



RADIO NOTES

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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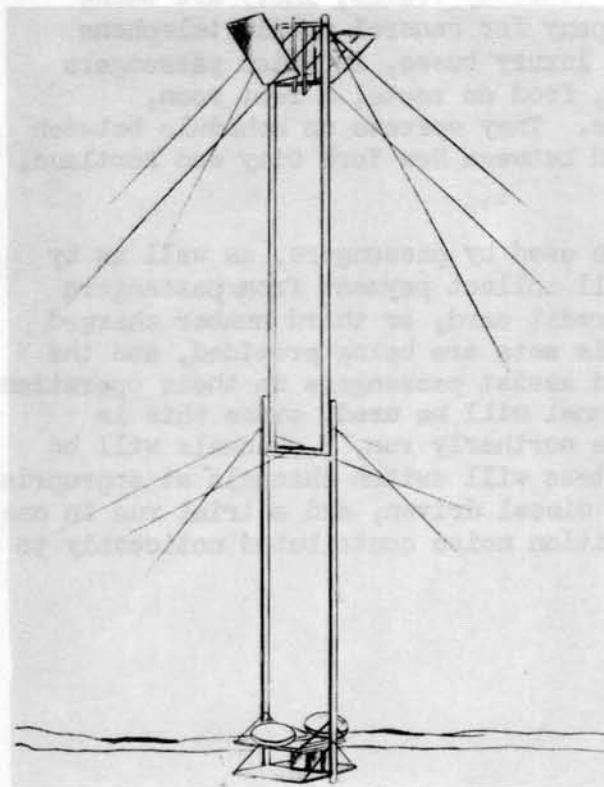
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1. TL MICROWAVE DEVELOPMENT

The TL Radio system is progressing rapidly from prototype to a full blown system ready for field use. Its final form is now crystallizing, its schedule has been set to provide for first shipments in July of 1961, field studies to confirm features and usage have been made, and a P.E.L. covering the system is expected to be out soon.

The system will be very much as described in RADIO NOTES of February 19, 1960 - a basic transmitter-receiver box with a tower which can be located anywhere that you can find a piece of land and an AC power connection. The photograph in that article showed an experimental station at Holmdel on which the TL system is based. The TL design has now progressed to the point where its final form is taking shape. The sketch here shows how a repeater station is expected to look with transmitter-receiver cabinets below and a reflector at the top of a 100 foot H frame tower. A decision has been made to use a reflector antenna system rather than a horn and waveguide. This change not only saves on cost, but permits use of taller towers giving greater antenna system gain under some conditions. The TL arrangement will not be limited to the tower shown, but can be used with other tower types. In addition, the equipment can be mounted in a central office or other buildings where required. Frequency diversity layouts will be available where necessary.



SKETCH OF TL REPEATER
5 FT. DISH AND 6 X 8 FT. REFLECTOR

Field visits to some operating areas have recently been made to check the desirability and need of some of the proposed TL system features. The information gathered has been most valuable in helping to crystalize the final form of the system. During these field visits we took a look at the economics of a number of light route applications and concluded that in many cases TL radio offered stiff competition to other facilities. TL didn't prove in hands-down in all instances, so you engineers won't be done out of a job, but it did look like an extremely useful tool for many applications.

A lot of work has been done here looking toward simplifying and speeding up the ordering, manufacturing and installation of the TL radio system. The details aren't complete yet, but if it works out as we now think, TL will be the fastest and easiest microwave system to put in that you have seen for some time.

2. ABOVE 890 MC HEARINGS REOPENED

The "Above 890 Mc" proceeding (Docket 11866) is the one in which the American Company testified as to the Bell System frequency requirements above 890 Mc.

