

CONFIDENTIAL

twistthink
DESIGN TECHNOLOGY STRATEGY

130 Central Ave., Suite 400
Holland, Michigan 49423

TITLE: BILL OF MATERIALS

CUSTOMER: Charity Water

PROJECT: Remote monitoring, India MARK II

PROJECT LEAD: KD

IND. DESIGNER: TZ

ELECT ENGINEER: RW

MECH. ENGINEER: KO

TTB0108-05

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DOC REV.

NOTES

- If a "YES" appears in the "CM Equivalent OK?" column, alternate components meeting the same specifications as the listed component may be substituted by the contract manufacturer.
- Revision history documented at the bottom of the page.

Item	Qty.	Ref.	Value	Tol.	Voltage	Dielectric	Description	PCB Footprint	Manf.	Manf. P/N	CM Equivalent OK?	Placement	RoHS
1	2	C100,C102	1uF	10%	25V	X5R	CAP, CERAMIC, 0402	0402_CAP	TAIYO YUDEN	TMK105BJ105MV-F	YES	NP	YES
2	1	C101	4.7uF	10%	10V	X5R	CAP, CERAMIC, 0402	0402_CAP	TDK	C1005X5R1A475K050B	YES	NP	YES
3	1	C109	1uF	10%	50V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71H104KE14D	YES	NP	YES
4	1	C36	10uF	20%	25V	X5R	CAP, CERAMIC, 0603	0603_CAP	TDK	C1608X5R1E106M080AC	YES	NP	YES
5	4	C9,C10,C15,C16	10pF	+/- .25pF	50V	COG	CAP, CERAMIC, 0402	0402_CAP	TDK	C1005COG1H100C050BA	YES	NP	YES
6	1	C96	1000pF	10%	50V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R7H102KA01D	YES	NP	YES
7	2	C99,C108	10uF	20%	10V	X6S	CAP, CERAMIC, 0805	0805_CAP	TAIYO YUDEN	LMK212AC6106MD-T	YES	NP	YES
8	1	D2	GREEN				LED, GREEN, SMD	LITEON_L1TST-C150_Series	LITEON	L1TST-C150GKGT		NP	YES
9	3	D3,D4,D5	PESD0402		40V		DIODE, OVERVOLTAGE	LITTELFUSE_PESD0402-140	LITTELFUSE	PESD0402-140		NP	YES
10	3	J10,J11,J12	SAMTEC TSM-106-01-F-5H [6 PIN]				CONNECTOR, 6 PIN, .100, SMD, RA	SAMTEC_TSM-106-01-F-5H	SAMTEC	TSM-106-01-F-5H		NP	YES
11	2	J3,J4	WIRE HOLE				CONNECTOR, WIRE HOLE, P/O PCB	WIREHOLE_98R58				NP	
12	1	J5	MICRO USB				CONNECTOR, MICRO USB, VERT	MOLEX_105133-0011	MOLEX	1051330011		NP	YES
13	1	J6	SAMTEC FTSH-105-01-F-DV [10PIN]				CONN., .05 CTC, DUAL ROW, 10 PIN	SAMTEC_FTSH-105-01-F-DV-K	SAMTEC	FTSH-105-01-F-DV		NP	YES
14	1	J8	SAMTEC SSM-110-L-DV [20 PIN]				CONN., 20 PIN, 2 ROW, VERTICAL .100 CTC	SAMTEC_SSM-110-S-DV	SAMTEC	SSM-110-L-DV		NP	YES
15	1	J9	SAMTEC TSM-107-01-L-DV [14 PIN]				CONN., 14 PIN., .100 CTC, 2 ROW	SAMTEC_TSM-107-01-L-DV	SAMTEC	TSM-107-01-L-DV-P-TR		NP	YES
16	1	L12	100 ohm	25%	3A		INDUCTOR, SMD, FERRITE	603	MURATA	BLM18KG101TN1D		NP	YES
17	8	P1,P2,P3,P4,P5,P6,P7,P8					SENSING PADS, P/O PCB	TCH750W150H				NP	YES
