Ten things to do, with a handheld radio

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This series of articles are intended to give the newcomer to ham radio an insight into some of the things you can do with a handheld dual band radio.

5: Slow Scan Television

Despite the name, this is not television, and under normal circumstances this will not give you real time video. However, it will give you the ability to receive, and transmit, still picture transmissions in full colour. Each picture may take several seconds to receive, depending on the resolution, but much of the line and frame synchronisation has been made automatic and is quite robust.
For simplicity in this article, we will assume the sending device is an Android phone, but other devices can also be used, such as iPhones, Laptops or desktop PCs with appropriate software and connections.

Audio coupling

There are two methods we can use for connection, acoustic and direct connection. Acoustic is the simplest method but results in a low quality connection. While the picture is being sent the speaker of the cell phone is held close to the microphone of the radio whilst the Push To Talk button is pressed. The microphone will pick up all external sounds, so you have to do this in a quiet environment.
This article will show how a direct connection can be made.

Receive only, or Transceive?

The SSTV programs for PC can transmit and receive, and the free Apps will do either, but you need to pay a little $ for one App to do both. We will talk about which program to use later, but first we deal with the connections.

Figure 1 An SSTV picture received in New Zealand from the International Space Station

Receive only operation

This is the simplest connection requirement, and can be used to monitor SSTV transmissions from other hams or satellites like the International space station.

"Receive only" equipment

To receive SSTV pictures, you will need a radio receiver, and a computer or mobile device to convert the audio tones from your radio into images.

Radio with
audio sockets

Mobile device or
computer running SSTV software

Figure 2 Minimal equipment setup for receive only

"Receive only" Connections

To couple the computer or phone to the radio, you will need to connect the mic of the phone to the audio output of the radio. For a Kenwood or Baofeng radio the job is simple as the speaker connections come out via the 2.5mm socket. The diagram below shows how to wire between the radio plug and an Android device headphone jack, or laptop microphone jack.
For a short cable the wiring does not have to use screened cable, but twisting the pair will reduce interference. The 4 way phone plug connections maybe too miniscule for the average solderer. An easier method is to buy a cheap phone headset Figure 3, cut off the headphone and microphone, and use the plug and lead to connect to the radio plug.

Many sources of information on SSTV connection suggest reducing signal levels between radio and computer. Previous experience shows this is not needed and the internal gain adjustments at each end are sufficient to enable harmonious operation.

With a direct connection to a radio output some phones will fail to detect an external input. This will show up as the internal phone mic still being active when the headset plug is in. The cure is to include a small capacitor (100nF) or resistor (2.2k) in series with the audio line.

Figure 3 Standard cell phone headset
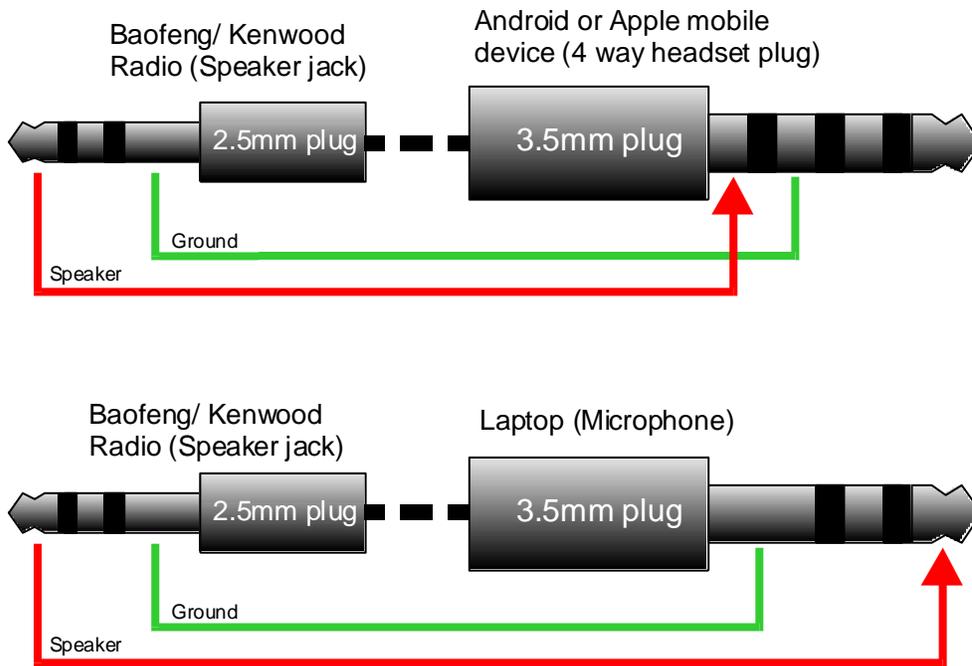
Figure 4 Connections between radio and computer/mobile device for receive only

Transceiver operation

To add the transmit mode, the audio connection from phone to radio needs to be added. This will enable the phone to both send and receive pictures.
Obviously the radio will need to be switched to transmit for sending pictures, and the most reliable method is to use the radio PTT. Alternatively, the VOX (voice operated transmit) can be used to sense the SSTV tones on the microphone input.

