

## Bill of materials

Table 1. STDES-70WRXWLC bill of materials

Item	Qty.	Ref.	Part/Value	Description	Manufacturer	Order code
1	1	C116	3.3nF	CAPACITOR SMD 0603 3.3nF 50V X7R 10%	YAGEO	CC0603KRX7R9BB332
2	1	C133	22nF	CAPACITOR SMD 0402 22nF 50V X7R 10%	Murata	GRM155R71H223KA12D
3	1	C134	680pF	CAPACITOR SMD 0402 680pF 50V X7R 10%	Murata	GRM155R71H681KA01D
4	1	C135	470pF	CAPACITOR SMD 0402 470pF 50V X7R 10%	YAGEO	CC0402KRX7R9BB471
5	1	C207	2.2uF	CAPACITOR SMD 0402 2.2uF 25V X6S 20%	Murata	GRM155C81E225ME11D
6	1	C304	4.7uF	CAPACITOR SMD 0402 4.7uF 6.3V X6S 20%	Murata	GRM155C80J475MEAAD
7	11	C101, C138, C141, C142, C205, C210, C211, C212, C213, C214, C215	1uF	CAPACITOR SMD 0402 1uF 6.3V X7R 10%	Murata	GRM155R70J105KA12D
8	13	C102, C104, C136, C139, C140, C208, C209, C303, C305, C306, C307, C308, C309	100nF	CAPACITOR SMD 0402 100nF 50V X7R 10%	Murata	GRM155R71E104KE14D
9	3	C103, C204, C206	10uF	CAPACITOR SMD 0603 10uF 10V X5R 10%	Murata	GRM188R61A106KE69D
10	5	C105, C106, C107, C108, C110	10uF	CAPACITOR SMD 1210 10uF 50V X7S 10% Derating	Murata	GCM32EC71H106KA03L
11	2	C109, C111	100nF	CAPACITOR SMD 0603 100nF 50V X7R 10%	KEMET OR GENERIC	C0603C104K5RACTU
12	3	C115, C121, C122	4.7nF	CAPACITOR SMD 0603 4.7nF 50V X7R 5%	YAGEO	CC0603JRX7R9BB472
13	2	C117, C118	22nF	CAPACITOR SMD 0603 22nF 50V X7R 10%	SEMCO	CL10B223KB8NNND
14	2	C119, C120	10nF	CAPACITOR SMD 0603 10nF 50V X7R 10%	SEMCO	CL10B103KB8NNND

