

## G.E.C. Extension Telephone Schemes.

ONE of the simplest ways in which a telephone Administration can increase revenue with but little capital outlay is by offering extension service to those subscribers whose needs are probably not met in full by the usual single instrument. At the same time, subscriber goodwill can be increased because extension service removes the inconveniences inevitably present if only one instrument is installed when two or three are really necessary. In the past, however, the maximum increase in convenience has not always been obtainable, because the apparatus necessary for providing most of the desirable facilities has itself been somewhat inconvenient to use. This has been largely due to the number of separate items of apparatus required at each point in the extension system. This multiplicity of parts has had its effect also on the appearance of an installation, which has been far from attractive. Notwithstanding these factors, extension service has always found wide application, a fact that is proof of the need for a form of telephone service lying, in facilities offered, between a P.B.X. and a single instrument.

To-day, the disadvantages have been removed, and a subscriber may now have extension service without suffering the installation of a separate telephone, switching bell set, bell, etc., as was necessary in the past. The Gecophone and the G.E.C. Switching and Extension Telephones have been combined in schemes that provide all the facilities usually required, and the

largely self-contained construction of these instruments reduces the number of separate components to a minimum. Extension service, therefore, takes on an added appeal, both to the subscriber and the Administration.

In the following pages are described eighteen Schemes which have been designed to provide a wide range of extension service. Each scheme has been allotted a number for its ready identification. All are suitable for use on automatic or C.B. manual systems.

The G.E.C. Switching Telephone (Cat. No. 200), and Extension Telephone (Cat. No. 201), were described in Vol. 8, No. 1, of this Journal. The method of their use then outlined is included in the schemes now listed.

### *Scheme No. 1.*

Two Gecophones (Cat. No. 75) in parallel on one exchange line.

This is the simplest form of extension working. Incoming calls are signalled at both telephones and answered from either. Calls can be made from either and are not secret. There is no intercommunication, that is, one extension cannot call the other.

### *Scheme No. 2.*

Two Gecophones in parallel on one exchange line, one Gecophone (Cat. No. 203A) having a switch for its bell.

This is similar to Scheme No. 1 except that incoming calls may be signalled at both instruments or at one only if the switch in the second is open. Should the

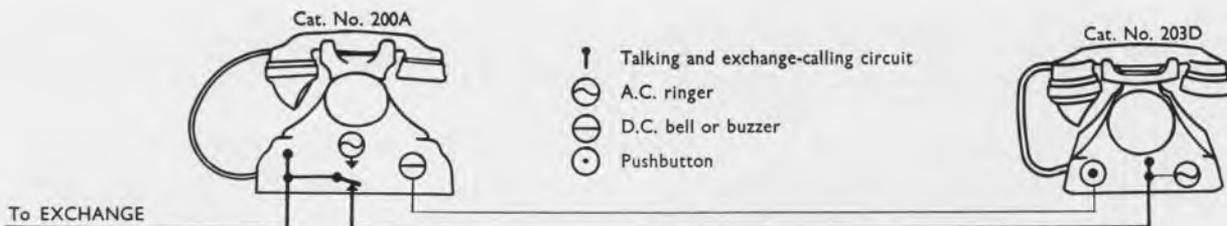


Fig. 1.—Scheme No. 5, showing conventions used also in diagrams for other Schemes.

user not wish to be disturbed, he leaves the switch open, when incoming calls are signalled and answered at the other Gecophone. Calls can be made from either telephone and are not secret. There is no intercommunication.

*Scheme No. 3.*

Three Gecophones in parallel on one exchange line, with controlled extension. Incoming calls are signalled only at one of the Gecophones (Cat. No. 203B). After answering, the user of this Gecophone may call either of the others (Cat. No. 203C) by pressing an appropriate button. A buzzer sounds in this second telephone, and, with removal of the handset, the user may take the call. Calls can be made from any

telephone and are not secret. There is no intercommunication.

*Scheme No. 4.*

Three Gecophones in parallel on one exchange line, with “filtering” of calls.

