Television Receiver Kit

Easily Assembled at Home

This television receiver kit was designed to simplify the problem of home construction. The finished job combines the appearance of a manufactured chassis with the efficiency of good engineering

By **D. E. Replogle***

ARE you telewise? If not, you are missing much profitable entertainment. Television is no longer an experimental mystery, there being a number of powerful stations broadcasting regular features that are picked up by thousands of amateurs who have built their own receiving equipment. W2XCR of New York, W2XCD of Passaic, N. J., and W3XK of Washington, D. C., for instance, broadcast continuous programs from three in the afternoon until a half hour after midnight each day in the week with the exception of the hour from five to six. Other stations located in Boston, Long Island City, Chicago and on the West Coast also have regular program services. All types of entertainment are being featured by these stations; playlets, dancers, important speakers, singers. The voice part of these broadcasts can be picked up by the average good broadcast receiver but in order to pick up the images a special short wave receiver and radiovisor must be employed.

The Federal Radio Commission has designated a special band for television broadcasting, in the range between 100 and 150 meters. As there are fewer television stations per channel in this band than radio stations in their band, the signals are easily picked up without interference. Unfortunately few of the short wave broadcast receivers on the market are suited for television reception. Broadcast receivers are rarely designed to go below 200 meters and most of the efficient short wave sets are designed to operate in the more popular 3000, 7000, and 14,000 kc. bands.

In order to enjoy television programs two pieces of apparatus are required: a short wave television receiver, and a radiovisor. The receiver is similar in design to those used for regular short wave radio reception with certain reservations to be dealt with later. The radiovisor takes the place of the loud speaker in the usual outfit. In this particular article we shall interest ourselves only with the construction of the receiver proper, dealing with the radiovisor later. That article, together with the present one, will cover complete home television equipment.

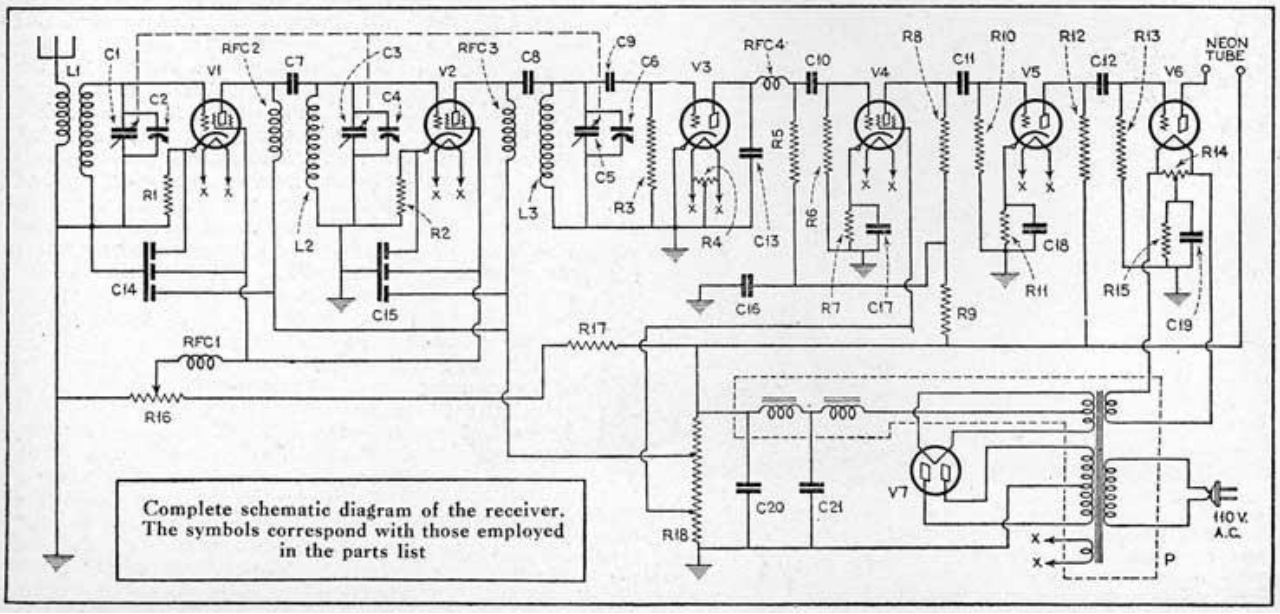
A television receiver kit has been designed by the Jenkins Corporation of Passaic, N. J., which answers the requirements of a good television receiver. The kit includes the complete parts for the receiver, power pack and amplifier. The parts and circuit are especially designed to eliminate distortion. A resistance coupled amplifier has been used, as the best transformer coupled amplifiers cannot cover the frequency range necessary for the detail and shading of radio pictures.

