CONTENTS

"Operation Crystal" ........................................ page 2
Ham Shack Intercom ....................................... page 3
Edison Radio Amateur Award Winner ....................... page 6
Sweeping the Spectrum ..................................... page 7
Essential Characteristics Handbook ....................... page 8
Checking the operation of this "surplus chassis" model sent me digging into my old junk box to find the necessary material. Out came a plastic-finished earphone instead of the metal one shown in the original model built by Edgar M. Wood, K2BDO, of Merri Plaines, 21, N. J. A plug-in 2.3 a.h.r. RF choke was connected as a self-resonant coil in the illustrated circuit to receive the local broadcast station operating on the 1210 KC Commercial Frequency. Another 25 may be connected in series with the first for improved results if your local station operates below 1600 KC. For the "lost ounce" in volume, a Miller type 76A diaphragm earphone unit could be used in a large headphone case with the plug adjusted by a screwdriver through a hole in the case.

A "field" test was made by running around the neighborhood clipping the antenna lead onto fences, for example, until the maximum DX strength was obtained. A rather heavy antenna wire was even tossed over some tree branches with good results. (These tests are best made at night when you want to convince your already skeptical neighbors that their favorite radio amateur has gone completely crazy.)

CONNECT TO TOWER

Practically all of the letters I have received for OPERATION CRYSTAL so far stress the fact that plenty of antenna is needed for maximum results when listening for DX. The biggest idea along this line came from Herbert W. Eise, WJDJ of Gantima, Nebraska, where they apparently have plenty of wide-open spaces for antenna like the one shown in the surrounding drawing. This "loop" antenna should make even the simplest circuit, shown below, a real DX getter.

INSULATE FROM TOWER

65 FT.

CRYSTAL RECEIVER

65 FT.

This art makes up in volume and simplicity what it lacks in selectivity, according to letters run at my shack. The strongest local station will be the one that wins at the earphones. In some locations a mixture of stations will result, but that should be no problem when receiving Continental. Polarity of the crystal seems to be unimportant. Although several people submitted this idea, Jerry Lucas, of Wilmington, Delaware, sent the first such entry to be received at my office.

Letter submitted before December 1, 1935, will be eligible for publication in the OPERATION CRYSTAL column. (See G-E HAM NEWS, volume 16, no. 1. Do not use this column for contest entries and antenna ideas of an everlasting nature are also eligible. All material submitted must be free of patent restrictions and becomes the property of G-E HAM NEWS.

--Denny Diode
HAM SHACK INTERCOM

What’s unusual about an inter-com system? The control circuits of this G.E. HAM NEWS model are designed specifically with the “heater” type of radio shack in mind—a good nickname for most home stations located in attics, spare rooms, crawl spaces, or actual shack in the yard. When installed in the radio shack, rapid-temperature compensation is available to the front and rear doors, kitchen, nursery, or whatever you use it for. It will replace, at nominal cost, the most conventional systems of signalling the “chit chit.”

Banging on the floor, rapping on the ceiling, or ticking the celar or attic light on and off would no longer be in vogue. It is also a handy gadget to have for communication between tents at the radio club’s annual Field Day ceremony.

For the “occasional” volume man, it could be used as a speech amplifier to drive the grid of a “clamp” tube on the screen of that triode final amplifier even while it is also in duty in its intended role. One position of the master station selector switch could be reserved for this application.

The purpose of a speech amplifier is to improve the signal power level. It is even handy for checking the output of the 6JQ-96 crystal receiver.

When the 6JQ-96 is connected by wire directly to the public-address system, the output is fed directly to the master station switch S8 which in turn can be used to control the amplification of the signal. The purpose of the master station switch S10 is also to control the output of the amplifier whenever S1 is in the “on” position. The output of the remote station can be amplified by S10 with a gain of 20. When S1 is in the “on” position, the amplifier can be turned on and off with a single switch.