This differs from Scheme No. 3 in that, whilst incoming calls are signalled and answered at the first Gecophone (Cat. No. 203D), as in Scheme No. 3, from this telephone one only of the others (Cat. No. 203E) can be called. The user of this second telephone may call the third (Cat. No. 203C), which thus receives calls only after they have been “filtered” through the other two. Calls can be made from any telephone and are not secret. There is no intercommunication.

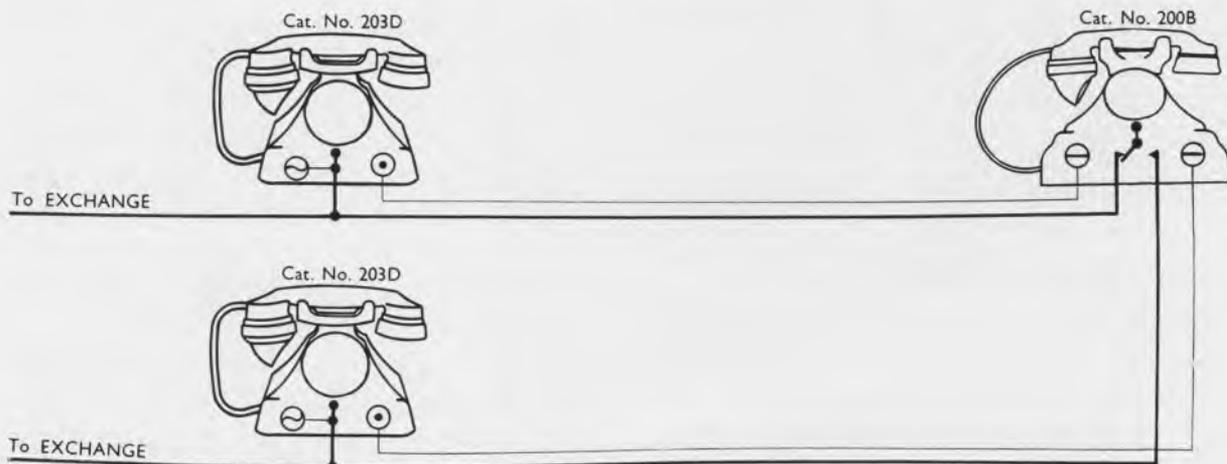


Fig. 2.—Scheme No. 6.

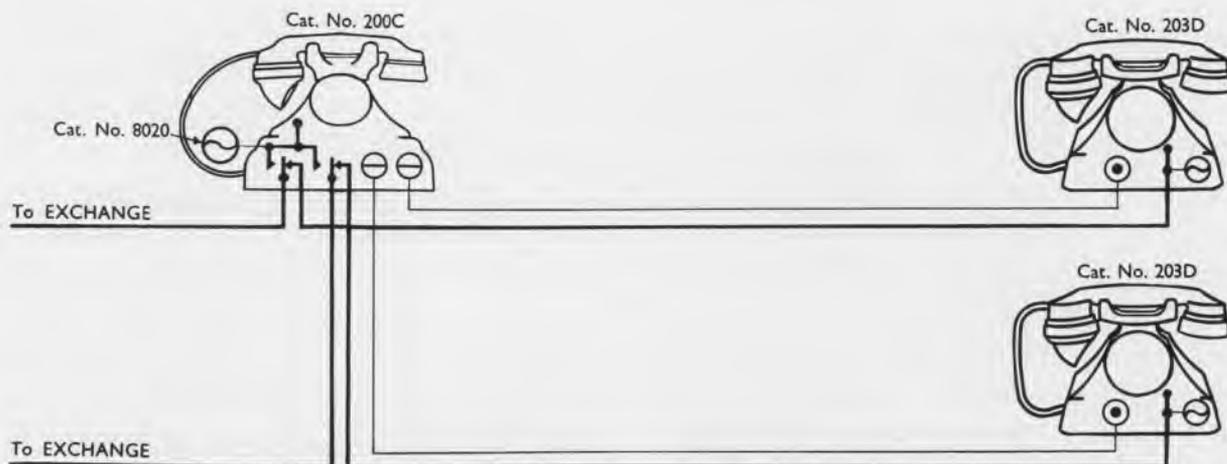


Fig. 3.—Scheme No. 7.

