

Comment	Description	Desig	Location (For UI board 0.3)	Footprint	Order	Alternate Source(s)
WM871	Audio CODEC	U1	1.5cm right of J3/J4	SSOP-28	FN 177-6264	Mouser 238-WM8731SEDS/RV
Usb Host	USB Host Connector	J10		USB_OUT_A	FN 117-7883	Mouser 571-292303-3
Usb Dfu	Mini USB connector	J11		MINI_USB_B_SMD	FN 211-2367	Mouser 649-10033526N3212MLF
STM32F40x-VG (LQFP100)		U4		SQFP14X14-100(N)	FN 206-4367	Mouser 511-STM32F405VGT6 (The 511-STM32F407VGT6 may also be used - <i>see notes</i>)
Speaker	Header, 2-Pin	P7	on edge of board below J4	SIP2	FN 168-3898	Mouser 665-AS07108POWRR (Waterproof Cone) or 665-AS07108PO-3-R (standard cone)
Service	Header, 4-Pin	P8	1cm below and left of U4	HDR1X4	NA	May be cut from larger header
RED	LED 3mm	LD2		LED2	FN 211-2100	Mouser 696-SSL-LX30FT14SID or 859-LTL42NKRKNN
POWER	Push Button	S17		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
Phones	Jack Socket 4 pin	J4		KLBR4	FN 121-7016	Note: Lumberg P/N: KBLR 4 (Right-Angle 3.5mm) No known U.S. supplier other than Farnell via U.K.
NDS356AP	NDS356AP	Q1	2.5cm right of J2	SOT-23	FN 984-6409	Mouser 512-NDS356AP
Mic	Jack Socket,Thru-Hole	J3		MX-387GL	FN 126-7376	Note: PRO SIGNAL P/N: MX-387GL (Right Angle, 3.5mm) No known U.S. supplier other than Farnell via U.K.
LM386M-1	Low Voltage Audio Power Amp	U2	1cm right of J4	SO-8	FN 948-8324	Mouser 926-LM386M-1
Line Out	Jack Socket,Thru-Hole	J1		MX-387GL	FN 126-7376	Note: PRO SIGNAL P/N: MX-387GL (Right Angle, 3.5mm) No known U.S. supplier other than Farnell via U.K.
Line In	Jack Socket,Thru-Hole	J2		MX-387GL	FN 126-7376	Note: PRO SIGNAL P/N: MX-387GL (Right Angle, 3.5mm) No known U.S. supplier other than Farnell via U.K.
HY28AB	2.8 inch TFT LCD	LCD1		HY28A	hotmcu.com	
Header 30	Header, 30-Pin	P1		HDR1X30	EB 290947876334	Mouser 517-929834-01-xx (header) and 517-929974-01-xx (plug) where "xx" is the number of pins. Note that Ebay part consists of both male/female plug/sockets and have 40 pins which are cut down to size. In the Mouser part numbers, specify number of pins
GREEN	LED 3mm	LD1		LED2	FN 211-2096	Mouser 749-3GT or 638-2647SYGDS530E2 (For a BLUE LED, user Mouser 638-264-7UBC/C430)
FOX924B-16.000 SEE NOTES!	TCXO	U5	1.5cm below and right of U4	2SMX-3SMXB	FN 206-3959	Mouser 559-FOX924B-16
DFU Mode	Header, 2-Pin	P6	0.75cm below U4	SIP2	NA	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_STEPP	Push Button	S8		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_STEPM	Push Button	S7		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_M3	Push Button	S6		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_M2	Push Button	S3		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_M1	Push Button	S9		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_G4	Push Button	S5		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_G3	Push Button	S1		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_G2	Push Button	S2		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_G1	Push Button	S16		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_F5	Push Button	S15		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_F4	Push Button	S13		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_F3	Push Button	S10		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_F2	Push Button	S12		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_F1	Push Button	S11		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_BNDP	Push Button	S14		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
BUTTON_BNDM	Push Button	S4		BUTTON_SMD	EB 290913735944	Mouser 101-0364-EV (May be 0.5mm taller than Ebay part, which itself varies by 0.5mm from description)
ALPS-EC12E2420404	ALPS Rotary Encoder	E1		Encoder	FN 152-0812	Equivalent: Bournes PEC12R-4220F-N0024 Mouser 652-PEC12R-4220F-N24 (652-PEC12R-4225F-N24 and 652-PEC12R-4230F-N24 have longer shaft which may be cut)
ALPS-EC12E2420404	ALPS Rotary Encoder	E2		Encoder	FN 152-0812	Equivalent: Bournes PEC12R-4220F-N0024 Mouser 652-PEC12R-4220F-N24 (652-PEC12R-4225F-N24 and 652-PEC12R-4230F-N24 have longer shaft which may be cut)