The control circuit consists of a 12AX1 twin triode and a grounded cathode circuit. The input circuit has less gain than conventional types, but eliminates the input matching transformer which would otherwise be necessary. Balanced output at 100 plate volts is possible with the new 6C31P tube. The balanced output is fed to the control circuit through a transformer, which provides the necessary phase shift. The transformer is built into the master station in such a manner as to eliminate any error from pickup by the remote station cables. (See G.E. HAM NEWS, Volume 4, No. 4, for details.)

Expensive instant-heating type tubes were deemed unnecessary because the amplifier was found to be capable of passing a signal about 8 seconds after the relay was energized.

A transformer-powered, half-wave, selenium-rectifier plate supply with an RC filter is used to minimize the shock hazard always possible with transformerless type supplies. This also simplifies the tube heater and relay power problem. The power transformer, T1, runs all the time that the power switch, S8, on the volume control switch is “on.” After running several hours in the stand-by position, the transformer was hardly warm. The built-in power supply can be eliminated if a similar source is available in the shack.

Standard 3.5 ohm voice-OM PM speakers could be used in place of the 48-ohm types designed especially for inter-serve if each remote station does not require over 25 feet of connecting cable. Savings in original cost would be about $15 cents per speaker.

Construction

All new parts are used in the model stations, but either one could be built around a “definitive” table radio chassis and cabinet. The amplifier and power supply is built on a Bud CB-1620 miniature open-ended aluminum chassis drilled according to Fig. 2. All parts are arranged so that the chassis can be mounted vertically in either a 6 x 9 x 5-inch metal utility box, or on a 5 1/2-inch wide relay rack panel. Station selector switch S9 is mounted on the back panel where the shafts project through the underside of the chassis. A protective cover for this tube in the power output stage. See the places shown in the bottom view, Fig. 3, when the selector and switches are assembled with the chassis. The selector switch and switches are used to select the six 5-inch hole marked “D” where leads from the different switches, and volume control pass through the chassis.

All wiring is done with conventional colored hook-up wire, so no shielded leads are needed for transmission. All wires to the speaker, S8, and the pilot-light, header, are left a few inches longer than necessary. These parts are then fastened to the panel, drilled as shown in Fig. 4, before the chassis is assembled with 3/16-inch long teflon-impregnated metal washers. The 3/16-inch fasteners are fastened to the bottom lip of the chassis and the panel. Note that blank spaces are left on both sides of the cabinet. The 3/16-inch fasteners are fastened to the bottom lip of the cabinet, provide clearance for the relay mounting screws. The enclosed transformer is mounted on the remote stations were mounted directly on the back of the cabinet. Leads from the series rectifiers to the relay are made long enough to allow the cabinet to be opened with the chassis in place.
Fig. 1  Schematic diagram

Fig. 3  Chassis bottom view
The above description also applies if the chassis will be housed in a small table radio cabinet, except that small knobs of 3/8-inch thick white plastic are glued to the inside of the panel and 3/8-inch long wood screws fasten the chassis to the flanges from the rear. A back cover of 1/8-inch thick tempered hard-board with the terminal strips mounted on it is then fastened.

**RELAY RACK MODEL**

The amplifier chassis bolts directly to the rear of the relay rack panel, with the control knobs located about 3 inches off-center. The lower edge of the chassis comes flush with the same edge of the panel. The speaker, Bl, power relay and pilot-light bracket are fastened to unslotted portions of the panel either side of the chassis. The speaker is centered about 4 inches from one end of the panel and the relay positioned next to it. RM pilot-light bracket and Sp are located in line with the control knobs between the chassis and relay. A 6-watt speaker transformer, 125 volts @ 30 ma, 6.3 volts @ 2 amp, secondary.

**REMOTE STATIONS**

A Bud CB-1054A 4-inch metal speaker cabinet houses each remote speaker and the call-in switch, Bl. Each Chinch-Neos 17-4 terminal strip for the external cable is mounted on the back of the box with 6-32 x 1/4-inch machine screws. Note that the cabinet is grounded to the terminal strip.

