UNIT AUTOMATIC EXCHANGES USING "UNITS AUTO NO.13"

Increase of Capacity Beyond 400 Lines, and Introduction of U.A.X. No.13XX

1. General. This Instruction, which is supplementary to G 3530 and G 3550, deals with the provision of an increased multiple capacity beyond the 400 lines, which is the maximum for a U.A.X. No.13X. (I.T.D. Circular C 18/56 refers).

2. The principles detailed in this Instruction are intended to cause little or no disturbance to existing equipment. Any local circumstances having requirements not conforming to the principles of this Instruction should therefore be referred to the Engineering Dept. (E1/4).

3. Except for the differences described in this Instruction, the installation of the U.A.X. equipment should be in accordance with G 3530.

4. Brief description of U.A.X. No.13XX. The U.A.X. No.13XX is intended to be used for the relief of U.A.X. No.13X where the U.A.X. No.13XX would meet the 5-year development requirements.

5. A U.A.X. No.13XX has a maximum multiple of 600 lines, and the following paragraphs describe what is necessary for the extension of an existing U.A.X. No.13X to become a U.A.X. No.13XX. The U.A.X. No.13XX is developed from the U.A.X. No.13X by the provision of a third 'C' unit and from one to four additional 'A' units.

6. Group-selector levels 2-7 are used for subscribers' circuits, and levels 8 and 9/0 for junctions. If 500-lines multiple will meet ultimate requirements, level 7 can also be used for a junction route.

7. Permissible traffic. The maximum traffic that can be carried by individual units is as stated in Traffic, B 3912.

8. Layouts. Owing to difficulty in siting unit C3 adjacent to unit C2, unit C3 and 'A' units 9-12 required for subscribers numbers 600-799 will normally form a separate suite. In addition to the normal U.A.X. No.13 equipment, facilities must be provided for giving full flexibility between the external cables and the subscribers' multiple. The layout of the equipment will depend on the method employed to give this facility (see par. 10).

The layout of the equipment is shown on Dgm. ES 6063.

9. Floor covering. If the floor covering has not been provided in accordance with ACCOMMODATION, Sites and Buildings, A 3108, this should be laid before the installation of the equipment commences.

10. Methods of giving flexibility between cable pairs and multiple numbers. There are three methods of giving flexibility between the external cables and the subscribers' multiple; the method to be used is at the Telephone Manager's discretion and will depend on local circumstances. The Local Line Planning Group should be consulted regarding all work in connexion with termination of circuits on the E.C.D.F. (see par. 12).

(a) If space is available between the end wall and unit C2, a 'D' unit should be fitted in the position shown on Dgm. ES 6063. This unit is required for mounting the protectors and fuse-mountings normally fitted in unit C3.

A suitable framework for supporting the protectors and fuse-mountings should be made up locally and fitted in the 'D' unit. The existing protectors in unit C3

should be transferred to the 'D' unit and the cables between these protectors and the connexion strips on the I.D.F. should be recovered. The protectors for subscribers 600-799 should be cabled by means of "Cable, Switchboard, P.V.C., S.L., ...-wire, 9½" to the appropriate connexion strips on the I.D.F. (Mult.) of unit C3.

If a 'D' unit exists, and there is space within the unit which is not required for other purposes, this unit can be used for mounting the protectors and fuse-mountings recovered from unit C3.

(b) If a 'D' unit cannot be fitted, flexibility can be given by means of an "External Cable Distribution Frame". Details of the construction, cabling, and jumpering of this frame are given in pars. 12 to 17.

(c) As an alternative to the use of an External Cable Distribution Frame, flexibility can be given by means of a "Cabinets, Cross-connexion, No.3". This cabinet should be fitted outside the exchange. The external cables serving subscribers on Units C1 and C2 should be diverted via the cabinet. 200 cable pairs should be provided between the cabinet and the fuse-mountings in unit C3 to serve subscribers 600-799.

11. Cable trench. When an External Cable Distribution Frame is used the existing trench should be enlarged in accordance with Dgm. ES 6063.

12. External Cable Distribution Frame (E.C.D.F.). This frame should be provided locally and constructed in accordance with Dgm. ES 5925.

The frame consists of three verticals, designated AA, AB, and AC, each vertical accommodating three "Strips, Connexion, No. 148A". The connexion strips on the three verticals will accommodate a total of 900 circuits. A "Strip, Connexion, No. 148A" comprises five Enclosed Type Strips, Connexion, 20 + 20-pair, similar to those used in street cabinets. These assemblies are described in LINES, Underground, L 3120.