ALPS-EC12E2420404	ALPS Rotary Encoder	E3		Encoder	FN 152-0812	Equivalent: Bournes PEC12R-4220F-N0024 Mouser 652-PEC12R-4220F-N24 (652-PEC12R-4225F-N24 and 652-PEC12R-4230F-N24 have longer shaft which may be cut)
ALPS-EC12E2420404	ALPS Rotary Encoder	E4		Encoder	FN 152-0812	Equivalent: Bournes PEC12R-4220F-N0024 Mouser 652-PEC12R-4220F-N24 (652-PEC12R-4225F-N24 and 652-PEC12R-4230F-N24 have longer shaft which may be cut)
680	Resistor	R36	3.5cm left of J10	0805	FN 933-4360	Mouser 71-CRCW0805680RFKEA or 660-RK73H2ATTD6800F or 71-CRCW0805-680
680	Resistor	R37	4cm left of J10	0805	FN 933-4360	Mouser 71-CRCW0805680RFKEA or 660-RK73H2ATTD6800F or 71-CRCW0805-680
680	Resistor	R8	1cm right of J4	0805	FN 933-4360	Mouser 71-CRCW0805680RFKEA or 660-RK73H2ATTD6800F or 71-CRCW0805-680
470nF	Capacitor	C26	2.5cm right of J1	0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
470nF	Capacitor	C31	2cm right of J1	0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
470nF	Capacitor	C7	1.5cm right, 0.5cm down from J2	0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
470nF	Capacitor	C8	1cm right, 0.5cm down from J2	0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
220uF	Electrolytic capacitor	C32	1cm below J4	CAP_ALUM	FN 225-4321	Mouser 647-UWT1C221MCL1S or 667-EEE-HA1C221XP
220uF	Electrolytic capacitor	C34	0.5cm right of J4	CAP_ALUM	FN 225-4321	Mouser 647-UWT1C221MCL1S or 667-EEE-HA1C221XP
220	Capacitor	C21	0.5cm above J3	0805	FN 233-2795	Mouser 77-VJ0805A221KXBPBC or 77-VJ0805A221JXAPBC or 77-VJ0805A221JXAMC or 581-08055A221K4T2A or 80-C0805C221J5G
220	Capacitor	C27	0.5cm below J2	0805	FN 233-2795	Mouser 77-VJ0805A221KXBPBC or 77-VJ0805A221JXAPBC or 77-VJ0805A221JXAMC or 581-08055A221K4T2A or 80-C0805C221J5G
220	Capacitor	C28	0.5cm below J2	0805	FN 233-2795	Mouser 77-VJ0805A221KXBPBC or 77-VJ0805A221JXAPBC or 77-VJ0805A221JXAMC or 581-08055A221K4T2A or 80-C0805C221J5G
220 - SEE NOTES!	Resistor	R42	2cm right of U4	0805	FN 933-2804	Mouser 71-CRCW0805-220-E3 or 660-RK73H2ATTD2200F or 667-ERJ-6ENF2200V
100nF	Capacitor	C10	1.5cm right of J2	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C11	2cm right of J2	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C14	2cm right of J4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C15	3cm right of J3	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C23	1.5cm right of J3	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C24	2cm right of J1	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C33	2.5cm right of P7	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C80	0.5cm right of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C84	0.5cm above and right of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C85	1cm below U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C86	0.5cm left of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C87	0.5cm above and left of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C88	0.5cm left of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C89	0.5cm right of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF	Capacitor	C90	0.5cm right of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100nF - SEE NOTES!	Capacitor	C95	1.5cm below and left of U4	0805	FN 174-0673	Mouser 77-VJ0805V104MXBPBC or 843-0805J0500104KJT or 77-VJ0805V104MXCBC or 80-C0805C104K5R
100	Resistor	R16	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R17	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R18	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R19	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R20	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R21	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB
100	Resistor	R22	4cm right of J4	0805	FN 933-2375	Mouser 71-CRCW0805-100-E3 or 660-RK73H2ATTD1000F or 71-CRCW0805100RFKEB