*Scheme No. 5.*

G.E.C. Switching Telephone (Cat. No. 200A) and a Gecophone (Cat. No. 203D) on one exchange line.

This is shown diagrammatically in Fig. 1. The switch is normally left to connect the line through to the Gecophone, on which calls are signalled and answered. A button may be depressed in the Gecophone to call the Switching Telephone, the user of which takes the call on his handset. The switch may then be operated to disconnect the Gecophone and thus to obtain secrecy

Calls can be made from the switching Telephone and, with the switch in correct position, from the Gecophone. The switch should be specified as locking or non-locking, as desired, but since the Switching Telephone can be signalled from the Gecophone, the latter cannot in any case be inadvertently isolated. There is no intercommunication.

*Scheme No. 6.*

A Gecophone (Cat. No. 203D) on each of two exchange lines, with a Switching

Telephone (Cat. No. 200B) in parallel with either. This scheme is shown in Fig. 2. An incoming call on either line is signalled and answered at the associated Gecophone, which is fitted with a pushbutton for signalling the Switching Telephone should it be necessary to extend the call. In the Switching Telephone, a call from one Gecophone is signalled by a buzzer and from the other by a bell. The user switches to either line, in accordance with the signal received. Calls to the exchange can be made from either Gecophone, and from the Switching Telephone over either line. They are not secret. There is no intercommunication.

*Scheme No. 7*

A Gecophone (Cat. No. 203D) on each of two exchange lines, with a Switching Telephone connected to either, with secrecy This is shown in Fig. 3. A three-position switch in the Switching Telephone (Cat. No. 200C) normally switches both lines through to the Gecophones, on which calls are signalled and answered. From pushes in the Gecophones,

the Switching Telephone may be signalled, a bell and a buzzer giving the necessary distinction between them. With the switch then moved to the appropriate position, the signalling Gecophone is isolated and the call is taken at the Switching Telephone in secrecy. The second Gecophone remains connected to the second line.

The switch may be left in position for incoming calls on a selected line to be signalled at the Switching Telephone. With the switch at normal, a call may be originated at either Gecophone, a corresponding indicator in the Switching Telephone then showing an engaged signal. There is no intercommunication.

#### *Schemes Nos. 8 to 13.*

These differ from each other in detail but have in common the use of two telephones on one exchange line, with calls answered and made from either, and with intercommunication between them. They are therefore the most useful of the schemes employing two telephones. Scheme No. 8 is described in full, and then the other schemes are explained by mentioning the extent to which they differ from Scheme No. 8.

#### *Scheme No. 8.*

Switching Telephone (Cat. No. 200) and Extension Telephone (Cat. No. 201) on one exchange line, with intercommunication and partial secrecy

This scheme is shown in Fig. 4. An incoming call is normally signalled and answered at the Switching Telephone. Should it be necessary to extend the call, then the switch is moved to the appropriate

position and a pushbutton is depressed to sound a buzzer in the Extension Telephone. The user takes the exchange call by lifting the handset.

The matter discussed, however, may not require the exchange call to be switched through, but may require the user of the Switching Telephone to call the Extension Telephone for discussion before replying to the distant party. This requirement is met by a hold circuit that is connected across the line when the switch is moved to a second position for intercommunication.

The intercommunication facility enables the Extension Telephone to call the Switching Telephone to ask for a through connexion in order that an exchange call can be made. On the other hand, the switch may be left to establish a through connexion in order that incoming calls shall be signalled and answered at the Extension Telephone. When the line is engaged by this latter telephone, an indicator provides an engaged signal in the Switching Telephone, the user of which, wishing to make a call, would use his discretion as to whether or not to interrupt. Exchange calls to the Extension Telephone are not secret against the Switching Telephone because the switch, in establishing a through connexion, does not isolate the Switching Telephone. On the other hand, calls to the Switching Telephone will normally be secret against the Extension Telephone.

With the exchange line held, intercommunication is secret, *i.e.*, the distant party cannot hear the conversation. Should



Fig. 4.—Scheme No. 8.

intercommunication be in progress, an incoming exchange call will not interfere but will ring the bell associated with the Switching Telephone.

