NEW ZEALAND POST OFFICE

ENGINEERING REPORT

ER/TP 1054

BASIS OF PROVISION : N.Z. UNIT TYPE AUTOMATIC EXCHANGE SYSTEMS

ENGINEER-IN-CHIEF'S OFFICE
GENERAL POST OFFICE
WELLINGTON

(FOR OFFICIAL USE ONLY)

NEW ZEALAND POST OFFICE
ENGINEER-IN-CHIEF'S OFFICE
WELLINGTON

ER/TP : 1054
ISSUE : 1
DATE : JAN 1970

ENGINEERING REPORT

BASIS OF PROVISION : N.Z. UNIT TYPE AUTOMATIC EXCHANGE SYSTEMS

FILE REFERENCE : C.E. 393/3/4

PREPARED BY : A.B. SCOTT-HILL

APPROVED FOR ISSUE BY : R. WRIGLEY

This report represents N.Z. Post Office policy regarding the basis of provision for UAX plant and supersedes information contained in Technical Report 1054.

CONTENTS

SECTION 1 : INTRODUCTION

1.1. SCOPE

1.1.1 This report describes the basis of provision upon which the items of UAX plant are built into a specific UAX.

1.2. DOCUMENTATION

1.2.1 New UAX's which are expected to be established within the 20-year planning period are recorded initially on the appropriate toll Group Switching Development Plan, which establishes the trunking and code numbering of each and its relationship to the Toll Group as a whole.

NOTE: As it is unlikely that any further UAX equipment will be purchased, any new installations or extensions to existing UAX's will have to be met from recoveries.

A review of equipment provisioning of UAX's is undertaken annually, and equipment is allocated in accordance with individual exchange priorities.
Reference E.I. GENERAL Planning R 3010.

There are two types of UAX equipment being recovered :-

(1) UAX's received under Supply No. 1 and
(2) Standard GBW type UAX's.

Before the Supply No. 1 equipment can be used in association with the GBW type equipment, certain modifications will have to be made. Modification instructions for converting the Supply No. 1 equipment to their GBW equivalents are available on request from the Engineer-in-Chief's Office, Telephone Equipment Section. The Supply No. 1 equipment drawings are annotated in the NZPO drawing series and their modified GBW equivalents are included in the appropriate sections of this report.

1.2.2 The general design of each individual UAX as determined by the District Engineer is given on the Small Exchange Design Data Sheets (SEDD). Reference E.I. GENERAL Planning R 3005.

1.2.3 From this design information is prepared a Project Specification which may of necessity alter the equipment provision etc., as shown on the SEDD sheets submitted by the Engineer. These alterations may be caused by equipment shortages, current parent exchange development proposals or any other considerations.

1.2.4 A requisition form detailing the precise quantities of material required for a new UAX, for an extension to an existing UAX or for UAX register equipment extensions, is prepared from the Project Specification and forwarded to the Engineer-in-Chief.

1.2.5 UAX's within Toll Groups with Crossbar GCX,s are to be converted to Local/Outgoing Register working to take advantage of the Crossbar facilities. Register equipment required is to be ordered with the Crossbar GCX equipment. Reference Basis of Provision UAX Registers and ANI Equipment ER/TP 1303. Also in some cases toll groups or sectors with Step GCX's or SCX's parented on Crossbar ZCX's will be converted to Local/Outgoing Register working as described in the appropriate Toll Group Switching Development Plan.

Installation details for installing Local Registers and Outgoing Sender equipment at UAX's are given in IS 1198 and IS 1201 respectively.

1.2.6 Included in the Project Specification are the following drawings :-

(a) Trunking and Equipment Diagram.

(b) Floor Plan.

(c) Skeleton Rack Layout : B, E, M and S Units.

(d) Register Frame Layout.

1.3 REFERENCES

1.3.1 This Report contains references to the following drawings :-

NZPO Drwg No. 37140 :	Typical UAX Trunking.
NZPO Drwg No. 37153 :	Space Allocation of UAX Equipment.
GBW 15780	Typical Cabling, Jumpering and Trunking Arrangements UAX NZ 13.
NZPO Drwg No. 22962 :	Typical Floor Layout UAX Building 12 ft Wide.
NZPO Drwg No. 22961 :	Typical Floor Layout UAX Building 16 ft Wide.
NZPO Drwg No. 24593 :	Number Allocation Chart UAX NZ 13.
Design Guide No. 12	UAX Junction Signalling Systems.

1.3.2 The following NZPO master tracings are available :-

NZPO Drwg No. 25534 :	Trunking and Equipment Diagram for UAX's.
NZPO Drwg No. 25398 :	Floor Plan (12' x 16', 12' x 24', 16' x 24' and 16' x 32' Buildings).
NZPO Drwg No. 24827 :	Strapping Chart from GBW 13920.

1.3.3 The following is a list of NZPO keysheet drawings that apply in part to UAX's :-

ER/TP 1403	Basis of Design Trunking Keysheets.
NZPO Drwg No. 26092 :	Keysheet of signalling terminations, Skillman 6 channel junction carrier.
NZPO Drwg No. 21891 :	NZ 2000-type Switching Systems : Master list of all General and Typical drawings.

1.4 ENCLOSURES

NZPO Drwg No. 37140 :	Typical UAX Equipment.
NZPO Drwg No. 37153 :	Space Allocation of UAX Equipment.
NZPO Drwg No. 22962 :	Typical Floor Layout UAX Building 12 ft Wide.
NZPO Drwg No. 22961 :	Typical Floor Layout UAX Building 16 ft Wide.
Appendix 1	List of GBW and NZPO UAX relay sets (B-unit mounted).

SECTION 2 : GENERAL

2.1 UAX BUILDING PROVISION

2.1.1 When accommodation for a UAX is not available in existing departmental premises, a separate standard UAX building is to be provided.

2.1.2 The overall requirements for space in a UAX building should be considered, and one of the following standard sizes selected which will meet the growth during the 20-year planning period and be capable of extension beyond this period if necessary.

(a) A two equipment row building 12 ft wide; length is normally 16 ft or 24 ft, but a 12 ft long building is also available (Ref NZPO Drwg 22962).

The maximum size for a two equipment row building - i.e., 12 ft wide x 24 ft long - will normally meet requirements up to 300 lines together with an M- or R-unit.

(b) A three equipment row building 16 ft wide; length is normally 24 ft, but a 32 ft long building is also available for special purposes - e.g., large quantity of carrier equipment (Ref NZPO Drwg 22961).

NOTE The length of the building is normally dictated by the number of B-units and requirements for carrier equipment.

2.1.3 The foregoing outlines the general policy governing the provision of UAX accommodation, but this may have to be varied to meet special conditions.

2.2 JUNCTION AND INTERNAL EQUIPMENT PROVISION

2.2.1 The provision period for subscribers' exchange equipment, internal switching equipment and junction terminating equipment is three years post cut-over. This applies to both initial installation and extensions.