74HC4066	Quad bilateral switch	U3	1.5cm right of J1/J2	SO-14	FN 120-1330	Mouser 771-HC4066D652 or 595-SN74HC4066DR or 595-CD74HC4066M96
47nF	Capacitor	C35	0.25cm below J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C50	13cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C51	15cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C52	13cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C53	14cm right of J1	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C54	12cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C55	12.5cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C56	4cm right of J1	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C57	4cm right of J2	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C58	15.5cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C59	7cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C60	10cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C61	8.5cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C62	7cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C63	12.5cm right of J1	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C64	4.5cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C65	16cm right of J4	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47nF	Capacitor	C66	15.5cm right of J1	0805	FN 152-0303	Mouser 77-VJ0805Y473JXAPBC or 80-C0805C473K5R or 581-08055C473K
47K	Resistor	R1	Top of board, opposite J3	0805	FN 146-9929	Mouser 660-RK73H2ATTD4702F or 71-CRCW0805-47K-E3 or 667-ERJ-6ENF4702V
47	Resistor	R41	1.5cm above and right of U4	0805	FN 173-8942	Mouser 660-RK73H2ATTD47R0F or 71-CRCW080547R0FKEB or 667-ERJ-6ENF47R0V
20pF - SEE NOTES!	Capacitor	C93	0.5cm right of U1	0805	FN 233-2762	Mouser 581-08051A200JAT2A or 581-08055A200KAT2A or 80-C0805C200J1G
20pF - SEE NOTES!	Capacitor	C94	0.5cm right of U1	0805	FN 233-2762	Mouser 581-08051A200JAT2A or 581-08055A200KAT2A or 80-C0805C200J1G
16Mhz - SEE NOTES!	Crystal	Y1	2cm right of U4	HC49/4H_SMX	FN 971-3808	Mouser 774-ATS16BSM-1
10uF	Tantalum capacitor	C12	1cm right of J3	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C13	2cm right of J3	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C16	2.5cm right of J4	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C17	2.5cm right of J3	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C22	2cm right of J4	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C25	2.5cm right of J2	1206	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C39	1.5cm right of P7	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10	Resistor	R4	0.25cm below J4	0805	FN 933-2421	Mouser 71-CRCW0805-10-E3 or 660-RK73H2ATTD10R0F or 603-AC0805FR-0710RL
4.7uH	Inductor	RFC1	2.75cm right of J3	0805	FN 206-6896	Mouser 70-IMC0805ER4R7J01
4.7uH	Inductor	RFC2	1cm above and right of U4	0805	FN 206-6896	Mouser 70-IMC0805ER4R7J01
4.7uH	Inductor	RFC3	9.75cm right of J4	0805	FN 206-6896	Mouser 70-IMC0805ER4R7J01
4.7K	Resistor	R10	0.5cm right of J2	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R11	0.5cm right of J1	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R12	0.5cm right of J2	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V

