

MINI FM PHONE TRANSMITTER KIT

Description:

This is a subminiature FM telephone transmitter capable of transmitting both sides of a telephone conversation to most any FM receiver up to 1/4 mile away. When properly installed, it has no noticeable effect on the operation of the telephone and is virtually impossible to detect. Powered by the telephone line, the XPB 1 requires no batteries and only transmits when the phone is in use.

features:

- Adjustable from 88 to 108 MHz.
- Hear both sides of telephone conversation.
- Attach to any phone line in your house.
- Use with any FM receiver.
- No batteries required, powered by phone line.
- Super-miniature, measures only 1.1 by .75 inches.



INTRODUCTION

These days there are many ways to transmit from a telephone line, but this small transmitter is probably the easiest to build and the simplest to use. When properly installed, it has no noticeable effect on the operation of the telephone line and is virtually impossible to detect. The operational power is supplied by the telephone line and only transmits when the phone line is in use. This will allow it to be left unattended for any length of time because no batteries are required.

The circuit is easily installed by connecting it in series with the telephone line at any point. Any FM receiver can be used to receive both sides of the telephone conversation.

IMPORTANT

It is important to note that it is strictly illegal to use this device to eavesdrop on telephone conversations unless authorized by all parties of the conversation.

CIRCUIT DESCRIPTION

As shown in the schematic diagram, the circuit contains a diode bridge made up of diodes Q1, Q2, Q3, and Q4 to rectify the AC voltage that appears on any phone line when it is in use. The Circuit is installed by breaking one side of a telephone line (either a green or red wire) at any point and connecting the two hook up wires from the circuit to the two ends of the broken line. The polarity of the connection is not important since the diode bridge forms a full wave rectifier that correctly feeds the proper polarity to the rest of circuitry. The rectified voltage powers the transmitter section formed by Q1. This voltage varies in accordance with the voice signals being transmitted over the line, A 150 Ohm resistor, R1, is connected so that it completes the telephone circuit and normal operation of the telephone line is maintained. The impedance of most telephone circuits is much higher than 150 Ohms so the circuit is virtually undetectable. The transmitter section of the circuitry consists of transistor,

Q1, connected to the oscillator with C2, C3, and L2 forming the tuned circuit that determines the transmitted frequency. The collector and base of Q1 are connected to each end of the tuned circuit with the feedback provided by the connection of the emitter to the junction of C2 and C3. Due to the high gain of the transistor, the feedback causes it to oscillate at a frequency determined by the tuned circuit. As stated before, the DC voltage powering Q1 varies according to the voice signals carried on the phone line. These variations cause the output frequency to vary producing Frequency Modulation (FM) that is easily received by any FM receiver tuned to the output frequency.

PARTS LIST

Check the contents of your kit against the following parts list. Check off each part as you proceed, If your are missing any parts, please accept our apology and contact us and we will send you a replacement right away

<u>Desig.</u>	<u>Description</u>	<u>Quan.</u>
R1	150 Ohm 1/4W Resistor (Brn-Grn-Brn)	1
R2	10K Ohm 1/4W Resistor (Brn-Blk-Orn)	1
R3	4.7 K Ohm 1/4W Resistor (Yel-Vio-Red)	1
C1	5-60 pF Miniature Trim Cap (Green Marking)	1
C2,C3	27 pF Ceramic Disc Cap	2
L1	2.2 uH Inductor	1
L2	Air Wound Coil (SeeText)	1
Q1	PN2222, Silicone NPN Transistor	1
Q1,Q2,Q3,Q4	1N4148, Silicone Switching Diode	4
Circuit Board		1
Antenna Wire		1

ASSEMBLY INSTRUCTIONS

Follow the instructions carefully. Read each step thoroughly before you proceed with the operation. Each part used in the assembly has an associated component number (R2, C3, etc.) called a designator. These numbers appear in several places in the manual and should be used whenever possible. This will make the task of following the instructions as easy as possible.

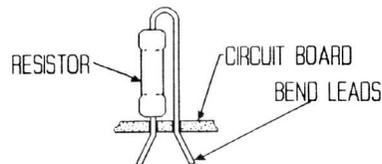
Soldering - Soldering is one of the most important operations you will perform while assembling this project. A good solder joint forms an electrical connection between the parts, such as the component lead and

the circuit track. A poor solder connection can cause the unit to work poorly or not at all. It is easy to make a good solder joint if you follow a few simple rules:

- Use the right type of soldering iron. A 22 to 25 watt pencil type with a fine tip will work best.
- Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth. Apply solder to the tip to give it a wet look. This is called tinning the soldering iron tip. If the solder tends to "ball up" or not stick to the tip, it needs to be cleaned and tinned again. Turn the iron off, let it cool and then file or sandpaper the tip to clean it before attempting to tin it again.
- Always use rosin core, radio-type solder (60:40 tin lead content) for all the soldering on this unit. The use of any other type of solder (acid core, paste solder, etc.) will void your warranty and we will not service your unit

Parts Placement - Position all parts as shown in the assembly diagram of Figure 2. Install all parts and wires on the side of the circuit board opposite the circuit tracks. Keep all leads as short as possible.