2.3 FLOOR LAYOUT

2.3.1 Typical floor layouts for UAX buildings are shown on NZPO Drawings 22961 and 22962 respectively. These floor layouts have been designed to utilise the maximum available floor area and they should be used for all new works. However, it may be necessary to depart from these layouts in the following cases :-

(a) For an extension to an existing UAX where the now standard layout has not been used.

(b) When it is required to install a UAX in a non-standard building and there are space restrictions.

2.3.2 The number of units that can be installed in any one row is determined not only by the available floor space but also by the amount of cabling required between these units and their associated C-unit. The critical place in regard to cabling is the exit from the C-unit to other units. As the quantity of cable between an A-unit and the C-unit is usually greater than from any other unit, the number of A-units installed in any one row should normally be limited to four. It is recommended that a maximum of five units of other types in addition to the four A-units should be cabled to a C-unit. This also applies when locally manufactured troughing as shown on NZPO Drwg No. 22961 is used. However, when M-units are served via this locally manufactured troughing it may be possible to relax this limitation because they have very little cabling to the C-unit.

2.3.3 Multi-party units can cause some difficulty in floor layout as provision has to be made for the possibility of removal following upgrading. They should therefore be sited at the end of an ultimate cable run - e.g., at the end of row or served by locally manufactured troughing as depicted in NZPO Drwgs Nos. 22961 and 22962.

2.3.4 A master tracing, NZPO Drwg No. 25938, is available to assist in the preparation of a final floor plan for the UAX concerned.

SECTION 3 : NZ 13 A-UNITS

3.1 GENERAL

3.1.1 The typical equipment of A-units is shown on ATE Drwg No. 494063 and GEC Drwg No. 700351.

3.1.2 The number of A-units required for a UAX installation should be calculated on a subscriber multiple basis.

3.2 LINE CIRCUITS, GBW 13910 OR NZ 25089/27820 MODIFIED TO ISSUE C AND B RESPECTIVELY

3.2.1 A-unit supplied from stock are wired for 50 subscribers' line circuits and meters but normally equipped with only 40 line circuits. If required, subscribers meters and the additional line circuits are to obtained from stock.

3.2.2 At a few installations it may be advantageous to install an additional 10 line circuits above the normal capacity of 50. These line circuits are to be used to terminate M-unit lines.

3.2.3 Meters will only be required at UAX's with subscriber dialling beyond the flat-rate tariff area.

3.2.4 The number of line circuits (and meters where required) installed at a UAX should be in accordance with the three year provision period estimate of the total lines calculated as follows :-

1 line circuit required for each 'I' line
1 line circuit required for each 'P' line
2 line circuits required for each 'S' line
1 line circuit required for exch 'M'-relay set line
1 line circuit required for each 'M'-unit line
1 line circuit required for each 'R'-relay set line
1 line circuit required for each R- or RM-unit junction not terminating on an I/C R/S

The Total number of line circuits required is to be rounded off to the next highest multiple of 10, with a minimum of 40 line circuits per A-unit.

3.2.5 Plates, mounting (equipped with 10 line circuits GBW 13910)

Specify sufficient additional plates as required.

3.3 GROUP SELECTORS, GBW 15960, GBW 13890, NZ 25090 SHEET 1 OR NZ 27821 SHEET 1

NOTE NZ 25090 Sheet 1 will have to be modified to NZ 27821 Sheet 1 for jacking into GBU 13890/15960.

3.3.1 Each A-unit should be equipped with group selectors on the basis of :-

(a) Subscriber originated traffic including traffic from 'R' and 'M' subscribers.

(b) The amount of traffic originating from I/C junctions terminated on L/F levels (where applicable).

3.3.2 The grade of service is not to fall below 0.01, and traffic table C/10 is to be used to calculated the number of selectors required. Traffic checks after cut-over will indicate whether any equipment changes are necessary.

3.3.3 If it not possible to estimate the traffic rate for a proposed UAX, group selector provision should be in accordance with the table below .

NOTE This table assumes that all I/C junctions from the parent are connected to levels 8 and 9 of the A-unit line finders and that the UAX is a terminal UAX.

The table gives selector quantities per A-unit for UAX's both message-rate and flat-rate on their parent and are based on the following typical traffic rates :-

(a) Message Rate on Parent -

Originated traffic per 100 subscriber of 2 erlangs
I/C junction traffic per 100 subscribers of 1 erlang

(b) Flat-rate on Parent -

Originated traffic per 100 subscribers of 3 erlangs
I/C junction traffic per 100 subscribers of 2 erlangs

	Subscribers Served	Group Selectors Required per A-unit	
		Message-Rate	Flat-Rate
Note (	81 to 100	8	-
" (	61 to 80	7	-
" (	51 to 60	6	8
	41 to 50	6	8
	31 to 40	5	7
	21 to 30	5	6
	Up to 20	4	5

The Maximum number of group selectors per A-unit = 8

NOTE These figures apply only when M-unit subscribers are served in addition to the A-unit subscribers.

3.4 ORD. FINAL SELECTORS, GBW 16660 AND ORD. & PBX FINAL SELECTORS, GBW 13900/1 OR NZ 27755

Also NZ 25091 see para 3.9 for restriction of usage of this equipment.

3.4.1 GBW 13900, a UAX 2-10 PBX type Final Selector, is used in UAX A-units when PBX stepping is required and where the junction entry limit does not exceed 1560 ohms.

3.4.2 For UAX's having junctions greater than 1560 ohms and up to 2000 ohms, use PBX Final Selectors GBW 13900 modified to GBW 13901 (by changing the coil of relay OC to code 15613) in units A1 and A2, and regular Final Selectors GBW 16660 in other A-units.

3.4.3 NZ 27755, a UAX 2-10 PBX type Final Selector can be used in lieu of GBW 13900/1 Final Selector. The junction entry limits of NZ 27755 is 1800 ohms, but it can be extended to 2000 ohms by changing the coil of the OC relay to Code B 75186.

3.4.4 The number of final selectors equipped in each pair of A-units should be based on the number of subscribers to be served, and on the estimated traffic rate per subscriber. The grade of service is not to fall below 0.01, and traffic table C/10 is to be used to calculate the number of selectors required.

3.4.5 Where it is not possible to accurately estimate the traffic rate for a proposed UAX Final Selector, provision should be in accordance with the table below. Traffic checks after cut-over will indicate if any equipment changes are necessary. This table is based on 2.0E/100 subs and 3.0E/100 subs. These rates are considered typical of a UAX either message-rate or flat-rate respectively on its parent.