4.7K	Resistor	R13	3cm right of J1	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R14	3cm right of J1	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R15	3cm right of J2	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R38	1cm above and right of U4	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R6	3cm right of J3/J4	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R7	3cm right of J4	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
4.7K	Resistor	R9	0.5cm right of J1/J2	0805	FN 200-8383	Mouser 71-CRCW0805-4.7K-E3 or 660-RK73H2ATTD4701F or 667-ERJ-6ENF4701V
2.2uF	Capacitor	C91	0.5cm left of U4, lower left	0805	FN 184-5751	Mouser 810-C2012X5R1H225K or 810-C2012X5R1H225M or 963-UMK212BB7225KG-T
2.2uF	Capacitor	C92	0.5cm above and left of U4	0805	FN 184-5751	Mouser 810-C2012X5R1H225K or 810-C2012X5R1H225M or 963-UMK212BB7225KG-T
2.2K	Resistor	R2	0.5cm right of J4	0805	FN 188-7289	Mouser 71-CRCW0805-2.2K-E3 or 660-RK73H2ATTD2201F or 667-ERJ-6ENF2201V
1uF	Tantalum capacitor	C18	0.5cm right of J3	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C19	0.25cm right of J3	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C20	1cm right of J4	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C29	1cm right of J1	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C30	1cm right of J2	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C5	0.5cm right of J1	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C6	0.5cm right of J1	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C81	0.5cm right of U4, upper right	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C82	0.5cm right of U4, lower right	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C83	0.5 above and right of U4	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1uF	Tantalum capacitor	C9	1cm right of J4	1206_Elec_Cap	FN 145-7406	Mouser 647-F921D105MAA or 74-293D105X0020A2TE3 or 80-T491A105K016
1nF	Capacitor	C1	0.5cm below J2	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C2	0.5cm below J2	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C3	0.5cm above J1	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C36	Top of board, opposite J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C37	Top of board, opposite J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C38	Top of board, opposite J4	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C4	between J1 and J2	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C67	between J10 and J11	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C68	between J10 and J11	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C69	15cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C70	15cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C71	13cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C72	13cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C73	4cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1nF	Capacitor	C74	5cm right of J3	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXXPBC or 581-08055C102K or 77-VJ0805Y102JXPBC
1K	Resistor	R3	2cm right of P7	0805	FN 157-6459	Mouser 71-CRCW0805-1.0K-E3 or 660-RK73H2ATTD1001F or 603-AC0805FR-071KL
1K	Resistor	R40	0.25cm right of P6 (below U4)	0805	FN 157-6459	Mouser 71-CRCW0805-1.0K-E3 or 660-RK73H2ATTD1001F or 603-AC0805FR-071KL

0	Resistor	R30	0.5cm above U4	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0	Resistor	R31	0.5cm above and left of U4	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0	Resistor	R32	4.5cm right of J2	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0	Resistor	R33	6.5cm right of J1	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0	Resistor	R34	7cm right of J1	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0	Resistor	R35	7.5cm right of J1	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0 - SEE NOTES!	Resistor	R43	1.5cm right of U4	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5
0 - SEE NOTES!	Resistor	R44	1.5cm right of U4	0805	FN 933-3681	Mouser 660-RK73Z2ATTD or 71-CRCW0805-0-E3 or 594-MCU08050Z0000ZP5

Parts noted on the diagram as **OPTIONAL**, but not on parts list above. It is recommended that this part be installed.

1nF	Capacitor	C40	Below and right of U2	0805	FN 185-6408	Mouser 77-VJ0805Y102MXPBPC or 77-VJ0805Y102JXPBPC or 581-08055C102K or 77-VJ0805Y102JXPBPC
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Additional parts needed for UI board version 0.4:

Note that UI board version 0.4 includes the modifications detailed in the sections below.

