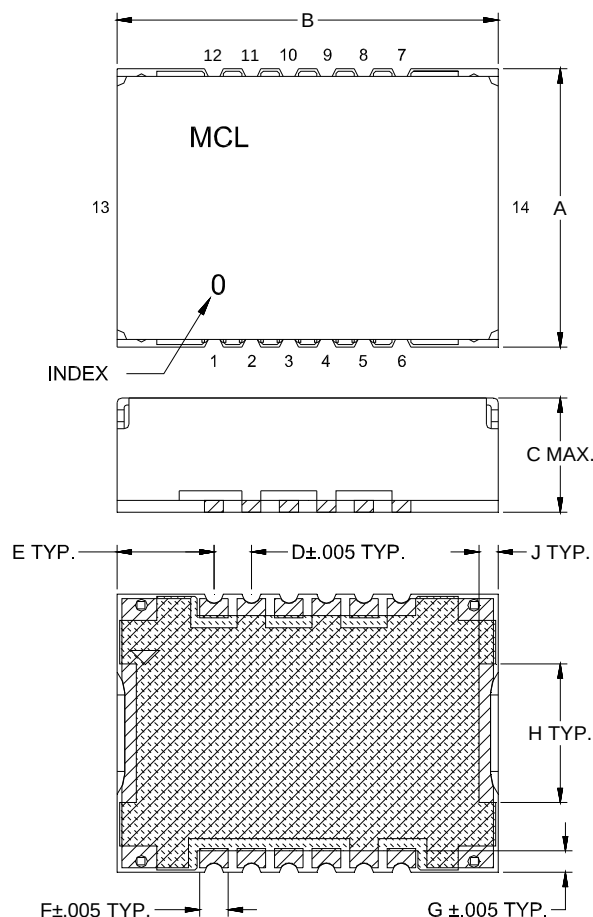
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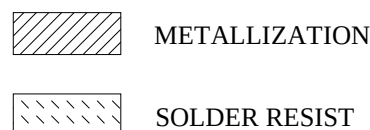
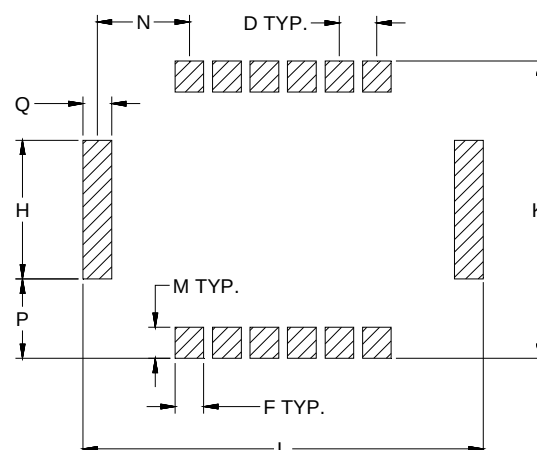


Outline Dimensions

DK1171



Suggested PCB Land Pattern



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAM
DK1171	.584 (14.83)	.800 (20.32)	.240 (6.10)	.079 (2.01)	.203 (5.16)	.060 (1.52)	.045 (1.14)	.291 (7.39)	.039 (1.0)	.624 (15.85)	.840 (21.34)	.065 (1.65)	.193 (4.90)	.170 (4.32)	.060 (1.52)	2.5

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



INTERNET <http://www.minicircuits.com>

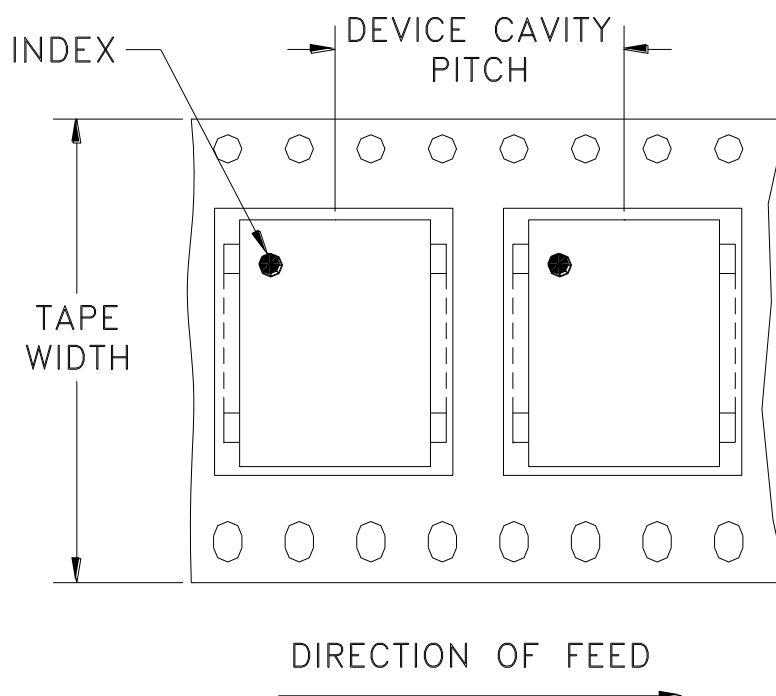
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Tape & Reel Packaging TR-F28

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
32	20	13	Small quantity standards (see note)	20
				50
				100
				200
			Standard	500