Subscribers Served	Final Selectors Required per Pair of A-units	
	Message-Rate	Flat-Rate
81 to 100	7	8
61 to 80	6	8
51 to 60	6	7
41 to 50	5	7
31 to 40	5	5
21 to 30	4	5
Up to 20	3	4

The Maximum number of final selectors per A-unit = 5

NOTE The maximum traffic capacity of the final selectors in an odd A-unit is 1.36 erlangs, and at UAX's having a terminated rate greater than 2.7 erlangs per 100 subscribers it will be necessary to restrict the number of subscribers connected to this A-unit - e.g., maximum of 45 subscribers if traffic rate is 3 erlangs per 100 subscribers.

3.5 LINE FINDERS GBW 13910 OR NZ 27820 MODIFIED TO SHEET 2

Also NZ 25089 Sheets 1 and 2 and NZ 2820 Sheet 1. See para 3.9 for restrictions of usage of this equipment.

3.5.1 Specify one for each group selector provided.

3.6 CONTROL RELAY SETS, GBW 13910 OR NZ 27820 MODIFIED TO ISSUE B

3.6.1 Two per A-unit (part of the unit equipment).

3.7 METERS, OVERFLOW (B.P.O. No. 100C)

3.7.1 Specify one overflow meter per working group selector as shown on the Trunking and Equipment Diagram.

3.8 METERS, SUBSCRIBERS (B.P.O. No. 100A)

3.8.1 Specify at UAX's with subscriber toll dialling. Meters or additional meters are to be ordered in multiples of 10, corresponding to the number of line circuits being provided.

NOTE Line circuits connected to L/F level '0' will not require meters.

3.9 RESTRICTIONS OF USAGE OF UAX SUPPLY NO. 1 EQUIPMENT

3.9.1 Linefinders NZ 25089/27820 Sheet 1 cannot be used where route restrictions of certain line finder levels are required. The above facility can however be provided by converting them to their respective Sheet 2.

3.9.2 Control Relay Sets NZ 25089 can only be used in a Supply No. 1 type A-unit.

3.9.3 A 2-10 PBX Final Selector NZ 25091 can only be used in a Supply No. 1 type A-unit.

3.9.4 Revertive Relay Set NZ 23400. This relay set is not suitable for use in its present form.

3.10 SUPPLY NO. 1 ALARM ARRANGEMENTS

3.10.1 The alarm arrangements provided do not give the same facilities as the standard GBW type in that the allotter alarm is given upon a single failure which is not in accordance with E.I. TELEPHONES Automatic H 5211, para 4.4. It is not intended to alter this at present pending finality of the UAX alarm schemes.

SECTION 4 : NZ 13B-UNITS

4.1 NUMBER AND LAYOUT OF B-UNITS

4.1.1 The typical equipment of B-units is shown on ATE Drwg No. 494064 and GEC Drwg No. 700352.

4.1.2 Typical UAX trunking and relay sets for various types of parent and rating are shown in Drwg NZPO 37140 attached.

4.1.3 Drwg NZPO 37153 attached indicated B-unit space allocation for both GBW and NZPO circuits. This drawing can be used in association with NZPO 29607 to determine the most suitable B-unit layout for a particular installation. The objective is to achieve a uniform ultimate layout together with the minimum initial number of B-units. Often these two requirements will conflict and the B-unit layout will have to be a compromise biased in favour of economy of immediate plant provision.

4.2 "NEW" UAX TRUNKING

4.2.1 This type of full facility trunking was developed in 1966 to achieve economies of relay set usage and TMX multiple space by concentrating UAX toll traffic on either level 0 or 9 of the incoming UAX selectors at the Group Centre depending on whether the call originates from a CCB or ORD subscriber. Because this "new" UAX trunking will not be compatible with the requirements of the Crossbar Switching network where National Subscriber Dialling is planned to be introduced, its application will be confined to selected Toll Groups. Therefore, the conventional UAX trunking will continue to be used except where otherwise directed by the Engineer-in-Chief.

4.3 B-UNIT EQUIPMENT

4.3.1 The layout of this section of the report has been divided into four virtually self-contained parts :-

Part A covers

(i) Miscellaneous B-unit Equipment

(ii) AC3 Junction Relay Sets

(iii) Carrier Junction Relay Sets.

Part B covers current UAX B-unit relay set provision (other than AC3 or carrier) - i.e., relay sets associated with a non-metering UAX with basic junctions direct to a Group Centre or Local Controlled UMX / BMSB

Part C covers outmoded UAX B-unit relay set provision (other than AC3 or carrier) - i.e., relay sets associated with existing UAX's with metering, or with basic junctions trunked to or from another UAX

Part D covers UAX B-unit relay set provision (other than AC3 or carrier) for remote R- or M-units, or attached R-units.

4.4 PART A

(I) MISCELLANEOUS B-UNIT EQUIPMENT

(a) REVERTIVE RELAY SETS

4.4.1 Relay Group : Revertive Relay Sets, GBW 13770 (GBW 13770 MOD A - NOTE 3)

Use when 'P' and/or 'M' subscribers are to be served.

For up to 20	'P' plus 'M'	subscribers,	equip	2	Rev	Relay	Sets
For 21 to 50	"	"	"	3	"	"	"
For 51 to 100	"	"	"	4	"	"	"
For over 100	"	"	"	5	"	"	"

NOTE 1 The quantities quoted above are typical and should be sufficient for the initial installation. After cut-over, traffic checks will indicate if a revision of relay set quantities is required.

NOTE 2 Space is available in an M-unit to mount three revertive relay sets, and should an M-unit or units be installed, as many as possible of the revertive relay sets are to be mounted in these units.

NOTE 3 Modify GBW 13770 to GBW 13770 MOD A when a UAX is converted to Local Register working. Party subscribers are to be advised of the change to the calling instructions, i.e., the handset is not to be replaced before ring tone is heard by the caller.

(b) 'M'-PARTY RELAY SETS

Three to five party lines not less than 50,000 ohms IR wire to wire are classified as 'M' lines.

4.4.2 Relay Group : 'M' Multi-party Lines, GBW 13750

Specify one 'M' line relay set for each 'M' line

It should be noted that M-party relay sets GBW 13750 have a maximum signalling limit of 1650 ohms loop CR and where economic these relay sets should be specified instead of signalling extenders used in association with an M-unit to provide M-party service up to 1650 ohms loop CR. Where the loop CR lies between 1650 and 2000 ohms, a signalling extender should be used. Ref para 4.4.17.

(c) 'R'-PARTY RELAY SETS

Lines under 750 ohms Simplex CR and over 5000 ohms Simplex IR are classified as 'R' lines. Such lines can cater for up to 10 subscribers.

4.4.3 Line to Loop Signalling Adapter Circuit, NZPO 32544

(i) Specify one for a single subscriber on an 'R' line connected to an A-, M- or RM-unit final multiple number.

(ii) Specify one for each 2 to 5 party 'R' line connected to M- or RM-unit.