Item	Qty.	Ref.	Part/Value	Description	Manufacturer	Order code
15	2	C123, C124	47nF	CAPACITOR SMD 0603 47nF 50V X7R 10%	SEMCO	CL10B473KB8NNND
16	8	C125, C126, C127, C128, C129, C130, C137, C143	220nF	CAPACITOR SMD 0603 220nF 50V X7R 10%	MURATA	GRM188R71H224KAC4D
17	5	C131, C132, C310, C311, C313	10nF	CAPACITOR SMD 0402 10nF 25V X7R 10%	Murata	GMD155R71E103KA01D
18	2	C301, C302	8.2pF	CAPACITOR SMD 0402 10nF 50V COG 0.5pF	Murata	GRM1555C1H8R2DA01
19	1	D107	BAT54SWFILM, SOT-323	40 V, 300 mA General purpose Signal Schottky Diode	ST	<a href="#">BAT54SWFILM</a>
20	1	D201	ESDA25P35-1U1 M, QFN-2L	High-power transient voltage suppressor	ST	<a href="#">ESDA25P35-1U1M</a>
21	1	D202	ESDALC6V1M3, SOT883	Dual low capacitance Transil array for ESD protection	ST	<a href="#">ESDALC6V1M3</a>
22	1	D307	RED	LED, 0603, Red, 5V, 25mA	Everlight	19-213/R6C-AP1Q2B/3T
23	1	D308	BLUE	LED, 0603, Blue, 5V, 30mA	BrLed	BL-HB336G-TRB
24	1	D309	YELLOW	LED, 0603, Yellow, 5V, 25mA	Everlight	19-21/Y2C-CP1Q2B/3T
25	2	D103, D104	SMAJ22A	22V TVS	ST	<a href="#">SMAJ22A</a>
26	2	D105, D106	1N4448HLP	Fast switching diode	DIODES INCORPORATED	1N4448HLP-7
27	4	D203, D204, D205, D206	STPS0520Z, SOD-123	20 V, 0.5 A Power Schottky rectifier	ST	<a href="#">STPS0520Z</a>
28	7	D300, D301, D302, D303, D304, D305, D306	GREEN	LED, 0603, Green, 2V, 20mA	Everlight	19-217/G7C-AN1P2/3T
29	1	FB301	1000ohm	300mA bead, 0402	Murata	BLM15AG102SN1D
30	1	J201	USB Micro-B	CON_USB_MICR O_B	WURTH ELEKTRONIK	629105150521
31	1	J301	1X4P	1X4P, 2.54mm female connector	XDX	
32	1	J303	2X6P	2X6P, 2.54mm, male connector	XDX	
33	4	J100, J101, J102, J302	1X4P	1X4P, 2.54mm male connector	XDX	
34	3	JP101, JP201, JP301	1X2P	1X2P, 2.54mm male connector	XDX	
35	1	L201	68uH	Inductor, 1812	WURTH ELEKTRONIK	744045680

Item	Qty.	Ref.	Part/Value	Description	Manufacturer	Order code
36	1	Q201	BC847CDW1T1G	GENERAL PURPOSE_45V_100mA_225mW	ON SEMICONDUCTOR	BC847CDW1T1G
37	1	Q203	PDTC114EU	GENERAL PURPOSE_50V_100mA_205mW RB=RC=10K	NXP	PDTC114EU,135
38	2	Q102, Q202	DMP6350S	P-Channel MOSFET	DIODES INCORPORATED	DMP6350S
39	1	R111	220k	Resistor, 0402, 5%	Rohm	MCR01MZPJ224
40	1	R113	5.1k	Resistor, 0402, 5%	Rohm	MCR01MZPJ512
41	1	R115	75	Resistor, 0603, 5%	Rohm	MCR03EZPJ750
42	1	R201	1M	Resistor, 0402, 5%	Rohm	MCR01MZPJ105
43	1	R203	47k	Resistor, 0402, 1%	Rohm	MCR01MZPF4702
44	1	R218	20k	Resistor, 0402, 1%	Rohm	MCR01MZPF2002
45	18	R100, R107, R108, R109, R110, R300, R301, R302, R303, R304, R305, R307, R308, R309, R311, R315, R316, R317	4.7k	Resistor, 0402, 5%	Rohm	MCR01MZPJ472
46	2	R101, R103	400	Resistor, 0805, 5%	Rohm	MCR10EZPJ401
47	2	R102, R104	200	Resistor, 0805, 5%	Rohm	MCR10EZPJ201
48	3	R105, R209, R214	15k	Resistor, 0402, 5%	Rohm	MCR01MZPJ153
49	7	R112, R210, R211, R212, R215, R306, R310	10k	Resistor, 0402, 5%	Rohm	MCR01MZPJ103
50	3	R116, R225, R226	100k	Resistor, 0402, 5%	Rohm	MCR01MZPJ104
51	3	R118, R217, R220	0	Resistor, 0402, 5%	Rohm	MCR01MZPJ0R
52	2	R205, R213	10k	Resistor, 0402, 1%	Rohm	MCR01MZPF1002
53	2	R207, R208	22	Resistor, 0402, 5%	Rohm	MCR01MZPJ220
54	2	R221, R223	470k	Resistor, 0402, 5%	Rohm	MCR01MZPJ474
55	2	R313, R314	20k	Resistor, 0402, 5%	Rohm	MCR01MZPJ203
56	3	SW301, SW302, SW303	Switch button, 6*6*5.0	Switch button, 6*6*5.0	XKB	TS-1102S-B-C-B

