

Bill of materials
Table 1. STDES-8PH7TMG bill of materials

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
1	3	B1, B2, B3	KEY3	Switch Tactile N.O. SPST Button	ALPS	SKRKAEE020
2	1	C1	10uF/6.3V, 0402_C	Cap Ceramic 10uF 6.3V X5R 20% Pad SMD 0402 85°C T/R	Yageo	CC0402MRX5R5BB106
3	2	C2, C3	NC/6pF, 0402_C	Cap Ceramic 6pF 50V C0G 0.5pF Pad SMD 0402 125°C T/R	Yageo	CC0402DPNPO9BN6R0
4	33	C4, C6, C7, C8, C10, C12, C13, C15, C16, C17, C18, C20, C23, C24, C25, C27, C36, C42, C90, C94, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C114	100nF, 0402_C	Cap Ceramic 0.1uF 50V X7R 10% Pad SMD 0402 125°C T/R	Yageo	CC0402KPX7R9BB104
5	4	C5, C9, C11, C14	22uF, 0402_C	Cap Ceramic 22uF 6.3V X5R 10% Pad SMD 0603 85°C T/R	Yageo	CC0402MRX5R5BB226
6	4	C19, C22, C26, C29	CC1206KFX7RDBB1 02, 1206_C	Cap Ceramic 0.001uF 2000V X7R 10% Pad SMD 1206 125°C T/R	Yageo	CC1206KFX7RDBB102
7	2	C21, C28	10uF, 0603_C	Cap Ceramic 10uF 6.3V X5R 10% Pad SMD 0603 85°C T/R	Yageo	CC0603KRX5R5BB106
8	31	C30, C31, C34, C37, C39, C40, C43, C46, C47, C49, C50, C53, C54, C56, C57, C60, C61, C63, C64, C67, C68, C70, C71, C74, C75, C77, C78, C81, C82, C84, C85	100nF/50V, 0402_C	Cap Ceramic 0.1uF 50V X7R 10% Pad SMD 0402 125°C T/R	Yageo	CC0402KPX7R9BB104
9	16	C32, C33, C44, C45, C51, C52, C58, C59, C65, C66, C72, C73,	330pF, 0402_C	Cap Ceramic 330pF 16V X7R 10% Pad SMD 0402 125°C T/R	Yageo	CC0402KRX7R7BB331

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
		C79, C80, C86, C87				
10	12	C35, C38, C41, C48, C55, C62, C69, C76, C83, C109, C120, C121	10uF/50V, 1206_C	Cap Ceramic 10uF 50V X5R 10% Pad SMD 1206 85°C T/R	Yageo	CC1206KKX5R9BB106
11	2	C88, C89	8pF, 0402_C	Cap Ceramic 8pF 50V COG 0.5pF Pad SMD 0402 125°C T/R	Yageo	CC0402DPNPO9BN8R0
12	2	C91, C92	2.2uF_X7R, 0402_C	Cap Ceramic 2.2uF 6.3V X5R 20% Pad SMD 0402 85°C T/R	Yageo	CC0402MRX5R5BB225
13	2	C93, C113	1uF, 0402_C	Cap Ceramic 1uF 6.3V X5R 20% Pad SMD 0402 85°C T/R	Yageo	CC0402MRX5R5BB105
14	1	C95	4.7uF, 0402_C	Cap Ceramic 4.7uF 6.3V X5R 20% Pad SMD 0402 85°C T/R	Yageo	CC0402MRX5R5BB475
15	1	C110	ESL107M050AGMAA , D3.5/8MM	Cap Aluminum Lytic 100uF 50V 20% (8 X 11.5mm) Radial 3.5mm 0.12 Ohm 725mA 10000h 105°C Bag	KEMET	ESL107M050AGMAA
16	1	C111	220nF/50V, 0402_C	Cap Ceramic 0.22uF 50V X7R 10% Pad SMD 0402 125°C T/R	Yageo	CC0402KPX7R9BB224
17	1	C112	100uF/10V, D2/6.3MM	ESH, Aluminum Electrolytic, 100 uF, 20%, 10 VDC, -40/+105°C, Lead Spacing = 2mm	KEMET	ESH107M010AC3KA
18	1	C115	22nF, 0402_C	Cap Ceramic 0.022uF 16V X5R 10% Pad SMD 0402 85°C T/R	Yageo	CC0402KRX5R7BB223
19	1	C116	1nF, 0402_C	Cap Ceramic 0.001uF 16V X5R 10% Pad SMD 0402 85°C T/R	Yageo	CC0402KRX5R7BB102
20	1	C117	82nF, 0402_C	Cap Ceramic 0.082uF 16V X5R 10% Pad SMD 0402 85°C T/R	Yageo	CC0402KRX5R7BB823