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



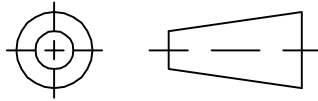
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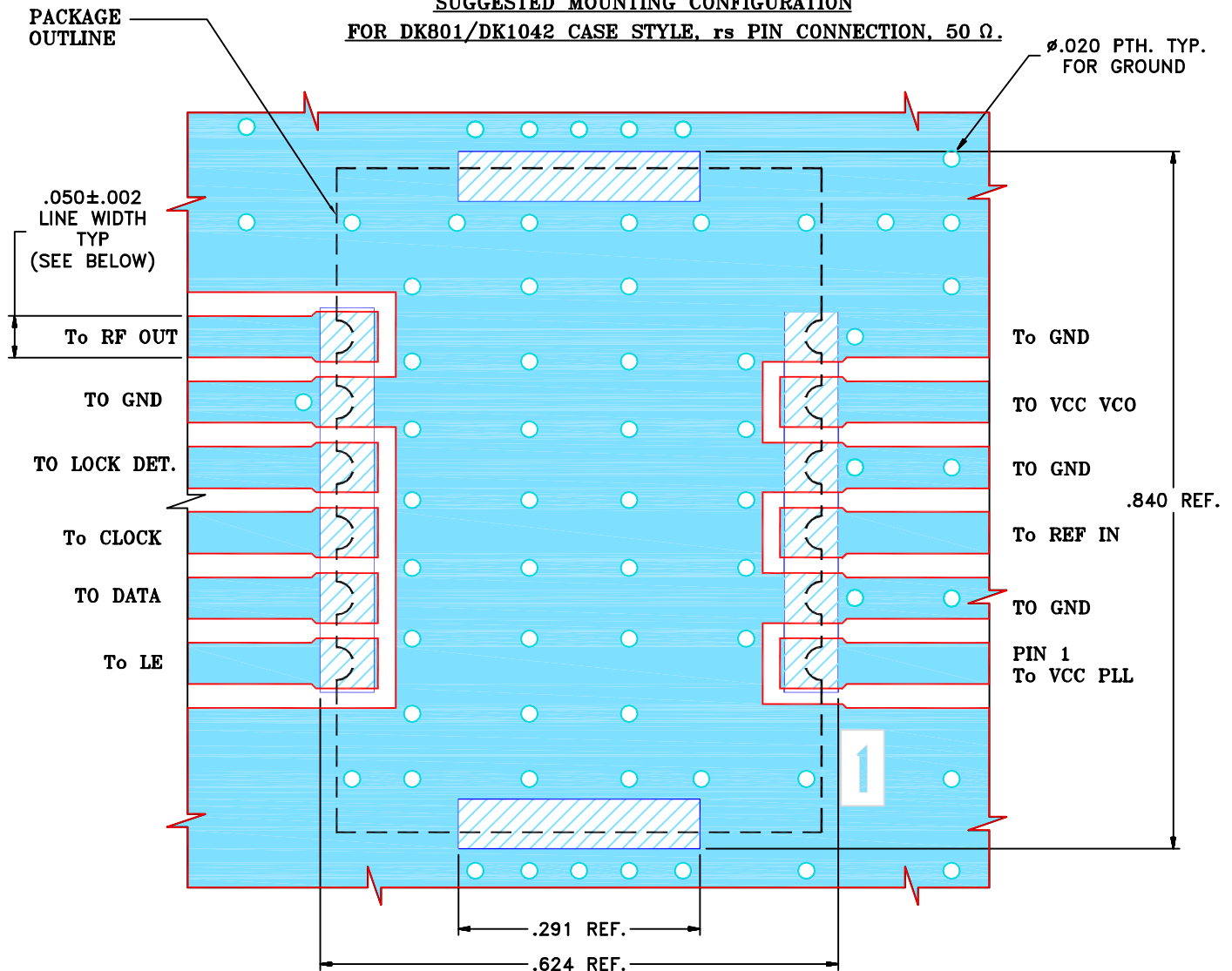
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M108069	NEW RELEASE	11/06	DK	HH
A	M110535	MODIFY GROUND PADS	03/07	DK	HH
B	M126537	DELETE CHIP COMP. & TABLE OF VALUES	03/10	DK	HH
B	R78979	DELETE CHIP COMP. & TABLE OF VALUES	03/10	DK	HH

SUGGESTED MOUNTING CONFIGURATION

FOR DK801/DK1042 CASE STYLE, rs PIN CONNECTION, 50 Ω . ϕ .020 PTH. TYP.
FOR GROUND

NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS. .025"±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS ±

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

DRAWN

DK (RAVON)

27 MAR 07

CHECKED

RZ (RAVON)

27 MAR 07

APPROVED

HH (RAVON)

27 MAR 07

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ASHEETA1.DWG REV:A DATE:01/12/95


Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, rs ,DK801/DK1042, KSN
TB-567+ (50 Ω)
SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-249