4.4.4 Relay Group : 'R' Multi-party Lines, GBW 14410

Specify one for each 2 to 5 party 'R' line connected to A-unit final multiple numbers.

4.4.5 Relay Set for 6 - 10 Party 'R' Lines, NZPO 31610

Specify one for each 6 to 10 party 'R' line.

NOTE This relay set can only be used with the approval of the Engineer-in-Chief.

4.4.6 Auxiliary Ringing Code Relay Set for 6 to 10 party 'R' Relay Sets, NZPO 31611

Specify one at UAX's equipped with 6 to 10 party 'R' line relay sets.

4.4.7 Relay Group : Ringing Codes for 5 Party Lines, GBW 13762

Specify one at UAX's serving 'M' or 'R' subscribers from 'M' or 'R' relay sets except NZPO 32544.

NOTE It is not necessary to specify this relay set if an M- or RM-unit is installed as these units are equipped with a ringing code relay set.

4.4.8 Fuse Panels

Specify as required. B-units are now equipped three fuse panels (some existing B-units may only have two fuse panels equipped). An additional fuse panel to provide a maximum of four fuse panel per B-unit can be equipped, if required.

4.4.9 Fire Call-out Scheme 'E' NZPO 25947 , Scheme 'F' NZPO 27985 or Scheme 'G' NZPO NC400ZA-FCT

Specify if required (reference Technical Report No. 1067).

Note (a) When a step Group Centre is converted to Crossbar, existing Scheme E systems will have to be replaced by Scheme G's. Specify one NZ400ZA-FCT per call out line requiring Scheme G (Plus one spare NZ400ZA-FCT for maintenance purposes to be held at the Group Centre if it the first requirement in the Toll Group). The relay set is to mounted in a B-unit whenever possible (Reference IS 1193).

Note (b) The FCT provides a double point of entry for association with two PBX numbers, the first of which, the pilot number is allocated as the unlisted number. This arrangement is necessary with exchanges with calling sub release conditions (UAX and NEC Crossbar) to ensure the FCT cannot be busied during the time out and force release period. Accordingly at UAX's with FCT equipment two-line circuit appearances must be allocated within a PBX group. It should be noted however if the number ending in digit 0 is used as the unlisted pilot number, the second line can be wired to commoned 11th step F/S contacts of the associated F/S level. In this case no second PBX number is required (PBX type F/S will still have top be equipped).

4.4.10 Subscriber Controlled Diversion Service, NZPO 30975

Specify if subscriber controlled diversion service is required (reference E.D. Report 2025).

4.4.11 O/G Relay Set from Final Selector Multiple to Manual Exchange, NZPO 31959

Specify one when a priority answered fire reporting line is required in an area without '111' emergency service.

4.4.12 Transformers BPO No. 50A, GBW 13730 Fig 28

Specify one per UAX when limited facility junction relay sets GBW 14450/1 are equipped.

4.4.13 Brackets mounting 'BK'

Requisition as required for vertically mounted relay sets, etc. Refer to typical equipment drawings ATE 494064 and GEC 700352.

4.4.14 Selector Shelves - Five Selector positions per shelf

Commonly termed E-unit shelves, these are used in special circumstances - e.g., internal congestion, extensive code dialling between adjacent UAX's etc., or to terminate incoming junctions. Refer ATE drawing No. 494064 Sheet 3 Figs D & E.

Specify as required.

4.4.15 Group Selector, GBW 15960 Fig 1A and Fig 2/3, GBW 13890 modified to GBU 13890 Mod A or NZ 25090/27821 modified to their respective Sheet2

Note (a) NZ 25090 Sheet 2 will have to be modified to NZ 27821 Sheet 2 for jacking into GBU 13890/15960

Note (b) Incoming junctions can normally be terminated directly onto group selectors. However, if from a simplex signalling UMX or BMSB the junctions have to be connected via an adapter relay set, NZ 31496. See typical UAX trunking Drwg NZPO 37140/22/2.

See Clause 4.4.14 above. Specify as required.

4.4.16 Rack Common Services, GBW 13730 Fig 2

Specify when selectors shelves are installed in a B-unit.

NOTE This circuit is be assembled locally on a 10 x 2 BPO No. F151/20AH mounting plate. The parts required are to be requisitioned from stock.

4.4.17 Subscribers' Line Signalling Extender Relay Sets

NZPO 38743 For Ind, 2 party and PABX extensions.
NZPO 38744 For 'M' and 'R' lines

These relay sets are B-unit mounted and occupy 1 circuit/plate. Specify one circuit for each line in excess of 1000 ohms loop CR (Refer ER/TP 1237). For M-party service up to 1650 ohms loop CR GBW 13750 is normally used (Refer para 4.2.2).

Loop CR limits for Ind, 2-Party and M-Party	2000 ohms
Simplex CR for R-lines	*1500 ohms

* Both legs of line connected in parallel and including the resistance of the earth.

4.4.18 P-Wire Control Circuit for CCB Lines UAX - GCX, NZPO 38982

Used in UAX's greater than 400 lines pending Crossbar replacement when parented on a Crossbar GCX (non-linked basis). Part of CCB discrimination circuit on level '0' trunks to parent GCX.

Specify one circuit per CCB line. If more than one CCB line exists a minimum of two CCB junctions should be provided to the GCX to allow for simultaneous CCB calls.

(II) AC3 JUNCTION RELAY SETS

4.4.19 AC3 junction relay sets are normally mounted in S-Units. However, in exceptional cases - e.g., where one or two junctions are required with AC3 signalling - it may be worthwhile to consider possible location in a B-unit. For type of AC3 junction relay sets, see Section 9 NZ 13 S-Units.

(III) CARRIER JUNCTION RELAY SETS

4.4.20 B-unit mounted carrier junction relay sets with either UAX's or remote R- or M-units are shown in NZPO Drwg 37140 attached and also in the Report ER/TP 1403 Trunking Key Sheets.

Section 7.4 Rural Carrier (STC, GEC and FUJITSU)
Section 7.3 OOB Carrier
Section 7.1 PCM Junction Carrier Systems

4.4.21 Bothway Limited Facility Rural Carrier Junction Relay Set from UAX NZ 13 to Manual Board, NZ 31391

These relay sets are used to interface signalling between the UAX and the Rural Carrier Signalling System.

These relay sets are plate mounted, the 2-wire version has two circuits/3 plates whereas the 4-wire version occupies 1 circuit/2 plates. The 2-wire version is not to be used for new work. Specify as required.

4.4.22 Incoming Limited Facility Rural Carrier Junction Relay Set from Manual Board to UAX NZ 13, NZ 31392

These relay sets are used to interface signalling between the rural carrier signalling system and the UAX.

These circuits occupy 1 circuit/plate. Specify as required.

