

## THE HOUSE EXCHANGE SYSTEM

### Facilities

**1. General.**—This system provides facilities for direct intercommunication between a number of telephone stations in the same building (or block of buildings) and for direct access from these stations to the public exchange.

### 2. Definitions.

(a) A "multiple" station is a station equipped with a "Telephone, Intercom. No. 1/1, 1/2 or 1/2A" (see Q 1002). Multiple stations are linked by a multiple cable and are normally confined to one building but, exceptionally, the cable may be extended to link multiple stations in neighbouring buildings.

(b) A "main" station is a multiple station equipped with one or more transfer units ("Units, Transfer, Intercom." containing exchange calling and supervisory equipment) in addition to a "Telephone, Intercom." (see Q 1002 for description of transfer units).

(c) A "non-multiple" station is a station equipped with a C.B. or auto. handset telephone. The line linking this station to the multiple system is known as a non-multiple extension. A non-multiple station has restricted facilities in comparison with a multiple station.

**3. Size of Installation.**—Equipment is available in two sizes :—

(a) "1 + 5 system", comprising one exchange line and five multiple stations

(b) "2 + 10 system", comprising two exchange lines and ten multiple stations.

By a slight modification, it is possible to accommodate one additional multiple station on each size of installation but this is done only in special circumstances.

★4. One non-multiple station may be connected to a system in lieu of one multiple station. C.B. Extension Plans 1, 1A, 1B, 3, 4, 5 and 5A, 7 and 7A (internal and external) and 11 may be associated with a non-multiple station if the appropriate limits given in TRANSMISSION, Telephone, B 3567 are not exceeded at the most remote station on the extension plan.

5. Extension telephones cannot be associated with multiple stations (but see par. 14) and it is not possible to work two multiple station telephones in parallel.

6. The system is designed to work on C.B. principles but may be connected with any type of public exchange without change of the House Exchange equipment. In L.B. areas, C.B. line conditions are provided by means of an auxiliary-apparatus unit fitted in the exchange-line terminations at the exchange (see Q 3001).

7. Association with a P.B.X.—The House Exchange system may be connected as a subsidiary installation to a P.M.B.X. (or P.A.B.X.) by terminating one or two extensions from the P.B.X. in the place of exchange lines on the House Exchange system. A special installation associated with a P.B.X., as described in par. 14, may also be provided. For association with a L.B. P.B.X., auxiliary-apparatus units are required to provide C.B. conditions for the House Exchange system.

### ★8. Interconnexion of P.B.X. and House Exchange System or Two House Exchange Systems.

—If satisfactory transmission can be given, a non-multiple extension from a House Exchange system may be terminated as an exchange line on a P.M.B.X. (or P.A.B.X.) switchboard to give intercommunication between the P.B.X. extension stations and the House Exchange multiple stations. In this arrangement, the House Exchange system has normal direct exchange-line connexions independent of the P.B.X.

A non-multiple extension of one House Exchange system may be terminated, in place of an exchange line, on another House Exchange system to give intercommunication between the two systems.

The extension of exchange calls over these connecting circuits is not normally allowed but, in special circumstances, limited facilities can be provided; thus, it is possible :—

(a) over the circuit between a P.B.X. and a House Exchange system to extend only those exchange calls using the exchange lines of the House Exchange system

(b) over the circuit between two House Exchange systems to extend only those exchange calls using the exchange lines of the installation where the circuit is terminated as a non-multiple extension.

Where the two installations are in separate buildings, only incoming exchange calls may be extended.

## FACILITIES

9. A summary of the facilities offered by a normal House Exchange system follows in pars. 10 to 13. For full operating procedure, see Q 1003.

### 10. Exchange calls.

(a) *Multiple station to exchange.*—Direct connexion from any multiple station with full facilities to the public exchange system over any exchange line connected to the House Exchange system.

(b) *Multiple station—restricted facilities.*—The facility of making exchange calls may be restricted at chosen stations so that they may originate exchange calls only via the main station and at the will of the main station operator. The facility of making and receiving exchange calls may be completely barred to chosen stations.