If the experimenter possesses a receiving set that covers a range of 100 to 150 meters, employs a resistance amplifier, a stage of power amplification which employs the type –45 tube, a system of tuning that can easily tune out undesired stations, and sufficient sensitivity to pick up with ample strength the signals from one or more of the television stations now operating, he need only construct the radiovisor in order to procure television programs.

The receiver while designed especially for the Jenkins radiovisor may be used with other standard radiovisors as well. Its price is well within the range of any fan. The assembled set resembles the usual six tube single control short wave set. The power pack, operating with a type –80 full wave rectifying tube, is located in the rear of the set. A tuned radio frequency amplifier with two stages of radio frequency is employed, followed by a detector, two stages of audio frequency and a stage of power amplification. The carefully filtered power pack output supplies all the necessary A, B, and C voltages for the set. Each part in the kit has been numbered for easy identification. With the aid of clear charts and simple instructions the receiver can be assembled in a few hours. Every part is included in the kit so that not even a bolt or piece of wire need be purchased.

The first unit to be considered is the power pack, which in the assembled set will be located in the rear of the receiver.

*Jenkins Television Corp.



Complete schematic diagram of the receiver. The symbols correspond with those employed in the parts list

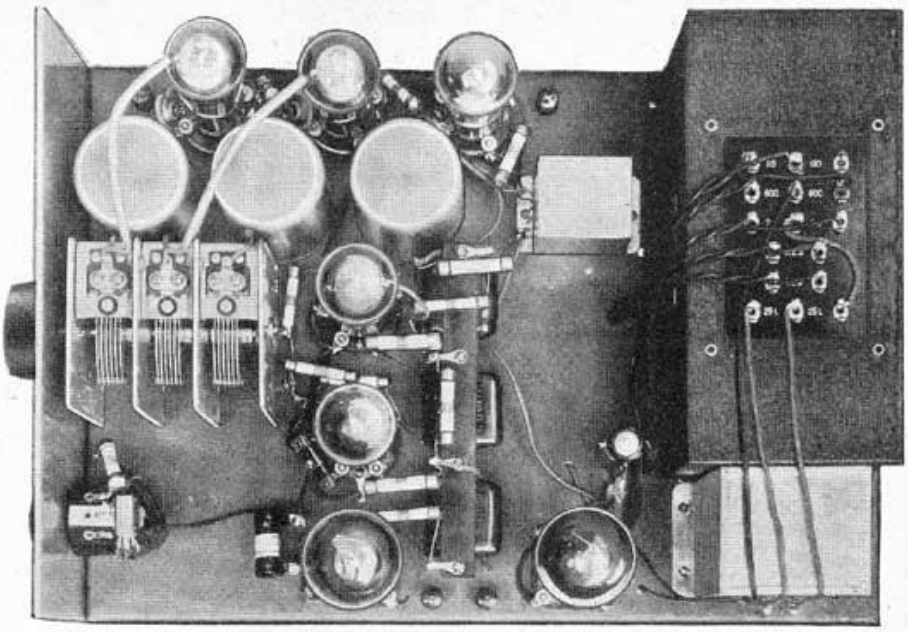
This pack includes a special transformer supplying 2.5 volts and 5.0 volts to the audion filaments, as well as 300 volts to each plate of the rectifier tube. The rectified high voltage is filtered by means of two special 30 henry chokes, enclosed in the transformer housing for simplicity, and a 6 mfd. condenser block. This unit supplies all the power required to operate the receiver and is turned on and off by a switch mounted on the volume control knob on the front panel of the receiver.

The second unit is a radio frequency amplifier and station selector, located on the front portion of the base immediately behind the front panel. This unit consists of two screen-grid tubes operating in three tuned circuits. Tuning is accomplished by means of a single knob that controls the three gang variable condenser.

The three tuned circuits provide ample selectivity, while the two screen-grid tubes amplify the signal sufficiently to provide good pictures when the received wave has a field strength as low as 15 microvolts per meter. Were the receiver more sensitive it would pick up static and other electrical noises to distort the picture when the strength of the received signal drops below 15 microvolts per meter. The radio-frequency amplifier is designed to pass the wide frequency band which is absolutely essential to good television image reception.

The third unit consists of three stages of resistance coupled amplification. The first stage employs a screen-grid audion, and the second the usual three element audion. The third and last stage uses a type –45 audion. This stage provides the power to operate the neon tube of the radiovisor.

The kit contains a base with all holes for mounting drilled. All supports for coils, condensers, tubes, etc., are complete in every detail. Almost every piece of apparatus is fastened on with lock washers so that there is little chance of any of the equipment being jarred loose.