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
21	2	C118, C119	10uF/6.3V, 0603_C	Cap Ceramic 10uF 6.3V X5R 10% Pad SMD 0603 85°C T/R	Yageo	CC0603KRX5R5BB106
22	2	CN1, CN2	AE-RJC101013, RJ45	RJ45 connector	Apps Electronics Limited	AE-RJC101013
23	1	CN3	1050170002 MICRO USB, 1050170002	Conn Micro USB 2.0 Type B RCP 5 POS 0.65mm Solder RA SMD 5 Terminal 1 Port T/R	Molex	1050170002
24	2	D1, D2	1N4148, SOD-323	DIODE GEN PURP 75V 150MA SOD323	Vishay	1N4148WS-HE3-18
25	8	D3, D4, D5, D6, D7, D8, D9, D10	MMSZ5235BT1G, SOD-123	Zener Diode Single 6.8V 5% 50hm 500mW 2-Pin SOD-123 T/R	ON	MMSZ5235BT1G
26	1	D11	STPS0520Z, SOD-123	Rectifier Diode Schottky 20V 0.5A 2-Pin SOD-123 T/R	ST	STPS0520Z
27	2	D12, D13	ESDA051-1JY, SOD-323	ESD protection	ST	ESDA051-1JY
28	1	D14	STPS1045SF, TO-227A	Rectifier Diode Schottky 45V 10A 3-Pin(2+Tab) PSMC T/R	ST	STPS1045SF
29	1	D15	SM15T33CA, SMC(DO-214AB)_S1	TVS Diode Single Bi-Dir 28.2V 1.5KW 2-Pin SMC T/R	ST	SM15T33CA
30	1	D16	STPS340AFN, SMA(DO-214AC)_S1	Rectifier Diode Schottky 40V 3A 2-Pin SMA flat T/R	ST	STPS340AFN
31	1	F1	0452008. F6.1X2.7	Fuse Chip Slow Blow Acting 8A 75V SMD Solder Pad 6.1 X 2.69mm Ceramic T/R CSA/UL	Littelfuse	0452008
32	4	FB1, FB2, FB5, FB6	BEAD 0402_L	Ferrite Beads Multi-Layer 120Ohm 25% 100MHz 0.5A 0.25Ohm DCR 0402 Automotive T/R	Murata	BLM15AG121SH1D
33	5	FB3, FB4, FB7, FB8, FB9	0603_L	Ferrite Beads Multi-Layer 120Ohm 25% 100MHz 0.8A 0.18Ohm DCR	Murata	BLM18AG121SZ1D