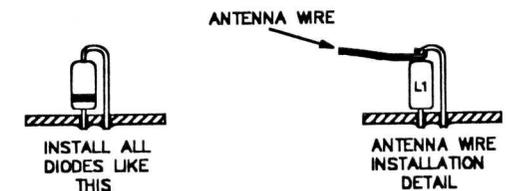
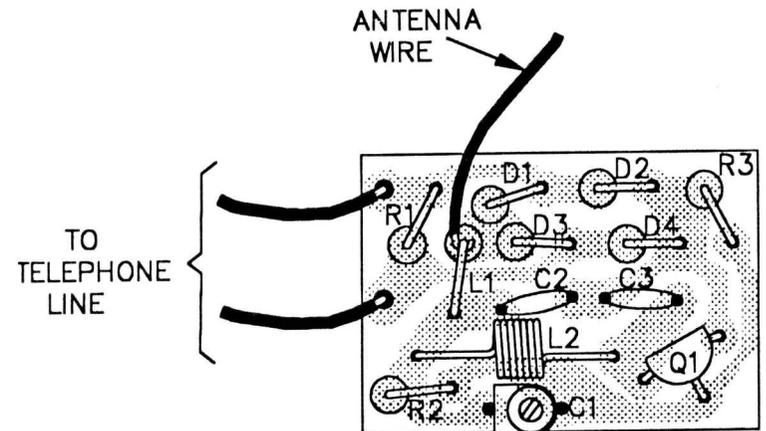
Resistors - Form the resistor leads as shown so they fit the circuit board. Install each resistor on the side of the circuit board opposite the circuit track as shown. Press it against the circuit board and bend the leads outward slightly to hold it in place. Solder the resistor in place as follows: Hold the soldering iron tip against the lead and the circuit track. Apply solder to the lead on the side opposite the soldering iron tip. As the solder begins to melt, allow it to flow around the connection. Remove the solder and the iron from the connection and cut off the excess leads. Check the connection. It should appear smooth and shiny. Using this method, install all of the resistors as shown in the assembly diagram. Check them off when you finish:



() R1 () R2 () R3

Capacitors - Install the variable capacitor, C1, on the component side of the circuit board and solder as shown in the assembly diagram. Clip off the excess leads and check off C1 when you finish:

() C1

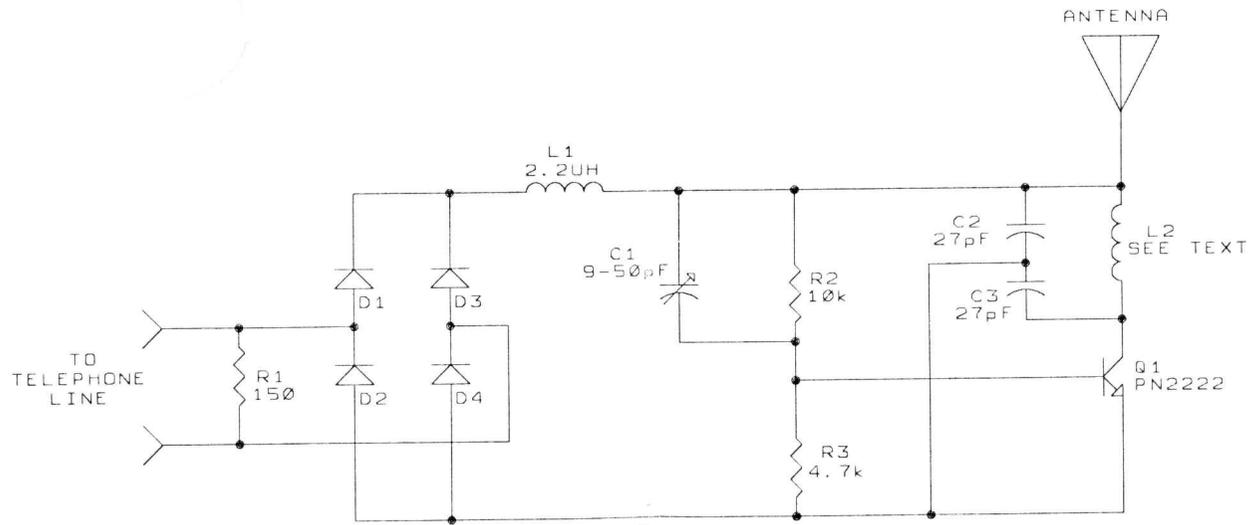


ASSEMBLY DIAGRAM

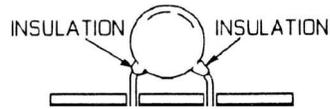
SAFETY WARNING! Avoid Eye injury when cutting component leads. Hold the board so that the clippings do not fly toward your eyes.

