THE receiver to be described was built from a kit designed to provide amateurs and experimenters with parts for a complete sound and picture receiver for the RCA Standard Television Signal. It is a superheterodyne covering the 44 to 50 and 50 to 56 megacycle channels with provision made for adding coils to a switch assembly as additional frequency assignments are put to use. Both sound and picture channels are tuned simultaneously by means of this selector switch and a small vernier condenser. There are six controls on the front of the panel.

Four additional, seldom used, knobs are brought out on the left hand side of the chassis. All of these knobs are grouped in a manner that facilitates understanding their use and makes them convenient to use. It is intended that a half wave dipole antennae be used for reception, using a transmission line with a characteristic impedance of approximately 110 ohms to connect the antennae to the receiver. A conventional antennae with a single wire lead-in is not recommended because such antennae and lead-in pick up reflected signals from several directions and may cause multiple images on the cathode ray tube.

High Frequency Coil Assembly

The radio frequency and oscillator coil assembly consists of a rotary channel switch assembly upon which is mounted a four-section coil for each of the two low frequency television channels. Each of these four-section coils consists of an antenna primary, a preselector, the detector input, and oscillator as shown. This arrangement permits the coupling between windings to be adjusted to optimum conditions for each television band without the compromises involved in covering a larger tuning range with one set of coils. The channel switch has four positions with two, four-section coils mounted on the switch, prewired and tested. The coil-mounting plate has provision for two additional coil assemblies which will be ample for a given locality for some time to come. Later, this can be changed.

Picture I.F. Amplifier

The picture i.f. amplifier makes use of capacitative coupling to facilitate adjustment of band width. Small iron cores, which tune the coils, are adjusted from the top of the can, while the degree of overcoupling is adjusted with a two-plate trimmer connected between the high potential ends of the coils. A cut-away view of such a coil, shows the simplicity of this arrangement. Plate and grid leads to the tubes are taken from the lower end of the coils and are about one and one-half inches in length. Loading resistors to obtain uniform amplification over the pass-band are connected externally to the coil assembly. A portion of the cathode resistor is not bypassed. This minimizes variation of input resistance and capacity with variation of bias. A trap for the 8.25 meg. sound i.f. frequency is connected to the grid of the first i.f. tube. This trap is also adjusted from the top of the coil can, being tuned by a small iron core.

Picture I.F. Alignment

One way to adjust the i.f. is to apply a voltage from an oscillator with frequency sweep to the amplifier of the stage by stage, observing the shape of the selectivity curve on a cathode ray oscillograph connected to the video detector. If the experimenter has access to such a "wobulator" but has not a cathode ray oscillograph, the cathode ray tube of the receiver will do very well. It is only necessary to apply the vertical sawtooth voltage of
the sweep circuit to the horizontal deflecting plates, allowing the horizontal sweep to go unused and capacity-couple the plate of the video amplifier to the vertical deflecting plate. The trace will "lock-in" well enough to observe the selectivity curve.

The diagram shows how the output of the 6FS can be applied to the vertical deflecting plate by changing the .05 mfd 2000 volt blocking condenser from the control grid of the cathode ray tube to the vertical deflecting plate. The grid resistor to the bias supply must, of course, be left connected to the control grid.

Another method of alignment of the picture i.f. is to use a test oscillator and output meter, adjusting the transformers in order, starting with the output transformer. It may be helpful to first plot a selectivity curve for this stage alone, adjusting the capacity coupling so that two peaks will appear at approximately 10.5 and 11.5 Mc respectively. Upon going to the next stage, a second curve may be made to have its two points of maximum response at about the same two frequencies. When the signal is applied to the grid of the 1852 converter, this stage is adjusted to "fill-in" the valley between the two peaks and a third curve plotted to show the overall i.f. selectivity. The trap for the sound i.f. frequency may be adjusted before tuning the input picture transformer, but should be "touched up" after the input stage has been aligned.

This alignment procedure will give an overall i.f. sensitivity on the order of 500 microvolts for optimum contrast on the cathode ray screen. For amateurs living outside the "service area" of a television transmitter it is possible, because of the flexibility of the i.f. amplifier, to adjust the band pass characteristic to any reasonable combination of selectivity and gain. Thus, a distance handicap can be compensated for, to some extent, though naturally at sacrifice of picture detail. Similarly, those who are fortunate enough to have a signal input of 4000 or 5000 microvolts may reduce the sensitivity and improve detail, as dictated by their particular locations.