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
				0603 Automotive T/R		
34	1	FB11	1206_L	Ferrite Beads Multi-Layer Power 50Ohm 25% 100MHz 12A 0.0016Ohm DCR 1206 Automotive T/R	Murata	BLM31SN500SH1L
35	1	J1	PJ-080BH CUI- PJ-080BH	2.5 x 6.4 mm, 10.0 A, Horizontal, Through Hole, Shielded, Dc Power Jack Connector	CUI Devices	PJ-080BH
36	1	L1	1267AY-220M# L8080	Inductor Power Shielded Wirewound 22uH 20% 100KHz Ferrite 2.8A 0.0744Ohm DCR 3131 T/R	Murata	1267AY-220M#
37	8	LD1, LD4, LD6, LD8, LD10, LD12, LD14, LD16	Green 0603_LED_S1	Green LED indicator	Any	
38	10	LD2, LD3, LD5, LD7, LD9, LD11, LD13, LD15, LD17, LD18	Red 0603_LED_S1	Red LED indicator	Any	
39	8	M1, M2, M3, M4, M5, M6, M7, M8	M12A-05PFFP- SF8001 M12	Conn M12 Circular F 5 POS Solder ST Thru-Hole 5 Terminal 1 Port	Amphenol LTW	M12A-05PMMC-SF8B20
40	1	P1	77311-118-03LF HDR1X3	BergStik®, Board to Board connector, Unshrouded vertical Header, Through Hole, Single Row, 03 Positions, 2.54 mm Pitch	Amphenol ICC (FCI)	77311-118-03LF
41	2	P2, P3	Header 6 HDR_1x6_2R54_V_ M	BergStik®, Board to Board connector, Unshrouded vertical Header, Through Hole, Single Row, 06 Positions, 2.54 mm Pitch	Amphenol ICC (FCI)	77311-118-06LF
42	62	R1, R8, R14, R15, R16, R17, R18, R20, R56, R57, R58, R60, R61, R62, R63, R64, R65, R66,	0Ω 0402_R	Res Thick Film 0603 0 Ohm Pad SMD T/R	Yageo	RC0402FR-070RL

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
		R67, R77, R78, R79, R89, R90, R91, R101, R102, R103, R113, R114, R115, R125, R126, R127, R137, R138, R139, R149, R150, R151, R155, R164, R165, R166, R167, R168, R169, R170, R171, R172, R173, R175, R176, R179, R180, R181, R182, R183, R184, R185, R186, R187				
43	6	R2, R158, R159, R160, R161, R195	4.7K Ω 0402_R	Res Thick Film 0402 4.7K Ohm 5% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402JR-074K7L
44	6	R3, R4, R6, R188, R189, R190	22 Ω 0402_R	Res Thick Film 0402 22 Ohm 1% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402FR-0722RL
45	8	R19, R22, R25, R26, R68, R192, R206, R207	1K Ω 0402_R	Res Thick Film 0402 1K Ohm 5% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402JR-071K1L
46	28	R21, R53, R54, R55, R74, R75, R76, R86, R87, R88, R98, R99, R100, R110, R111, R112, R122, R123, R124, R134, R135, R136, R146, R147, R148, R153, R154, R191	10K Ω 0402_R	Res Thick Film 0402 10K Ohm 5% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402JR-0710KL
47	1	R27	11.8K Ω 1% 0402_R	Res Thick Film 0402 11.8K Ohm 1% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402FR-0711K8L
48	8	R28, R29, R30, R31, R38, R39, R40, R41	49.9 Ω 0402_R	Res Thick Film 0402 49.9 Ohm 1% 0.063W(1/16W) \pm 100ppm/ $^{\circ}$ C Pad SMD T/R	Yageo	RC0402FR-0749R9L

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
49	8	R32, R33, R34, R35, R42, R43, R44, R45	75Ω 0402_R	Res Thick Film 0402 75 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402FR-0775RL
50	4	R36, R37, R46, R47	270Ω 0402_R	Res Thick Film 0402 270 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07270RL
51	16	R48, R49, R69, R71, R81, R83, R93, R94, R105, R107, R117, R119, R129, R130, R141, R143	0Ω 0603_R	Res Thick Film 0603 0 Ohm Pad SMD T/R	Yageo	RC0603FR-070RL
52	16	R51, R52, R72, R73, R84, R85, R96, R97, R108, R109, R120, R121, R132, R133, R144, R145	2.2KΩ 0402_R	Res Thick Film 0402 2.2K Ohm 5% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-072K2L
53	8	R59, R80, R92, R104, R116, R128, R140, R152	124KΩ 0402_R	Res Thick Film 0402 124K Ohm 5% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07124KL
54	1	R162	100KΩ 0402_R	Res Thick Film 0402 100K Ohm 5% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07100KL
55	1	R174	330Ω 0402_R	Res Thick Film 0402 330 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07330RL
56	1	R177	100Ω 0402_R	Res Thick Film 0402 100 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07110RL
57	1	R178	220KΩ 0402_R	Res Thick Film 0402 220K Ohm 5% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07220KL
58	1	R193	200KΩ 0402_R	Res Thick Film 0402 200K Ohm 5% 0.063W(1/16W)	Yageo	RC0402JR-07200KL

