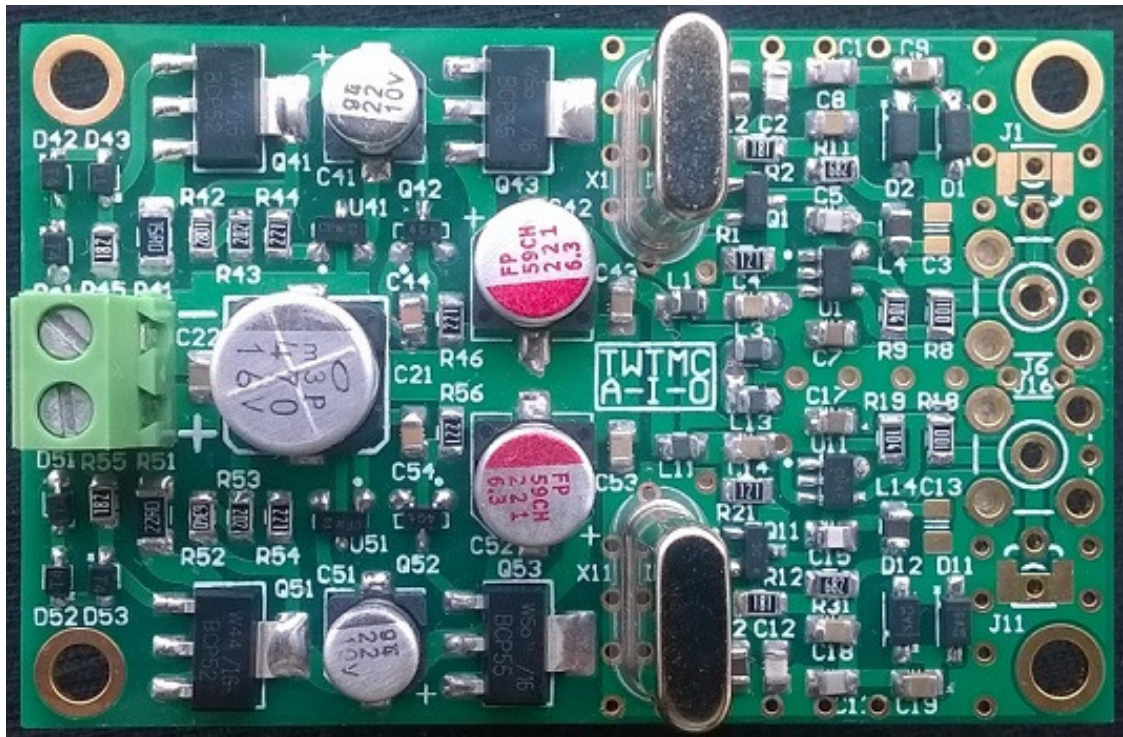
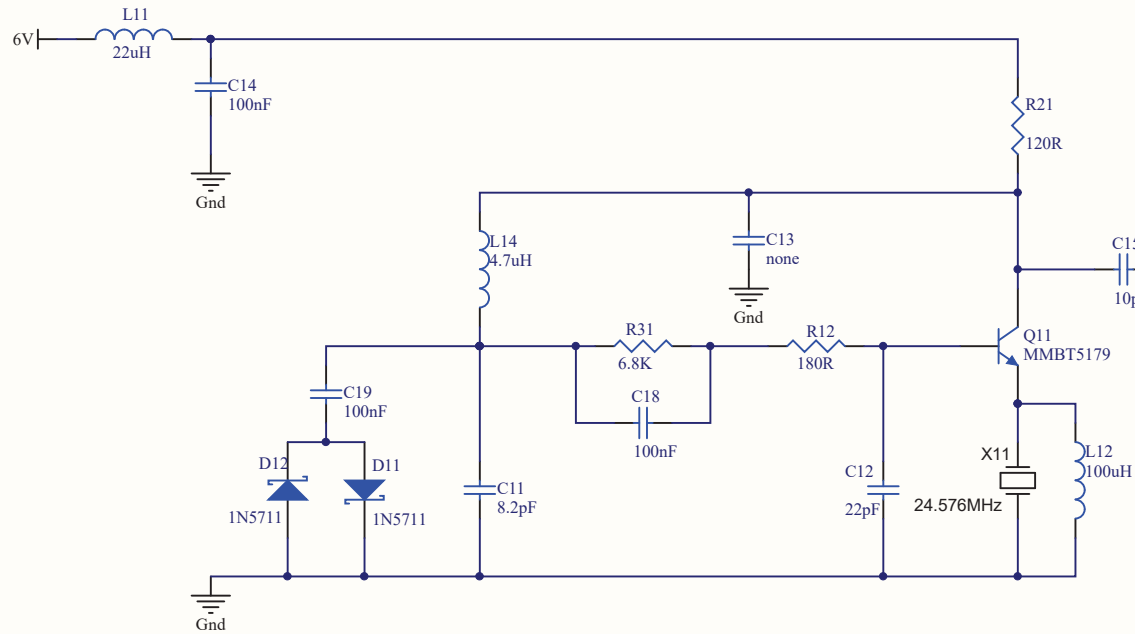