To provide current for the talking circuits on intercommunication, a local battery is employed, and is used also to supply current for the buzzers.

#### *Scheme No. 9.*

This is exactly as Scheme No. 8, except that removal of straps in the Switching Telephone makes exchange calls to Extension secret against the Switching Telephone.

#### *Scheme No. 10.*

As Scheme No. 8 except that a Gecophone (Cat. No. 203E) with external bell replaces the Extension Telephone.

#### *Scheme No. 11.*

As Scheme No. 9, except that a Gecophone (Cat. No. 203E) with external bell replaces the Extension Telephone.

#### *Scheme No. 12.*

As Scheme No. 8, except that calling is by hand-generator instead of pushbuttons. In consequence, the number of wires between telephones is reduced to two, which may be desirable if they have to run over a pole route. This scheme employs

a generator and additional external bell at the Switching Telephone, and an extension instrument in the form of a Gecophone (Cat. No. 75) with internal bell and external generator.

#### *Scheme No. 13.*

As Scheme No. 12 except that removal of straps in Switching Telephone makes exchange calls to Extension secret against the Switching Telephone.

#### *Schemes Nos. 14 to 17*

These go a step further than Schemes 8 to 13 in employing two extension instruments. Scheme No. 14 is described with reference to a diagram, and the others are explained by reference to the extent by which they differ from Scheme No. 14.

#### *Scheme No. 14.*

Switching Telephone (Cat. No. 200) and two Extension Telephones (Cat. No. 201) on one exchange line, with intercommunication and partial secrecy

This is illustrated in Fig. 5. The facilities it offers are exactly as those of Scheme No. 8, except that they are increased as a result of the use of two extensions. One extension may obtain intercommunication with the other by first calling the Switching Telephone and asking for the second extension to be signalled.

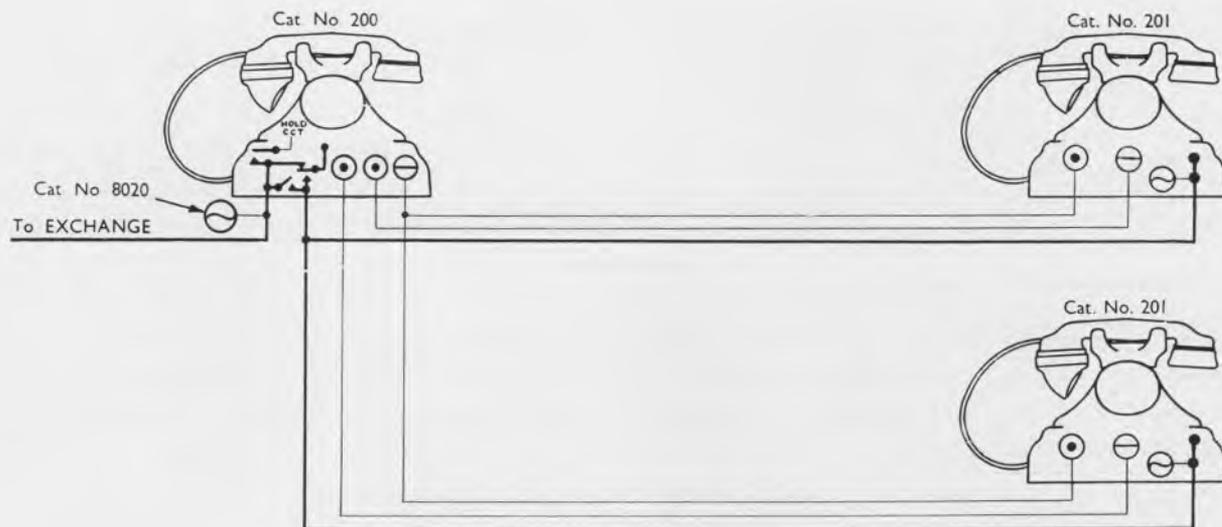


Fig. 5.—Scheme No. 14.

*Scheme No. 15.*

This is as Scheme No. 14 except that removal of straps in the Switching Telephone makes calls to either extension secret against the Switching Telephone.

