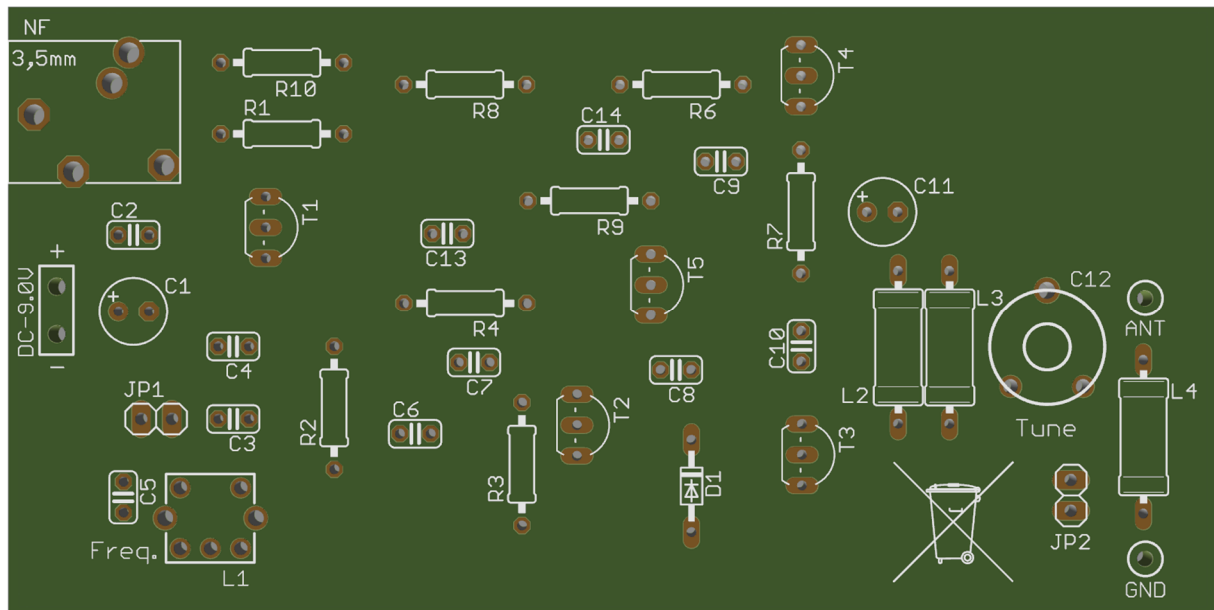


Medium-Wave Transmitter 1.5



Parts list:

Resistors	Capacitors	Semiconductors	Others
R1 = 100K Ω (br, blk, y)	C1 = 100 μ F	T1 = BC547C	D1 = 1N4148
R2 = 1K Ω (br, blk, r)	C2 = 100nF (104)	T2 = BC547C	NF = audio input jack
R3 = 100K Ω (br, blk, y)	C3 = 470pF (471)	T3 = BC546B	L1 = 100 μ H Tunable coil
R4 = 1K Ω (br, blk, r)	C4 = 270pF (271)	T4 = BC547C	L2 = 100 μ H (br, blk, br, gld)
R6 = 220K Ω (r, r, y)	C5 = 47pF (47)	T5 = BC547C	L3 = 220 μ H (r, r, br, gld)
R7 = 220 Ω (r, r, br)	C6 = 330pF (331)		L4 = 470 μ H (b, gry, br, gld)
R8 = 4,7K Ω (y, v, r)	C7 = 100pF (101)		ANT = 1.5m cable
R9 = 470K Ω (y, v, y)	C8 = 100nF (104)		GND = 1.5m cable
R10 = 1.2K Ω (br, r, r)	C9 = 100nF (104)		9V battery clip
	C10 = 100nF (104)		JP1 = 2x1 pin header, jumper
	C11 = 100 μ F		JP2 = 2x1 pin header, jumper
	C12 = 90pF Trimm Cap.		
	C13 = 100nF (104)		
	C14 = 1nF (102)		

Note: L2 and L3 should be soldered side by side as close as possible to each other

Technical specifications:

Operating voltage:	9VDC
Current consumption:	approx. 25mA
Transmitting frequency:	1200-1620KHz *
Transmission range:	5 ... 100m (depending on the receiver used)

Description:

Thank you for purchasing this Medium Wave Transmitter kit. By choosing this kit, you have chosen a high quality product that you will surely enjoy. The construction is very simple, just install the components according to the following table in the board. Then cut the 5 foot long antenna wire in half by folding it end to end, and cutting at the bend. Strip one end of each wire. Solder 1 wire at "ANT" and the other at "GND". The Transmitter antenna is ideally stretched straight, like a dipole. It may be attached to the wall with tape or pins. Alternatively, the "GND" wire (HF counterpoise) can be laid horizontally along the ground, and grounded by attaching it to the screw on a power socket (not into the holes for the AC plug), a heating pipe, a water pipe, etc. Grounding in this way will usually result in a stronger signal that can be heard at a greater distance. When grounding is not possible, the Transmitter can be used without connecting the ground wire. Both wires can be stretched out in opposite directions, either horizontally or vertically. A jumper should be attached at "JP2" to short coil "L4" for stationary operation with the counterpoise grounded. For portable operation (without grounding), coil "L4" will not be bridged.

Upon completion of the assembly, clean the solder connections with flux remover, and be sure there are no cold solder joints. Review all components on the list above, and be sure that each component is in the correct location on the board.

Commissioning the Transmitter:

Search your radio receiver for a unused frequency between 1200 and 1620kHz. Once you have decided on a frequency, Extend the radio's telescoping antenna fully to guarantee no other stations are on the frequency you choose. Return the radio's antenna to its original length. Prevent overloading the receiver, and hearing low level spurious emissions from the Transmitter, by placing the radio at least 5 feet from the Transmitter. Set the radio to a comfortable volume, rushing noise should be clearly audible. Next, you will put the Transmitter into operation. First, however, we refer you to the legal operation of low power Transmitters*.

Connect a 9V battery, or plug-in power supply, to the Transmitter. The Transmitter will immediately begin to send. Next, using a non-conductive plastic screwdriver, gently turn the core of coil L1 until the noise on the radio disappears, indicating the presence of the AM carrier from the Transmitter. If this does not occur, check that the jumpers are in the correct positions for the frequency and the antenna configuration you are using. The Transmitter and receiver should be tuned to the same frequency. Note that when there is no jumper at "JP1" the Transmitter broadcasts in the range of 1400 to 1620kHz. If you attach a jumper to "JP1", the transmission range shifts down by approx. 200kHz (1200-1400kHz). After adjusting the Transmitter so that the noise on the radio has disappeared, you can inject an audio signal at the 3.5mm jack NF on the upper left corner of the circuit board. Note, however, that signal is applied to both the tip and ring on the stereo (TRS) jack. The Shield is used for ground. The audio program should be heard on the radio. If the Transmitter antenna is not properly adjusted, the sound reproduction may be quiet and distorted. The Transmitter antenna should be adjusted, as described in the next section, to achieve good sound quality.