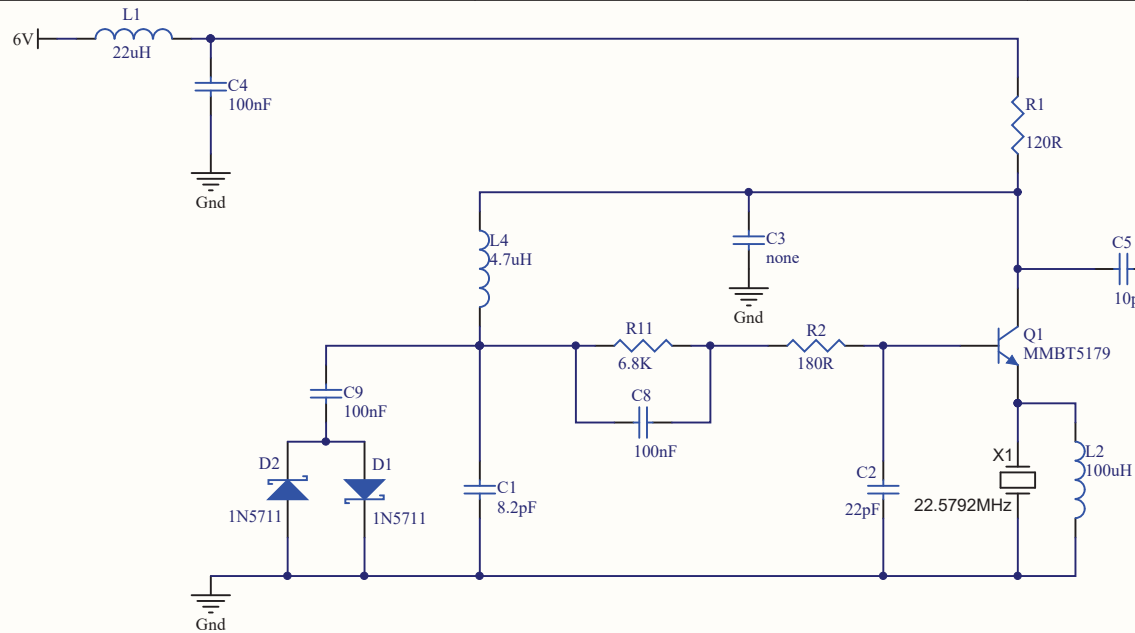