Figure 5 Wiring to allow reception and transmission of SSTV

Transceiver connections

This connects the speaker of the radio to the microphone input of the computer/phone, and the headphone of the computer/phone to the microphone input of the radio. As in the receive only case above, the plugs can be too intricate to make a good solder connection. Buying readymade headset cables and sacrificing the earphones/microphone is a much better way to make the connections as per Figure 6. Cheap radio speaker/mics can be sourced from web sources.

Speaker / Mic modified

(Speaker jack) (Mic jack)

Baofeng Radio
Speaker Mic plug

To radio

Mic removed

Gnd

100nF

Added capacitors

Gnd

Mic

Mic
PTT
Gnd
Spkr
Gnd

100nF

Left

Right
(not used)

Added cable

PTT

Android or Apple mobile
device (Headphone 4way plug)

3.5mm plug

Left Right Gnd Mic

(Right chan not used)
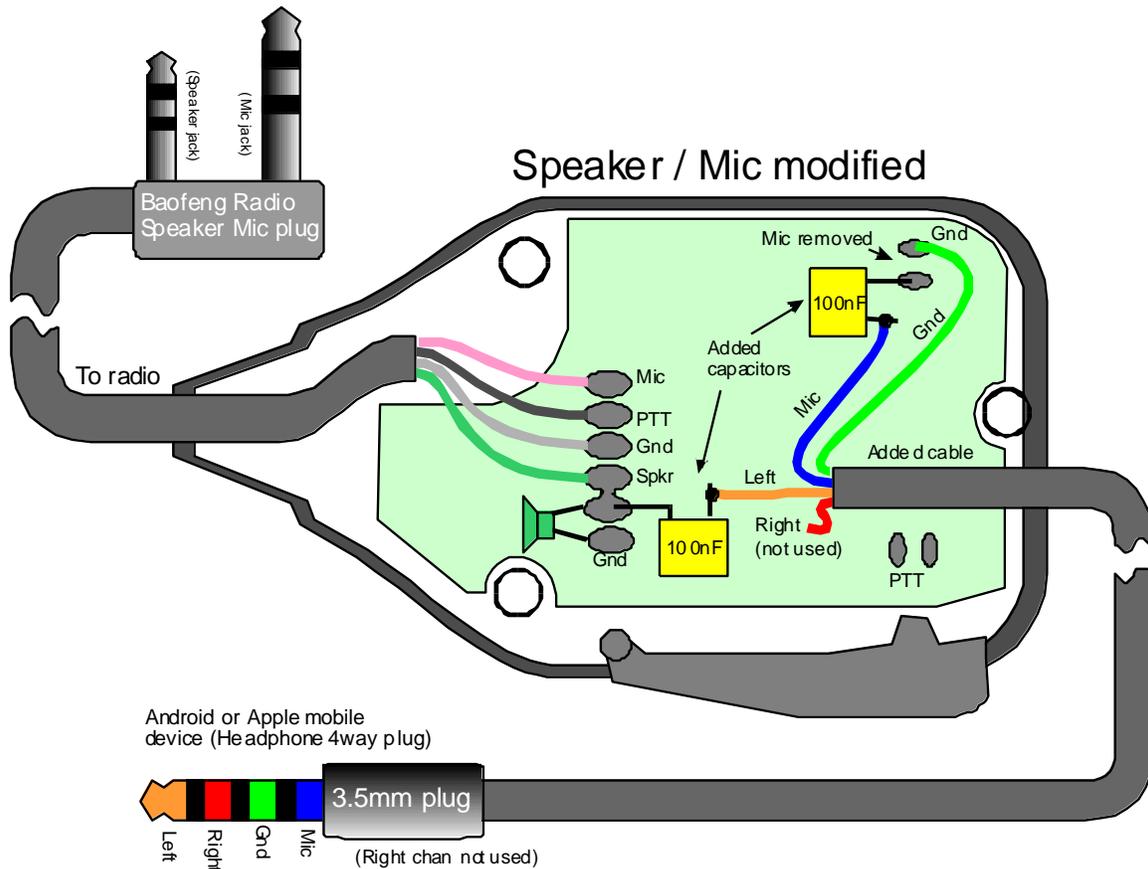
Figure 6 Overall connections for a mobile device

Operating

Receiving

This is very simple! Just start the SSTV App on the phone or computer, tune the receiver to the desired frequency, and if there is an SSTV transmission in progress - watch the picture appear. The picture will usually be automatically saved.
To monitor the SSTV tones when receiving, an earphone can be left wired in to the cable.

Making a transmission

Using "SSTV Encoder" on an Android phone, either take a photo of your call sign or use a pre-made picture from your photo gallery album. The radio must be switched to transmit, either with the PPT button, or try to use the radio VOX to detect the SSTV tones.

Call signs

As you know, every ham transmission should include your call sign, and SSTV is no different. Therefore the pictures you send should include, or start with your call sign, or send your call sign by voice before the picture transmission.

Modes

You will find there are many SSTV "modes" to chose from, such as ROBOT36 and MARTIN2 etc. They all have their own attributes, resolutions and transmission times, but there are too many to review in this article.

Have a look at http://www.amateur-radio-wiki.net/index.php?title=SSTV_Modes for a very comprehensive overview.

Appendix

Figure 7 General arrangement of Kenwood or Baofeng radio headset connections

Apps and programs

Android -

SSTV encoder (transmit only)
Robot36 (receive only)

Windows -

There are many programs available for free. This site has links to most of the software available: https://www.dxzone.com/best-sstv-software/