Following the closing of this proceeding in November 1957, the A.T. & T. and General Telephone Service Corporation requested that the proceeding be reopened for the purpose of considering the possible adverse effects of unrestricted licensing to private point-to-point radio systems and the frequency requirements for space communications. The F.C.C. has now responded to the space communication part of this request. They plan to hear oral presentations July 18 on statements to be filed by July 8. These relate to such matters as space communication experiments which may have been conducted, segments of the radio spectrum required for such communication functions as earth-space-earth, space-space, telemetry, tracking, guidance, command, etc., whether sharing of frequencies between services should be permitted, whether receiving sites should be generally distributed throughout the United States and the purpose to be served by space communications which are not met by other communications systems.

3. PUBLIC TELEPHONE SERVICE IN BUSES

Ten "5-Star" Trailways buses (Safeway Trails, Inc.) are being equipped by the New York Telephone Company for general mobile telephone service in the 150 mc band. These are luxury buses, in which passengers are provided the services of a hostess, food en route, a rest room, recorded music and other accommodations. They operate on schedule between New York City and Washington, D.C., and between New York City and Portland, Maine via Boston.

The telephone service will be used by passengers, as well as by bus company personnel. The hostess will collect payment from passengers who place calls, except for collect, credit card, or third number charged calls. Conventional push-to-talk mobile sets are being provided, and the hostess will be trained to instruct and assist passengers in their operation. On the Washington run, only the YJ channel will be used, since this is available throughout the route. On the northerly run, 3 channels will be needed to obtain coverage, and the hostess will switch channels at appropriate points along the route. The buses are diesel driven, and a trial run in one of them showed that the absence of ignition noise contributed noticeably to good performance.

4. PACKAGED TD-2 EQUIPMENT

Recently the Long Lines Central Area has had to provide temporary microwave services of long duration (3 to 6 months) consisting of four to five links in tandem added to a television network facility. In order to cope with future requirements of this type, they have repackaged TD-2 equipment into a portable and flexible arrangement.

The TD-2 transmitter, receiver, and power supply are packaged as individual units which are relay rack mounted inside permanent shipping cases 58 $\frac{1}{4}$ " high, 27" wide and 22 $\frac{3}{4}$ " deep. The transmitters and receivers each weigh 310 lbs., while the power supply weighs 350 lbs. These weight figures include shipping cases of 170 lbs. each.

One power supply unit has sufficient capacity for furnishing power to: (1) FM transmitting terminal and a microwave transmitter (2) a microwave transmitter and receiver, (3) a microwave receiver and FM receiving terminal. Consequently, only one power supply is required for a transmitting terminal, repeater, or receiving terminal.

The original plans provide for the packaging of eight transmitters, receivers, and power supplies and four FM receiving terminals equipped with clamper amplifiers and other video terminal equipment. At the present time two transmitters, receivers and power supplies have been completed. These were placed in service May 11, 1960 as repeaters on a TV system furnished to the government.