The Well Tempered Master Clock

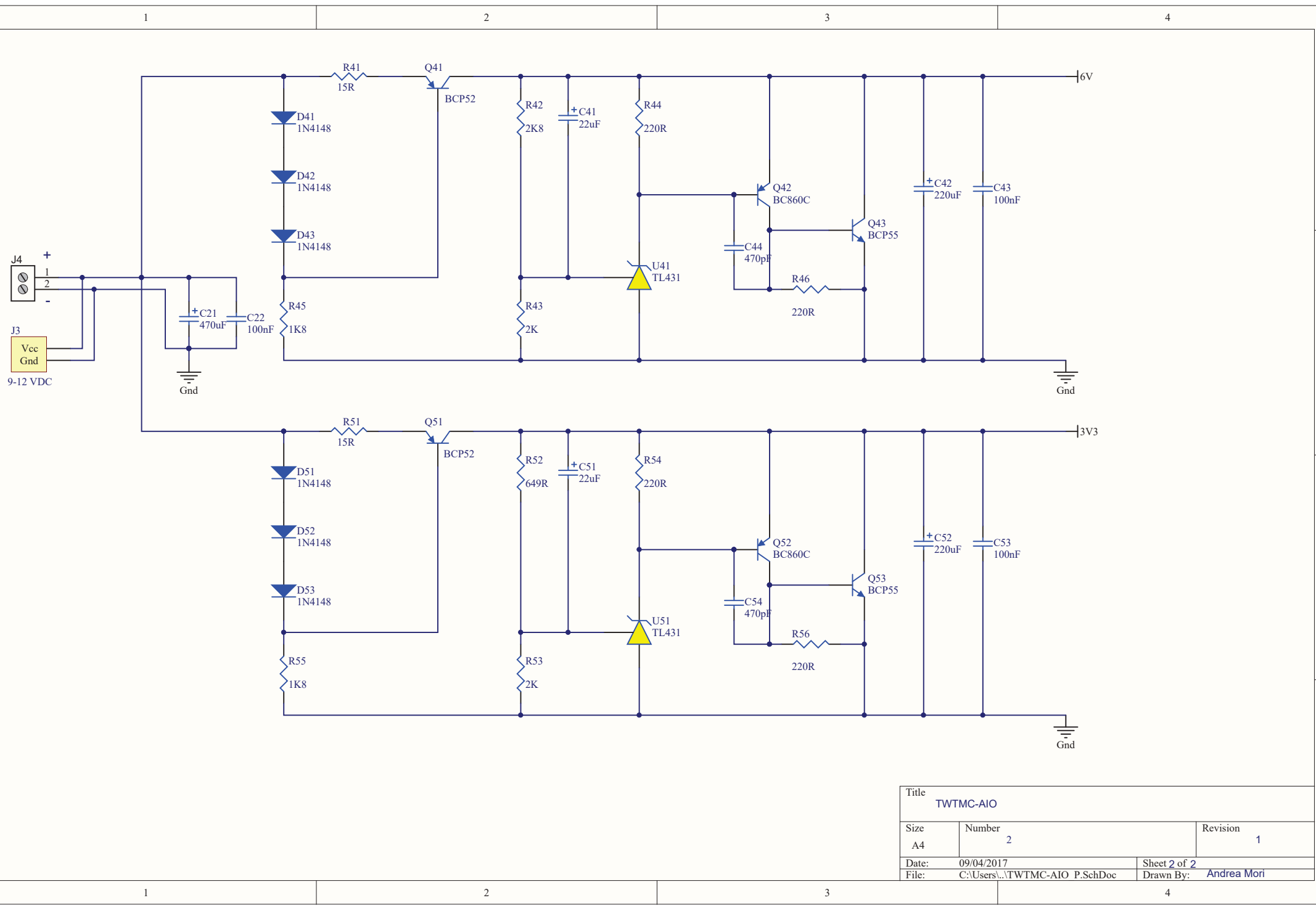
TWTMC-AIO



All in One Driscoll oscillator board

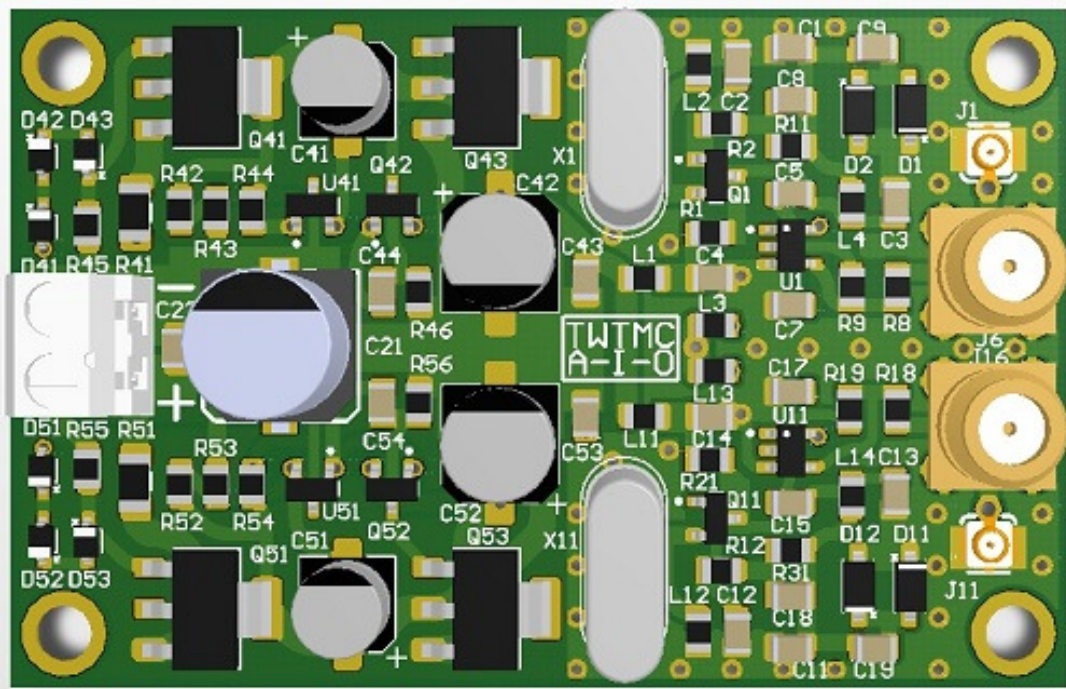


Title		
TWTMC-AIO		
Size	Number	Revision
A4	1	1
Date:	09/04/2017	Sheet 1 of 2
File:	C:\Users\...\TWTMC-AIO_O.SchDoc	Drawn By: Andrea Mori



Title		
TWTMC-AIO		
Size	Number	Revision
A4	2	1
Date:	09/04/2017	Sheet 2 of 2
File:	C:\Users\...\TWTMC-AIO P.SchDoc	Drawn By: Andrea Mori

