

*Some customers may prefer a handset that, in addition to the transmitter and receiver, also includes a dial. In what could be an important new design for the future, Bell Laboratories has built an experimental Dial-In-Handset telephone that offers this dialing convenience and meets rigid operation and transmission requirements.*

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## An Experimental “Dial-In-Handset” Telephone

During the last few years, customer demand for new telephone instruments and services has been increasing rapidly, stimulated by the vigorous merchandising campaign of the Bell System. A number of these are already available, such as the small Princess Telephone Set, the Call Director, the Telephone Answering set and the Speakerphone. A home communication system is just now becoming available. In addition, a push-button dial set is on field trial, and a new, smaller wall set will be ready for trial later this year. Many other projects are in various stages of development, such as panel-mounted telephones, desk-drawer sets, a small executive set and a patio telephone set.

One of the more radical concepts being explored involves a change in the use of the telephone. That is, it might be possible to bring the dial to the user by incorporating it in the handset.

This has led to consideration of a drastic departure from previous ideas of what a handset should look like.

The basic appearance of the handset has not changed appreciably since its introduction in 1928, but improvements in the art have of course made the present handset functionally far superior to its predecessors. The end result has been a lightweight, efficient and trouble-free instrument which, together with its mounting, has provided the customer with a telephone set of pleasing appearance and easy operation. However, there are particular applications where the advantages and the added convenience of a Dial-In-Handset telephone are immediately apparent. In bedroom installations, for instance, such an instrument would permit easy dialing while lying down, or in drive-up coin stations, where the handset is brought into the automobile, it would

eliminate the necessity to reach out for dialing.

There are several possible locations for mounting the dial in a handset. The standard lineman's handset has the dial located at the back of the instrument at the receiver end. Another possibility is to mount the dial finger-wheel concentrically around a small transmitter unit. This arrangement appeared attractive, but it would require both a new transmitter unit and a small dial designed to meet severe system requirements for large-scale usage. Still another Dial-In-Handset, a European design, stands upright with the dial located in handset base. All of these dial positions have one or more disadvantages, such as difficulty or awkwardness in dialing or an unbalanced distribution in weight.

### **The Importance of Dial Location**

Locating the dial between the transmitter and the receiver overcomes most of the difficulties. Since the dial can be recessed in a cavity, the needed mechanical protection is obtained automatically, and inadvertent rotation of the dial is minimized. The ultimate shape and form of the experimental handset was proposed by the industrial designer, Henry Dreyfuss, and was determined to a large extent by the dial location. In this arrangement, the handset shell is contoured to fit the hand, with the dial nesting snugly in the palm — a very convenient, stable position for holding and dialing. With the basic form of the handset thus established, a compatible base was developed, resulting in a much smaller

telephone with a distinctively different character.

The handset is molded in two pieces — a boat-shaped shell and a cover plate. All of the components — the transmitter, receiver, dial and dial light — are mounted on the cover plate. The two parts are fused together to form a complete handset. For maintenance, the dial and the retractile handset cord are accessible and replaceable through the dial cavity. The transmitter and receiver are permanently sealed in, but since these components are essentially trouble-free items, the need for servicing or replacement is extremely low.

The lamp for the dial light is placed in the region near the 8 and 9 holes of the fingerwheel. It is readily replaceable by the customer without special tools. All he needs is a small coin. The dial number-plate is a relatively thin piece of acrylic plastic material that is edge-lighted by the lamp, illuminating the dial characters uniformly over the entire number plate area. There is a choice here of using light characters on a variety of dark-colored backgrounds. In any case, alternative background cards can easily be substituted to harmonize with the color of the set. The lamp also serves as a night light for subdued illumination to locate the set in the dark.

The dial was developed by the Laboratories group at the Indianapolis location, specifically for this application. Weight has been minimized, and a new high-speed governor has been provided. Unlike present dials, which are firmly mounted in a fixed position on desk or wall housings, this



*This group picture shows recent trends in handset design. Two earlier designs, in black, are shown at left. Group at right consists of 500-type set with dial, experimental unit with push buttons, Princess Set, top, and new experimental Dial-In-Handset. The Dial-In-Handset is the first radical departure in handset design.*



*Miss Barbara Weiss of the Laboratories tries the new Dial-In-Handset. At her elbow is the new Princess Set, and at the left is an experimental panel model mounted with its base flush with wall.*

new dial must perform properly in all positions. The dial finger-wheel and the finger-hole diameters are slightly smaller than on the standard dial, but the wheel and the holes have been so shaped that dialing is easy and comfortable.

The transmitter is the T-1 unit used in the present standard handset. The receiver unit is new and its weight is roughly one-half that of the U-1 receiver, a saving of about 40 grams. This, of course, is an important consideration in handset applications.

The customary circular receiver and transmitter screw caps, with their annular pattern of holes, are no longer necessary in the new handset. The integral cover plate permits a wide choice of patterns. As seen in photograph on this page the transmitter openings are louvered and somewhat elliptical; the receiver openings are narrow slots which were designed to provide the proper acoustic load on the instrument. Other opening patterns of the same general character, but of slightly different shape, appear equally attractive. The distance between the transmitter and the receiver, and the angle of the planes of the trans-

mitter and receiver diaphragms, are identical to those in the standard handset. These dimensions are based on the size and shape of the human head and on rigid transmission requirements.

The new handset, including the dial, weighs 12.4 ounces, a little lighter than the standard black phenolic handset (12.5 ounces), but heavier than the color handset (10.1 ounces). Further design work is expected to reduce the weight slightly. The cord must of necessity be somewhat larger than that of conventional handsets, since four additional wires are required for the dial and dial light.

In the on-hook position, the handset rests on a small base housing that has a low, sloping silhouette. All exposed surfaces are smooth, simplifying the dusting problems for fastidious housewives. The base area is oval in shape and about half that of the 500 set. The over-all height, including the handset, is 3-1/2 inches compared to 4-3/4 inches for the 500 set. The substantial reduction in all dimensions, which makes the new set particularly suitable for small tables, also required a rearrangement of the set components and a complete redesign of the switch-hook. In addition, a high degree of flexibility has been maintained in the basic set so that a number of special service features can be added according to the needs of the customer. Among these are a two-line pick up, an exclusion or hold feature, and switching for a home communication system.

### **Other Features**

The new set could be installed either horizontally on a desk or table, or vertically on a wall surface. Stable, vertical hang-up is obtained by the matching contours of the squared off, inner part of the receiver cap and the exposed part of the switchhook.

The new experimental set has not been officially named, and until a more appropriate and distinctive name is suggested, it is being called the Dial-In-Handset telephone. The service objectives have been met and the preliminary design is finished, resulting in the unique free-flowing form. Preliminary results of a product trial indicate a high rate of customer acceptance of this radically different instrument. The design prospects look very promising — it is indeed an example of designing for the future.