74HC4066	Quad bilateral switch	U3a		SO-14	FN 120-1330	Mouser 771-HC4066D652 or 595-SN74HC4066DR or 595-CD74HC4066M96
100nF	Capacitor	C24a		0805	FN 174-0673	Mouser 77-VJ0805V104MXPBPC or 843-0805J0500104KJT or 77-VJ0805V104MXBCBC or 80-C0805C104K5R
2.2	Resistor	R4a		0805	FN 1717830RL	Mouser 660-RK73H2ATTD2R20F or 603-AC0805FR-072R2L or 71-CRCW0805-2.2
2.2	Resistor	R4b		0805	FN 1717830RL	Mouser 660-RK73H2ATTD2R20F or 603-AC0805FR-072R2L or 71-CRCW0805-2.2
470nF	Capacitor	C7a		0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
470nF	Capacitor	C8a		0805	FN 232-0847	Mouser 963-UMK212F474ZG-T or 963-UMK212BJ474KGHT or 810-C2012X7R1H474MST
220uF	Electrolytic capacitor	C32a		CAP_ALUM	FN 225-4321	Mouser 647-UWT1C221MCL1S or 667-EEE-HA1C221XP
4.7	Resistor	C35a		0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L
100uF	Electrolytic capacitor	C74a		CAP_ALUM	FN 232-6111	Mouser 647-UWJ1C101MCL1 or 667-EEE-1CA101WP or 667-EEE-HA1C101WP
4.7	Resistor	C45		0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L
4.7	Resistor	C46		0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L
3.3V LDO Regulator TO252	LDO VOLT REG, 3.3V	U6		TO-252	FN 108-7183RL	Mouser 512-KA78RM33RTF or 511-LF33CDT-TR or 863-NCP5501DT33RKG - These are LOW DROPOUT versions!
220uF	Electrolytic capacitor	C96		CAP_ALUM	FN 225-4321	Mouser 647-UWT1C221MCL1S or 667-EEE-HA1C221XP
10uF	Tantalum capacitor	C97		Tant Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C98		Tant Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
220	Resistor	R47		0805	FN 933-2804	Mouser 71-CRCW0805-220-E3 or 660-RK73H2ATTD2200F or 667-ERJ-6ENF2200V
220	Resistor	R48		0805	FN 933-2804	Mouser 71-CRCW0805-220-E3 or 660-RK73H2ATTD2200F or 667-ERJ-6ENF2200V
100nF	Capacitor	C99		0805	FN 174-0673	Mouser 77-VJ0805V104MXPBPC or 843-0805J0500104KJT or 77-VJ0805V104MXBCBC or 80-C0805C104K5R
24LC01B	Serial EEPROM	U7	<i>Possible Future Use -</i>	<i>No need to install</i>		<i>Possible future use - No need to install</i>

Notes and modifications for VERSION 0.3 boards and earlier - *Disregard the sections below if you are using UI board version 0.4:*

Muting of audio to TX modulator - A STRONGLY RECOMMENDED MODIFICATION - NOT NEEDED for UI board version 0.4:

74HC4066	Quad bilateral switch	U3a	Piggybacked on U3	SO-14	FN 120-1330	Mouser 771-HC4066D652 or 595-SN74HC4066DR or 595-CD74HC4066M96
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For UI boards 0.3 and earlier:

This modification involves “piggybacking” another 74HC4066 (which we call “U3a”) on top of U3 and connecting pins 5, 6, 7, 12, 13, and 14 to U3 and isolating the rest, using tweezers or very small needle-nose pliers to straighten the pins to get maximum lead length. Capacitors C7 and C8 are removed and reattached to the UPPER pads only: You can stand them on end, or point them “away” from U1.

Using very fine wire (e.g. #30 AWG “wire wrap”) connect pins 1 and 2 of U3a to the isolated end of C7 and the now-vacated pad of C7, and do likewise with C8 and pins 10 and 11 of U3a. This will form an audio switch that will open the audio path to the TX mixer and prevent a source of feedback that will severely degrade the receiver, particularly at high volume levels!

