

CW-TX-136R 136kHz CW Transmitter Kit Manual

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This is an easy kit of 136kHz CW transmitter. When used with the USB synthesizer kit supplied by QR2000 group, you can vary tx frequency.

The schematics are on the last pages of this manual.

Specifications

TX Frequency: fixed at 136.5kHz ($8.736\text{MHz} \div 64$)

Output Power: about 2wattws (@ DC 12V)

Operational Voltages: DC 9 to 13.8V



Notes:

In this picture, the RX connector used is a BNC, but the actually the one supplied is an RCA type to avoid possible wrong connection.

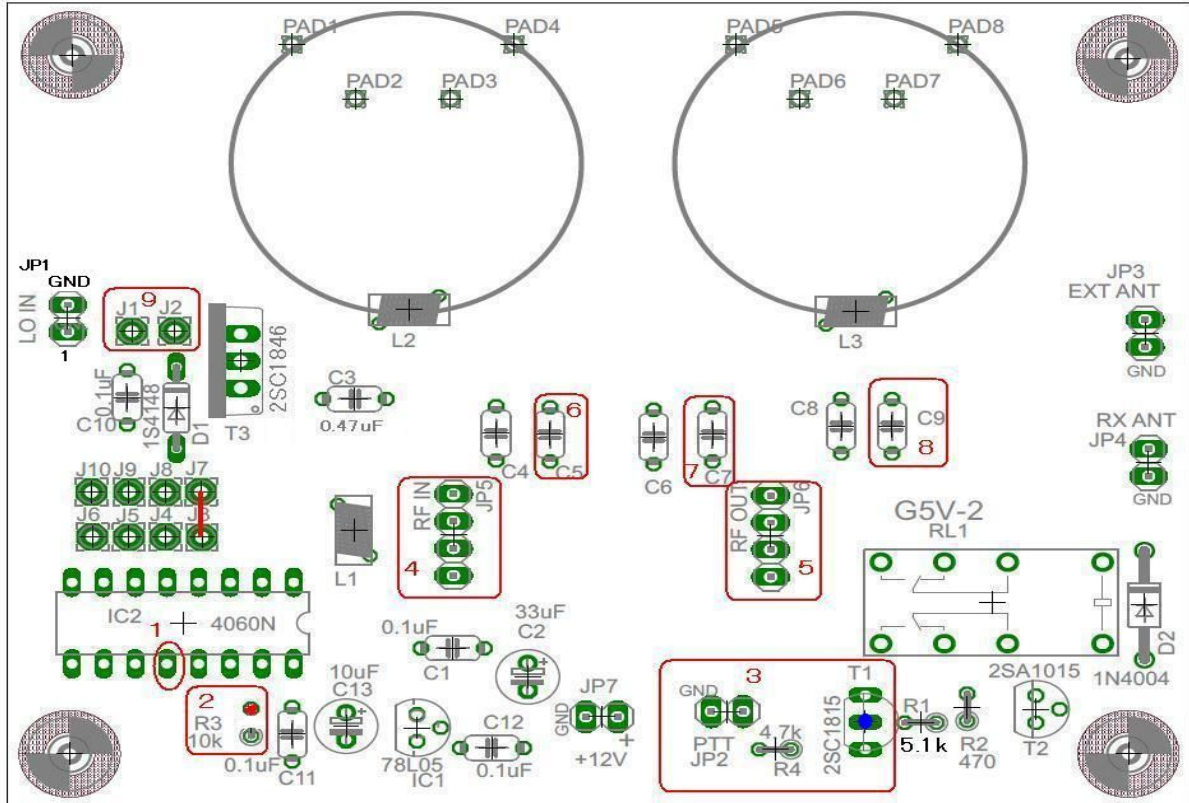
Either enclosure or LED light is NOT supplied along with this kit.