PCB layout



BOM

Label	Item	Pkg.	Manufacturer	Manufacturer part	Supplier	Supplier part	Q.ty	Note
C1 C11	8.2 pF NP0 50VDC	0805	Vishay	VJ0805A8R2BXAPW1BC	Mouser	77-VJ0805A8R2BXAPBC	2	
C2 C12	22 pF NP0 50VDC	0805	Kemet	C0805C220J5GACTU	Mouser	80-C0805C220J5G	2	
C4 C8 C9 C14 C18 C19 C22 C43 C53	100 nF X7R 25VDC	0805	Kemet	C0805C104K3RACTU	Mouser	80-C0805C104K3R	9	
C5 C15	10 pF NP0 50VDC	0805	Kemet	C0805C100J5GACTU	Mouser	80-C0805C100J5G	2	
C7 C17	1 uF X7R 16VDC	0805	Murata	GRM21BR71C105KA01L	Mouser	81-GRM40X105K16L	2	
C41 C51	22 uF 16V	5Dx5.4H	Nichicon	UWX1A220MCL1GB	Mouser	647-UWX1A220MCL1	2	
C42 C52	220 uF 6V3 polymer Low ESR	6.3Dx7.7H	Nichicon	RSB0J221MCN1GS	Mouser	647-RSB0J221MCN1GS	2	
C44 C54	470 pF X7R 50VDC	0805	Vishay	VJ0805Y471JXAPW1BC	Mouser	77-VJ0805Y471JXAPBC	2	
C21	470 uF 16VDC	8Dx10H	Nichicon	647-UWT1C471MNL1S	Mouser	UWT1C471MNL1GS	1	
R1 R21	120R 1/10W	0805	Susumu	RR1220P-121-D	Mouser	754-RR1220P-121D	2	
R2 R12	180R 1/10W	0805	Susumu	RR1220P-181-D	Mouser	754-RR1220P-181D	2	
R8 R18	10R 1/10W	0805	Susumu	RR1220Q-100-D	Mouser	754-RR1220Q-100D	2	
R9 R19	100K 1/10W	0805	Susumu	RR1220P-104-D	Mouser	754-RR1220P-104D	2	
R11 R31	6K8 1/10W	0805	Susumu	RR1220P-682-D	Mouser	754-RR1220P-682D	2	
R41 R51	15R 1/4W	1206	Yageo	RT1206FRE0715RL	Mouser	603-RT1206FRE0715RL	2	
R42	2K8 1/10W	0805	Susumu	RR1220P-2801-D-M	Mouser	754-RR1220P-2801D-M	1	
R43 R53	2K 1/10W	0805	Susumu	RR1220P-202-D	Mouser	754-RR1220P-202D	2	
R44 R46 R54 R56	220R 1/10W	0805	Susumu	RR1220P-221-D	Mouser	754-RR1220P-221D	4	
R45 R55	1K8 1/10W	0805	Susumu	RR1220P-182-D	Mouser	754-RR1220P-182D	2	
R52	634R/10W	0805	Susumu	RR1220P-6340-D-M	Mouser	754-RR1220P-6340D-M	1	
D1 D2 D11 D12	1N5711	SOD-123	Diodes	1N5711W-7-F	Mouser	621-1N5711W-F	4	
D41 D42 D43 D51 D52 D53	1N4148	SOD-323	Micro	1N4148WX-TP	Mouser	833-1N4148WX-TP	6	
Q1 Q11	MMBT5179	SOT-23	Fairchild	MMBT5179	Mouser	512-MMBT5179	2	
Q41 Q51	BCP52	SOT-223	NXP	BCP52-16,115	Mouser	771-BCP52-16115	2	
Q42 Q52	BC860C	SOT-23	NXP	BC860CW,115	Mouser	771-BC860CW-T/R	2	
Q43 Q53	BCP55	SOT-223	NXP	BCP55-16,115	Mouser	771-BCP55-16115	2	

L1 L3 L11 L13	22 uH 670mO 100mA	0805	TDK	MLZ2012N220LT000	Mouser	810- MLZ2012N220LT000	4	
L2 L12	100 uH 40 50mA	0805	Taiyo	LBR2012T101K	Mouser	963-LBR2012T101K	2	
L4 L14	4.7 uH 240 mO 200mA	0805	Tayo	LBR2012T4R7M	Mouser	963-LBR2012T4R7M	2	
U1 U11	74LVCU04	SOT-23-5	TI	SN74LVC1GU04DBVR	Mouser	595- SN74LVC1GU04DBVR	2	
U41 U51	TL431	SOT-23	NXP	TL431AQDBZR,215	Mouser	771-TL431AQDBZR215	2	
X1	22.5792 MHz	HC49/U	TFC	Custom	TFC	Custom	1	
X11	24.576 MHz	HC49/U	TFC	Custom	TFC	Custom	1	
	Crystal insulator		Bivar	CI-192-028	Mouser	749-CI-192-028	2	
J1 J11	output connectors							(1) u.fl or pin strip
J6 J16	output connectors							(1) SMA
J3 J4	PS connector							(2) power supply