Please note that UI Board version 0.4 has a footprint for U3a onboard and “piggyback” wiring is not required - *see the section “Additional parts for UI version 0.4”, above.*

Isolation of Speaker Amplifier Power supply - A STRONGLY RECOMMENDED MODIFICATION - NOT NEEDED for UI board version 0.4:

This modification involves cutting the trace that carries the 8 volts feeding U2, the LM386 audio amplifier on this board and inserting a **4.7 ohm** resistor in series with this line. This line may be along the bottom edge of the UI board and the added resistor may be inserted there. A ¼ watt, leaded resistor may be used, or the following part, a 1/8 surface-mount resistor, may be used:

4.7	Resistor			0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L
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This modification isolates the 8 volt power supply U2, prevent audio from being conveyed on this power supply lead and causing feedback when the volume is increased.

NOTE: After all of the other modifications have been done it is possible that this feedback may still occur: Adding 1000uF in parallel with C32 will solve this problem, as will operating “Frequency Translate” mode in newer firmware.

Separate MCU power supply - A STRONGLY RECOMMENDED MODIFICATION - NOT NEEDED for UI board version 0.4:

5Volt LDO Reg.	VOLT REG, 3.3V, TO-252	U6	Ground plane 3-4cm right of U4	TO-252	FN 108-7183RL	Mouser 512-KA78RM33RTF or 511-LF33CDT-TR or 863-NCP5501DT33RKG - See NOTES
10uF	Tantalum capacitor	C39a	At U5a input	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
10uF	Tantalum capacitor	C39b	At U5a output	1206_Elec_Cap	FN 143-2339	Mouser 647-F931C106MAA or 647-F931C106KAA or 74-TP3A106K016C1700A
220uF	Electrolytic capacitor	C39c	At U5a input	CAP_ALUM	FN 225-4321	Mouser 647-UWT1C221MCL1S or 667-EEE-HA1C221XP
4.7	Resistor	R41a	At U5a input	0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L
4.7	Resistor	R41b	At U5a input	0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L

This modifications provides U4, the MCU, a its own 3.3 volt, regulated power using a regulator that we shall call “U6” to prevent it from “contaminating” main 3.3 volt supply - which also powers low-level analog/front-end circuitry - with its noise.

To the right (and up) of U4 is an area of ground plane that can be scraped clean to which the regulator can be soldered. The 10uF capacitors are soldered to this ground plane and directly to the input/output pins

of the regulator. Just below the edge connector a cut can be made to the trace that will isolate the 3.3 volt line that goes to **U4 ONLY**. The 3.3 volt output may be connected to the ungrounded end of C88 while the input to the

regulator can be connected to the 5 volt line near the edge connector. This modification will significantly reduce a source of audible “whine” caused by CPU power modulation of the 3.3 volt supply line that causes receiver sensitivity reduction.

Note that the specified regulator is a low-dropout version, but there is an easily-accessible 8 volt supply at the edge connector that may be used if one only has access to a “non low-dropout” version of a 3.3 volt regulator.

The 5 volt input is connected via a “T”-type low-pass filter consisting of the two 4.7 ohm resistors in series with the 220uF capacitor in the center. See the “Board Modification” file for more detailed information.

LCD power supply filtering - a recommended modification - NOT NEEDED for UI board version 0.4:

100uF	Electrolytic capacitor	C39d	On "LCD" side of trace cut	CAP_ALUM	FN 232-6111	Mouser 647-UWJ1C101MCL1 or 667-EEE-1CA101WP or 667-EEE-HA1C101WP
4.7	Resistor	R41c	In +5 LCD supply line	0805	FN 205-7665	Mouser 660-RK73H2ATTD4R70F or 71-CRCW0805-4.7-E3 or 603-AC0805FR-074R7L

This modification involves cutting the trace in the +5 volt line that supplies power to the LCD and inserting a 4.7 ohm resistor. The 220uF capacitor is placed on the "LCD" side of the added 4.7 ohm resistor. This reduces the amount of electrical noise that the LCD puts on the +5 volt bus and thus on the low-level signal lines in the rest of the transceiver. See the "Board Modification" file for more detailed information.

