

Two additions to the service bench.

That is why we find that if a single r.f. stage is best for a home receiver it is pretty much the same for the communication receiver. So most of these receivers have a single r.f. stage. But—and this is an important “but”—the gain of the r.f. stage in the communication receiver is supposed to be a certain amount and the signal tracing unit should be capable of determining this gain at the stage and at the frequency involved, without disconnecting leads and parts—without disturbing the circuit.

Compass operation calls for a high order of selectivity in the receiver, the existence of conditions which are not found in home receivers. Granting the use of signal tracing equipment for service operations, this apparatus too has to meet certain requirements—selectivity requirements—sensitivity requirements—and still retain its stability and its property of application to a sensitive receiver without essentially interfering with the performance.

Communication receivers that operate at low signal levels, much lower than the average wide range of a.v.c. operation, over a signal voltage range as high as 200,000 to 1, consistent with high signal to noise ratio at the most sensitive conditions, call for test equipment capable of operation when the receiver under test is set for good sensitivity.

Selectivity is a factor in the receiver and it must be a factor in the test unit. Granted that there are several ways of checking selectivity, it makes most sense that the simplest be used, which can be equipment which is already connected to the receiver to make other tests. Such equipment is properly designed signal tracing apparatus, which in capable hands, can make myriad tests with ease. In this respect one receiver is like another, that is communication and home broadcast, but selectivity in the latter has been pretty much ignored, if only because the data required as reference is seldom available. But in communication equipment it is furnished with most every receiver.

Oscillator systems in communication receivers are not unlike those used in home receivers, except possibly for the use of crystals in the former, but these offer no more of a problem to proper signal tracing apparatus than conventional oscillators. To the service man, however, it is a variation from conventional procedure and means a subject for study, but this is anything but an insurmountable task. Frequency doubling takes place in some communication receivers, particularly of the ultra high frequency variety in the oscillator stage so as to produce a final heterodyning frequency of high stability. But the process of identifying the

manner of operation of these systems moves along prescribed paths like those laid out for the home receivers, more critical though it may be.

The i.f. systems employed in receivers outside of the home radio field are like those which the average service shop finds each day; that is, as far as the circuit is concerned. Even the fact that some special receivers employ three stages instead of the conventional two is not a radical departure, for we have seen three stage i.f. systems in home broadcast receivers. One difference is that the range of intermediate frequencies is broader, some receivers being as high as 4100 kc., but even this is not so strange in the light of the intermediate frequencies used in present day f-m home receivers. The use of magnetic core tuning, very common in these special service receivers, is like that used in some everyday receivers and a screw adjustment is only a screw adjustment even if one is more critical than the other.

Do not for one moment believe that these comments, concerning similarity and the ease of maintenance, are intended to convey the impression that there is nothing special about these receivers. There is, but usually not of such character as to be beyond the capabilities of the properly equipped service shop. We stress this point because so many men have felt that certain things were entirely beyond their remotest ideas of ability to serve, despite what claims were made to the contrary. If the regular service business had been built with receiver standards as precise as those which prevail in fields outside of general radio broadcasting, there would be no need for stressing these points. . . . The truth is the truth and it must prevail. Given proper equipment and in possession of all facts concerning a receiver, and the ability to interpret these facts, any serviceman will service any communication receiver. Television receivers are more complicated than these communication systems, yet servicemen, who have made it their business to find out what made a television receiver work, have proved that they are capable of maintaining proper service.

Concerning the physical design of these special service receivers, they are as a rule better constructed than home broadcast receivers. If ever you read the *Civil Aeronautics Authority* requirements before they license a radio unit for use on a plane, you would understand why. On the other hand, the construction is not of such character that it would bewilder the operator. The tubes are like those used in the everyday receivers—single ended and double ended. Maybe the sockets are better and the firmness of contact greater, but the parts are accessible from the top or the bottom as in any other receiver. Certainly there are times when some elements hide others, but these are encountered every day and it is here that signal tracing proves its time-saving advantages, for it makes possible total elimination of such resistance or voltage tests which would require the removal of some components in order to be able to get to the others.

Speaking about such voltage and resistance measurements we must cite one instance when such a routine of voltage and resistance measurement

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THE VIDEO REPORTER

by Samuel Kaufman

“AS these lines are being written—” It’s rather difficult these days to report on any video matters without the above preamble.