4.4.23 Bothway Junction Relay Set Fujitsu Rural Carrier UAX NZ 13 - GS3/WE TMX (Limited Facility), NZ 36603

These relay sets are used to interface signalling between the UAX and the Rural Carrier System.

These circuits occupy 2 circuits/3 plates.

Note Rural carrier systems are not to be used for new junctions or trunk systems without approval from the Engineer-in-Chief. Existing systems are to progressively replaced.

4.4.24 Incoming Limited Facility Junction from Manual Board to UAX NZ 13 Out-of-Band Carrier System, NZ 31863

These relay sets are used to interface signalling between the UAX and the out-of-band carrier system.

These circuits occupy 1 circuit/plate. Specify as required (4-wire version Sheet 5).

4.4.25 Bothway Limited Facility Junction Relay Set between Manual Board and UAX NZ 13, NZ 31864

Theses relay sets are used to interface signalling between the UAX and the out-of-band carrier system.

The circuits occupy 2 circuits/3 plates. Specify as required (4 wire version Sheet 6).

4.4.26 Outgoing Junction Relay Set Out-of-Band Signalling 2000 Type, NZ 34179

These relay sets are used to interface between a UAX and an out-of-band carrier system.

These relay sets can be used for :-

(a) Outgoing UAX - Crossbar parent (modification to R/S required)
(b) Outgoing UAX - Step parent
(c) Outgoing Step - UAX

Specify as required.

4.4.27 Incoming Junction Relay Set with Toll Facilities Out-of-Band Signalling 2000 Type, NZ 34195

These relay sets are used to interface signalling between an out-of-band carrier system and a UAX.

These relay sets can be used for :-

(a) Incoming to UAX from Crossbar parent (modification to R/S required)
(b) Incoming to UAX from Step/Manual parent.
(c) Incoming to Step parent from UAX.

Specify as required.

4.5 PART B

CURRENT PROVISION OF RELAY SETS (OTHER THAN AC3 OR CARRIER) I.E., RELAY SETS ASSOCIATED WITH A NON-METERING UAX WITH BASIC JUNCTIONS DIRECT TO A GROUP CENTRE EXCHANGE OR A LOCAL CONTROLLED UMX/BMSB

4.5.1 Bothway Limited Facility Junction Relay Set, GBW 14451

Only specified in the following cases :-

(a) When the parent exchange is a UMX/BMSB.
(b) When bothway junctions are required on an auxiliary route to a UMX/BMSB.
(c) When aerial circuits are used which are not up to standard for full facility signalling.

Specify one for each bothway junction.
For Transformers BPO No. 50A, see para 4.4.12

NOTE This circuit provides for barring of auxiliary I/C traffic gaining access to toll routes.

4.5.2 Outgoing (U/D) Limited Facility Junction Relay Set, NZ 31487

Specified for outgoing (U/D) only subscriber dialling junctions to a UMX or BMSB exchange in the cases listed in 4.5.1 above.

Specify one for each such unidirectional only outgoing subscriber dial junction.

Note 1 This circuit requires the use of lamp panels when used in conjunction with a UMX parent, and a 50 volt UMX power supply. Hence where this is undesirable relay sets to GBW 14451 (from recoveries) should be used instead.

Note 2 This circuit does not provide for CCB discrimination

4.5.3 Full Facility Outgoing (B/W or U/D) Junction Relay Set, GBW 13939, GBW 16000, GBW 16670/1, GBW 20100

These relay sets are used for O/G (U/D) or O/G (B/W) full facility toll junctions associated with either combined level 0 & 1 working, separate level 0 & 1 working or level 0 working. For new work, one GBW 20100 is to be specified for each O/G or B/W toll junction.

Note As with GBW 16670 or GBW 16671, this relay set (GBW 20100) is unsuitable for metering, tandem switching or parenting on a UMX/BMSB.

4.5.4 Outgoing to Auto (B/W or U/D) Junction Relay Set, GBW 13970, GBW 16830/1, GBW 13950 MOD C

These relay sets are used for O/G (U/D) or O/G (B/W) subscriber dial junctions associated with separate Level 0 & 1 working, or for an auxiliary route to an adjacent UAX.

For new work, one GBW 16831 is to be specified for each such O/G or B/W subscriber dial junction. Where this relay set is not available relay set GBW 13960 is to be modified to GBW 13960 Mod A for use.

Note This relay set (GBW 16831) is unsuitable for metering, and as with GBW 16830, is unsuitable for tandem switching.

4.5.5 Incoming (B/W or U/D) Junction Relay Set, GBW 13980/1, GBW 16880

These relay sets (2 circuits/plate) are used for I/C (U/D) or I/C (B/W) toll or subscriber dialled junctions. For new work specify one GBW 16880 circuit for each U/D incoming junction or each B/W junction provided with an outgoing relay set to GBW 13930, GBW 16000, GBW 16670/1, GBW 20100, GBW 13970 or GBW 16830/1.

Note 1 GBW 16880 is equipped with dial tone suppression which can optionally be excluded if necessary.

Note 2 GBW 13908/1 has no inherent dial tone suppression, an GBW 15510 (5 circuit/plate) is to be additionally specified should dial tone suppression be desired. (i.e., connected to a GS1, GS3 or WE exchange without AC3 signalling).

Note 3 GBW 13780 Mod A can be used in lieu of GBW 13980/1, and GBW 13950 Mod C can be used in lieu of GBW 16830/1.

4.5.6 Dial Tone Suppression Relay Set, GBW 15510

These relay sets (5 circuits/plate) are to be used in conjunction with GBW 13980/1 (superseded by GBW 16880 - see Note 2 of clause 4.5.5 above) when incoming AC2 distant operator access is provided.

One circuit is to be specified for each circuit to GBW 13980/1 or GBW 13780 Mod A.

Note GBW 15510 is not normally required in association with AC3 junctions, and not normally specified for use on incoming subscriber dialled junctions from a UMX/BMSB.

'NEW' UAX TRUNKING TYPE RELAY SETS

4.5.7 Unidirectional Outgoing Two-wire Intermediate Pulse Repeater, NZ 36887

By means of pulse repetition, the use of this relay set at an intermediate exchange enables the normal junction loop CR limit of 2000 ohms to be exceeded. The use of these relay sets is preferred to AC3 signalling but will require the provision of separate toll and subscriber dialled junctions. However, consideration of the possible requirement for AC3 signalling on the toll junctions should not be overlooked.

Specify one for each junction as required.

Note 1 Standard negister switching facilities are provided.

Note 2 Provides Manual Hold.

Note 3 Limitations on the permissible number of links in tandem should be observed (Ref ER/TP 1048 Par 27.2 and 27.4).

4.5.8 Unidirectional Incoming Auto-to-Auto Relay Set Non-metering Two-wire Intermediate Pulse Repeater, GBW 16200 MOD A

For use on incoming junctions associated with NZ 36887 above. Provides for negister switching - i.e., similar to NZ 36887 except that manual hold is not provided.

