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P.A.B.X. Equipment Waverley Station, Edinburgh

EARLY in the year 1938 the London and North Eastern Railway Company decided to replace the existing manual telephone system at the important Waverley Station, Edinburgh, by a modern automatic installation with full facilities for direct access to the public exchange. After a careful study of the particular requirements, Ericsson Telephones Ltd. were successful in securing this valued contract. The work was quickly put in hand with the result that the new exchange was successfully cut into service early in November 1938.

Photo by Valentine, Dundee

View of Waverley Station and Hotel, Edinburgh, from the Castle

Waverley Station has an ideal situation in the centre of Edinburgh, as is clearly seen from the view included with this article. It lies in the hollow formed by the draining of the Nor' Loch, and the historic Edinburgh Castle towers on the hill above. The station itself is disposed around a block of central office buildings, and it is in these buildings that the exchange equipment is located.

Two hundred subscribers were catered for initially, but it is anticipated that the service will be extended to 300 lines.

A three-digit numbering scheme is employed. The apparatus used is of British Post Office standard type, consisting of fifty-point rotary line switches as line finders, and two-motion switches of the 100-outlet, 2000-type, as group and final selectors.

The switching equipment is mounted on three types of single-sided open racks, viz.:—line relay and finder rack, group selector rack and final selector rack.

Two line relay and finder racks are provided, each with capacity for 150 line circuits and 27 line finders, these being arranged in three groups of 50 lines, with 9 line finders per group. Traffic figures, however, make only 8 line finders per 50 line group necessary at the outset, the ninth position being for ultimate extension. The first rack is fitted with its full complement of three groups, the second has wiring for two groups and equipment for one.

The group selector rack has capacity for 6 groups of switches, each group consisting of nine group selectors and one assigner. As in the case of line finders, only 8 group selectors per group are fitted, the ninth position being for ultimate extension. Wiring for five groups is provided initially, with equipment for four groups. Each group occupies one shelf on the rack. The general arrangement of the group selector rack, and also of the final selector rack, is shown in the illustration of the equipment.

Automatic Exchange Equipment, Waverley Station, Edinburgh

The final selectors are also arranged in groups, each catering for 100 subscribers lines. A full group would consist of 15 switches, but only 10 switches per group are required to cover present traffic figures. The final selector rack is wired for the full capacity of three such groups, but only two are equipped. The height of this rack, as of all the auto racks, is 8′-6½″. Suitable alarm arrangements are provided throughout, and are extended to the manual board.

This is of the floor pattern type, with two operators' positions, the woodwork being teak. The subscribers lines are terminated in jacks and lamps on the jack field; here also are the jacks, lamps and keys for the special trunks. These trunks form permanent connections from Waverley Station to such towns as Glasgow, Aberdeen, Newcastle, York, Burntisland and Coatbridge. Although the relays for cord circuits, pilots and operators' telephone circuits are fitted inside the rear door of the switchboard sections, a miscellaneous apparatus rack is provided for the relays for the trunk circuits.

The system operates from a 23 cell battery, having a capacity of 150 ampere hours at the 10 hour rate of discharge. The battery is accommodated in a room adjoining the apparatus room, and is kept in a fully charged condition by means of an automatic battery charger, operating on a 230 volts, single phase, 50 cycles A.C. supply, and having a maximum output of 14 amperes at about 50 volts. If the exchange load exceeds the output of the charging unit, the whole of the latter is absorbed by the load, the deficit being obtained from the battery.

If the exchange load is less than the output of the charging unit, the surplus serves to charge the battery until it is fully charged. The charging unit then automatically changes to a trickle-charging rate until the battery falls below the prescribed limit, at which stage charging re-commences and the cycle of operations is repeated.

Ringing and tones are generated by a dynamotor, operating from the exchange battery. Duplicate ringing machines are fitted, and arranged so that in the event of No. 1 machine failing, machine No. 2 is automatically brought into service. The dynamotor only runs whilst a call is in progress, a switch being provided for continuous running if necessary.

The exchange operates on standard P.A.B.X. principles and provides the following facilities.

(1) Full automatic intercommunication between all auto extensions.

(2) Dialling '0' enables an auto extension to call the local telephonist who can then make any connection.

(3) Dialling '9' enables certain of the auto extensions to gain direct access to the Edinburgh public system.

(4) Dialling '9' from an auto extension not provided with facility (3) causes the local operator to be signalled. The caps on the lamps of these lines are a different colour to those on the lines with direct access facilities and consequently the operator gets an indication that the call must not be routed through to the public exchange.

(5) Through clearing between extensions and the public exchange.

(6) All lines terminate on lamps and jacks on the manual board, so that the operator can gain direct access to any line.

(7) The operator can offer a trunk or exchange call to extensions engaged on the auto equipment, without breaking down the existing connection.

(8) Priority facilities are provided on certain specified extension lines. Access to engaged lines is made by depressing the priority button on the extension instrument.

(9) Two extension lines can be connected to the same pair of wires and operated on a party line basis. Each party is allocated a different directory number.

(10) Provision is also made to enable three extensions to be connected to the same pair of wires; code ringing being employed to call the required party.

(11) Line No. 270 provides communication between auto extensions and 8 manual extensions on a P.B.X. in the station hotel. The 8 lines are connected in parallel with line 270 which terminates on a standard instrument at the hotel switchboard. These lines are provided with instruments minus bells in addition to the instruments connected to the P.B.X. system. Should one of the auto extensions wish to speak with an extension on the P.B.X. system, he dials 270 and is answered by the hotel operator who takes the demand and rings the required extension over the P.B.X. system. The called extension answers on the instrument connected to the P.B.X. and is requested to clear and take the call on the other instrument. He is then connected to line 270 and can converse with the calling auto extension. Calls can of course be routed in the opposite direction.

The exchange room was originally occupied by the local manual board and a Post Office P.B.X. It is interesting to note that these equipments were removed and the new one installed without any break in the service.