Item	Qty.	Ref.	Part/Value	Description	Manufacturer	Order code
57	1	U101	STWLC98JR, WLCSP 4.289X3.869X0.47 90 0.4PIT	Qi-compliant inductive wireless charger power receiver for 70 W applications	ST	STWLC98JR
58	1	U102	LSF0204	4-Bit Bidirectional Multi-Voltage Level Translator for Open-Drain & Push- Pull	TI	LSF0204RGYR
59	1	U201	ST730MR, SOT23-5L	300 mA, 28 V low- dropout voltage regulator, with 5 $\mu$ A quiescent current	ST	ST730MR
60	1	U202	PM6644TR, VDFPN 10 3x3x1.0	350 mA adjustable step- down regulator	ST	PM6644TR
61	1	U204	LD39015M33R, SOT23-5L	150 mA low quiescent current low noise voltage regulator	ST	LD39015M33R
62	1	U205	LD39015M18R, SOT23-5L	150 mA low quiescent current low noise voltage regulator	ST	LD39015M18R
63	1	U301	STM32F072CBT6 , LQFP 48 7x7x1.4 mm	Mainstream Arm Cortex-M0 USB line MCU with 128 Kbytes of Flash memory, 48 MHz CPU, USB, CAN and CEC functions	ST	STM32F072CBT6
64	1	Y300	16MHZ-10PPM-8 PF	SMD crystal	NDK	NX2016SA 16MHz EXS00A- CS06655
65	2	JP101, JP201	Jumper	1X2P, 2,54mm, Jumper	XFCN	F200D-02-PT-B
66	1	OLED	OLED display module	OLED display module	YUN KAI	-
67	1	Rx coil	4uH, Rx coil Module	4uH, 32mm, 50mm, 7 x 0.2mm, 6 x 1 layers	Luxshare	-

## Evaluation board license agreement

**Important:** All information on this document is subject to this Evaluation Board License Agreement.

By using this evaluation board or kit (together with all related software, firmware, components, and documentation provided by ST, "Evaluation Board"), You ("You") are agreeing to be bound by the terms and conditions of this Evaluation Board License Agreement ("Agreement"). Do not use the Evaluation Board until You have read and agreed to this Agreement. Your use of the Evaluation Board constitutes Your acceptance of this Agreement.

### LICENSE

STMicroelectronics ("ST") grants You the right to use the enclosed Evaluation Board offering limited features only to evaluate and test ST products solely for Your evaluation and testing purposes in a research and development setting. The Evaluation Board shall not be, in any case, directly or indirectly assembled as a part in any production of Yours as it is solely developed to serve evaluation purposes and has no direct function and is not a finished product. If software and/or firmware is accompanied by a separate end user license agreement ("EULA"), then such software and/or firmware shall be governed by such EULA.

### EVALUATION BOARD STATUS

The Evaluation Board offers limited features allowing You only to evaluate and test the ST products. The Evaluation Board is not intended for consumer or household use. You are not authorized to use the Evaluation Board in any production system, and it may not be offered for sale or lease, or sold, leased or otherwise distributed for commercial purposes. If the Evaluation Board is incorporated in an evaluation system, the evaluation system may be used by You solely for Your evaluation and testing purposes. Such evaluation system may not be offered for sale or lease or sold, leased or otherwise distributed for commercial purposes and must be accompanied by a conspicuous notice as follows: "This device is not, and may not be, offered for sale or lease, or sold or leased or otherwise distributed for commercial purposes".