Specify one for each junction as required.

4.5.9 Full Facility Outgoing (B/W or U/D) Junction Relay Set (Pulse Generation Type), GBW 16910

This relay set is used for O/G (U/D) or O/G (B/W) full facility toll junctions associated with either combined level 0 & 1 working, separate level 0 & 1 working or level 0 working.

For approved applications only, one GBW 16910 is to be specified for each such O/G or B/W toll junction.

4.5.10 CCB Line Route Restriction Circuit with Discriminating Facilities, GBW 16900

This relay set is used for association with each CCB line circuit (at a UAX where circuits to GBW 16910 are in use) to provide level 0 REG/CCB discrimination. In addition this relay set has the facility of barring CCB subscribers to any CAX 1st or 2nd group selector level - i.e., can bar access to phonograms, emergency service etc., if desired.

For approved applications only, one GBW 16900 is to be specified for use with each CCB line circuit at the UAX.

4.5.11 The standard incoming (B/W or U/D) junction relay set GBW 16880 (see par 4.5.5) is used in conjunction with GBW 16910.

4.5.12 Apart from possible use on an auxiliary route, GBW 16831 (see par 4.5.5) rather than GBW 16910 is also to be used on subscriber dialled level 1 junctions to the parent - i.e., where provision of separate level 0 & 1 junctions are justified.

4.5.13 Other relay sets - i.e., those which have been developed for special cases and therefore have limited application - are included in the complete list of UAX, NZPO and GBW relay sets in Appendix 1 attached.

4.6 PART C

OUTMODED PROVISION OF RELAY SETS (OTHER THAN AC3 OR CARRIER) - I.E., RELAY SETS ASSOCIATED WITH EXISTING UAX's WITH METERING, OR BASIC JUNCTIONS TRUNKED TO OR FROM ANOTHER UAX

4.6.1 Bothway Limited Facility Junction Relay Set, GBW 14451

Only specified in the following cases :-

(a) When the parent exchange is a UMX/BMSB.

(b) When bothway junctions are required on an auxiliary rote to a UMX/BMSB.

(c) When open aerial circuits are used which are not up to full facility standards.

For Transformers BPO No. 50A, see para 4.4.12.

Note This relay set would not be used with meters, as all toll calls would be ticketed at the UMX/BMSB. The circuit also provides for tandem switching or barring of incoming auxiliary traffic.

4.6.2 Outgoing (U/D) Limited Facility Junction Relay Set, NZ 31847

Specified for outgoing (U/D) flat-rate subscriber dialling junctions to a UMX or a BMSB exchange in the cases listed in para 4.6.1 above.

Note 1 This circuit requires the use of lamp panels when used in conjunction with a UMX parent and a 50-volt UMX power supply. Hence, where this is undesirable, relay sets to GBW 14451 (from recoveries) should be used instead.

Note 2 The circuit provides for tandem switching of incoming auxiliary traffic. However, no barring or metering facilities are available.

Note 3 This circuit does not provide for CCB discrimination.

4.6.3 Full Facility Outgoing (B/W or U/D) Junction Relay Set, GBW 13930, GBW 16000

These relay sets are used for O/G (U/D) or O/G (B/W) full facility toll junctions associated either combined level 0 & 1 working or level 0 working.

For extensions, specify one GBW 13930 for each additional O/G or B/W toll junction, and modify to GBW 16000 if required (see note below).

Note Both of the above circuits provide for metering on subscriber dialled calls. However, GBW 13930 provides for tandem switching of incoming auxiliary traffic, whereas GBW 16000 has the facility of barring such traffic, or trombone calls.

4.6.4 Outgoing to Auto (B/W or U/D) Junction Relay Set, GBW 13970

This relay set is used for O/G (U/D) or O/G (B/W) subscriber dial junctions associated with separate level 0 & 1 working, or for an auxiliary route to an adjacent UAX.

For extensions, specify one GBW 13970 for each such O/G or B/W subscriber dial junction.

The above circuit provides for metering on subscriber dialled call and tandem switching if incoming traffic.

4.6.5 Incoming (B/W or U/D) Junction Relay Set, GBW 13980/1, GBW 16880

These relay sets (2 circuits/plate) are used for I/C (U/D) or I/C (B/W) toll or subscriber dial junctions.

Specify one GBW 16880 for each unidirectional incoming junction, or each B/W junction provided with an outgoing relay set to GBW 13930, GBW 16000, GBW 16670/1, GBW 20100, GBW 13970 or GBW 16830/1.

Note 1 GBW 16880 is equipped with dial tone suppression which can optionally be excluded if necessary.

Note 2 GBW 13980/1 has no inherent dial tone suppression, and GBW 15510 (5 circuits/plate) is to be additionally specified should dial tone suppression be desired (i.e., connected to a GS1, GS3 or WE exchange without AC3 signalling).

4.6.6 Dial Tone Suppression Relay Set, GBW 15510

These relay sets are to be used in conjunction with GBW 13980/1 (Superseded by GBW 16880) - see Note 2 of para 4.6.5 above) when incoming AC2 distant operator access is provided.

One circuit is to be specified for each circuit to GBW 13980/1.

Note GBW 15510 is not required in association with AC3 junctions and normally not specified for use on incoming subscriber dialled junctions connected to a UMX/BMSB.

4.6.7 Route Discrimination and Timing Relay Set, GBW 13920

This relay set is used in conjunction with each outgoing junction relay set GBW 13930, GBW 13960, GBW 13970 or GBW 16000 to provide discrimination on first, second, etc., digits dialled for barring purposes on any particular route, or multi or fixed fee metering.

Specify one for each outgoing relay set where required.

Note 1 Metering is restricted to local traffic

Note 2 Barring can be applied to all traffic indiscriminately, or to CCB, local and tandem switched traffic individually.

Note 3 This relay set also has the facility of allowing tandem switched calls to have access to routes barred to local calls.

Note 4 The associated strapping chart is NZ 24826.

4.6.8 Route Discrimination Common Relay Set, GBW 14010

Specify one per group of O/G junctions when it is desired to extend the route discriminating capacity of GBW 13920 by one digit.

4.6.9 Route Restricting and Timing Relay Set, GBW 13940

This relay set is used in conjunction with each outgoing junction relay set GBW 13930, GBW 13960, GBW 13970 or GBW 16000 to provide discrimination on a first digit for route barring or fixed-fee metering purposes.

Specify one for each such outgoing relay set where required.

Note 1 Metering is restricted to local traffic.

Note 2 As this relay set provides no CCB barring or manual hold facility (unlike GBW 13920), it may be unsuitable for use on a junction which has access to a TMX.

4.6.10 6-second time Pulse Distribution Relays, GBW 14020 Fig 1 and Fig 2

This relay set is used in association with either GBW 13920, GBW 13940, or GBW 13950 when subscribers meters are used.