(c) *Non-multiple station to exchange.*—Connexion, via the main station, of a non-multiple station to the public exchange system over any exchange line connected to the House Exchange system.

(d) *Main station control.*—Incoming exchange calls are normally answered at the main station which may be any predetermined multiple station fitted with a special unit [see par. 2 (b)] on which the exchange-line calling signal is given. An installation may have a 1st-choice main station and a 2nd-choice main station at separate, predetermined, multiple stations. By the operation of a key (or keys) on the 1st-choice main station the functions of that station may be transferred to the 2nd-choice main station. As an alternative to a 2nd-choice main station, an extension bell (or bells) may be fitted, at any multiple station with full facilities, to enable incoming exchange calls to be answered at that point. See also pars. 10(h) and 10(j) for main station supervision of exchange calls.

(e) *Transfer facility.*—An incoming or outgoing exchange call (except calls dialled from a non-multiple station) may be transferred from any station to any other station on the system without breaking down the exchange connexion. On installations with two exchange lines, a multiple station may hold one exchange call while transferring to another station a call incoming on the other exchange line. [See also par. 10(f).] The main station must be called-in to transfer an exchange call to a multiple station with restricted facilities or to a non-multiple station.

(f) *Hold facility.*—Any multiple station may hold an exchange call while making a call to any other station on the system. While an exchange call is being held, the outside subscriber is unable to overhear a conversation between the holding station and

the other called station. On installations with two exchange lines, any multiple station with full facilities may hold one exchange line while making a call on the other exchange line.

(g) *'Exchange line engaged' test.*—At multiple stations, except as described in par. 10(h), an audible signal is given on depression of the exchange line key if that exchange line is engaged. It is not necessary to lift the handset to make this test which is operative whether the handset is on or off the rest.

(h) *Secrecy and Monitoring.*—Exchange calls are normally secret but a monitoring facility may be given to the main station or a chosen multiple station. The monitoring facility is normally restricted to one station (usually the 1st- or 2nd-choice main station) and is not for continuous use as it degrades transmission. The facility is available for trunk offering. The audible 'exchange line engaged' signal is not given at stations having a monitoring facility.

★(j) *Visual 'Exchange line engaged' signal.*—At main stations, a visual indication that an exchange line is engaged or free is given by means of the indicators on the main-station unit. The facility may be withdrawn at the subscriber's request.

### 11. Local intercommunication calls.

(a) *Multiple station to multiple station.*—Direct calling between all multiple stations on the system.

(b) *Secrecy.*—Local intercommunication calls are not secret, i.e. another station may break-in by calling one of the engaged stations, but independent calls between stations in pairs up to the capacity of the installation may proceed simultaneously without mutual interference.

★(c) *'Engaged with exchange call' test.*—At a calling multiple station, except as described in par. 11(d), a buzzer signal is given if the called station is engaged with an exchange call or is holding an exchange line.

(d) *Multiple station calling main station engaged with exchange call.*—On installations of the larger size, by using "Telephone, Intercom. No. 1/2A" at the main station the facility may be given for the main station to be called while it is engaged with or holding an exchange call. With this facility the main station does not return an audible 'engaged with exchange call' signal to calling multiple stations.

(e) *Multiple station to non-multiple station.*—Direct calling from all multiple stations to a non-multiple station.

(f) *Non-multiple station to multiple station.*—A non-multiple station wishing to call a multiple station first calls the main station. The main station then asks the required multiple station to call the non-multiple station, i.e. the call is reverted.

(g) *Conference calls*.—Any multiple station may call, and speak, simultaneously to all or any number of other stations, multiple and non-multiple, on the system.