18	1	Q3	TSM210N02CX				MOSFET, N-TYPE	SOT-23	TAIWAN SEMI	TSM210N02CX RFG		NP	YES
19	1	R106	10k	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP103J	YES	NP	YES
20	1	R46	100	1%			RES, CERAMIC, .0625W, 0402	402	KOA	RK73H1ETTP1000F	YES	NP	YES
21	1	R47	10.0k	1%			RES, CERAMIC, .0625W, 0402	402	KOA	RK73H1ETTP1002F	YES	NP	YES
22	1	R52	430	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP43J		NP	YES
23	5	R104	4.7k	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP47J	YES	NP	YES
24	4	R53,R58,R59,R121	0	5%			RES, CERAMIC, .0625W, 0402	402	KOA	RK73J1ETTP	YES	NP	YES
25	1	U23	TPS7A03328				IC, REG LDO 2.8V, 200mA	SOT-23_5PIN	TEXAS INSTRUMENTS	TPS7A03328BVR		NP	YES
26	29	C1,C2,C20,C21,C24,C33,C35,C37,C42,C52,C57,C60,C61,C62,C63,C64,C66,C67,C72,C73,C74,C76,C78,C79,C80,C83,C84,C87,C112	1uF	10%	50V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71H104KE14D	YES		YES
27	1	C104	4.7uF	10%	10V	X5R	CAP, CERAMIC, 0402	0402_CAP	TDK	C1005X5R1A475K050B	YES		YES
28	1	C107	22uF	20%	10V	X5R	CAP, CERAMIC, 0805	0805_CAP	TAIYO YUDEN	LMK212B1226MG-T	YES		YES
29	2	C18,C22	1000pF	2%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H101GA01D	YES		YES
30	6	C23,C45,C48,C86,C105,C110	1uF	10%	25V	X5R	CAP, CERAMIC, 0402	0402_CAP	TAIYO YUDEN	TMK105BJ105MV-F	YES		YES
31	10	C25,C41,C43,C44,C46,C65,C75,C77,C81,C88	01uF	10%	50V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71H103KA88D	YES		YES
32	1	C26	100uF	20%	10V	X5R	CAP, CERAMIC, 1206	1206_CAP	TDK	C3216X5R1A107M160AC	YES		YES
33	1	C27	15pF	5%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H150JA01D	YES		YES
34	4	C29,C31,C56,C58	6pF	+/- .5pF	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H60ROA01D	YES		YES
35	4	C3,C28,C47,C54	10uF	20%	25V	X5R	CAP, CERAMIC, 0603	0603_CAP	TDK	C1608X5R1E106M080AC	YES		YES
36	1	C30	68pF	5%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	AVX	04025A680IAT2A	YES		YES
37	3	C32,C92,C94	1uF	10%	10V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71A104KA01D	YES		YES
38	1	C34	.01uF	10%	10V	X7R	CAP, CERAMIC, 0402	0402_CAP	KEMET	C0402C103K8RACU	YES		YES
39	3	C38,C51,C111	180uF	20%	6.3V	ELEC	CAP, ALUM POLYMER, SMD	PANASONIC_SX_Series	PANASONIC	EEF-SX0181ER			YES
40	4	C39,C90,C91,C106	10uF	20%	10V	X6S	CAP, CERAMIC, 0805	0805_CAP	TAIYO YUDEN	LMK212AC6106MD-T	YES		YES
41	1	C4	0022uF	10%	25V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71E223KA61D	YES		YES
42	5	C40,C68,C69,C70,C71	33pF	5%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H330JA01D	YES		YES