Parts Lists

Symbol	Value	Name	Remarks
C1	0.1uF	ceramic cap	
C2	33uF	electrolytic cap	
C3	0.47uF	ceramic cap	
C4	0.022uF	ceramic cap	
C5			Not used
C6	0.047uF	ceramic cap	
C7			Not used
C8	0.022uF	ceramic cap	
C9			Not used
C10	0.1uF	ceramic cap	
C11	0.1uF	ceramic cap	
C12	0.1uF	ceramic cap	
C13	10uF	electrolytic cap	
D1	1N4148	diode	
D2	1N4004	diode	1N4003 or 4002 may be supplied
R1	.1k Ω	resistor	
R2	470 Ω	resistor	
R3	10k Ω	resistor	Do NOT install as per symbol mark on board. See the assembly note
R4	4.7k Ω	resistor	Not used
IC1	78L05	3-term regulator	For DC 5V output
IC2	74HC4060	Division IC	
T1	2SC1815	transistor	Not used
T2	2SA1015	transistor	
T3	2SC1846	Power transistor	Heat sink, thermal seat provided
L1	2mH	RFC	
L2	58uH	FT82-61	0.4mm ϕ UEW, 27 turns, abt 70cm
L3	58uH	FT82-61	0.4mm ϕ UEW, 27 turns, abt 70cm
IC Sockets	2 pcs	DIP8, DIP16	To install OSC and IC
RL1	G5V-2	Relay	Operates at DC 12V
OSC		8.736MHz	To get 136.5kHz with a 64 division
BNC	1 pc	BNC connector, female	To connect with TX antenna
RCA	1 pc	RCA, female	To connect to RX
PWR	1 set	Power jack and plug	2.1mm dia
STP	1 pc	3.5mm dia stereo plug	To connect with CW keyer
Fuse	1 pc	1 Amp elec. fuse	
SW	1 pc	3C power switch	Power line ON/OFF

Start Assembly

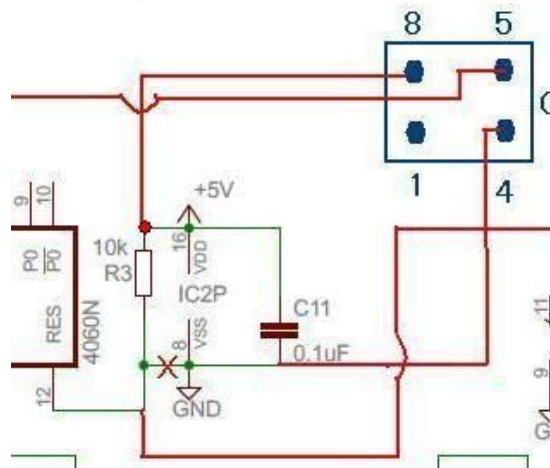
You need to make some changes from the original design. The last two pages of this manual show the original circuitry first and the the modified circuitry (for this CW-TX-136R) last. Please go through carefully and then, you can go ahead with the assembly.



Important Points to be changed from the original:

1.

The PCB print shows connection to ground for Pin 12 of IC2 74HC4060. Actually, you need to install the DIP16 socket first. **Bend up Pin 12** only of 74HC4060 and then insert the IC into the socket. Directly solder the one lead of 10k Ω to the afloat Pin 12.



2.

Do not insert the leads of 10k Ω to the original R3 holes directly. As described above, the one lead of 10k Ω must be soldered to the afloat Pin 12 of 74HC4060, and the other to the upper hole (marked red circled in above figure) of R3 and Pin 8 of the DIP8 socket for OSC respectively. Connect Pin 4 of the DIP8 socket for OSC to the lower hole of R3 as ground.

3.

The parts shown in the red rectangular should not be installed. The collector hole (marked blue circled) of T1 2SC1815 must be connected to the afloat Pin 12 of 74HC4060.

4.5.6.7.8.9.

Not used.

How to install OSC:

You need to use the DIP8 IC socket to mount the OSC. There are no mount holes provided on the PCB. You can mount it afloat above the PCB or through a 3-contact jack (not provided along with this kit). If such a jack is provided, you can connect with the USB synthesizer or any other DDS through the jack.

Pin 1: not used

Pin 4: Connect to GND. (Use either the lower hole of R3 or the emitter hole of T1 2SC1815.

Pin 5: Connect to Pin 1 of JP1. (to provide signal to the IC)

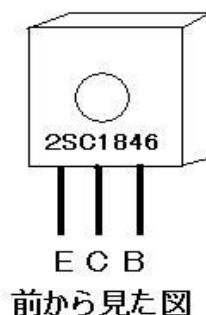
Pin 8: Connect to the upper hole of R3 (to provide +DC 5V)

CW Key

This transmitter will transmit when the Pin 12 of 74HC4060 becomes grounded. Please wire to the CW key jack so that the key should get grounded when to transmit.

2SC1846 Power Transistor

Before soldering, please make sure to mount the power transistor with the heat sink and make adjustments of the leads so that the heat sink does NOT get troubles with the enclosure you are going to use. You should also use the thermal seat.



2SC1846 seen from the front

74HC4060 Multiplier Settings

This transmitter will use a 64-division. Please set the jumper between J3 and J7.

Jumper Pins	Division Multiplier
J6-J10	16x
J4-J8	32x
J3-J7	64x
J5-J9	128x

Coils for LPF

Wind 27 turns through FT82-61. Use the supplied UEW wire (0.4mm dia). You can fix the core to the PCB using a nonmetallic wire through PAD 1-8 holes or can use hot bond instead.