Many other possible uses will probably occur that have not been included in this description, although, our few examples show that an intercom system is a necessity in many amateur radio installations.
Ben Hamilton, W6WYF, shown with YVI, Phoebe Ana and Tom Richard at his La Mesa, Calif., home station W6KY, coaches a network relaxation from activities which consume more than 20 hours weekly in addition to his career as industrial electronics instructor at San Diego Junior College and Vocational School. The Civil Defense control center (upper right) co-ordinates operation of nets for CD, Zara Wardas, Red Cross disaster service, county road service, and AM (24 of 44 communities in 60 by 50-mile San Diego County. Four bands are used to insure adequate coverage of rugged mountains, coastal, and desert areas. (Below left) his program of network planning, specifying, installing and operating equipment, personal training system, and close supervision of operators (lower right) has given his 750,000 members one of the best such services in the nation.

Ben is Communications chairman for the Red Cross chapter, SCM for AMR Communications officer in the 42nd Division of the California National Guard, and is a veteran of World War II and the Korean War.
All the recent activity in the transistor field has touched off a couple of interesting programs on that subject at one of the local radio clubs, remarks our editor, ... who is keeping an eye out for some good transistor ham gear. Most good-priced sets must have either a manufacturer or user of transistors who might supply economic well-wired in the subject to act as a club program speaker. The subject is probably too extensive to cover in one program—fundamentals could be handled in one season, and applications in another. Primary amateur interest would naturally be in the portable and miniature equipment field.

I caught our editor taking a peak at the cover of the 1954 February issue of Electronic for July 1954, 170 miles away. Particularly impressive was a demonstration drawing a ceramic tube envelope withstanding heat from a gas-torch that reduced a similar glass envelope to a shapeless molten mass. "Ezra" of the show was the new GL-5192 UHF Lighthouse triode, utilizing 61 component parts assembled in 164 precision mechanically controlled operations which factor out heavy returns on operator skill. Power inputs of 13 watts at 300 plate volts in a class C CW amplifier or oscillator frequencies up to 1900 MHz are possible in grounded-grid cavity circuits. As a plate-pulsed oscillator, it may be used up to 4500 MHz at 2000 cathode plate volts. Select electron transit times, instantaneous switching, and quick connect features are all a result of the design and excellent isolation of the anode from the cathode allow efficient operation at these frequencies.

From a recent issue of the Suburban Radio Club, Ferguson, Missouri, bulletin comes word of this novel use a gong in military...

A general contractor directed scoring improvisations at the test planes, electronics and others of the construction crew when he conducted individually and selectively for the delays and troubles which, he said, were being run. If he could only get a little more time, he said, he would quit this losing game, etc. More or less complete hold construction jobs for long...
Look for the cover picturized at the right on the counter of your local G-E Tube Distributor, who should now have his copies of the new, completely revised, G-E Receiving Tube Essential Characteristics Handbook. Latest information on over 100 new miniature, sub-miniature, size-X, size-XI, special purpose and television picture tubes, plus a separate section on germanium diodes, is packed into a compact 6 x 83/4-inch size. A multi-ring binder allows the book to stay open and lie flat at any page. The type style used shows at a glance whether a tube is miniature, glass or metal. A bonus feature is the printing of the base diagram on the same page as the tube listing—a tedious thumbing back and forth for this information.

- Function, maximum ratings, and typical operating conditions of over 1200 tube types are listed clearly.
- Outline drawings with dimensions allow you to determine whether or not that S tube receiver will fit into your favorite-brand coffee can.
- A section with circuit diagrams for most typical receiving tube applications brings up the rear.

Do not write to Lighthouse Lorry for your copy! They are available only through authorized G-E Tube Distributors.

G-E HAM NEWS
Available FREE from
G-E Electronic Tube Distributors

published bi-monthly by
TUBE DEPARTMENT
GENERAL ELECTRIC
Schenectady 5, N.Y.
In Canada
Canadian General Electric Co. Ltd.
Windsor, Ontario

E. A. IBAU, EDITOR
MAY-JUNE, 1955