The second detector consists of one diode of a 6H6. The low pass filter which comprises the load of this tube is mounted in the high voltage compartment directly below the horizontally placed 6FS. An inspection of the illustration of the complete receiver will show the advantage of this particular arrangement. It will be noted that the placement of the 6H6 and the 6FS permit short, direct leads for both the video frequencies and the synchronizing pulses, which are taken from the same (6H6) tube.

**Video Amplifier**

The video amplifier consists of a 6FS tube in a circuit which is a combination of series and shunt compensation to give a flat frequency response up to 3 Mc. In the video amplifier the experimenter may raise or lower the gain, if so inclined. This flexibility is desirable since the frequency response of the video amplifier should be comparable to the band pass characteristic of the picture i.f. amplifier system.

The vidostron is operated with the cathode and control grid about 2000 volts negative with respect to chassis. For this reason, a rated 2000 volt blocking condenser must be used between the cathode ray control grid (Build further on page 56).
May, 1939

RADIO NEWS

Meter Cases

For Conveniently Housing All Types And Makes of 2" And 3" Panel Mounting Bases And 3" Speakers.

Made of Black Crocodile skin with ceramic insulated terminals. No. 7911 is for 2" meters. No. 182 is for 3" meters. Fitter also available. Best in the business for your best. Contact your local distributor. For latest catalogue supplement, 25¢ each.

BUD RADIO, INC.
332 G Cedar Avenue
Cleveland, Ohio

Build Your Own FACSIMILE RADIO PRINTER

Get In On The Ground Floor With The Most Promising Development

Already daily broadcasting experiments from leading radio stations have shown the fascinating study and fun. This new art holds promise of a great future, and another chance to grow up in a field of professional profit and satisfaction as radio was 20 years ago. Time is not far distant when radio facsimile printers may possibly develop into American homes an exciting stream of pictures or events as they happen with visual reports, vital information and news. Already the progress provides much of interest and for study in the early morning broadcasts of news and pictures with many stations operating on ultra high frequency during daylight hours.

The Crosley "Radio" radio printer is development of the flush method and is being used in many fields throughout the country today. When you have built the printer, it is easily attached to your own radio receiver. We provide all the necessary parts and directions necessary to make a matching ready to build, packed in a special kit. Most Crosley dealers will display them. If none are convenient to you, write us.

THE CROSLEY CORPORATION

REDO DEPARTMENT
FOWLER CROSLEY, Pres.
194 INDIAN STATION STREET
CINCINNATI, OHIO

Please send me literature about the Crosley REDO, all Midwest broadcasting activities and list of stations now doing experimental broadcasting. Also, the name of my nearest Crosley dealer to carry the REDO.

NAME

ADDRESS

Use This Coupon

W 9 FLU. tells that one day an SWL came to him and asked, "Who is this guy EQ that everyone calls? I can never tune him in.

W 9 VRAVO has had an amateur license for four years and hasn’t been on the air yet. He wrote his excitements over the birth of a WJ junior op, what has put a 160 crystal in his rig and tried to tune in 20 meters. How could be double to 20 meters with one detector, push-pull booster, and push-pull filter.

Because his ’36 car, beeked the call and name differently, W 9 VRAVO thought the man an emergency system. By the endings after all was straightened out, though.

Build a Tele-Receiver

(Continued from page 13)

The 90-foot telephone poles besides the 90-foot tower made by W 9 DOO, and the 900 gang.

The Southwest Experimental Radio Amateurs Association held their annual banquet on March 10.

W 9 T’s snap for fast sounds good over the air these days. He also may remember John, who is the chap who spent nine months in the Asian interior, and contacted the Russian Scientists on the ice box.

W 9 ZEN seems to be on all bands. No doubt he shifts from 10 to 20 to 40 meters, but it sounds as if he is always there.

W 9 JFP is most consistent of the Hartford Headquarters Gang outside of W 1 AW. We have noticed out on the West Coast that unusual DX comes in during, or just after a rainstorm. This is due partly, no doubt, to the power noises being drowned out, but partly due to the low pressure area coming in from certain directions, thus clearing up the air.

Some of the stations coming in good during the DX test included the following: On 7 megacycles—Y 9 ZLR, J 9 VB, V 9 MAB, F 9 QO, G 9 MAB.