### OWNERSHIP AND COPYRIGHT

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### RESTRICTIONS AND WARNINGS

Before You handle or use the Evaluation Board, You must carefully review any related documentation provided by ST. Such documentation may contain important warnings. You shall comply with all such warnings and other instructions and employ reasonable safety precautions in using the Evaluation Board. Failure to do so may result in death, personal injury, or property damage. If You have any questions regarding the safe usage of the Evaluation Board, You should contact ST for guidance.

You may not sell, assign, sublicense, lease, rent or otherwise distribute the Evaluation Board for commercial purposes, in whole or in part, or use Evaluation Board in a production system, with the exception that if You are an authorized ST distributor, You may resell the Evaluation Board in compliance with the applicable terms and conditions. Except as provided in this Agreement or as explicitly permitted in the documentation of the Evaluation Board, You may not reproduce the Evaluation Board or modify,

reverse engineer, de-compile or disassemble its software and/or firmware, in whole or in part.

You shall not use the Evaluation Board in any safety critical or functional safety testing, including but not limited to testing of life supporting, military or nuclear applications. ST expressly disclaims any responsibility for such usage which shall be made at Your sole risk, even if ST has been informed in writing of such usage. Unless expressly designated in writing by ST as suitable for use in testing automotive or aerospace applications, You shall not use the Evaluation Board in such testing.

### 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.

### WARRANTY

ST WARRANTS THAT IT HAS THE RIGHT TO PROVIDE THE EVALUATION BOARD TO YOU. THIS WARRANTY IS PROVIDED BY ST IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY AS TO MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR UNINTERRUPTED OR ERROR-FREE OPERATION, ALL OF WHICH ARE EXPRESSLY DISCLAIMED. THE EVALUATION BOARD IS PROVIDED "AS IS".

YOU WARRANT TO ST THAT YOU WILL ENSURE THE EVALUATION BOARD IS USED ONLY BY ELECTRONICS EXPERTS WHO UNDERSTAND THE DANGERS OF HANDLING AND USING SUCH ITEMS, YOU ASSUME ALL RESPONSIBILITY AND LIABILITY FOR ANY IMPROPER OR UNSAFE HANDLING OR USE OF THE EVALUATION BOARD BY YOU, YOUR EMPLOYEES, AFFILIATES, CONTRACTORS, AND DESIGNEES.

#### **LIMITATION OF LIABILITIES**

IN NO EVENT SHALL ST BE LIABLE TO YOU, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR ANY OTHER LEGAL THEORY, FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, INCIDENTAL, PUNITIVE, OR EXEMPLARY DAMAGES WITH RESPECT TO ANY MATTERS RELATING TO THIS AGREEMENT, REGARDLESS OF WHETHER ST HAS BEEN ADVISED OF THE POSSIBILITY OF THE SAME. IN NO EVENT SHALL ST'S LIABILITY ARISING OUT OF THIS AGREEMENT IN THE AGGREGATE EXCEED THE AMOUNT PAID BY YOU UNDER THIS AGREEMENT FOR THE PURCHASE OF THE EVALUATION BOARD, OR TEN UNITED STATES DOLLARS (\$10.00) IF NO PURCHASE PRICE WAS PAID.

#### **INDEMNIFICATION**

You shall, at Your expense, defend ST and its Affiliates against a claim or action brought by a third party for infringement or misappropriation of any patent, copyright, trade secret or other intellectual property right of a third party to the extent resulting from (1) Your combination of the Evaluation Board with any other component, system, software, or firmware, (2) Your modification of the Evaluation Board, or (3) Your use of the Evaluation Board in a manner not permitted under this Agreement.

You shall indemnify ST and its Affiliates against and pay any resulting costs and damages finally awarded against ST or its Affiliates or agreed to in any settlement, provided that You have sole control of the defense and settlement of the claim or action, and ST cooperates in the defense and furnishes all related evidence under its control at Your expense. ST will be entitled to participate in the defense of such claim or action and to employ counsel at its own expense.

"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.

#### **APPLICABLE LAW AND JURISDICTION**

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.



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