43	3	C49,C53,C59	10pF	5%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H100JA01D	YES		YES
44	1	C55	.22uF	10%	10V	X5R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R61A224KE19D	YES		YES
45	1	C6	.015uF	10%	25V	X7R	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM155R71E153KA61D	YES		YES
46	1	C82	4.7uF	10%	25V	X5R	CAP, CERAMIC, 0603	0603_CAP	TDK	C1608X5R1E475K080AC	YES		YES
47	1	C85	560pF	5%	50V	COG	CAP, CERAMIC, 0402	0402_CAP	MURATA	GRM1555C1H561JA01D	YES		YES
48	1	C93	10uF	20%	10V	X5R	CAP, CERAMIC, 0402	0402_CAP	AVX	04022D106MAT2A	YES		YES
49	1	D1	SP1002				DIODE, TVS, ARRAY	SC-70	LITTELFUSE	SP1002-01JTG			YES
50	5	D15,D16,D17,D18,D19	BAT54		30V		DIODE, SCHOTTKY BARRIER	SOT-23	DIODES INC.	BAT54-7-F			YES
51	1	D7	GREEN				LED, GREEN, SMD	LITEON_L1TST-C150_Series	LITEON	L1TST-C150GKGT			YES
52	4	D7,D8,D9,D10	PESD0402		40V		DIODE, OVERVOLTAGE	LITTELFUSE_PESD0402-140	LITTELFUSE	PESD0402-140			YES
53	2	J1,J2	HIROSE UFL-R-SMT[01] [COAX]				CONNECTOR, COAX, ULTRA SMALL, VERTICAL	HIROSE_UFL-R_SMT_01	HIROSE	U-FL-R-SMT(10)			YES
54	1	J14	SHORTING BAR				SHORTING BAR, 2 PIN, 2MM		SAMTEC	25N-BK-G			YES
55	1	J15	SAMTEC TMM-103-01-L-S-SM[3 PIN]				CONN., 3 PIN, 2MM, SMD	SAMTEC_TMM-103-01-L-S-SM	SAMTEC	TMM-103-01-L-S-SM			YES
56	1	J7	78727-0001				CONN, SIM CARD, MICRO	MOLEX_78727-0001	MOLEX	78727-0001			YES
57	8	L1,L4,L5,L7,L8,L9,L10,L11	100 ohm	25%	3A		INDUCTOR, SMD, FERRITE	603	MURATA	BLM18KG101TN1D			YES
58	1	L2	220 ohm	25%	2A		INDUCTOR, SMD, FERRITE	603	MURATA	BLM18EG2215N1D			YES
59	1	L3	2.2uH	20%			INDUCTOR, SMD, FERRITE	1212	MURATA	LQH3NPP22R2MMEL			YES
60	1	L6	470nH	20%			INDUCTOR, WIREWOUND, SMT	1008	MURATA	D2E252012P-R47M-P2			YES
61	1	PCB1	PRINTED CIRCUIT BOARD				PRINTED CIRCUIT BOARD		TBD	TTFO108-04			YES
62	1	Q1	SI2323DS				MOSFET, P-TYPE, SMD	SOT-23	VISHAY	SI2323DS-T1-E3			YES
63	1	Q11	DMP2007				P-CHANNEL MOSFET	POWERDI_3333-8	DIODES INC	DMP2007UFG-13			YES
64	7	Q2,Q4,Q5,Q6,Q9,Q10,Q12	TSM210N02CX				MOSFET, N-TYPE	SOT-23	TAIWAN SEMI	TSM210N02CX RFG			YES
65	1	Q8	NDS332P				MOSFET, P-TYPE	SOT-23	ON SEMI	NDS332P			YES
66	15	R1,R17,R19,R27,R28,R34,R37,R48,R60,R63,R69,R85,R88,R89,R113	10k	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP103J	YES		YES
67	1	R101	47k	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP47J	YES		YES
68	1	R102	0.033	0.50%			RES, 2412, 1W	OHMITE_LVK_2412	OHMITE	LVK24R033DER			YES
69	1	R103	150	5%			RES, CERAMIC, .1W, 0402	402	KOA	RK73B1ETTP15J	YES		YES