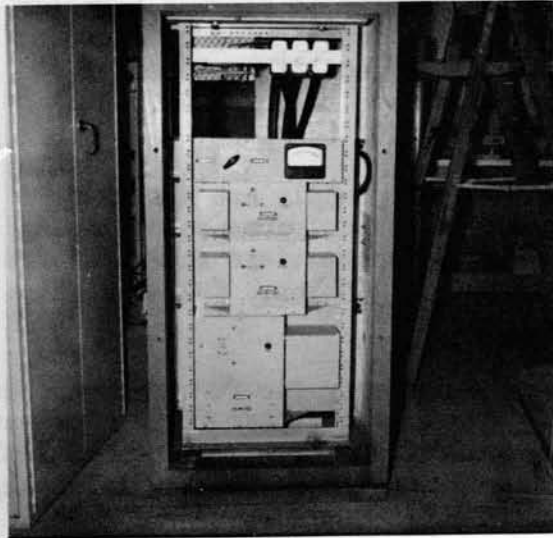


RECEIVER

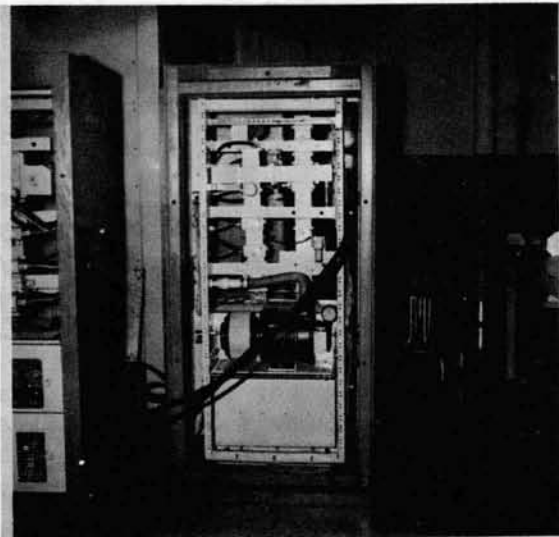


TRANSMITTER (Front)

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POWER SUPPLY



TRANSMITTER (Rear)

5. PROJECT ECHO THWARTED BY ROCKET VEHICLE FAILURE

The Project Echo communications experiment of the National Aeronautics & Space Administration (NASA) was thwarted on Friday, May 13, when launching of the 100-foot inflatable sphere from Cape Canaveral, Florida failed. It was announced after the failure that the Project Echo test will probably not be attempted again until later this year. Moral: Never launch satellites on Friday the 13th.

NASA had planned to send the aluminum sphere into a 1000-mile altitude earth orbit for use as a passive reflector in a worldwide communications test, (RADIO NOTES, September 22, 1959) but the launching failed in its second stage and the vehicle carrying the collapsed balloon, which was to be inflated in space, disappeared.

The Bell Telephone Laboratories station at Holmdel, New Jersey, and the NASA/Jet Propulsion Laboratory's Goldstone tracking station in California, were to be main ground points for the communications test. Other facilities, both professional and amateur, around the world had also been poised to try to bounce radio signals off the surface of the sphere.

The Holmdel installation consists of a 10 kw transmitter operating at 960 mc, a steerable 60 foot parabolic antenna, a steerable horn reflector receiving antenna with a 20 by 20 foot aperture, a specially designed receiver using a maser amplifier operating at 2390 mc and computing and control equipment to keep the antennas aimed at the satellite. The maser (a solid state amplifier), cooled by liquid helium, eliminates most of the thermal noise added to a signal by conventional receivers.

6. GLOBE WIRELESS MERGER

Globe Wireless Ltd. is one of the international radiotelegraph carriers using the frequency band where our overseas radiotelephone service operates and with whom we have dealings on frequency matters. A recent merger makes Globe a part of the International Telephone and Telegraph family of companies.

Under an application granted by the F.C.C., Globe Wireless will come under control of the American Cable and Radio Corporation, a subsidiary of the International Telephone and Telegraph Company. In the new set-up Globe retains its present name, and becomes an operating unit under American Cable and Radio along with All America Cables and Radio, Inc., The Commercial Cable Company and Mackay Radio and Telegraph Company.

Globe was one of the early companies in the international radio field, having been formed in 1930. It now operates in the international fixed point-to-point service and also in the maritime mobile service, mostly in the Pacific area.

7. MOBILE DIAL TELEPHONE SERVICE

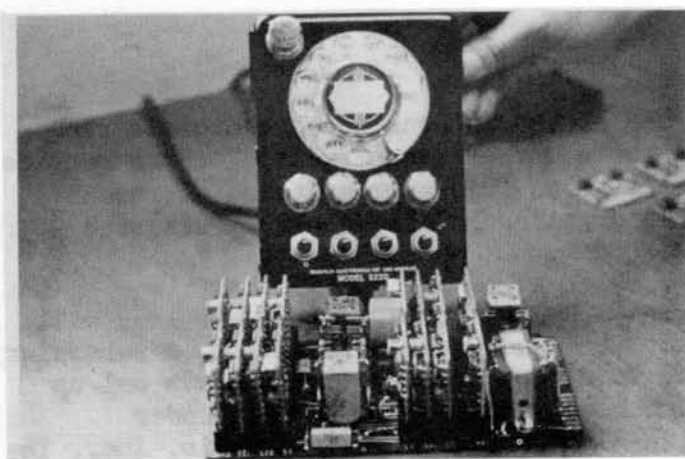
First customer trials in the Bell System of two-way mobile dial telephone service began in Chattanooga, Tennessee on May 4 with the installation of dial telephones in ten customers' cars. Experiments conducted earlier (RADIO NOTES, September 22, 1959) in Southern Bell vehicles proved it practical to begin trials of the new equipment in customer vehicles.