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
				±100ppm/°C Pad SMD T/R		
59	1	R194	220Ω 0402_R	Res Thick Film 0402 220 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-07220RL
60	1	R196	1.2KΩ 0402_R	Res Thick Film 0402 1.2K Ohm 5% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402JR-071K2L
61	1	R197	1.05KΩ 0402_R	Res Thick Film 0402 1.05K Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD T/R	Yageo	RC0402FR-071K05L
62	24	TVS1, TVS2, TVS3, TVS4, TVS5, TVS6, TVS7, TVS8, TVS9, TVS10, TVS11, TVS12, TVS13, TVS14, TVS15, TVS16, TVS17, TVS18, TVS19, TVS20, TVS21, TVS22, TVS23, TVS24	SMAJ28A-TR SMA(DO-214AC)_S1	TVS Diode Single Uni-Dir 28V 400W Automotive 2- Pin SMA flat T/R	ST	SMAJ28A-TR
63	1	TVS25	SM15T33A SMC(DO-214AB)_S1	TVS DIODE 28VWVM 59VC SMBFLAT	ST	SM15T33A
64	2	TX1, TX2	AE-SB16001 Transformer	Telecom Transformer 2(1:1) 16 Terminal Gull Wing SMD	Apps Electronics Limited	AE-SB16001
65	1	U1	KSZ8863RLL LQFP-48_7x7x05P	Ethernet Switch 10/100 Base- T/TX PHY I ² C, SPI Interface 48-LQFP (7x7)	Microchip	KSZ8863RLL
66	2	U2, U3	SLVU2.8-4A1 SOP-8_150mil	15V Clamp 24A (8/20μs) Ipp Tvs Diode Surface Mount 8-SOIC	ST	SLVU2.8-4A1
67	8	U4, U5, U7, U8, U9, U10, U11, U12	L6360 VFQFPN_26L	Transceiver 1TX 1RX 400Kbps 26-Pin VFQFPN EP T/R	ST	L6360
68	1	U6	VN808CM-E PowerSO36	Current Limit SW 8-IN 8-OUT to 1.7A 36-Pin PowerSO Tube	ST	VN808CM-E
69	1	U13	STM32H743ZIT6 LQFP144_0R5_SKT	ARM® Cortex®- M7 series	ST	STM32H743ZIT6

Item	Q.ty	Ref.	Value	Description	Manufacturer	Order code
				Microcontroller IC 32-Bit		
70	1	U14	M24256-BRDW6TP TSSOP-8_3X4.4X065 P	EEPROM Serial-I2C 256K-bit 32K x 8 2.5V/3.3V/5V 8-Pin TSSOP T/R	ST	M24256-BRDW6TP
71	1	U15	L7986A HSOP-8_1.27	Conv DC-DC 4.5V to 38V Synchronous Step Down Single-Out 0.6V to 38V 3A 8-Pin HSOP EP T/R	ST	L7986A
72	1	X2	ABM8W-19.2000MHZ -8-J1Z-T3 SMD-3225_4P	Ceramic Resonator19.2 MHz, 4PIN, 3225	Abracon	ABM8W-19.2000MHZ-8- J1Z-T3

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Notice applicable to Evaluation Boards according to European Regulation

For the European Regulation of the Evaluation Board, the applicable EU directives are considered, with a particular attention to the Low Voltage Directive (LVD) 2014/35/EU, the Electromagnetic Compatibility (EMC) Directive 2014/30/EU, and the Radio Equipment Directive (RED) 2014/53/EU. If the Evaluation Board is outside the scope of the foregoing Directives, then the General Product Safety Directive (GPSD) 2001/95/EC and Council Directive 93/68/EEC, amending Directive 73/23/EEC on electrical equipment designed for use within certain voltage limits, are applicable.