Specify one GBW 14020 Fig. 1 & 2 at each UAX and an additional GBW 14020 Fig 1 & 2 for each eight of any of the above junction relay sets in excess of the first eight.

4.6.11 Outgoing (B/W or U/D) Junction Relay Set To A Dependant UAX, GBW 13950

This relay set is used for O/G (U/D) or O/G (B/W) toll or toll and subscriber dial junctions to an adjacent UAX to provide discrimination on a first digit for route barring or multi/fixed fee metering purposes.

It is usually associated with incoming junctions relay set GBW 13990 to provide for tandem switching of a dependant UAX toll calls in either direction via the local UAX, with or without barring or metering on subscriber dialled junction calls.

Specify one for each junction.

Note 1 Metering is restricted to local calls.

Note 2 Should local CCB discrimination be required, GBW 13960 together with GBW 13920 may have to be specified.

4.6.12 Outgoing (B/W or U/D) Junction Relay Set to a Dependant UAX, GBW 13960

This relay set is used for O/G (U/D) or O/G (B/W) toll or toll and subscriber dial junctions to an adjacent UAX (normally) when route discrimination or metering facilities are not required.

It is usually associated with incoming junction relay set GBW 13990 to provide for tandem switching of a dependant UAX's toll call in either direction via the local UAX with free calling on subscriber dialled junction calls.

Specify one for each such junction.

Note 1 The associated use of this relay set together with GBW 13920 will enable CCB discrimination in addition to the route restricting and metering facilities provided by GBW 13950 above (see Note 2 of para 4.6.11).

Note 2 If the dependant UAX has junctions to other exchanges, either GBW 13950 or GBW 13920/13940 with GBW 13960 would be required to restrict access to dependant UAX subscribers only.

4.6.13 Incoming (B/W or U/D) Junction Relay Set from a Dependant UAX, GBW 13990

This consists of a relay set GBW 13990 Fig 1 and uniselector sets GBW 13990 Fig 2.

This relay set is used on an I/C (U/D) or I/C (B/W) junction from a dependant UAX to provide access to the local UAX line finder levels (by dependant UAX subscribers dialling 1), and access to the local UAX toll junctions directly (by dependant UAX subscribers dialling 0) with standard full facility level 0 REG/CCB discrimination.

Note Specify one GBW 13990 Fig 2A uniselector set for each 1st, 3rd, 5th etc., of 5 I/C relay sets GBW 13990 Fig 1, and one GBW 13990 Fig 2A for the 2nd, 4th, 6th etc., groups of 5 I/C relay sets GBW 13990 Fig 1.

4.6.14 Other relay sets - i.e., which have been developed for special cases and therefore have only limited application - are included in the complete list of UAX, NZPO and GBW relay sets in Appendix 1 attached.

4.7 PART D

UAX (PARENT) B-UNIT RELAY SET PROVISION (OTHER THAN AC3 OR CARRIER) FOR REMOTE R- OR M-UNITS, OR ATTACHED R-UNITS

4.7.1 For relay sets installed at remote R- or M-units see para. 8.17.

PARENT R/S FOR REMOTE R- OR M-UNITS

4.7.2 Outgoing (B/W or U/D) Junction Relay Set to a Dependant UAX, GBW 13950

This relay set is used for O/G (U/D) or O/G (B/W) toll, or combined toll and SFD, or combined toll and STD junctions to a remote R- or M-unit to provide discrimination on a first digit basis for route barring or multi/fixed fee metering purposes. It is normally used to provide barring of local UAX subscribers from dialling the remote R- or M-unit while allowing toll operators access. It can also be used (if separate toll and subscriber dialled junctions are provided from the Group Centre to the UAX) to allow free-calling between the CAX and remote R- or M-unit while barring UAX subscribers from dialling remote R- or M-unit subscribers.

Specify one for each such junction.

Note 1 Metering is restricted to local traffic.

Note 2 Should local CCB discrimination be required, GBW 13960 together with GBW 13920 may have to be specified.

Note 3 The associated strapping chart is NZPO Drwg 24828.

4.7.3 Outgoing (B/W or U/D) Junction Relay Set to a Dependant UAX, GBW 13960

This relay set is used for O/G (U/D) or O/G (B/W) toll, or combined toll and SFD to a remote R- or M-unit (normally) when route discrimination or metering facilities are not required. It is generally used to provide free calling between the UAX and remote R- or M-unit, and possibly the CAX.

Specify one for each such junction.

Note The associated use of this relay set together with GBW 13920 will enable CCB discrimination in addition to the route restricting and metering facilities provided by GBW 13950 (see Note 2 of para. 4.7.3).

4.7.4 Incoming (B/W or U/D) Junction Relay Sets, GBW 13980/1, GBW 16880

These relay sets (2 circuits/plate) are used for I/C (U/D) or I/C (B/W) toll or combined toll and SFD, or combined toll and STD junctions from a remote R- or M-unit.

Specify one GBW 16880 circuit for each unidirectional incoming junction, or each bothway junction provided with an outgoing relay set to GBW 13950 or GBW 13960.

Note 1 GBW 16880 is equipped with dial tone suppression which can optionally be excluded if necessary. This exclusion is essential in most cases with a dependant R- or M-unit as dial tone is normally required to be returned to the remote R- or M-unit on seizing a junction to the UAX. (The exception is where AC3 signalling is used on the RM junctions and dial tone must be provided locally.)

Note 2 GBW 13980/1 has no inherent dial tone suppression.

4.7.5 To allow for tandem switching of calls between a remote R- or M-unit via the parent UAX and the Group Centre, the following relay sets must also be used at the parent UAX for other than remote R- or M-unit junctions. (This may involve replacement of existing relay sets by transfer from another UAX equipped with these relay sets.)

4.7.6 Bothway Limited Facility Junction Relay Set, GBW 14451

As with 4.6.1

4.7.7 Outgoing (U/D) Limited Facility Junction Relay Set, NZ 31487

As with 4.6.2

4.7.8 Full Facility Outgoing (B/W or U/D) Junction Relay Set, GBW 13930

Used for O/G (U/D) or B/W (U/D) full facility toll junctions associated with either combined level 0 & 1 working, separate level 0 & 1 working or level 0 working.

Where a remote R- or M-unit is to be parented on a UAX, one GBW 13930 is to be specified for each O/G or B/W toll junction at the UAX.

Note Similar relay sets GBW 16000, GBW 16670/1 or GBW 20100 are unsuitable as they do not permit manual hold for remote R- or M-unit subscribers.

4.7.9 Outgoing to Auto (B/W or U/D) Junction Relay Set, GBW 13970

This relay set is used for O/G (U/D) or O/G (B/W) subscriber dial junctions associated with separate level 0 & 1 working, or for an auxiliary route to an adjacent UAX.