REV:
B

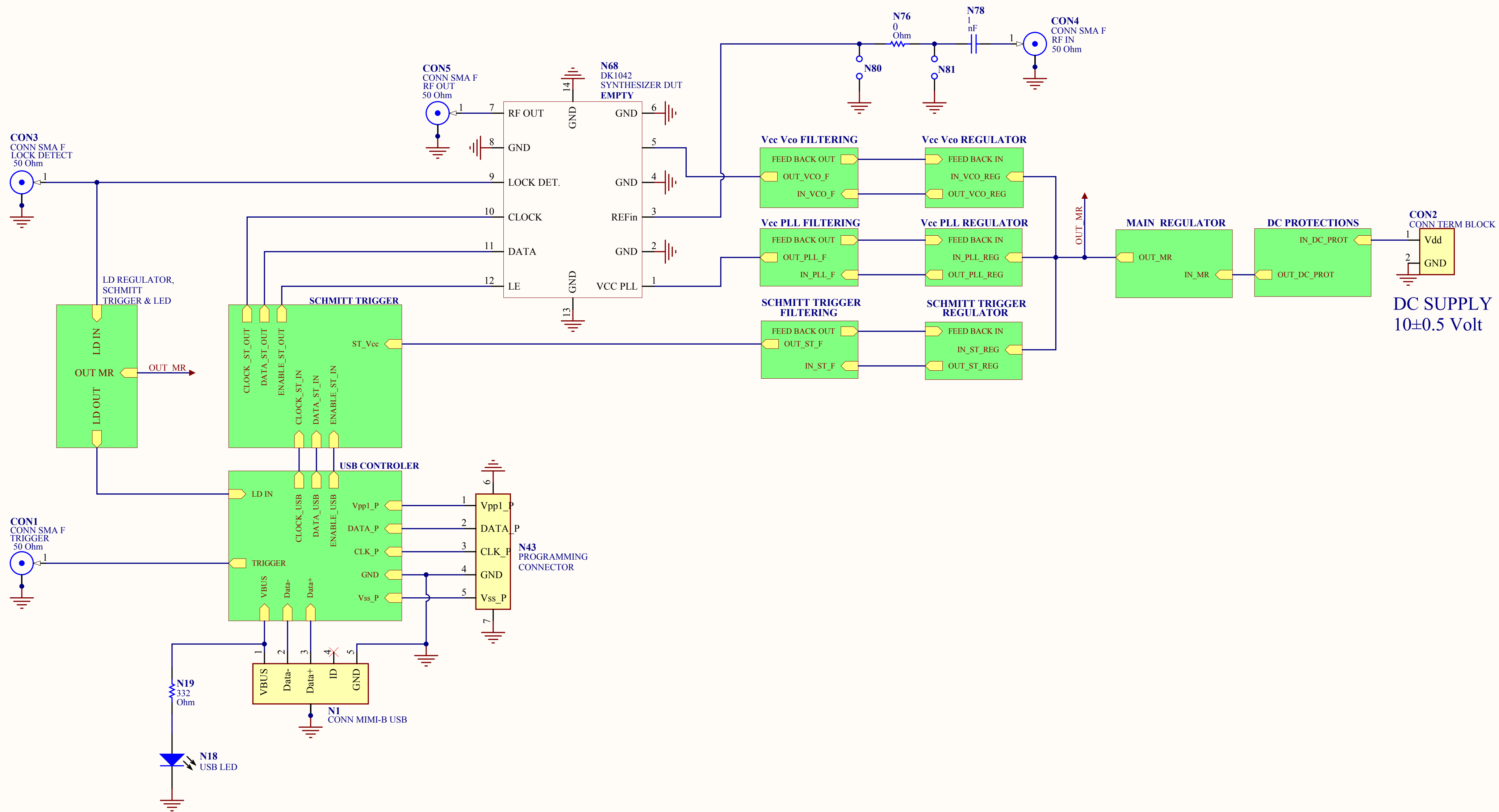
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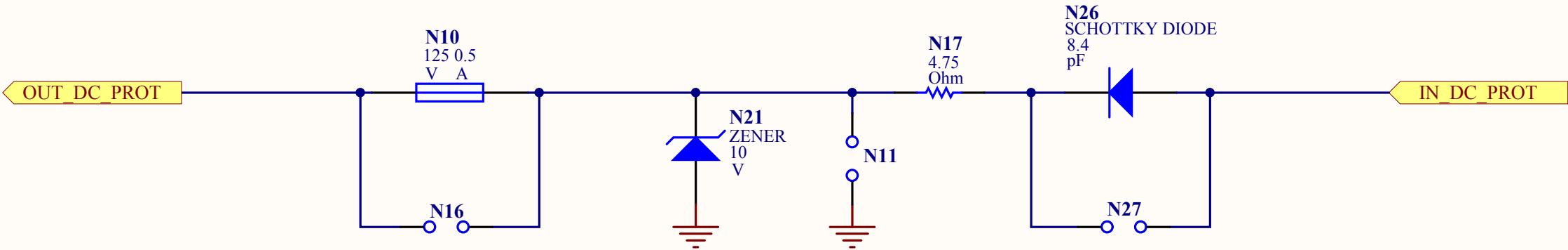
SHEET: 1 OF 1