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	CUSTOMER: Charity Water	PROJECT LEAD: KD
	PROJECT: Remote monitoring, India MARK II	IND. DESIGNER: TZ
	ELECT ENGINEER: RW	MECH. ENGINEER: KO
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NOTES

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70	3	R111,R133,R139	1k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP102J			YES
71	1	R116	1.21k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1211F	YES		YES
72	1	R117	1.50k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1501F	YES		YES
73	1	R131	121.0k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1213F	YES		YES
74	1	R132	56.0k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP5602F	YES		YES
75	1	R135	47k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP47J			YES
76	1	R137	100	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1000F			YES
77	2	R138,R140	240	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP24J			YES
78	2	R147,R148	5.60k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP5601F			YES
79	38	R2,R3,R15,R16,R23,R25,R31,R35,R36,R38, R39,R40,R41,R42,R44,R45,R49,R64,R68, R71,R73,R76,R83,R84,R86,R87,R90,R91, R93,R94,R95,R96,R98,R100,R107,R126, R141,R146	0	5%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73Z1ETTP	YES		YES
80	7	R24,R29,R43,R66,R129,R144,R145	100k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP104J	YES		YES
81	1	R30	1k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP102J	YES		YES
82	1	R33	1M	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1004F	YES		YES
83	8	R50,R54,R56,R110,R114,R119,R124,R136	10.0k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1002F	YES		YES
84	7	R51,R55,R57,R109,R115,R118,R123	100	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP1000F	YES		YES
85	1	R65	402.0k	1%			RES, CERAMIC, 0625W, 0402	402	KOA	RK73H1ETTP4023F	YES		YES
86	4	R67,R70,R74,R92	4.7k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP47J	YES		YES
87	3	R77,R78,R79	22	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP220J	YES		YES
88	1	R80	560	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP561J			YES
89	5	R81,R82,R97,R99,R130	3.3k	5%			RES, CERAMIC, 1W, 0402	402	KOA	RK73B1ETTP332J	YES		YES
90	1	U1	US2MDL				IC, MAGNETOMETER	LGA-12	ST MICRO	US2MDLTR			YES
91	1	U10	TPS76928				IC, REG LDO 2.8V, 100mA	SOT-23_5PIN	TEXAS INSTRUMENTS	TPS76928DBVR			YES
92	1	U11	TPS61021A				IC, REG, 2MHz ADJ BOOST	WSON-8	TEXAS INSTRUMENTS	TPS61021A05GT			YES
93	1	U13	MT29F1G01ABAFDWB				IC, FLASH EMMC	U-PDFN-8	MICRON	MT29F1G01ABAFDWB-IT-F TR			YES
94	1	U14	STM32L4R5VIT6				IC, MCU STM32L4R5VIT6	LQFP-100	ST MICRO	STM32L4R5VIT6			YES
95	1	U15	ATECC608A				IC, CRYPTO AUTHENTICATION	SOIC-8	MICROCHIP	ATECC608A-TNGTLSS-B			YES
96	1	U16	CAT24CS12WI-GT3				IC, SERIAL EEPROM, 512K	SOIC-8	ON SEMI	CAT24CS12WI-GT3			YES
97	1	U17	SN74ACB3T3257				IC, MUX-DEMUX	TSSOP-16	TEXAS INSTRUMENTS	SN74ACB3T3257PWR			YES
98	1	U18	MSP430FR2676TRHBR				IC, MCU	VQFN-32_5X5MM	TEXAS INSTRUMENTS	MSP430FR2676TRHBR			YES
99	1	U19	HDC2010YPAR				SENSOR, HUMIDITY	DSBGA-6_1P5MM	TEXAS INSTRUMENTS	HDC2010YPAR			YES
100	1	U2	DS2740				IC, FUEL GAUGE	TSSOP-8_3MM	MAXIM	DS2740U+T&R			YES
101	1	U20	TPS22917				IC, LOAD SWITCH	SOT-23_6PIN	TEXAS INSTRUMENTS	TPS22917DBVR			YES
102	1	U22	TPS3823-25				IC, VOLTAGE SUPERVISOR	SOT-23_5PIN	TEXAS INSTRUMENTS	TPS3823-25DBVR			YES
103	1	U23	SN74AHC1G32				IC, OR GATE, SINGLE, 2-INPUT	SOT-23_5PIN	TEXAS INSTRUMENTS	SN74AHC1G32DBVR			YES
104	2	U3,U4	PE42424A-Z				IC, RF SWITCH	DFN-6_1P5x1P5	PSEMI	PE42424A-Z			YES
105	1	U5	M41T62Q6F				IC, REAL TIME CLOCK	QFN-16_3MM_ST	ST MICRO	M41T62Q6F			YES
106	1	U6	MAX-8C				MODULE, GPS	LCC-18	UBLOX	MAX-8C-0-10			YES
107	1	U7	TPS62740				IC, DC/DC CONV	WSON-12	TEXAS INSTRUMENTS	TPS627400DSR			YES
108	1	U8	SARA-U201				MODULE, CELL	SARA-R4_MODULE	UBLOX	SARA-U201-048			YES
109	1	U9	TXB0304				IC, LEVEL TRANSULATOR TXB0304	UQFN-12	TEXAS INSTRUMENTS	TXB0304RUTR			YES
110	2	Y1,Y2	32.768 KHz	+/- 20ppm			CRYSTAL, 32.768 KHz, SMD	ABRACON_AB507_SERIES	ABRACON	AB507-32.768KHZ-T			YES
111	1	Y3	16MHz	+/- 30ppm			CRYSTAL, 16.00 MHz, SMD	ABRACON_ABM8G_SERIES	ABRACON	ABM8G-16.000MHZ-18-DZY-T			YES
112	1	Y4	SIT1552				CRYSTAL OSCILLATOR	4-UF8GA	SITIME	SIT1552AI-JF-DCC-32.7680			YES

	1	R104 WAS PLACED NOW NP TTB0108-05 REPLACED TTB0108-04	RW	4/23/2021
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