One photograph pictures Miss Peggy Moon, Chattanooga District Plant, demonstrating the ease with which a mobile telephone call can be dialed. The other shows the dial mechanism and a section of the electronic switching apparatus.



Any call - local or DDD - may be dialed from a mobile dial telephone in the same manner as a call from a home or office telephone. Registering, timing and billing information for calls made from a mobile dial telephone is done automatically. In dialing a call from a local "land-line" station to a mobile dial unit, however, the CAMA access code (112) must be dialed before the two-letter, five digit mobile dial telephone number is dialed.

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Southern Bell's experiments with mobile dial telephones began in Chattanooga about a year ago. An interdepartmental mobile dial telephone committee has been working out various problems present in the development of a new service of this type. This committee will continue to function during the customer trial period and will furnish information concerning the progress of the trial to other Bell System Companies.

At the end of the trial period - if the units win customer acceptance - all mobile telephone service in Chattanooga will be converted to full dial operation.

8. TELEPHONE MAINTENANCE

The Companies are now actively participating in the Telephone Maintenance Radio Service.

As there are differences in F.C.C. requirements of operation in the Telephone Maintenance Service as compared with the Domestic Public Land Mobile Radio Service, we want to take this opportunity to clarify a few points.

Telephone Maintenance Service operates under the F.C.C. Industrial Rules, Part 11, while Domestic Public Land Mobile Service operates under Part 21. Historically, operation under the Industrial Rules is on a simplex basis while the Telephone Companies in their general public service, operate on a duplex basis. In the Telephone Maintenance Service, either the duplex or simplex operation is permitted; nevertheless, the rules for the two services are not quite parallel. Rule 11.753 of the Telephone Maintenance Service states:

"Mobile relay stations will not be authorized in the Telephone Maintenance Radio Service within the continental limits of the United States, except when such stations and all associated control and mobile stations are to be operated exclusively on frequencies above 450 mc."

This rule means that the base station may not automatically (without benefit of operator) retransmit the conversation when using frequencies below 450 mc. The various services in the Industrial rules are for the most part from car to dispatcher at the base station or directly between cars. If operation is required on frequencies below 450 mc

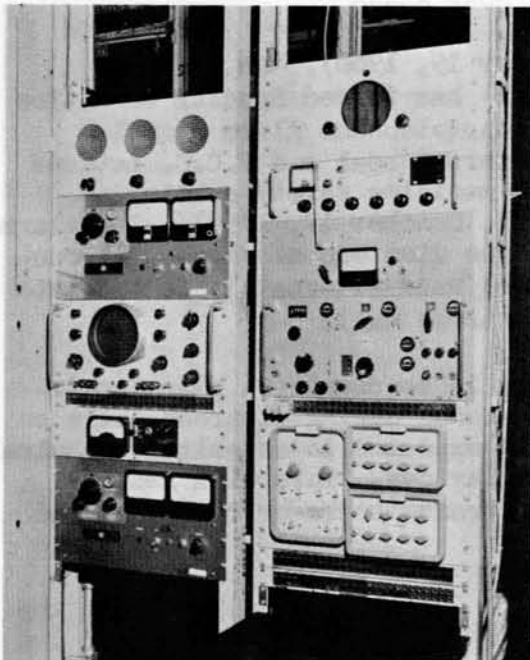
where the communication is to be retransmitted through the base station, the necessary circuit arrangement must be set up by a "patch" or "key" and the communication conducted under the supervision of the attendant at the control point. This type of operation is permitted under the present rules without special authority from the F.C.C.