Filtering of the SDA and SCL to reduce the 1-second "Tick" from the reading of the temperature sensor - A recommended modification - NOT NEEDED for UI board version 0.4:

470	Resistor	R41d	Near the MCU	0805	FN 200-8377	Mouser 660-RK73H2ATTD4700F or 71-CRCW0805-470-E3 or 667-ERJ-6ENF4700V
470	Resistor	R41e	Near the MCU	0805	FN 200-8377	Mouser 660-RK73H2ATTD4700F or 71-CRCW0805-470-E3 or 667-ERJ-6ENF4700V

These resistors are inserted in series with the SDA and SCL lines and must be placed *near the MCU* to reduce/eliminate the 1-second "tick" caused by the fast fall-time of the clock/data edges when the temperature sensor is read.

This "tick" is most apparent on higher bands (20 and above), particularly when using a small antenna. See the "Board Modification" file for more detailed information on where these resistors should be placed!

[End of modification information for UI board version 0.3 and earlier.]

IMPORTANT NOTE: The referenced Mouser part numbers in Column G are believed to be correct, but should be double-checked before ordering!

Note on Header/Plug: Mouser parts are specified for separate header and plug (sockets) with the number of pins to be specified at the time of ordering. The Ebay supplier includes both the header and the plug, but if you order from Mouser, you must order each separately! *Remember to order extra pins to be used for the other headers!*

NOTES:

- C5/C6: Some versions of the UI board have incorrect silkscreen showing the INCORRECT POLARITY of C5/C6. **This has been corrected on UI Board version 0.3**

- Use U5 OR Y1, but not both. U5, Y1, C93, C94: The use of U5 is recommended, but Y1 will work just fine. If U5 is used you do not need to order or install Y1, C93, C94, R42, R43. If you do NOT use U5, install Y1, C93, C94, R42, R43 and you do NOT need to install or order R44, C95 or RFC3.

- Part specified for U5a is a low-dropout version necessary for proper regulation when powered from 5 volt source. It should be noted that an 8 volt source is available if a "non low-dropout" version of a 3.3 volt regulator is all that is available.

- For U4, either the STM32F405VGT6 or the STM32F407VGT6 may also be used in this project. The '407 is the same, except that it is slightly more expensive and it includes a few additional peripherals which are not needed.

Location information is to be used for board version 0.3 ONLY!

Measurements are referenced to the noted edge of the component. Example: 1cm right of J4 is 1cm from the right edge of J4; 1.5cm below U4 is 1.5cm below the bottom edge of U4

Version information:

Updated 20140815: Added Mouser part numbers for pushbuttons and headers/sockets.

Updated 20140816: Added Mouser part numbers for LEDs, minor annotations/corrections

Updated 20140817: Added note about Header/Plug, other minor corrections, updated designations for tantalum vs electrolytic capacitors, note about C5/C6 and silkscreen polarity markings on some boards.

Updated 20140913: Added location field for smaller components using larger components as references

Updated 20140917: Added modification parts/information for muting of TX modulator (U3a) and MCU power supply (U6), note on U5/Y1.

Updated 20141021: Added modification parts/information for LCD power supply filtering and additional MCU power supply notes, SDA/SCL resistors for "Tick" filtering.

Updated 20141024: Corrected Mouser part number for R42.

Updated 20141108: Added note clarifying C5/C6 markings being correct on UI board version 0.3.

Updated 20141115: Corrected location information for C36, C37; Added information about adding resistor in 8 volt line

Updated 20141120: Added note about U4 and the use of either the STM32F405VGT6 or the STM32F407VGT6.

Updated 20141208: Clarification of Y1, U5 and related components.

Updated 20150226: Added section for components added for UI board version 0.4. **NOTE:** Location information may not be correct for some parts for UI board version 0.4!

Updated 20150311: Added notes about U7 (serial EEPROM) for UI board version 0.4.

Updated 20150316: Misc. cleanup, formatting changes and clarifications.

Updated 20150414: Validated parts for specifically for Ver. 0.4 - updated obsolete Farnell reference for 10uF capacitor

Updated 20150622: Added clarification of what modifications/parts were needed for UI board <=0.3 versus 0.4.