

The most important thing we build is trust

## 1.1 Description

The RHD5962 Buffered Thermometer demonstration card integrates a UT04VS33P Quad-Channel Voltage Supervisor with the RHD5962 temperature monitor to provide a versatile platform for sensor evaluation. The design operates on a single 3.3V CR2032 watch battery. No other power sources are required. Test points provide monitoring and supply capabilities for the 3.3V, Ground, and output of the RHD5962 (VTH).

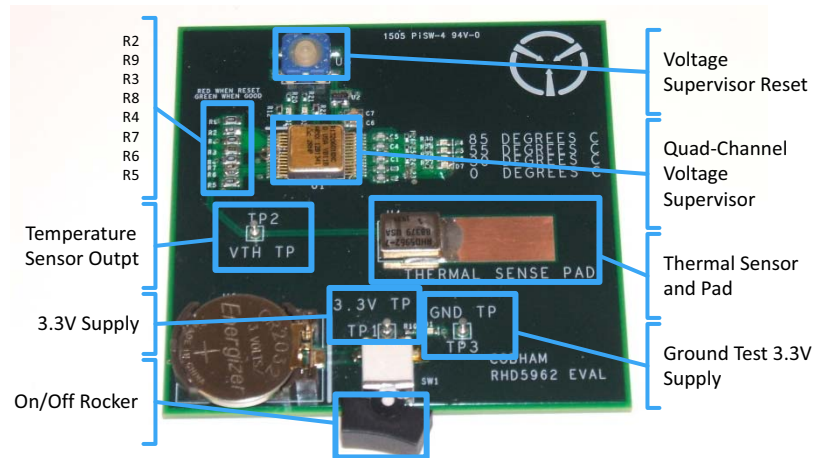


Figure 1. Picture of board with critical components and features pointed out. The rocker switch in the OFF position.

Table 1. Evaluation Board Parameters

Parameter	Condition	Min	Typical	Max	Unit
System Input Voltage, VIN		3.0	3.3	3.6	V
System Temperature Range		0		125	°C
System Temperature Sensitivity		8	8.9	11	mV/°C
Temperature Sensor Output, V THERM	@ 25°C	0.95	1	1.05	V
Voltage Supervisor Input Voltage Threshold Level, VRFTH		585	600	615	mV
Voltage Supervisor Output Open Drain Current	VDD = 3.6V			1	mA

## 1.2 Quick Setup Procedure

Initial setup of the RHD5962 demonstration card is simple. Insert the CR2032 watch battery with the positive side facing up and flip the rocker switch to the reverse of Figure 1.

### 1.2.1 Alternate Setup Method

1. With battery removed, connect the input power supply across the 3.3V\_TP and GND\_TP.
2. Turn on the power at the input. Increase input to 3.3V.
3. Press and release the reset button to verify functional conditions.

4. Check voltage output of temperature sensor at VTH\_TP. At ambient temperature, expect to see between 950mV to 960mV.
5. Visually verify the green ambient temperature LED (D6) is illuminated.

### 1.3 Tuning & Adjustments

Tuning the RHD5962 demonstration circuit is possible through a number of resistors on the top layer of the board. R6, R7, R8, & R9 pair with 1KΩ resistors to allow for easy calculations for changing the threshold voltages of the Voltage Supervisor.

**Equation 1.** 
$$R = \frac{VTHERM \times 1K\Omega}{600mV} - 1K$$

Figure 2 shows the full range of output from the RHD5962. Taking into account the temperature sensor tolerance (+/-0.5°C) and VSU reference voltage tolerance (+/-0.5°C) and then the resistor tolerance (+/-3°C), the final accuracy of the system is (+/-5°C).