NOTES:

- 1) ALL RESISTORS IN OHMS UNLESS OTHERWISE STATED.
- 2) ALL CAPACITORS IN μF UNLESS OTHERWISE STATED.
- 3) L2 IS R TURNS OF NO. 22 MAGNET ON A 5/32 DRILL BIT.

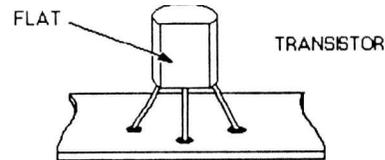


Install the ceramic disc capacitors, as shown in the assembly diagram, on the component side of the circuit board (opposite the circuit track). Solder each capacitor in place and clip off the excess leads. Check them off when you finish:



()C2 ()C3

Transistors - Install the transistor as shown in the Assembly Diagram. Solder and clip off the excess leads and check off Q1 when you finish:



()Q1

Diodes - Install the diodes, D1 through D4, as shown in the Assembly Diagram. Be sure and position them with the ink band toward the circuit board as shown. Solder and clip off the excess leads. Check them off when you finish:



()D1 ()D2 ()D3 ()D4

Inductors - Install L1 as shown in the Assembly Diagram, similar to the way the resistors were installed. Check off L1 when you finish:

()L1

If it is not already formed, form L2 by wrapping six (6) turns of No. 22 enameled magnet wire on a 5/32 drill bit. Strip and tin (pre-solder) the ends of the coil. Install the coil on the component side of the circuit board, as shown in the Assembly Diagram. Solder and clip off the excess leads. Check off L2 when you finish:

()L2

Antenna lead - Strip the end of the antenna lead and wrap it (one turn) around the lead of L1 away from the circuit board and solder it in place, as shown in the assembly diagram. CAUTION! Don't make the antenna any longer than is required to meet the range requirements you need. The longest range achieved is with an antenna that is one quarter the wave length (approximately 30 inches). If your antenna is made too

long, you may exceed the maximum output power for the transmitter. This can cause the transmitter to stop oscillating. Solder the antenna wire and clip off the excess lead. Check off when you finish:

()Antenna

Telephone Leads - Insert the telephone leads on the component side of the circuit board as shown in the assembly diagram. Solder and clip off the excess leads. Check off when you finish:

()Telephone Leads

CIRCUIT CHECKOUT

Double check all circuitry for proper assembly and short circuits. Check and make sure the transistor is correctly installed in the proper location with the proper orientation. Check each resistor and make sure the resistor values are properly located.

Connect a 6 volt lantern battery to the hook up wires (telephone leads). DON'T worry about positive (+) or negative (-), the circuit has no polarity. Set a nearby FM receiver to a clear frequency and adjust C1 until the background noise is blanked out. Note that several tuning points of C1 may affect your receiver but only the strongest point is correct. The others will be weak and unstable. It may help to keep the transmitter as close as possible to the FM radio. Use a nonmetallic tuning tool and tune C1 slowly and carefully since it is a very sensitive adjustment and will require patience to set it right on the desired frequency. For maximum range, use a 30 inch antenna wire (No. 24 to 26 insulated stranded wire). However, it is recommended that you keep the antenna as short as possible while still meeting your needs to avoid exceeding the federally allowed power level for experimenters.

CAUTION!

DO NOT TUNE THE UNIT ABOVE 108 MHz IF YOU LIVE NEAR AN AIRPORT OR AN AIR TRAFFIC LANE.

IMPORTANT

There are two legal considerations you should remember. First, the FCC frowns on any FM transmitter with a range of much more than a few hundred feet. Second, it is illegal to use any device to listen to or bug any conversation without the consent of all parties involved.

INSTALLATION

To install the circuit, simply cut the red or green wire of your phone line (just cut one not both) and connect the hook up wires to both ends of the phone line. The circuit is not polarized, so you don't have to worry about positive (+) or negative (-). The circuit does not require batteries, so once it is connected to the phone line, it is ready to transmit both sides of the phone conversation to any FM radio.

CHASSIS

Unless your transmitter is going to be used in such a manner that it will be subject to the weather, it is recommended that you do not use a chassis box. If you do decide to use a chassis box, do not use a metal or a conductive one. Use a plastic one since metal will block the transmitted signal.

IN CASE OF TROUBLE

- (1) Check each solder connection. Make sure the solder is smooth and that no solder bridges, splashes, or shorts exist.
- (2) Check the transistor for proper installation.
- (3) Check each resistor and capacitor value carefully. Make sure the correct value has been installed.
- (4) Be sure all wires and leads installed on the circuit board have been trimmed as close to the board as possible.
- (5) Make sure all diodes have been installed with the correct polarity.

Problems - If you can't get your unit to work at all, check and make sure that all parts are properly located and check all solder connections.