A GOOD TELEVISER FROM WAR SURPLUS

Parts from three or more pieces of surplus equipment are used in this receiver.

By ERNEST J. SCHULTZ, W2MUU

With the finding of local markets with large quantities of surplus radio gear, this manufacturer's long-heralded dream of a workable low-cost television receiver began the transition to active development. Little or no applicable constructional data on television receivers is available. Hours were spent collecting material from pre-war radio publications. We learned that the components needed for building a television differ little from those used in making an amateur dear-even, and a cathode-ray oscilloscope and that almost all the parts are available on the surplus market.

Television signals can be received with superhetodrive or t.f. receivers. Each have relative advantages and disadvantages. The t.f. receiver is simple but lacks sensitivity and needs a separate receiver for sound reception. The superhet has greater sensitivity and can be made to receive sound and picture signals simultaneously.

The television receiver differs widely from a conventional r.f. receiver because of several modifications and additional facilities. The sensitivity of a video receiver (in l.f. terms) is still ranging from 2.5 to 4 microvolts in the external response. Video amplifier, a sync separator and amplifier and video circuits must be added to the receiver.

Fig. 1—The i.f. strip used as an r.f. amplifier in the first experimental receiver setup.

Fig. 2—Video and synchronizing circuits to complete the receiver when used with the i.f. stages of Fig. 1 or the apparatus of Fig. 3.

RADIO-CRAFT FEBRUARY, 1943
17
The hot side of the elements are connected together through small r.f.
chains made by winding about 15 turns of No. 24 copper wire on a 1-
inch-long 3-42 pearl.

In the first experimental setup, it was difficult to time from one station to
another as each coil of the i.f. strip was tuned individually. This
advantage was overcome by using a switched trimmer condenser in
place of the trimmers shown in the diagram. This arrangement
makes a satisfactory visual receiver but a separate detector is required
for sound. We reassembled a 3-mw receiver for the job.

The second receiver

After experimenting with the i.f.
units, we decided to give the simplest
kind of receiver a trial. A survey of
the surplus war equipment that several
receivers were available and decided
in favor of the BC-108-A. Only a few
modifications were needed to convert this
equipment for television, but several
additions were necessary. The television
stations in New York City at the present
tine operate on channels 2, 4 and 6 which
are 6448, 6675 and 7022 m respectively.
The BC-108 tuning range was
calibrated from 155 to 286 mc and we
calculated that the addition of about
1 per cent, the r.f. section would have to
be tuned, the range. This gave about
enough tolerance on the present coil
tuning to handle the band. It was found
that with enough capacity to tune in
the lowest frequency station, we could
not reach the highest frequency channel.

After giving more consideration
to the subject, we decided that a simple
oscillator-tuner combination with
hand switching could be installed with
considerably less effort than taking apart
the r.f. sub-assembly and re-soldering all
the coils. The r.f. sub-assembly and front
section are shown as in the
photograph. The bottom shield of the

r.f. section was retained and used as a
chassis for the audio i.f. and amplifier
unit.

A new front end, consisting of a
6AG5 mixer and 6EC5 oscillator, Fig. 5,
was wired up. The antenna coil has 4
turns of No. 26 wire 1/4 inch in diameter
and 1 inch long. This coil is tapped 1
turn from the ground end. The oscillator
circuit has 3 turns of No. 14 wire 1/4 inch
long and 1 inch in diameter tapped 1
turn above ground. The parallel-coupled
trans in the tank circuit (if needed)
consists of 5 turns of No. 14 wire 1/2 inch
diameter and 1/2 inch long tuned by 3
3/8-inch rod-tuner condenser. Coupling between
the mixer and oscillator is through
glimmer. C, This consists of 2 pieces of
complementary metal oxide wire twisted
together for about 1 inch.

The antenna and oscillator coils are
tuned by switching preset 5:120-mc
ceramic trimmer condenser across them. A 2-plate variable condenser is
permanently mounted across the oscillator to provide variable tuning for the
audio channel.

(Continued on page 75)
A GOOD TELEVISER  
(Continued from page 54)

head already inserted in the socket supply was considered. The transformer is undoubtedly essential for the job and setting takes place even after hours of operation. However, since a good audio system was already available, it was possible to test the transformer in the loop by adding the additional circuit of a power amplifier.

As the scoop tube and associate the photographs of the picture tube show, we experimented with many different positional adjustments and found the circuit of the crossed tubes give about the best linearity and ease of alignment. A slight change in the position of the sweep tube is also necessary to make the picture tube and the actual line output. The horizontal sync control is used to adjust the vertical line and the horizontal sync control is used to adjust the horizontal line. With a moderate signal level, difficulty is encountered in making the sync output and the sensitivity control cannot be set too high on a strong signal or the picture will be distorted. Careful adjustment of the "lightening" control will erase the remaining noise visible when the control is set too high.

The transformers have a range wide enough to cover the first five television channels. The operator may select the position of the switch that corresponds with the desired channel. Only 5 channels are provided—one for each station active in the New York area. A switch more than 5 positions can be installed to accommodate as many other channels as desired.

The antenna used for this set is a simple whiffle dipole made of tubing and fed with coaxial cable. However, any type of antenna may be employed. A change in the input circuit should be made if a higher impedance type of feed line is to work efficiently.

Vestigial reception has been obtained from the three stations in New York, WAGB-4, WJAZ, and WAPI, with the receiver in Buffalo some 11 miles away. At the sensitivity control is advanced only at a fraction of maximum, there is little doubt that good results could be had at greater distances.

Some interference attributed to a high-banked FM station was seen in the form of vertical lines when observing WAPI, but was removed by inserting a parallel tuned in the antenna feed. We have had many hours of enjoyment with the television receiver and gained much useful information concerning the operation of circuits somewhat apart from those made through the development.