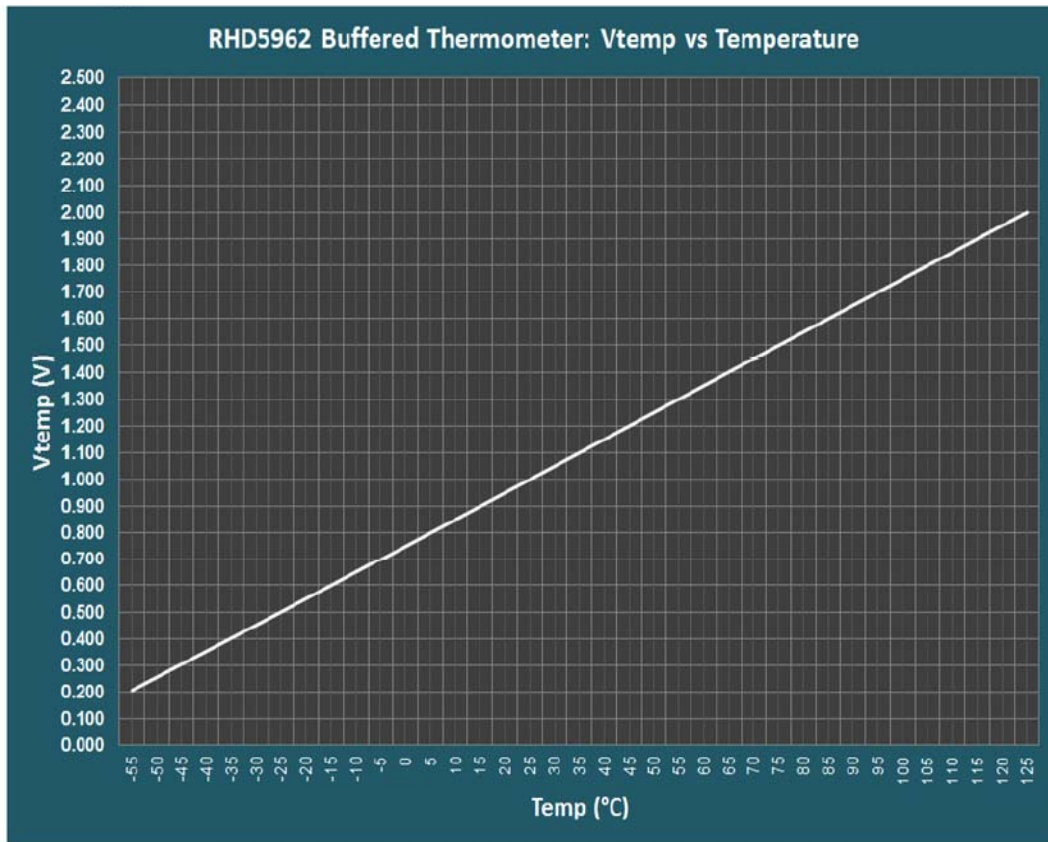


Figure 2. RHD5962 voltage (VTHERM) over temperature graph

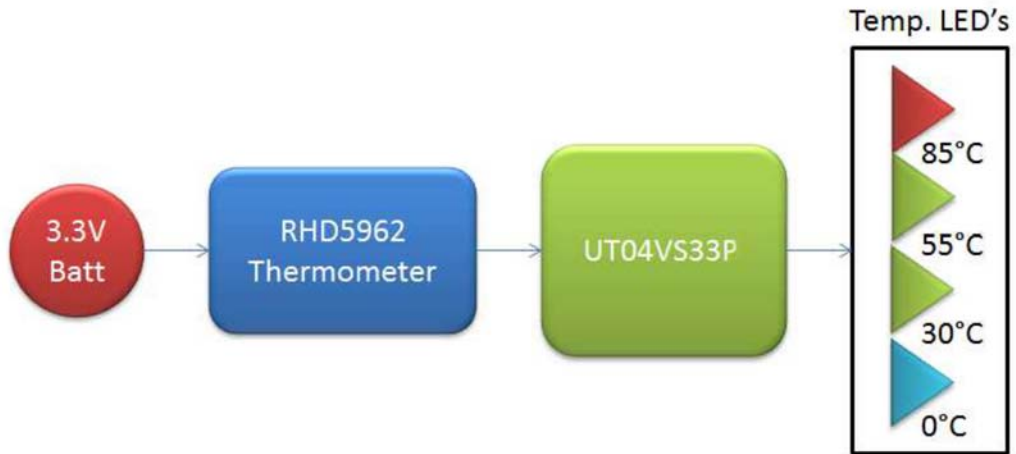


Figure 3. Functional Block Diagram

Table 2. Board Specification

Board Dimensions:	3"x 3"
Board Maximum Weight:	NA
Number of Layers:	4
Dielectric Material:	FR-4
Dielectric Thickness:	8 mil
Outer Layer Copper Weight	1oz
Inner Layer Copper Weight	0.5oz
Differential Line Spacing:	6 mil
Default Trace Width:	6 mil
Critical Components	RHD5962 UT04VS33P