The Evaluation Board meets the requirements of the Restriction of Hazardous Substances (RoHS 2 or RoHS recast) Directive 2011/65/EU, Annex II, as amended by Directive 2015/863/EU.

Notice applicable to Evaluation Boards not FCC-Approved

This kit is designed to allow:

1. Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and
2. Software developers to write software applications for use with the end product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of 47 CFR, Chapter I ("FCC Rules"), the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

For Evaluation Boards annotated as FEDERAL COMMUNICATIONS COMMISSION (FCC) Part 15 Compliant

- **FCC Interference Statement for Class A Evaluation Boards:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- **FCC Interference Statement for Class B Evaluation Boards:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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"Affiliates" means any corporation or other entity directly or indirectly controlled by, controlling or under common control with the entity in question, for so long as such ownership exists. "Control" means the direct or indirect beneficial ownership of more than fifty (50%) percent of the stock or other equity interests entitled to vote for the election of directors or an equivalent governing body. Any such corporation or other legal entity shall be deemed to be an Affiliate of such Party only as long as such Control exists.

TERMINATION

ST may terminate this Agreement without notice if You breach this Agreement. Upon termination, You shall immediately destroy or return all copies of the software, firmware, and documentation of the Evaluation Board to ST and certify in writing to ST that You have done so.

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This Agreement shall be governed, construed and enforced in accordance with the laws of Switzerland, without regard to its conflict of laws rules. The UN Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. In case of dispute and in the absence of an amicable settlement, the only competent jurisdiction shall be the Courts of Geneva, Switzerland. Any breach of this Agreement by You may result in irreparable damage to ST for which ST will not have an adequate remedy at law. Accordingly, in addition to any other remedies and damages available, You acknowledge and agree that ST may immediately seek enforcement of this Agreement in any jurisdiction by means of specific performance or injunction, without any requirement to post a bond or other security.

SEVERABILITY

If any provision of this agreement is or becomes, at any time or for any reason, unenforceable or invalid, no other provision of this agreement shall be affected thereby, and the remaining provisions of this agreement shall continue with the same force and effect as if such unenforceable or invalid provisions had not been inserted in this Agreement. In addition, any unenforceable or invalid provision shall be deemed replaced by a provision that is valid and enforceable and that comes closest to expressing the intention of the unenforceable or invalid provision.

WAIVER

The waiver by either party of any breach of any provision of this Agreement shall not operate or be construed as a waiver of any other or a subsequent breach of the same or a different provision.

RELATIONSHIP OF THE PARTIES

Nothing in this Agreement shall create, or be deemed to create, any joint venture, partnership, principal-agent, employer-employee or other relationship between the Parties, except that of independent contractors. Neither Party has the authority or power to bind, to contract in the name of, or to create a liability for the other in any way or for any purpose.

SURVIVAL

Any provision of this Agreement which imposes an obligation after termination of this Agreement shall survive the termination of this Agreement.

SECTION HEADINGS

Section headings are inserted for convenience only and shall not be used to interpret this Agreement.

WASTE AND RECYCLING

The Evaluation Board is not to be disposed of as urban waste. At the end of its life cycle, differentiated waste collection must be followed. Consult the local authorities for more information on the proper disposal channels. It is mandatory to separately collect the Evaluation Board and make sure it is delivered it to the appropriate waste management and recycling centers.

As of 15 August 2018, in all the countries belonging to the European Union, the Evaluation Board is subject to the WEEE Directive 2012/19/EU requirement; therefore, it is forbidden to dispose of the Evaluation Board as undifferentiated waste or with other domestic wastes. Consult the local authorities for more information on the proper recycling centers.

Disposing of the Evaluation Board incorrectly may cause damage to the environment and may be subject to fines based on specific countries' rules.

IMPORTANT NOTICE – READ CAREFULLY

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