ELECTRICAL SCHEME-GENERAL

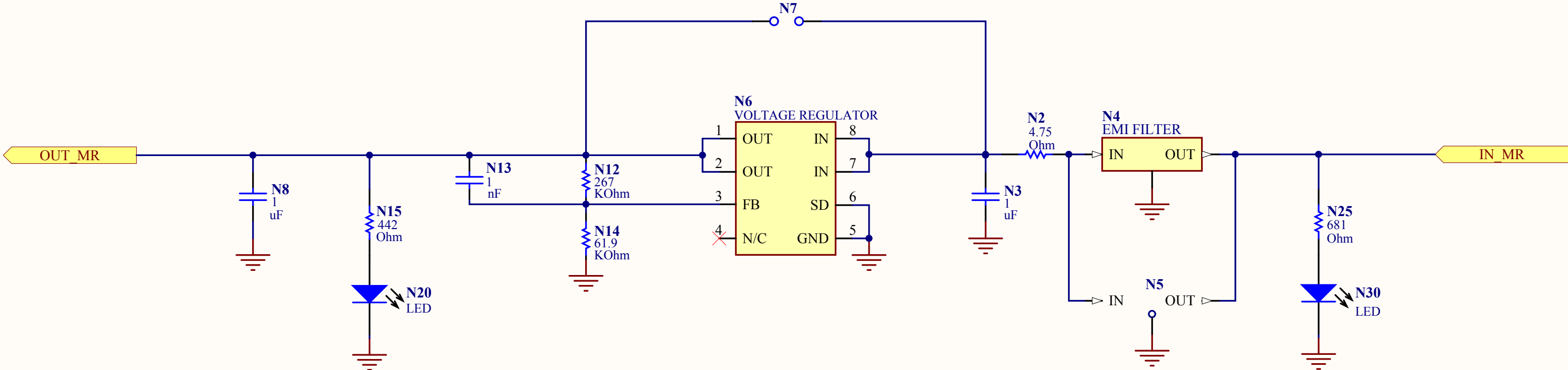
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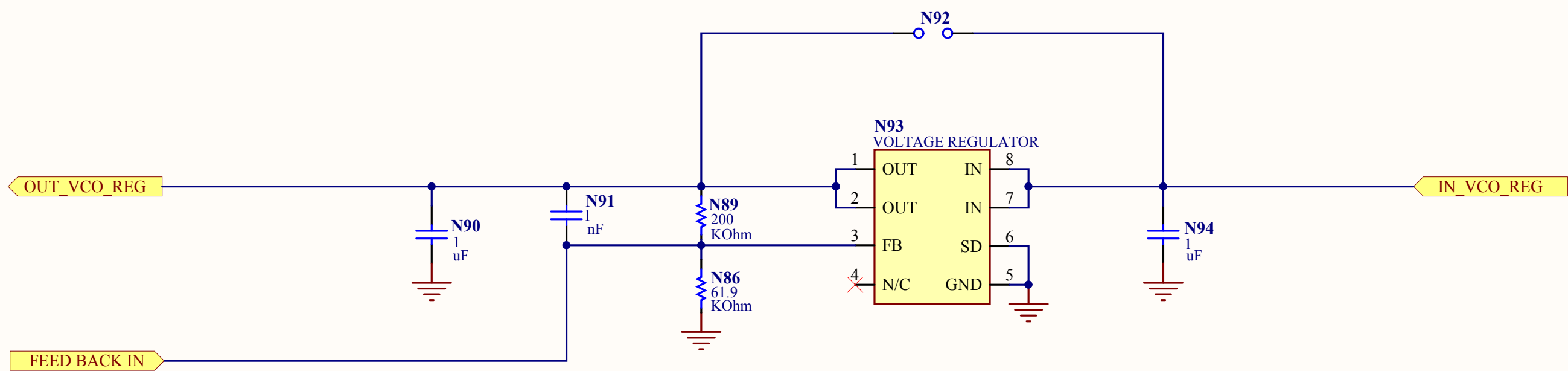
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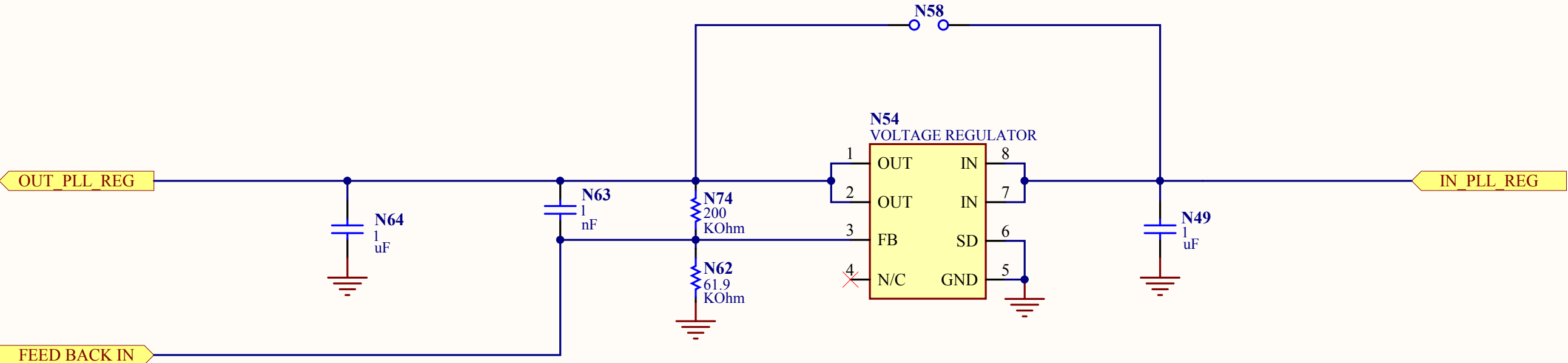
MAIN REGULATOR