Voltage Rails	Voltage	Current (Amp)
--Input	3.3	0.225

Layer Definitions:	Name	Type
--Layer1	Top	Sig/Pwr
--Layer2	GND1	GND

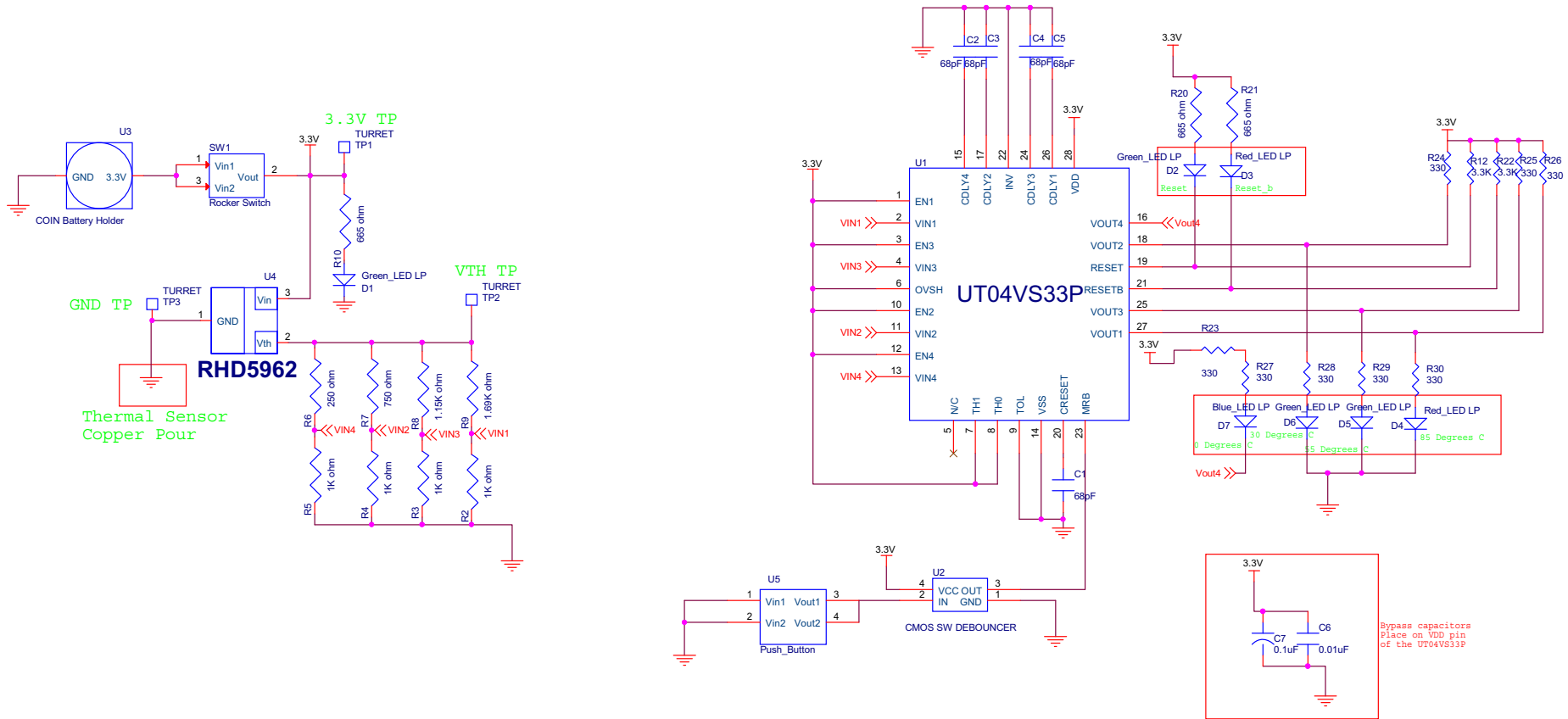


Figure 4. RHD5962 Reference Design Schematic

**NOTE**

Red text denotes layout instructions, green text denotes silkscreen markings, and blue text denotes population options.