Reason: So many *sotto voce* activities are going on behind the television scenes and there is so much concern over the next anticipated video move of the FCC that virtually every firm concerned with the art of sending or receiving moving images through the air is in a state of bewilderment.

So we will employ that phrase once again in reporting our impression of the current video scene. Here goes:

As these lines are being written, there is a sudden stir of activity in New York television circles. The NBC-RCA station has emerged from its autumnal hibernation to resume a skeleton service that is a mere shadow of the thriving schedule maintained just a few months ago. But, at that, a few hours of video programs are better than none at all. Or, are they? Any doubts are prompted by the apparent shearing of production expenses.

Yet, it is difficult to blame the officials of video station W2XBS for their economy in the face of the uncertainty of the next FCC move. As a matter of fact, many persons in the industry—in and out of the RCA family—were mildly surprised at the resumption of service.

And it is quite likely that the RCA-NBC unit would not have resumed service as yet, were it not for the sudden television publicity accorded other companies.

Although there was a general belittling attitude at NBC regarding the sudden attention given to the CBS color television method, the Radio City lads had to recognize the fact that the *Madison Avenue* opposition was getting such widespread attention that the public was marvelling at the CBS



Television is again active in N. Y.

achievement while forgetting about all the constructive things done by RCA and NBC in the past.

The first rule of success in the show business is to keep yourself before the public eye. And CBS pulled a trump card in staging its color television demonstrations while W2XBS was in hibernation. Regardless of its merits or shortcomings, the CBS color television plan was the fascinating thing that captured the fancy of radio listeners hearing about it. And those very same listeners are the look-and-listeners of tomorrow, and getting anything across promotionally at this time is an invaluable merchandising achievement and asset.

Another thing apparently came to the attention of the Radio City lads. From their very own location they saw a television antenna go up atop a skyscraper just three blocks away. It meant that programs would soon be emanating from it to the New York

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continued for the remainder of the available space and the pattern would indicate the response over whatever range we decide to use.

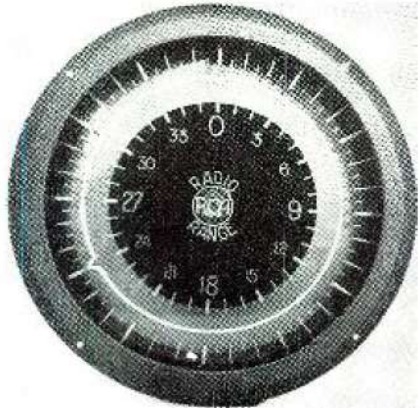
The remainder of the record was cut at 200, 400, 300, 100, 50, and 25 cps. at a level of +18 db. while the outside straight-sided cuts are 400 cycles at +18 db. as a reference. Note that the response falls off at 50 cycles which is normal without any boost. These cuts are to be used for low-frequency reference standards and therefore no treatment was wanted.

The test disc illustrated in Fig. 5 was cut at "constant amplitude" with a Brush RC1 crystal cutter. Here we find excellent response up to 10000 cycles as shown by the uniform pattern width. There is a 2 db. peak at 8000 cycles due to the employment of an equalizer that was added to increase the high-frequency amplitude at that point. The frequencies above 10000 cycles fall off rapidly down into the noise level. This pattern represents an almost ideal condition and the playback will show a nearly flat response if the amplifier is capable of reproducing the entire frequency range.

The next article in the series will be devoted to an explanation of both "Constant Velocity" and "Constant Amplitude" recording and the advantages and disadvantages of both.

Aviation Radio
(Continued from page 22)

soon as the old course is left behind. Dr. Luck is chiefly responsible for the new system after four years of development at RCA's aviation radio laboratory at Central Airport, Camden, N. J. Known as the omnidirectional radio range



beacon, the new instrument operates in the ultra-high-frequency wave lengths, avoiding static and achieving greater reliability in storms or other atmospheric disturbances, Dr. Luck told the engineers.

"The present aviation guidance equipment on long waves gives only four paths in which navigation can be carried out," Dr. Luck said. "But if the pilot wishes to fly off the regular course, or beam, he must carry through a complicated sequence of maneuvers to determine his exact position. In order to supplement the range, then, direction finders are used, to show the direction of the beam transmitting station from the plane."

He explained that aircraft direction finders are not satisfactory in the ultra high frequencies, so that in order to obtain static-free navigation in these frequencies a new system was developed.

"We have worked out a range which marks paths in all directions, reducing the need for a direction finder or radio compass," Dr. Luck said.