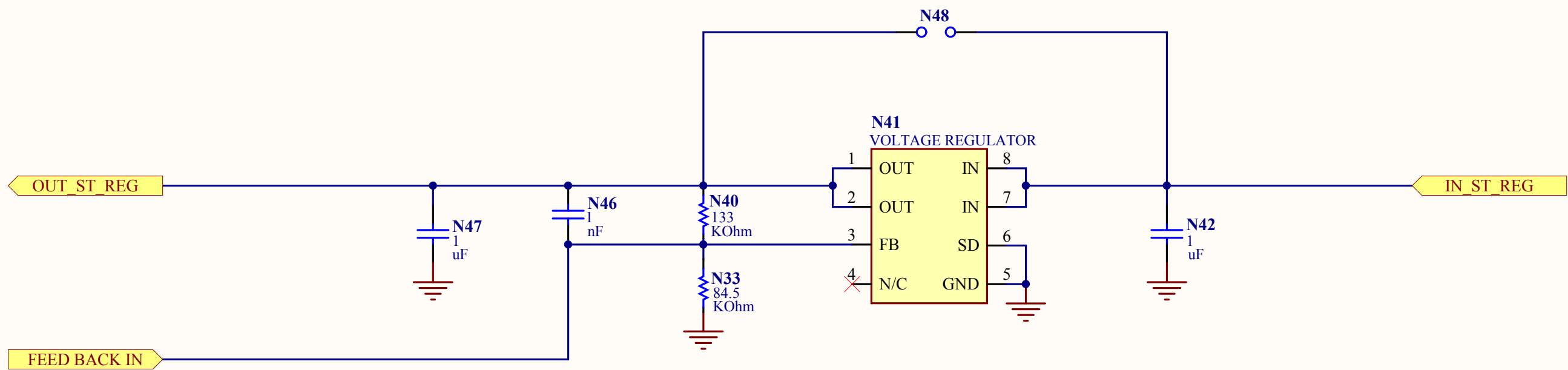
VCC VCO REGULATOR



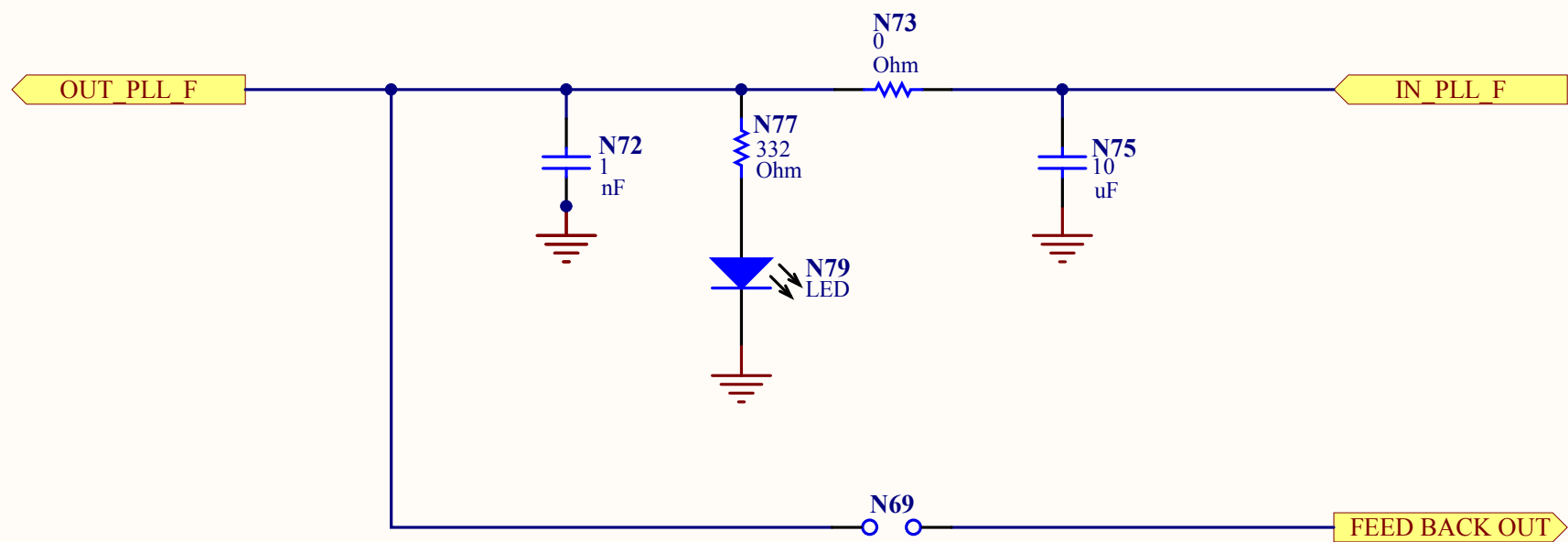
VCC PLL REGULATOR



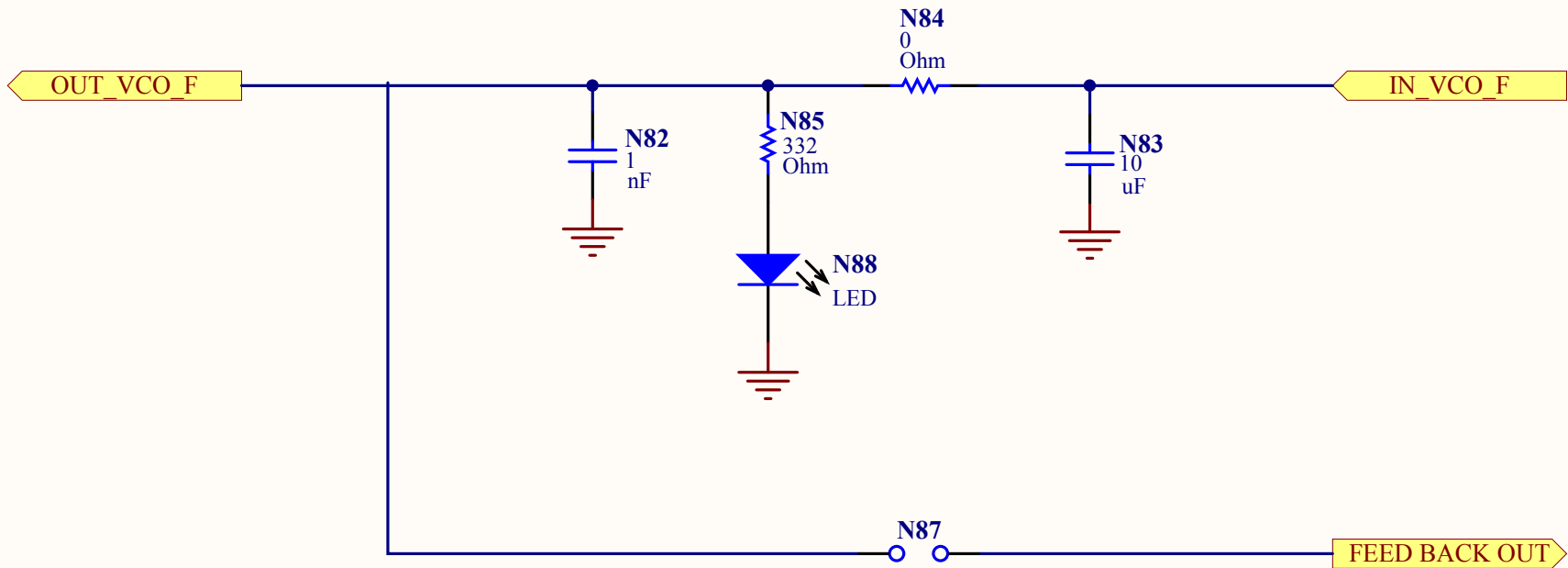