Table 3. Reference Design BOM

FN	Qty.	Reference Designators	Part Number	Description	PKG	MFG
0	1	PWB	4350-001	PWB	3"x3"	Prototron
1	5	C1,C2,C3,C4,C5	C1608C0G1H680F080AA	CAP,CER,68pF,50V,1%,0603	smt0603	TDK Corporation
1	ALT		445-7029-1-ND	CAP,CER,68pF,50V,1%,0603		Digikey
2	1	C6	C0805C103F5GACTU	CAP,CER,0.01uF,50V,1%,0805	smt0805	Kemet
2	ALT		399-11161-1-ND	CAP,CER,0.01uF,50V,1%,0805		Digikey
3	1	C7	TAJR104K020RNJ	CAP,TANT,0.1uF,20V,10%,0805	smt0805	AVX Corporation
3	ALT		478-3286-1-ND	CAP,TANT,0.1uF,20V,10%,0805		Digikey
4	3	D1,D2,D6	LNJ612W8WRA	Green_LED Low Power_0	smt0603	Panasonic
4	ALT		P11481CT-ND	Green_LED Low Power_0		Digikey
5	2	D3,D4	LTST-C193KRKT-5A	Red_LED Low Power_0	smt0603	Lite-On Inc
5	ALT		160-1830-1-ND	Red_LED Low Power_0		Digikey
6	1	D5	LTST-C193KSKT-5A	Yellow_LED Low Power	smt0603	Lite-On Inc
6	ALT		160-1831-1-ND	Yellow_LED Low Power		Digikey
7	1	D7	QTLP601CEBTR	Blue_LED Low Power_0	smt0603	Everlight Electronics
7	ALT		1080-1406-1-ND	Blue_LED Low Power_0		Digikey
8	4	R2,R3,R4,R5	ERJ-6ENF1001V	RES,1K,1%,0.125W,0805	smt0805	Panasonic
8	ALT		P1.00KCCT-ND	RES,1K,1%,0.125W,0805		Digikey
9	1	R6	RNCF0603TKY250R	RES,250,0.01%,1/16W,0603	smt0603	Stackpole Electronics Inc.
9	ALT		RNCF0603TKY250RCT-ND	RES,250,0.01%,1/16W,0603		Digikey
10	1	R7	ERJ-3EKF7500V	RES,750,1%,0.1W,0603	smt0603	Panasonic
10	ALT		P750HCT-ND	RES,750,1%,0.1W,0603		Digikey
11	1	R8	ERA-6AEB1151V	RES,1.15K,0.1%,0.125W,0805	smt0805	Panasonic
11	ALT		P1.15KDACT-ND	RES,1.15K,0.1%,0.125W,0805		Digikey
12	1	R9	ERA-6AEB1691V	RES,1.69K,0.1%,0.125W,0805	smt0805	Panasonic
12	ALT		P1.69KDACT-ND	RES,1.69K,0.1%,0.125W,0805		Digikey
13	3	R10,R20,R21	ERJ-2RKF6650X	RES,665,1%,0.1W,0402	smt0402	Panasonic
13	ALT		P665LCT-ND	RES,665,1%,0.1W,0402		Digikey
14	2	R12,R22	ERJ-3EKF3301V	RES,3.3k,1%,0.1W,0603	SMT0603	Panasonic
14	ALT		P3.30KHCT-ND	RES,3.3k,1%,0.1W,0603		Digikey
15	8	R23,R24,R25,R26,R27,R28,R29,R30	ERJ-2RKF3300X	RES,330,1%,.1W,0402	smt0402	Panasonic
15	ALT		P330LCT-ND	RES,330,1%,.1W,0402		Digikey
16	1	SW1	400BWMSP1R2BLKSM6QE	Rocker Switch	sw_400bwm	E-Switch
16	ALT		EG4336CT-ND	Rocker Switch		Digikey
17	3	TP1,TP2,TP3	2101-3-00-80-00-00-07-0	T POINT S_0	DIA53MIL	Mill-Max

Table 3. (Continued)Reference Design BOM

FN	Qty.	Reference Designators	Part Number	Description	PKG	MFG
17	ALT		ED1295-ND	T POINT S_0		Digikey
18	1	U1	UT04VS33P	UT04VS33P	CFP28P25M IL	Aeroflex/Cobham
19	1	U2	MAX6816EUS+TCT-ND	MAX6816EUS-T_0	SOT143	Maxim Integrated
19	ALT		MAX6816EUS+TCT-ND	MAX6816EUS-T_0		Digikey
20	1	U3	S8421-45R	COIN Battery Holder	s8421r	Harwin Inc.
20	ALT		952-1737-1-ND	COIN Battery Holder		Digikey
21	1	U4	RHD5962	RHD5962	smd-05	Aeroflex/Cobham
22	1	U5	1.14100.5030000	Push_Button	sw_racon8s md	C&K Components
22	ALT		CKN9363CT-ND	Push_Button		Digikey
23	1		CR2032VP	Coin Cell Battery 2032		Energizer Battery Co
23	ALT		N189-ND	Coin Cell Battery 2032		Digikey

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