Video Reporter
(Continued from page 32)

area. But there was one thing about it that they couldn't enjoy. It wasn't an RCA job. It belonged to the Allen B. DuMont Laboratories!

Incidentally, DuMont has continually done an envious promotional job.

So there was RCA, with a splendid record of television pioneering just standing by while other firms kept themselves before the public eye.

Hence—as these lines are being written—RCA-NBC is back in television action.

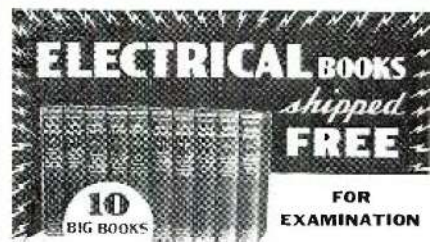
But this much is certain: No longer will the Radio City video set-up get exclusive attention. There are alert and active competitors in the field—a healthy thing for all concerned. And the one who will benefit the most out of the competition is the look-and-listener who is bound to have the advantage of constantly improved offerings from a few local video stations trying to outdo each other.

Book Review
(Continued from page 40)

in continental U.S.A., \$1.50 elsewhere; buckram bound, \$2.50. Spanish edition, \$1.50.

FESSENDEN, BUILDER OF TOMORROWS. By Helen M. Fessenden. Published by Coward-McCann, Inc., New York, N. Y. 362 pp. including index. Price \$3.00. This excellently written book takes the reader through the progress made by that great engineer, Reginald A. Fessenden. The writer, Helen M. Fessenden, in her

foreword says, "To the world of today and the world of tomorrow, worlds alike benefited and enriched by the life of Reginald A. Fessenden, I give the man himself. That the mind which conceived the correct theory of wire-



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NAME.....

ADDRESS.....

CITY..... STATE.....

Please attach letter stating name, occupation and name and address of employer and give at least one business man as reference.

"HAVING A SWELL TIME" WRITES ABNER BUGLE, "WISH YOU WERE HERE"

Abner Bugle is the man who used to write the advertisements for Sprague Condensers.

Nobody could juggle adjectives more gracefully than Abner and, when it came to slapping on the superlatives, even Abner admitted he was just about tops in his profession. But Abner ran into a snag one day, and here is how it happened:

"Look, boss," he wailed to the president of the advertising agency for which he worked. "I'm in a helluva fix. There's nothing more to say about Sprague Atom midget dry electrolytic condensers."

"What!" roared the president, gnashing his teeth so hard he bit the stem off his Meerschaum. "Don't be a fool, Bugle! Why, Atoms build up quicker. They stand higher surges. Their low leakage avoids overheating. They're smaller, and they've got more guts than—"

"I know all that," mourned Abner. "But every cheap condenser makes just about the same claims—whether they can live up to 'em or not. They may not be as good as Atoms in a radio set, but they look just as good in an ad. I don't know what to do."

"Jeepers Creepers, man!" the president's bellow shook the oil painting of the 50th million Sprague TC Tubular hanging on the wall. "And you say you're an advertising expert! Of course Atoms are better. They're unconditionally guaranteed. There isn't a firecracker in a carload—not in a trainload—two trainloads—three trainloads—"

"I know that, boss," wailed Abner. "But you can't PROVE those things in print. No



matter if he fills 'em with mush and wraps 'em in tissue paper, another manufacturer might CLAIM that his condensers are as good as Atoms."

The president did not reply. Grasping pad and pencil, he suddenly began to write. For two hours, Abner stood by, pale and wan and there was no other sound save the feverish scraping of the boss' gold pencil.

"Eureka!" shouted the president finally. "I've got it. Here's what we'll say in our next ad. Listen to this:

"We're glad most condensers are bought on the basis of hard-boiled engineering tests rather than mere advertising claims. When quality is allowed to speak for itself, there can be no mistaking what it says. That's why Spragues are today specified by leading users throughout the world."

"Splendid copy, boss—and it's all true," said Abner, breathing a deep sigh of relief.

"Splendid nothing!" shouted the president. "It's perfect. What's more, you're fired, Bugle. In the future, I'll write the Sprague ads myself."

SPRAGUE PRODUCTS COMPANY
North Adams, Mass.

P.S.—When last heard from, Abner Bugle had become a beachcomber in Tahiti. "Having a swell time—wish you were here," was what he wrote on the postcard, and added: "It's a great life. Beats advertising to a frazzle."

Advertisement