13. *Existing external cables for subscribers' circuits,* now terminated on the fuse-mountings on units C1 and C2, should be diverted via the connexion strips on verticals AA and AB, respectively. The cable between the joint in the cable trench and the connexion strip - "Cable E.S. W.Q." - should be terminated on the "D" side of the connexion strip. The cable between the "E" side of the connexion strip and the fuse-mountings should be "Cable, Switchboard, P.V.C., S.L. ...-wire, 9½". When this has been done, these circuits should be "pinned" as through connexions; "Pins Bridging, No. 2, White" should be used for this purpose.

The fuse-mountings on unit C3 should be cabled with "Cable, Switchboard, P.V.C. S.L., ...wire, 9½" to the connexion strips (E side) on vertical AC.

14. *Additional external cables* should be terminated on vertical AC if there is no space on verticals AA or AB, and also if the new cable is likely to serve a new part of the exchange area and be allocated numbers in the 600-799 multiple range.

15. *Fixture of the frame* should be to the wood battens surrounding the cable trench by means of 1½-in. No. 12 wood screws. Suitable fixings between the top of the frame and the end wall should be provided.

16. Jumpers on E.C.D.F. As M.D.F. jumper connexions for subscribers numbers 200-599 will be made on units C1 and C2 as at present, the only jumpers needed on the E.C.D.F. will be from verticals AA and AB to vertical AC, i.e. where subscribers 600-799 will be connected to cable pairs terminated on units C1 and C2, and where subscribers in the 200-599 numbering range will be connected to new cable pairs, terminated on vertical AC.

To facilitate the jumpering on the E.C.D.F., the frame has been designed with a vertical row of jumper rings on the left-hand side, through which jumpers between points at different levels should pass.

The jumper wire to be used on the E.C.D.F. should be "Wire, P.V.C. No. 2 - 1-pr., 9½, Blue and Blue-Red".

All cable and jumper terminations on the E.C.D.F. should be done by internal staff.

17. Junctions. Existing junction circuits will *NOT* be diverted through the connexion strips, whether mounted on the E.C.D.F. or in the cabinet, and if any additional junction cables are required, they should be terminated on the fuse-mountings on units C1 and C2.

18. Cabling Records. The connexions on the E.C.D.F. should be recorded on Card A 657 in accordance with G 5531.

19. Cable runways.

(a) When a 'D' unit is used for mounting the fuse-mountings and protectors for subscribers' circuits 600-799, a cable runway should be provided between the 'D' unit and unit C3. At the C3 unit end, the runway should be fitted so that the cables from the 'D' unit can be fed through the hole in the front of the 'C' unit.

(b) When an External Cable Distribution Frame is used, a cable runway should be provided from the top of the E.C.D.F. to the wall near unit C3 and down the wall to the small cable trench which permits the cables passing into the bottom of unit C3.

(c) To carry the group-selector multiple cables from the existing units to the new suite of units, runways should be provided from unit A4 to units A9 and from unit A8 to A11.

20. Cabling. Cabling between units C3 and A9 to A12 should be in accordance with Dgms. ES 5908 and ES 5907, except for the group-selector multiple which should be cabled as indicated in par. 24.

21. *When the units are installed in one building or in two buildings with a communicating lobby,* "Cable, Switchboard, P.V.C., S.L., ...-Wire, 9½" should be used for all general cabling. "Cable, Switchboard, P.V.C., S.L., 12-wire/20" should be used for tones, etc.

The main-battery feed to unit C3 should be taken from the distribution panel in unit C1. "Cable, 250-V., V.I.R., B and C, 0.0225 sq. in., Black and Red" should be used. The battery feed to the 'A' units should be obtained by means of a connexion from the distribution panel in unit C3 to unit A9 and, from there, looped into each of units A10 to A12. "Cable, 250-V., V.I.R., B and C, 0.0100 sq. in., Black and Red" should be used between unit C3 and A9 to A12.

22. The positive battery feed to unit C3 should be taken from either the positive battery supply tag on unit C1, [Dgm. TP 510(Fig. 2) and TP 3001 (Fig. 26) refers], or direct from the positive battery, whichever is the most economical method.

23. *When two buildings are concerned and a connecting lobby cannot be erected,* a pipe or duct-way should be provided to carry the cables between them. "Cable, E.S. W.Q., N-pair/10 and N-pair/20" should be used for general cabling, but when a waterproof underground duct-way is provided, "Cable, Switchboard, P.V.C., S.L. ...-wire/9½" and 12-wire/20" can be used as an alternative. "Cable, 250-V., V.I.R.L.C.

Single, 0.0225 sq. in" should be used for the power leads, between units C1 and C3. The power feeds between unit C3 and 'A' units A9-A12 should be as detailed in par.21.

Lead-covered cables, external to the building, should be bonded to the exchange earth; suitable clips (purchased locally) should be used for the connexion to the lead sheaths.