9. MEETING WITH EQUIPMENT MANUFACTURERS ON AIR-GROUND RADIO

A meeting was held with representatives of equipment manufacturers, ARINC and USITA on June 6 at 195 Broadway to discuss system requirements in connection with establishing public air-ground radiotelephone service. A.T. & T. Company and B.T.L. representatives outlined Bell System plans and general airborne equipment requirements. Manufacturers represented were: AC Spark Plug Division of General Motors, Motorola Inc., Bendix Radio, Collins Radio, RCA, General Electric and International Telephone and Telegraph Company. It is expected that the airborne radio equipment for this service will be purchased and maintained by the customer.

10. CENTRALIZED FREQUENCY CHECKING

The Pacific Company people at Los Angeles have been using a centralized frequency checking scheme somewhat similar to the New York Company arrangement covered in the April 19, 1960 issue of RADIO NOTES. The equipment shown in the photograph is installed at their mobile telephone control terminal location in downtown Los Angeles. It is used to check frequency and modulation of base station transmitters on Mt. Wilson and Verdugo Peak 20 to 25 miles away.



Base transmitter signals are picked up on special multi-channel receivers in each band and compared with the frequency of a Gertsch FM-6 frequency meter. A WWV receiver is used to calibrate this frequency meter. Modulation is observed on an oscilloscope connected to a receiver's discriminator, which may be calibrated by shifting the frequency of the FM-6. Comparisons of received signal and Gertsch reference frequency signal, for either frequency or deviation checks, are made simultaneously by means of a coaxial switch, driven at a 60 cycle rate, which connects the receiver input alternately to the receiving antenna and to the Gertsch meter.

The ability to see the modulation waveform on the oscilloscope has resulted in the detection of a variety

of troubles which might otherwise have remained uncorrected for some time. These have included over-modulation of transmitters, distorted tones from selective signaling oscillators, and improper operation of vogads and deviation limiters. It is becoming evident that this by-product of the frequency checking arrangement is a major asset. The Radio Specialties Frequency Deviation Meter described in P.E.L. 6593 is also well suited for this kind of an application. It combines into one instrument, the features of a multi-channel receiver and a calibrated oscilloscope, and under most conditions can remotely monitor a base station transmitter to observe frequency setting and modulation deviation.

11. MT. ROSE-RENO OFF-THE-AIR SYSTEM

During the week of April 18, 1960, B.T.L., A.T. & T. and Bell of Nevada Engineers made transmission tests on the first television installation of a TJ Radio system. The system had been in service and operating satisfactorily approximately one month prior to the tests.

The Mt. Rose-Reno television system is a four channel off-the-air system with the pickup point at Mt. Rose. The signals are relayed via four channels of TJ over an 18.3 mile path to Peavine Mtn. From Peavine Mtn. to Reno, a distance of 7.6 miles, four channels of Motorola VX1N04/05 are used.

Tests on the four TJ channels indicated that the system is performing satisfactorily for NTSC color. Results of these tests and other data on the performance of TJ for television will be sent to the Companies as soon as available.

12. SPECIAL COMMITTEE ON MARITIME RADIOTELEPHONE ALARM

As anticipated (RADIO NOTES, February 19, 1960), the Radio Technical Commission for Marine Services (RTCM) has formed Special Committee No. 44 to investigate the "Introduction of Radiotelephone Alarm Signal Usage in the United States". This follows international and F.C.C. actions authorizing voluntary use of the alarm on the maritime safety-calling frequency 2182 kc (P.E.L. 6554 and RADIO NOTES, October 19, 1959). The alarm signal is a distinctive alert for ship telephone distress messages. It consists of two audio tones (1300 and 2200 cycles) used alternately to modulate the 2182 kc transmission at the start of a distress call.