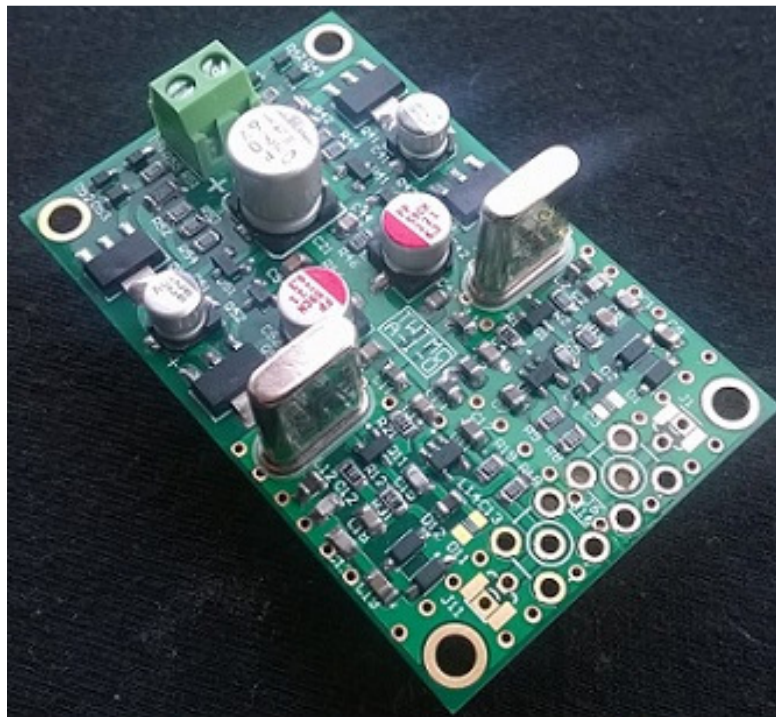
(1)

u.fl. Output	u.fl. Connector		Hirose	U.FL-R-SMT(10)	Mouser	798-U.FL-R-SMT10	2	Use only one of the 3 options
Pin Output	2 pin header		AMP	826646-2	Mouser	571-826646-2	2	
SMA Output	SMA connector		Molex	73391-0070	Mouser	538-73391-0070	2	

(15)

screw	2 Pole screw	7.62x7.3H8. 5	FCI	20020327-D021B01LF	Mouser	649-220327-D021B01LF	1	Use only one of the 2 options
Pin strip	2 pin header		AMP	826646-2	Mouser	571-826646-2	1	

Assembly guide



The TWTMC-AIO is a dual Driscoll crystal oscillator suitable for digital audio with power supply on-board.

The TWTMC All in One is supplied as a finished device or as a bare PCB board.

The finished board is only available for two fixed frequencies: 22.5792 MHz and 24.576 MHz. The board is supplied with Laptech HC-43/U AT-Cut crystals. Power supply and output connectors are not provided.

The bare board can accommodate fundamental and overtone AT-Cut and SC-Cut crystals and can be used for frequencies from 5 MHz up to 100 MHz.

It needs 1 external power supply: unregulated or pre-regulated 9 to 12 VDC. Two connector options are provided for power supply: header screw terminal block or pin strip.

Output voltage is fixed at 3V3. Duty cycle is fixed at 50%.

The board provides 2 outputs, one for each frequency, with different connectors: SMA, u.fl or pin strip.

Finished board

The output connectors have to be chosen within 3 possible options, see BOM. Optionally the finished board can be supplied with soldered output connectors.