*Scheme No. 16.*

In this scheme, Gecophones (Cat. No. 203E) with external bells replace the Extension Telephones of Scheme No. 14.

*Scheme No. 17*

In this scheme, Gecophones (Cat. No. 203E) with external bells replace the Extension Telephones of Scheme No. 15.

*Scheme No. 18.*

Switching Telephone (Cat. No. 200K) on two exchange lines.

This is not an extension scheme in the true sense because it employs only one telephone without an extension instrument.

The single telephone, however, has been designed to give much more than the usual facilities, and, being of the Cat. No. 200 type, finds a place in this list of Scheme Numbers.

The arrangement is shown in Fig. 6. Two exchange lines are terminated at the telephone, and calls can be received over either, an A.C. buzzer internally and an A.C. bell externally giving the necessary distinction to show to which line the telephone should be switched. A call can be originated on either line after the switch is appropriately positioned.

An incoming call may require the user to converse with another party, who can be



Fig. 6.—Scheme No. 18.



Fig. 7.—Switching Telephone, Cat. No. 200.

called over the second line whilst a hold circuit is applied to the first. Further, this second call may be held whilst conversation is resumed on the first, an indicator then providing a signal that the second line remains engaged and should be released, when no longer required, by depression of a pushbutton. Calls on one line are, of course, secret from those on the other

A particular application of the scheme is one in which the number of one line is omitted from the directory and made known to a few subscribers whom the user wishes to be able always to call him, even if he should be already engaged.

#### *Apparatus.*

It will be seen that the Switching Telephone plays a considerable part in these Schemes. The Cat. No. 200 instrument is, in fact, common to Schemes 8 to 17, and only the one type of Switching Telephone need be stocked for these Schemes. This is possible because the telephone is always fitted with a four-position switch, D.C. buzzer, indicator, and contact springs for two pushbuttons.

The actual pushes are stored within the set and either or both may be fitted to the contact springs to meet the needs of any particular Scheme. Removal of a small plate in the base discloses the aperture through which the push projects when fitted to its contact springs. The plate is then stored within the case. Not only are necessary stocks thus reduced to a minimum, but Switching Telephones recovered from one of the Schemes 8 to 17 may readily be arranged for use in another of the Schemes, if desired.

For Schemes Nos. 5, 6, 7 and 18, the Cat. No. 200 type of Switching Telephone has been modified, the various new forms being distinguished from each other and from the standard by means of suffix letters. The resulting Cat. Nos., for example, Cat. No. 200A, have been quoted in the foregoing descriptions.

The Extension Telephone Cat. No. 201 is in each instance of its use the standard set already described in Vol. 8, No. 1.

Gecophone Cat. No. 75 is the standard subscriber's set. For the various Schemes



Fig. 8.—Extension Telephone, Cat. No. 201.



Fig. 9.—Gecophone, Cat. No. 203B.

employing sets other than standard, the Gecophone has been modified as necessary and has been allotted the Catalogue No. 203, with suffix letters to distinguish the types. These Catalogues Nos. have been quoted in the foregoing descriptions.

All the telephones used in the Schemes have the features standard in the Gecophone. These are, electrically, high power efficiency with virtually maximum suppression of sidetone, an inductive shunt across the transmitter to limit transmitter current without degrading transmission, and effective spark-quenching across the dial impulse springs, and mechanically, a ventilated cradle (when required) for minimum condensation within the set, a robust cradle-switch with high insulation properties, accessibility of interior com-



Fig. 10.—Bell, Cat. No. 8021.

ponents, and a high-insulation external terminal strip.

The range of modern apparatus for these Schemes is completed by the Cat. No. 8020 series of bells, in which are three different types, each capable of arrangement for indoor or outdoor use. The bells may be used as extension bells or adjacent to the telephones, as for the Switching Telephone Cat. No. 200. They have been described in a previous issue of this Journal (Vol. 8, No. 1).

The descriptions of these Schemes has been necessarily brief and, in particular, the number of diagrams has been limited. A complete range of diagrams and a list with particulars of the components is given in Pamphlet AP.102, which is available to interested Administrations.