SCHMITT TRIGGER REGULATOR



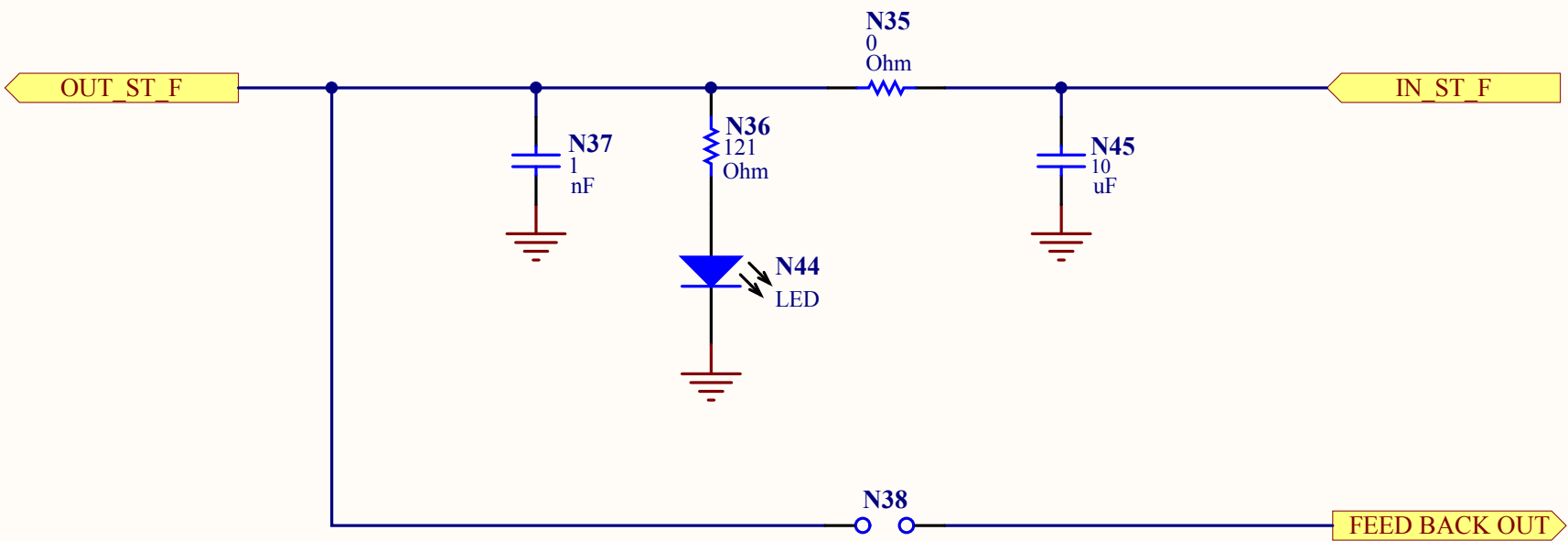
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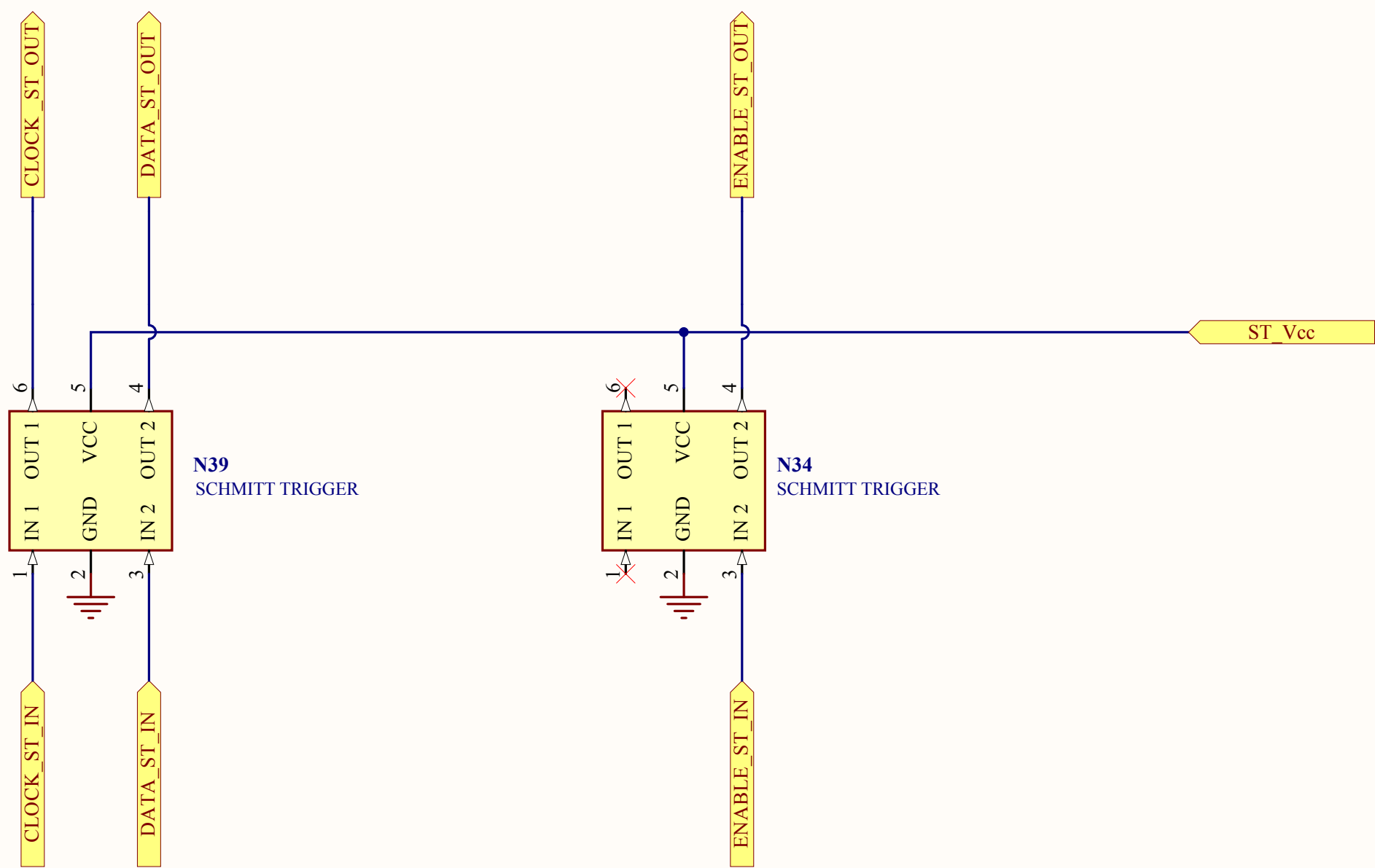
VCC VCO FILTERING