Assembled Jenkins television receiver, showing locations of all parts

List of Parts

1 power pack, P
1 filter condenser 4.0-2.0 mfd., C20, C21
1 plate by-pass condenser 1.0 mfd., C16
3 audio coupling condensers 0.25 mfd., C10, C11, C12
2 RF coupling condensers .0001 mfd., C7, C8
1 grid condenser .0001 mfd., C9
1 detector by-pass condenser .0001 mfd., C13
3 grid bias by-pass condensers 2.0 mfd., C17, C18, C19
2 RF by-pass condensers 0.1 mfd., C14, C15
1 variable tuning condenser gang, C1 to C6 inclusive
1 bleeder resistor 41,000 ohms tapped, R18
2 hum balance resistors 20 ohm center tapped, R4, R5
3 Coupling resistors 250,000 ohms, R6, R10, R13
3 coupling resistors 100,000 ohms, R3, R5, R17
2 coupling resistors 50,000 ohms, R8, R12
1 coupling resistor 25,000 ohms, R9
1 bias resistor for type –45 tube 2,000 ohms, R15
1 bias resistor for type –27 tube 2,000 ohms, R11
3 bias resistors for type –24 tube 500 ohms, R1, R2, R7
1 volume control resistor 25,000 ohms, R16
1 RF choke 300 turns, RFC1
3 RF coupling coils, RFC2, RFC3, RFC4
1 antenna coil, L1
2 RF coils, L2, L3
5 five-prong audion sockets, V1 to V5, inclusive
2 four-prong audion sockets, V6, V7
1 tuning dial.

Besides the above listed major parts, the kit contains the accessories, such as wire, nuts, insulating mounts, clips, etc.

The television receiver kit, showing power transformer at left. All necessary parts are included and numbered. Complete instruction book and diagrams are included in the kit

Mounting of the Parts

In designing the set the engineers have taken great care that the apparatus is mounted so as to give the greatest facility in wiring and the minimum of induced currents in the set.

First the three grid by-pass condensers, C10, C11 and C12, should be mounted in the proper places, next the two four-prong tube sockets on the right hand side of the base panel. The five five-prong sockets are then mounted, three on the left hand side of the baseboard going back and two just back of where the gang condenser is to be placed. The bleeder resistor, R18, should now be placed with great care. The front panel should then be anchored to the base. The two RF coils and the antenna coil, with their accompanying "cans," should be fastened down. The gang condenser is fastened directly on the chassis with the proper screws. It should be noted that the shaft of the condenser should be carefully insulated from the panel. The trimmer condensers on the gang condenser unit should be uppermost so that they will be freely accessible. The entire power pack should be placed at the rear of the baseboard. Binding posts for the antenna and ground should be located in the holes provided near the panel end of the baseboard. The binding posts for the loud speaker or radiovisor should be located on the opposite side of the baseboard near the output audio stage.

Wiring the Set

The parts having been mounted, we are now ready for wiring. The Jenkins kit calls for long leads to run through holes and under the base panel, but this is optional. The components have already been

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arranged so that they are in the best relative positions for close wiring. The theory of the straight line is the best one to follow in any wiring job. Many short wave broadcast and amateur enthusiasts operate with hay wire outfits but good television results cannot be expected with hay wire methods. A list of don'ts that every set builder should follow:

Don't make wires or leads longer than necessary.

When connecting leads to binding posts don't leave ends dangling over.

Don't leave great hunks of solder on leads.

Don't solder connections without first scraping the parts to be soldered.

Don't splice a broken lead; use a new one.

The above don'ts are an old story to the experienced amateur set builder and are followed closely by the best of them, but they cannot be repeated too often.

For the convenience of the builder all cathode wires have been made yellow, grid wires green, plate wires red, and all other wires black. First the complete filament is wired according to the diagram. When this is completed plug the audions in their proper sockets and connect the receiver to the electric lighting current. When the switch is turned on the audion filaments should light up showing that the wiring has been done properly. Next the grid circuit should be wired, followed by the plate and cathode circuits.

Let us now assume that the set is completely wired, audions in place and ready for operation. Attach antenna and ground and connect the loud speaker to the correct binding posts. Plug in the lead from the power pack to a convenient socket of your 110-volt lighting current, wait a moment for your tubes to light up. Turn the volume control half way and tune the receiver until a high buzzing noise is picked up in the loud speaker. Turn the volume control on more and the buzzing should become very loud. Everything is now in readiness to connect the radiovisor in place of the loud speaker.

Radio News, August 1931