The purpose of the special committee is to develop a plan for introducing and expanding the use of the alarm signal during distress calls on 2182 kc. In its report, the committee also is expected to establish technical requirements and specifications for the alarm devices. This will assure operational compatibility with the connecting transmitters or receivers and compliance with F.C.C. Rules.

The committee membership will include government, manufacturing, boating organization, and communications people. As the maritime safety agency, the Coast Guard will chairman and play a leading role on this committee. The Bell System representative is J. W. Stubner here at "195".

Official organization of the committee is just getting under way. As the committee work and plans for this feature materialize, information will be sent to the Companies.

13. NEW MOBILE TELEPHONE VEHICULAR SET

Trial models of the AC Spark Plug vehicular radio set are now being placed in commercial service. (See RADIO NOTES, December 21, 1959) Some 50 of these sets are to be installed in Company or customer cars in the Illinois, Indiana, Mountain States and New York Companies.

During an operational trial period of three to six months, the performance of these sets will be closely watched at 195 and the Bell Laboratories. In particular, maintenance will be checked with trouble reports.

Twenty of the sets have been assigned to Binghamton, New York. These will make up the vehicular requirements for a new urban mobile service area serving Binghamton, Johnson City and Endicott. AC Spark Plug engineers and the Upstate New York Plant Training people have conducted two one-day schools to introduce the new set to the field forces.

Results of the trial will be forwarded as soon as available.

14. RADIO INFORMATION

The following have been forwarded since the last issue of RADIO NOTES:

BSPM 718A	-
BSPM 719	R60.525.1, Issue 2 - Television - KS-15654, List 2, E47.421.1 Video Monitor
	AA636.740, Issue 3 - Performance Requirements - J68333A Test Bench for TD Radio - Toll Systems
	AA636.745, Issue 4 - Performance Requirements - TD-2 Transmitter-Receiver Bay Tested with J68345A Test Set - Toll Systems
BSPM 719A	-
BSPM 720	-
BSPM 720A	-

BSPM 721 A301.838, Issue 3 - J86473 Power Supply - Regulated
AC and DC Voltages - TJ Radio -
Operating Methods

BSPM 721A -

P.E.L. 6662 Personal Signaling Service - 35 Mc Systems - Stromberg-
Carlson Company Equipment Drawings (1S3.9M-14)

P.E.L. 6667 TD-2 Radio Systems - KS-16784 Blower-Heater Assembly for
Drying KS-5759 Delay Lens Antennas (1S3.4-139)

P.E.L. 6678 TD-2 Radio - J68330B Receiver Control Unit - Replacement
of V4 Electron Tube with 420P Diode (1S3.9G-33)

P.E.L. 6677 Radar Interference - Radar Filters (1S3.12-140)

P.E.M. 7198 TD-2 Radio Systems - Waveguide Water Trap for Horn
Reflector Antenna Systems

P.E.M. 7215 Power Systems - Protective Covers for KS-14169 and
KS-14170 Fuse Blocks Used on TD-2 425A Power Plants

P.E.M. 7228 TD-2 Microwave System - Automatic Protection Switching
System - Initiator Modification (1S3.6-79)

Unnumbered Letters to Chief Engineers and Plant Managers

4-29-60 Radiation Training Courses - Radiological Health
Activities

5-13-60 Ionizing and Microwave Radiation

Unnumbered Letter to Plant Supervisors

5-3-60 Mobile Radio Cost Results Summary

Unnumbered Letter to Certain Transmission Engineers

5-3-60 Bellboy Personal Signaling Service - Additional System
Line-Up Preliminary Information (1S3.9M-15)

Unnumbered Letter to Chief Engineers

6-7-60 Public Radiotelephone Service to Aircraft (1S1.12-5)

CORRECTION LETTER

5-11-60 Bellboy Personal Signaling Service - Changes and
Additions in 35 Mc Equipment Ordering Information