24. Group-selector multiple. The group-selector multiple on units A9-A12, should be connected to the existing multiple.

Levels 2 to 8, and level 7 if used as a subscribers level, should be cabled direct from the strips connexion on unit A9 to those on units A4 or A8, whichever is the more convenient.

25. In order to provide grading facilities on junction levels, if required, (four-group grading on level 9/0 and two-group on other levels) the cabling from the new suite of 'A' units should be split over the two existing suites of 'A' units. The cabling from units 9 and 10 should be connected to unit A4 and units 11 and 12 connected to unit A8.

26. Exchange earth. The exchange earth should be extended from unit C1 to the earth bar on unit C3 by means of "Wire, Copper, Soft, Stranded, 19/16".

27. Power. When the equipment is scheduled for extension to the 13XX size, the day load in Ah. of the existing equipment should be determined and reference made to POWER, General, A 0902 to check the adequacy of the existing power plant to meet the extension. If increased power plant capacity is required, the new power plant will generally be Power Plant 203C, in accordance with POWER, General, F 3029, with the following exceptions:-

(a) The batteries should comprise two batteries of 25 "Cells, Secondary, Enclosed, No. 5", installed in a two-tier arrangement similar to that shown for Power Plant No. 214C on Drawing P/TC 230.

(b) The additional battery rack should be made up in accordance with Dgm. ES 5869 and installed in the position shown on Dgm. ES 6063. The rack should be fixed to the wall.

(c) In cabling the batteries, the principle should be followed of having the total length of cable serving each battery, including inter-row connexions, the same. It will generally be found more convenient to make up a connexion assembly locally and fix this in a central position for cabling both batteries to it. Only a pair of cables need then be run from the connexion assembly to the power switchboard.

Special attention should be given to making the length of the cables between the power switchboard and the counter-E.M.F. cells as short as possible, and to achieve this the counter-E.M.F. cells should always be located in the same building as the power switchboard.

(d) In some circumstances, it may be necessary to install the "Power Switchboard No. 1" at the end of a suite of units. Where this is the case, special arrangements will be necessary to ensure the rigidity of the switchboard and, therefore, an angle-iron extension should be made to the framework of the "Power, Switchboard No. 1", consisting of two vertical members and a cross-piece, using angle-iron of the same cross-section as that of the framework. The vertical members should be bolted to the uprights of the power switchboard framework. Wall tie-bars should be fitted to the top of this extension and the minimum height between the tie-bars and the floor should not be less than 8 ft. 3 in.

One of the vertical members of the extension and one tie-bar should be used as a cable runway support.

28. Service telephone and testing set. As the third 'C' unit will be isolated from units C1 and C2, a separate service telephone should be provided. A testing set will be necessary when external cable flexibility is provided by means of the methods detailed in pars. 10*(b)* and 10*(c)*. The service telephone should be installed as detailed in G 3530 and connected to multiple No. 690.

29. Supervisory panel - Press-button facilities. The press-button on unit C3 should control the circuits associated with the units A9-A12.

30. Test number and common equipment relay-sets. The common equipment fitted on unit C3 will serve units A9-A12. The test number to be used for this portion of the exchange will be 699.

31. Final-selector routine test. Subscribers' circuits 690, 790 and 799 should be reserved as long as possible as these numbers are used in addition to 699 for final-selector routine-test purposes. Where 690 and 790 is the last line of a P.B.X. group, the P2 tag should be left disconnected (G 3530 refers).

32. Connexion of incoming junctions to linefinders. It is not proposed to distribute the existing junctions or additional junctions on existing routes over the linefinder groups on units A9-A12. The Engineering Dept. (E1/4) should be advised if 'A' units 1 to 8 are likely to be overloaded by this arrangement, and also when a new junction route is required, and the increased traffic on 'A' units will be greater than that stated in Traffic, B 3912.

33. Connexion of subscribers' circuits to linefinders. The subscribers in the multiple range 600-799 should be allocated to linefinder groups on units A9-A12 only. Full flexibility in the selection of numbers for shared-service partners cannot be given on U.A.X.s No.13XX. Both numbers of a sharing pair of subscribers will have to be in the original 400 multiple or both in the multiple range 600-799.

34. Heating. If tubular heaters have not been provided for the U.A.X. No.13X, heating should be provided in accordance with POWER, Heating, B 3101 before the U.A.X. No.13XX equipment is brought into service.

35. Signwriting. The signwriting on unit C3 should be altered where necessary to agree with the equipment fitted.

36. Disposal of doors recovered from units C3 and A9-A12. The disposal of doors should be dealt with as indicated in G 3550.

References:- G 3530, G 3550, G 5531
(E1/4) Traffic, B 3912
ACCOMMODATION, Sites & Buildings, A 3108
LINES, Underground, L 3120
POWER, General, A 0902, P 3029
POWER, Heating, B 3101
I.T.D. Circular C18/56

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