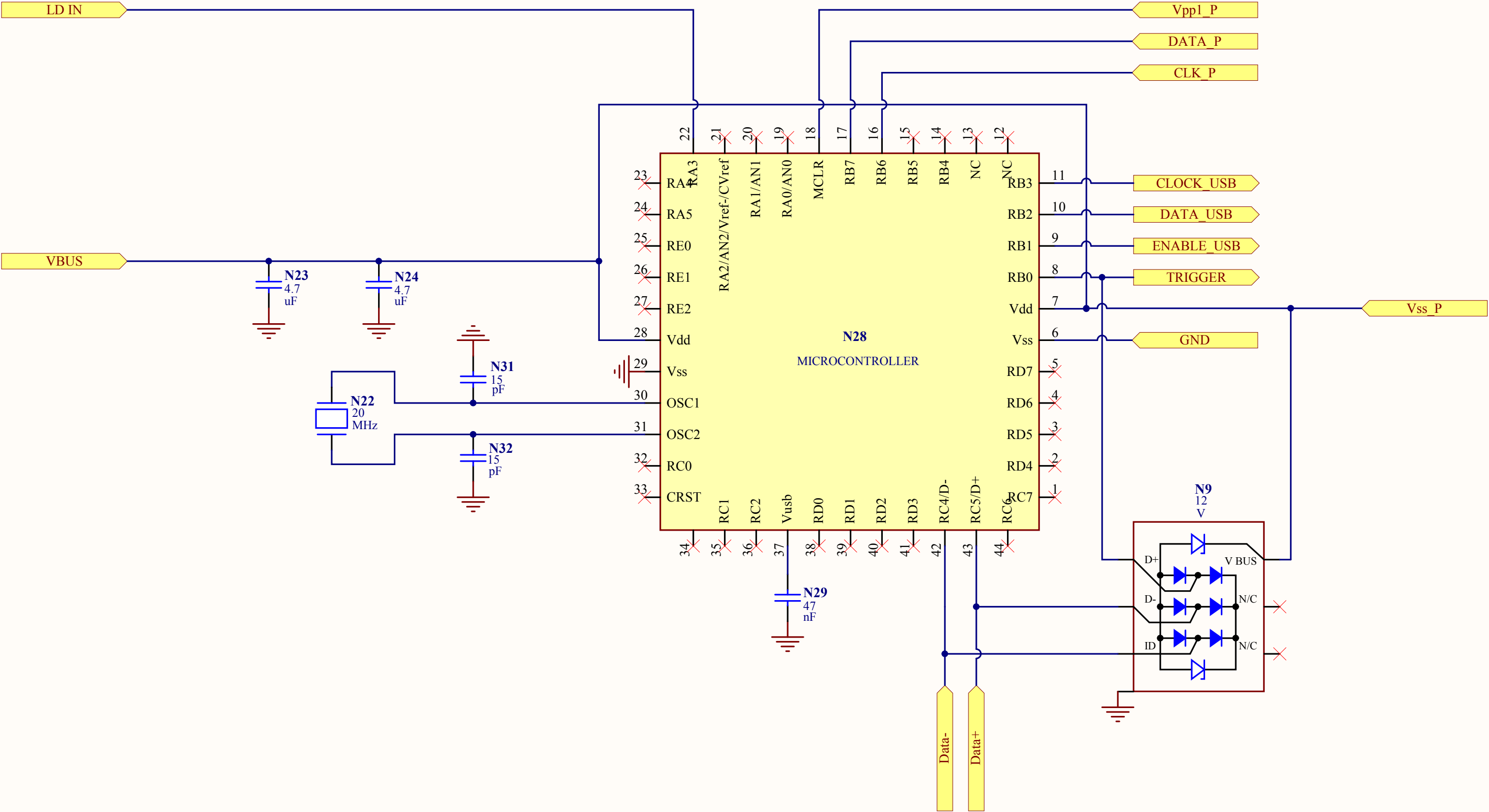
SCHMITT TRIGGER FILTERING



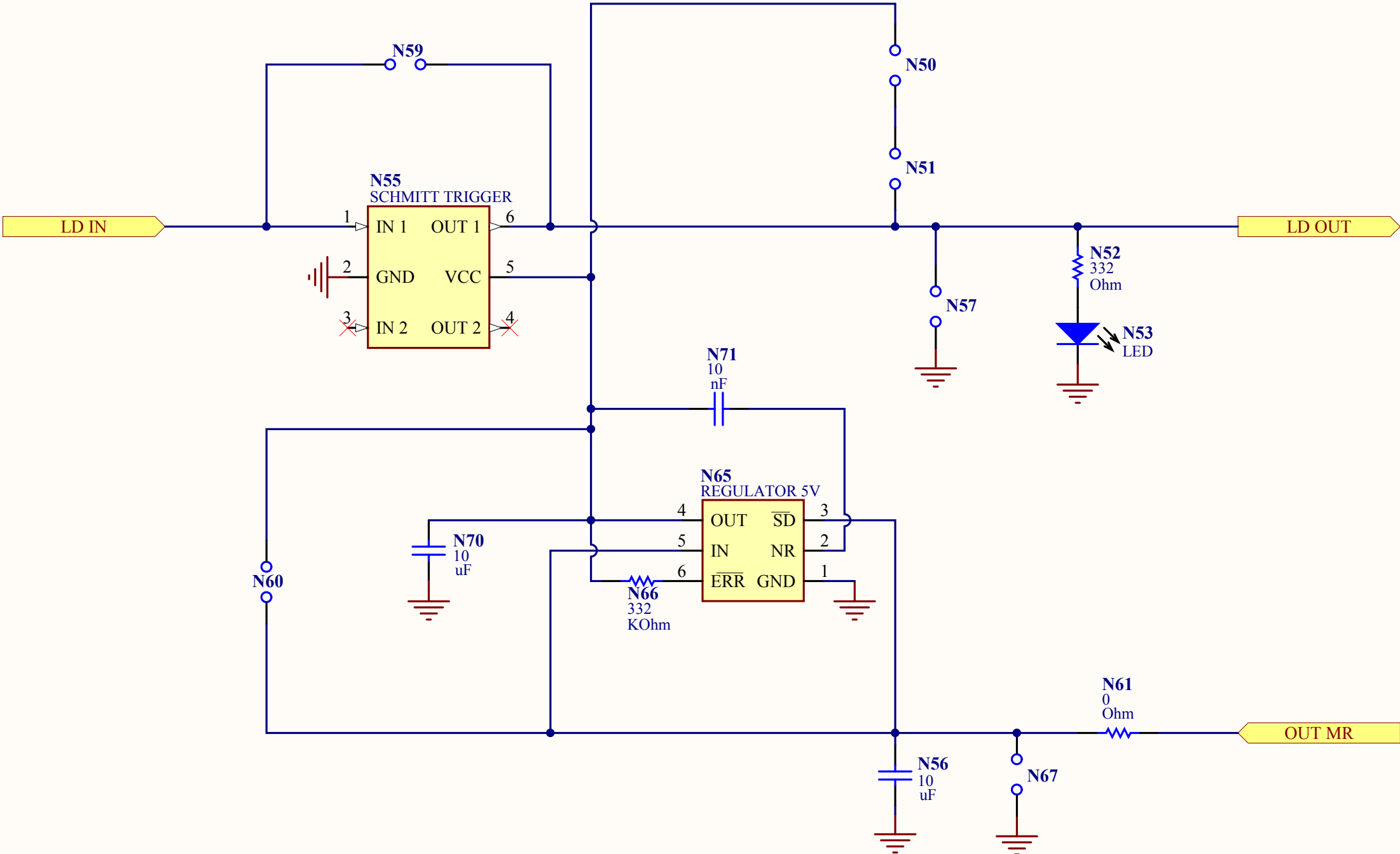
SCHMITT TRIGGER



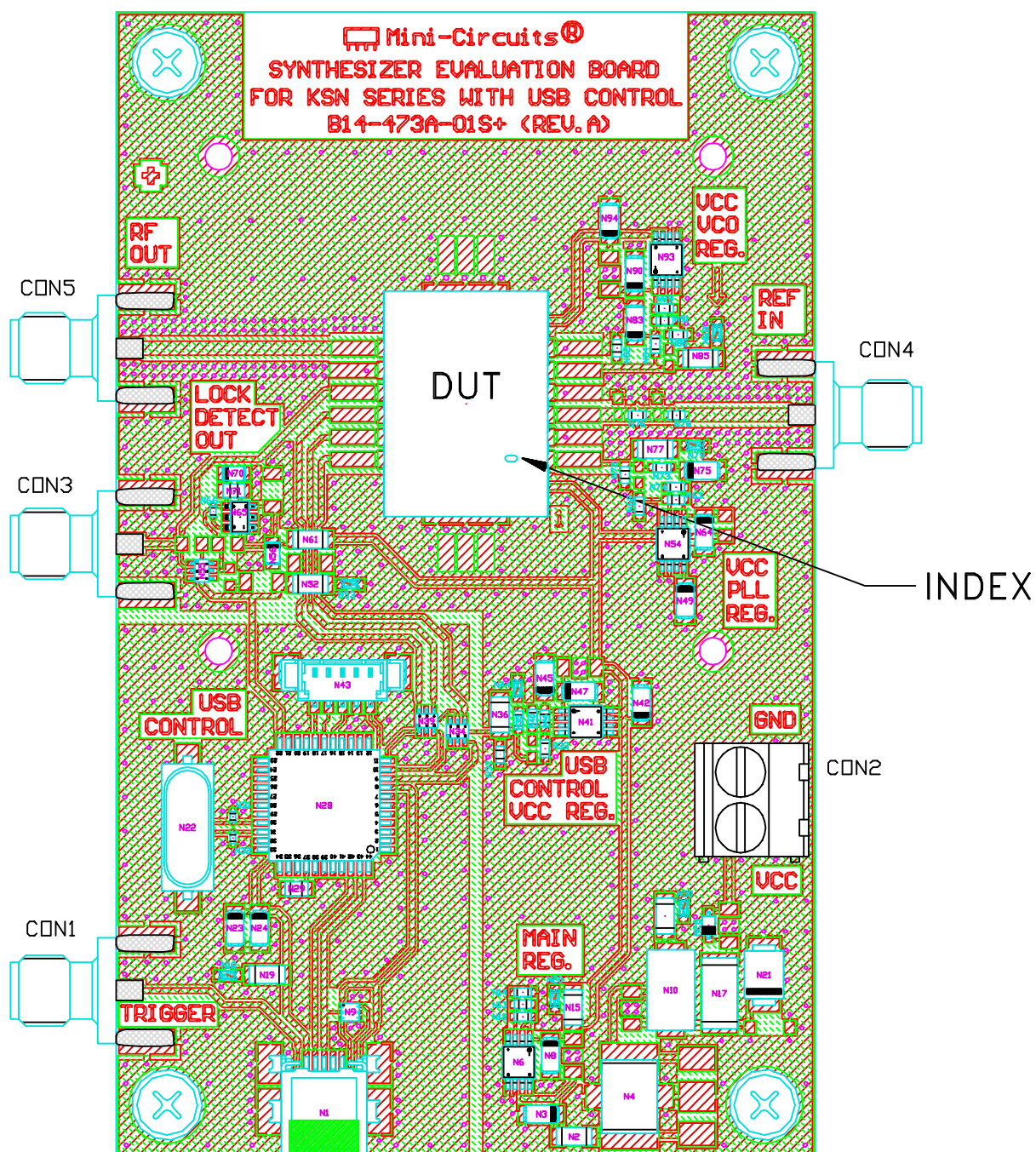
USB CONTROLER



LD REGULATOR SCHMITT TRIGGER AND LED



Evaluation Board and Circuit



TB-567+

NOTES:

1. SMA F JACK CONNECTORS.
2. PCB MATERIAL: FR4 OR EQUIVALENT, DIALECTRIC CONSTANT=4.7, DIALECTRIC THICKNESS=.059 INCH.



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-45° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215