**12. Night Service.**—A non-multiple station may be given night service by switching at the main station. Under these conditions incoming exchange calls will ring the non-multiple station bell and operate the main-station indicator and alarm bell. Outgoing exchange calls may be made direct from the non-multiple station on night service. Local intercommunication calls cannot be made to (or received from) multiple stations by the non-multiple station on night service, except on installations of the larger size, via the public exchange over the second exchange line. A multiple station with full facilities may be given night service by means of an extension bell from the main station (par. 13).

★**13. Extension bells.**—The alarm bell circuit associated with the calling indicators of the exchange lines, and/or the non-multiple extension, may be extended from the main station to any full-facility multiple station on the system, so that that station may serve in lieu of a 2nd-choice main station and be given night service (par. 12). A limitation to this facility is that, on certain installations, one bell circuit serves two indicators so that it is necessary to test for the calling line by operating the plunger keys on the intercom. telephone (see Q 1003). The buzzer circuit of a multiple station telephone may be extended by an extension bell if desired. Loud-sounding bells, lamp-signals or loud-sounding buzzers may also be provided. Details of permitted extension-bell, etc. circuits are given in Q 3001.

**14. House Exchange Facilities between P.B.X. Extensions.**—It is possible, as a non-standard facility, to connect a House Exchange system in association with a P.B.X. so that each House Exchange station has a separate P.B.X. extension terminated on the first exchange-line position of the intercom. telephone. An individual (or common) P.B.X. extension may also be terminated on the second exchange-line position for use as a Plan 9. If a P.A.B.X. installation is concerned, the lines from the House Exchange stations to the P.A.B.X. may be terminated on the manual board or on the automatic equipment as desired. The normal capacity of the installation is 10 multiple stations. Non-multiple stations are connected direct to the P.B.X. The arrangement has the following features differing from those described in pars. 10 to 12:—

(a) Access by multiple stations to or from the public exchange or P.B.X. extensions not on the House Exchange multiple is obtained via the P.B.X.

(b) Transference of exchange calls from one House Exchange station to another is carried out via the

P.B.X. If a P.A.B.X. is concerned, only those calls can be transferred which pass via the P.A.B.X. manual board. Transfer units are not fitted for this type of installation.

(c) Calling between multiple stations may be either direct or via the P.B.X.

(d) Calls routed via the P.B.X. are secret.

(e) An audible engaged signal is received by a multiple station making a direct local call to a station engaged on a call made via the P.B.X.

(f) An extension telephone for use by a clerk, secretary, etc., may be associated with the P.B.X. line connected to any of the House Exchange multiple stations so that calls on that P.B.X. line may be made and received at the extension point.

The facilities given by this arrangement are as follows:—

(i) Incoming calls from the P.B.X. ring the bell at both the multiple station and the extension station.

(ii) The extension station calls the multiple station by press button. Press-button calling from the multiple station to the extension station may also be provided if required.

(iii) Either station calls the P.B.X. direct. Normally a call from either station may be overheard at the other but, if requested, the multiple station may be given secrecy against the extension station.

Although the arrangement described in this paragraph is primarily for association with a P.B.X., it is also possible for a direct exchange line, instead of the P.B.X. extension, to be terminated on any of the intercom. telephones. Access to an exchange line thus connected directly to an intercom. telephone line is restricted to that telephone.

The operating procedure for this type of installation will be given in detail in Q 1004 when available.

★**15. House Exchange telephones with Hearing Aid.** At multiple stations, hearing-aid facilities may be provided by means of a "Repeater, Telephonic, No. 17C", in association with a "Telephone, Intercom, No. 1/1B or No. 1/2B". At non-multiple stations "Telephone No. 226 CB" and "Repeater, Telephonic, No. 17A" should be used.

**16. Coin boxes.**—It is not possible to provide coin boxes in association with House Exchange stations.

**17. Additional receivers.**—A hook is available suitable for attachment to House Exchange telephones to carry a watch receiver.

★**18. Coloured apparatus.**—Coloured apparatus for the House Exchange system is non-standard and cannot be provided at present.

References:—Q 1002, Q 1003, Q 1004, Q 3001

(S1) TRANSMISSION, Telephone, B 3567

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