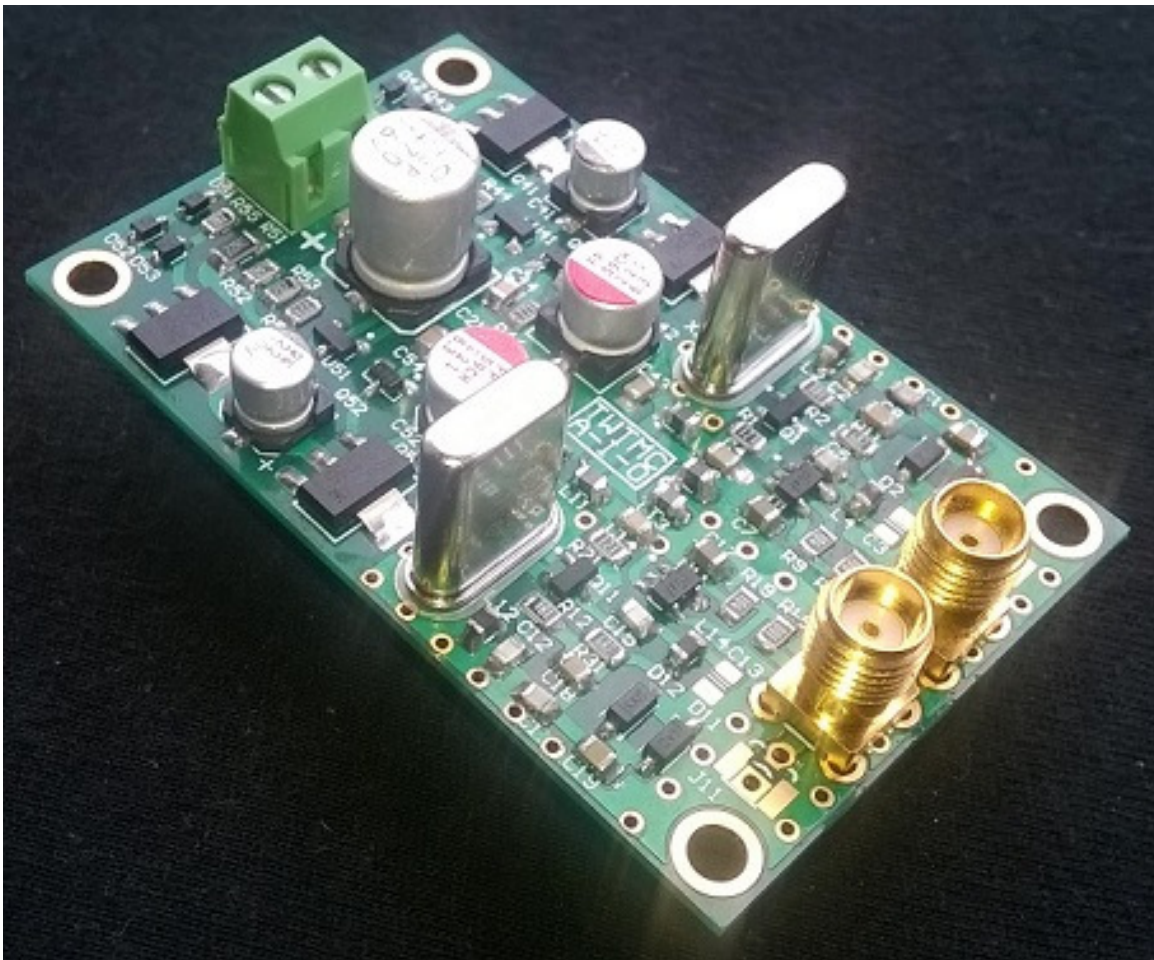
The power supply connector have to be chosen within 2 possible options, see BOM. Optionally the finished board can be supplied with soldered power supply connector.

Bare board

The components value indicated in the BOM are for 22.5792/24.576 MHz oscillators. If you are planning to build the oscillators for different frequencies, please see TWTMC-D Assembly manual for components value.

Resistors R11 and R31 have to be chosen to get around 3V between the collector of Q1/Q11 and ground. Firstly solder a 50K trimmer resistor in place of the resistors and adjust it to get the right voltage value. Then remove the trimmer resistor, measure its resistance and replace it with suitable resistors (the closest value as possible).

Finished board



Bare board