How to Calculate tx Frequency

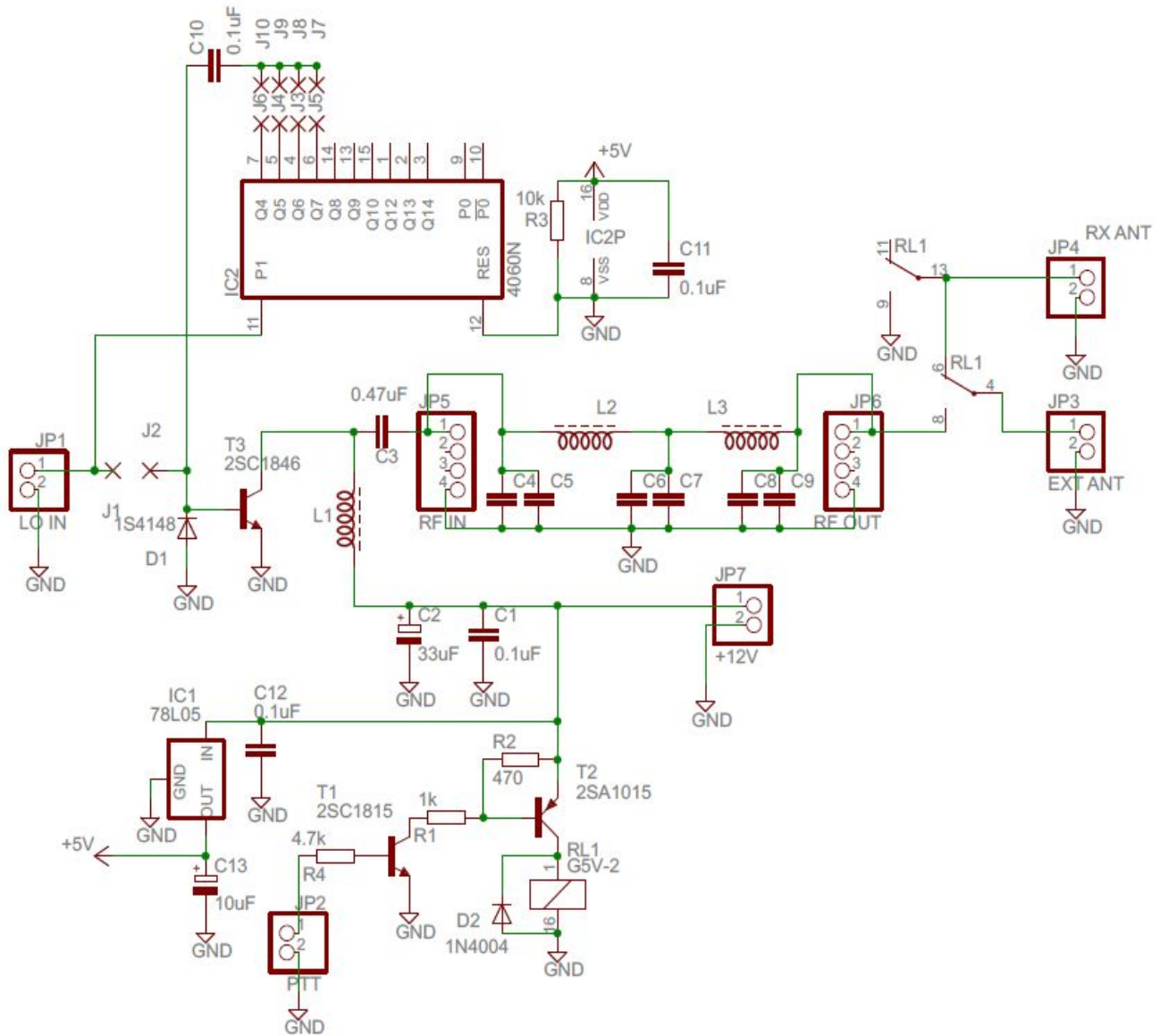
When you use a different OSC or USB synthesizer, you can calculate transmit frequency with the following equation:

$$\text{OSC freq} \div 64 = \text{tx Freq}$$

Test for Transmission

Once the assembly is complete, please make sure there are no wrong connections. Connect the transmitter with a tx antenna or dummy load and the DC power supply. Key down the CW key, and you will get the signal at 136.5kHz with about 2watts output.

Original Circuitry



Actual Circuitry of CW-TX-136R

(CW \dashv stands for CW Key)