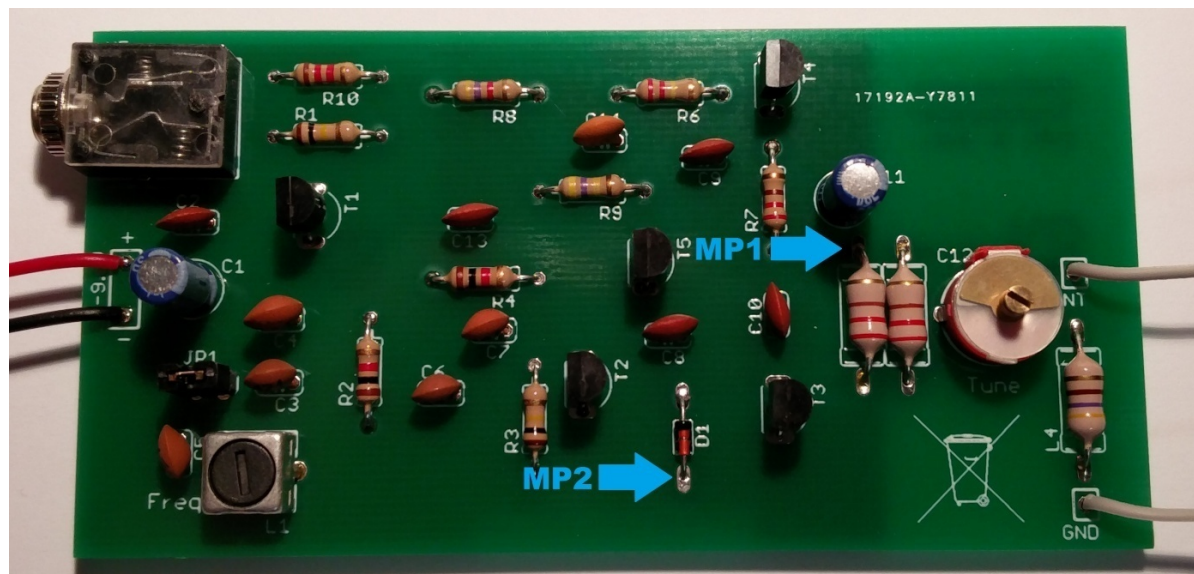
* Due to component tolerances, the frequency range may vary slightly.

Antenna Adjustment:

Ideally, the Transmitter antenna is matched with a voltmeter. Most multimeters have a DC voltage measuring range. So set the multimeter to the 10V range. or even the 20V range should be ok. Next connect the negative pole of the measuring instrument to Test Point "MP2" (Alternatively, you can use the metal housing of coil L1). The + lead of the multimeter is connected to Test Point "MP1". You can use alligator clips to connect the meter to the Test Points.

Turn the Transmitter on. Using a small (preferably plastic) screwdriver Turn the slotted brass shaft on the top of the "Tune" trim capacitor. Observe the voltage display of the measuring device. Turn the trim capacitor until the lowest voltage is reached. This occurs when the antenna is best balanced. Note that touching the trim capacitor with a metal screwdriver will change the tuning of the dipole. If you must use a metal screwdriver, you will have to compensate for the added capacitance of the screwdriver. Turn the capacitor so that the voltage does not quite reach its minimum value. Then remove the screwdriver. Adjust the capacitor again, in the same direction past the minimum voltage, so that the voltage drops again. A reading of approximately $3V \pm 20\%$ will be near the correct value. Ideally you should use a balance tool made of non-conductive plastic, so tuning to minimum voltage is all that is necessary. Some Black Plastic tuning tools are actually conductive. Generally they are so marked. They will change the frequency in a manner similar to metal screwdrivers, and will affect the tuning. Other color plastic alignment tools are usually not conductive. Most any thin piece of plastic will work if it is strong enough to turn the shaft of the capacitor.

If you don't have a voltmeter, you can still tune the Transmitters' antenna to your radio. For this purpose, place the radio in about 1m away from the transmitting antenna. Then set receiver to a clear frequency. Tune the Transmitter to a frequency close to the radio frequency. The ideal Transmitter frequency is close enough to just reduce the noise a little. Finally, adjust trim capacitor "Tune" for minimum noise.



Additional Information:

Any plug-in power supply used with the Transmitter must have a regulated 9V output. Many simple 9V power supplies are unregulated, and often provide a higher output voltage under low loads like the Transmitter uses. The voltage may be as high as 11V. The Transmitter can still be operated with this voltage, but do not use a "stronger" power supply than one with the inscription 9V DC. If hum is present in the transmission, reposition your receiver, Transmitter antenna or counterpoise. If this does not solve the problem, the power supply may be poorly "filtered". It really is best to purchase a regulated 9v supply that does not cause hum in the Transmitter output.

However, If you are experienced in building electronic circuits, you may wish to purchase a 1000Uf/25V electrolytic capacitor, or find one in your spare parts box. Connect across to the 9V input pads on the back of the Transmitter circuit board. Be sure to connect the "+" terminal on the capacitor to the +9V connection on the back of the Transmitter board. Connect the other capacitor lead to the "-" connection on the back of Transmitter board. Be careful to use heavy insulation so you do not short the case of the Capacitor to the sharp connections on the back of the board.