Internal P.F. construction permits a few degrees rotation about its long axis so that the edges of the picture may be made truly vertical and horizontal. Provision is also made at the tube socket to accommodate the commercial variation in the overall length of the tubes.

Synchronizing Pulse Clipper

Returning to the 965, the synchronizing circuit begins with the other diode plate, the cathode of which is
Within Earshot
(Continued from page 4)
out that brain child of yours.
We urge you not to hold back any
talent that set until that time.

W E wrote to many persons asking their
opinions on television. Some of the replies follow:

"I am vitally interested in the development
and perfection of Television. It will
nevertheless be years before the public
in the United States will want to enjoy
it for the reason that the United
States is in the way of entertainment,
commercial, governmental, and public
unemployment of important matters.
Radio has filled a need and brought a new
relationship between people and
institutions. It has brought new
entertainment and education.
Television will bring a still closer
contact between those who must have
their news and entertainment a
mass of people.

I have been told by many people that
they believe television is an intruder
and is an annoyance.

I am writing to say that I believe
in television and want to stay
informed. I do not believe that
people who read newspapers and
magazines are going to lose
interest in television when it
becomes available.

The public has only been tailored
and the time is coming when we will be
able to provide to all the
people in the country

\n
Culbertson, G. Olsen,
Governor of State of California.

Dear Sir:

I am glad to hear from you. It is
very rare to hear from a person
who is interested in television.

I have been told by many people
that they believe television is an
intruder and is an annoyance.

I think that television will
become very popular once it
becomes available to all the
people in the country.

Edward J. Kelly,
Mayor of Chicago.

Dear Sir:

The study of music is only one way in
which television may be used to
enrich the lives of all the people. Carry this
example over into the fields of art, science, of

---

sport, of entertainment, of democracy! There
are no limits which cannot be
overcome, and no areas which cannot be
enjoyed through the medium of the
new television system.

Sincerely yours,

John C. Colter,
President, Golden Gate
International Exposition.

Dear Sir:

I will open new fields of
entertainment which will
enrich the lives of those who
watch television.

Sincerely yours,

John C. Colter,
President, Golden Gate
International Exposition.

Dear Sir:

Television will open new fields of
entertainment which will
enrich the lives of those who
watch television.

Sincerely yours,

John C. Colter,
President, Golden Gate
International Exposition.

To these gentlemen, as well as to all others
who so kindly answered our inquiries, we offer
our heartfelt thanks.

We received many more expressions of
sympathetic support. Only several
instances are cited to illustrate the column.

A GREAT many of those interested in
radio are the same time followers of the
art of Daguerre. Right across the
landscape from our office there has been a
lot of horse and buggy trade. Curiously, we finally
encountered Andy Hackett, who is a
member of the daguerreotype club, and
asked what was going on. He threw the
dummy of the daguerreotype camera at us
for our inspection. He is practically a
complete camera of photography.

We never knew there was so much to this
interesting field. The magazine contains a listing
of cameras, projectors, film, lights, enlargers,
developing chemicals, and paper products.

Andy said it was a small
catalog of modern photographic equipment.
We would like to see it.

Make sure that you don’t miss this great May
issue of Pop. Tech."

\n
W E had occasion to talk to QOAE who
sold us a visit. When he did this he sold
over 10,000 miles away from his home.

He was on his way back
instead of being near
his home.

The service has only been tailored
and the time is coming when we will be
able to provide to all the
people in the country

\n
W WHEN burns the industry was in its
infancy, not so very long ago, the
very first listening audience was composed
of almost entirely of experimenters
who built their own receivers.

Most of the information
for the building of this instruments was
furnished by the manufacturers alive to all

Today, the one thing that is lacking
in television today, is the lack of a
large number of "viewers."

In the final analysis this
audience will come from the
professional and the
experimenters who will lead the expected
millions of everyday listeners and viewers
into the field.

As we plan the future
of television, we will
plan for the expansion
of the industry. A large
number of these pioneers already exist in
the West where television is a new era of
entertainment and education that will be of
immediate benefit to all.

It will provide a new field of
employment for those who have
a further interest in the march of progress in this country.

Edward J. Kelly,
Mayor of Chicago.

Dear Sir:

The study of music is only one way in
which television may be used to
enrich the lives of all the people. Carry this
example over into the fields of art, science, of

---

sport, of entertainment, of democracy! There
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overcome, and no areas which cannot be
enjoyed through the medium of the
new television system.