Where a remote R- or M-unit is to be parented on a UAX, one GBW 13970 is to specified for each O/G or B/W subscriber dial or auxiliary junction at the UAX.

Note The similar relay set GBW 16830 is unsuitable as it does not permit manual hold for remote R- or M-unit subscribers.

4.7.10 Incoming (B/W or U/D) Junction Relay Set, GBW 13980/1, GBW 16880

As with 4.6.5

4.7.11 Dial Tone Suppression Relay Set, GBW 15510

As with 4.6.6

4.7.12 Route Discrimination and Timing Relay Set, GBW 13920

As with 4.6.7

4.7.13 Route Discriminating Common Relay Set, GBW 14010

As with 4.6.8

4.7.14 Route Restricting and Timing Relay Set, GBW 13940

As with 4.6.9

4.7.15 6 Second Time Pulse Distribution Relays, GBW 14020 Fig 1 & Fig 2

As with 4.6.10

4.7.16 Outgoing (B/W or U/D) Junction Relay Set to a Dependant UAX, GBW 13950

As with 4.6.11

4.7.17 Outgoing (B/W or U/D) Junction Relay Set to a Dependant UAX, GBW 13960

As with 4.6.12

4.7.18 Incoming (B/W or U/D) Junction Relay Set from a Dependant UAX, GBW 13990

As with 4.6.13

PARENT R/S FOR ATTACHED R-UNITS

4.7.19 Incoming (U/D) Junction Relay Set From an Attached R-Unit, GBW 13780, NZ 26174

These relay sets are used to provide access from an attached R-unit to the parent UAX. In the case of GBW 13780 the I/C junctions terminate on Line Finder level 8 & 9 at the UAX. In the case of NZ 26174 the I/C junctions terminate on associated UAX line circuits.

Specify one of either GBW 13780 or NZ 26174 for each junction from an attached R-unit.

Note 1 GBW 13780 provides for barring of CCB calls and is therefore normally used at a UAX where subscribers meters are installed. It is also preferred for general use as line circuits are not involved.

Note 2 GBW 13780 has 2 circuits per relay plate.
NZ 26174 has 10 circuits per relay plate.

SECTION 5 : NZ 13C-UNITS

5.1 GENERAL

5.1.1 The typical equipment of C-units is shown on ATE Drwgs 494384 & 495272 and on GEC Drwgs 700797, 702509 & 577967.

5.1.2 Specify one C-unit when one to four A-units are installed.

5.1.3 Specify two C-units when five to eight A-units are installed.

5.1.4 Specify three C-units when nine to twelve A-units are installed.

5.2 FUSE MOUNTINGS (20 Pair) *

5.2.1 Specify as required to suit the quantity of U/G cable pairs to be terminated.

5.2.2 The maximum capacity of each C-unit is 16 fuse mountings (i.e., 320 cable pairs).

5.3 FUSE MOUNTINGS (40 Pair) *

5.3.1 Specify at UAX's where it is required to extend the cable pair capacity of the C-unit beyond 320 cable pairs. Cabling to the fuse mountings should not be extended to the maximum as difficulties will arise with jumpering arrangements between C-units.

5.4 PROTECTOR MOUNTINGS NO. 40B (ADDNL) *

5.4.1 The C-unit has the capacity of terminating 200 A-unit subscribers on the exchange side of the MDF. The C-unit, however, is only supplied with sufficient protector mountings (i.e., five) to terminate 100 subscribers. Additional protector mountings should be requisitioned for as required.

5.4.2 The C-unit also has two other protector mountings positions which can be used to terminate any of the following :-

(a) Junctions.

(b) M or R relay sets.

(c) The 20 lines of a Local R-unit.

(d) The 20 lines of a Local M-unit.

Note The C-unit is supplied equipped with one of these protector mountings and the other one should be requisitioned for if required.

* For Stock List Numbers see page 44

5.5 BRACKETS NUMBERING FOR PROTECTOR MOUNTINGS BPO NO. 153

5.5.1 Specify one for each extra protector mounting added.

5.6 JACKS TEST NO. 4 (In Strips of 20) *

5.6.1 Specify one for each extra protector mounting added.

5.7 BRACKETS 'V' FOR MOUNTING BPO TEST JACKS NO. 4 *

5.7.1 Specify two per test jack strip.

5.8 RINGING AND METER PULSE RELAY SET, GBW 13723 FIG 2

5.8.1 One per C-unit (part of C-unit equipment).

Note Also, one is to be held for relief purposes at each Maintenance Control Centre.

5.9 TONE AND TIME PULSE RELAY SET, GBW 13723 FIG 1

5.9.1 One per C-unit (part of C-unit equipment).

Note Also, one is to be held for relief purposes at each Maintenance Control Centre.

5.10 LINE TEST SET , GBW 13871, NZ 33827

5.10.1 One per C-unit (part of C-unit equipment).

5.11 LINE TEST CORD NO. 4/72B

5.11.1 Specify one per UAX.

5.12 METER TEST CORD NO. 2/12A

5.12.1 Specify one at metered UAX's.

5.13 NU TONE TEST CORD NO. 3/72A

5.13.1 Specify two per C-unit with a maximum of five per UAX.

* For Stock List Numbers see page 44

5.14 SIMPLE VOLTMETER (DETECTOR GPO NO. 4) *

5.14 Specify one per UAX.

Note Detector GPO No. 4 is to be superseded by Hioki multi-meter THS (S/L AC 659).

5.15 PRESS BUTTON, ALARM LAMP

5.15.1 Specify one per UAX.

5.16 SHELVES FOR TEST TELEPHONE

5.16.1 Specify one per UAX.

5.17 TEST TELEPHONE

5.17 Specify one per UAX. To comprise of a standard No. 706 Automatic Telephone.

5.18 CABLE TROUGH AND MOUNTING BRACKET

5.18.1 One required between 1st and 2nd rows of equipment. Two joined together required between 1st and 3rd rows of equipment.

5.19 FRAMEWORK WOODEN

5.19.1 Provide one when a second C-unit is specified.

5.19.2 Provide two when a second and third C-unit are specified.

* For Stock List Numbers see page 44

SECTION 6 : NZ 13 E-UNITS

6.1 GENERAL

6.1.1 The typical equipment of E-units is shown on Drwg ATE 495266. In recent years the practise of equipping group selectors and shelves (refer para 4.4.14 and 4.4.15) in B-units has dispensed with the need for E-units, which are now no longer purchased from the Contractor.

6.1.2 E-units or B-units equipped with group selectors and shelves are used in special circumstances - e.g., internal congestion, extensive code dialling between adjacent UAX's etc., to terminate incoming junctions.

6.1.3 E-units or B-units fully equipped with group selectors and shelves have accommodation for 25 group selectors (5 selectors/shelf).

6.1.4 For group selectors see para 4.4.15.

SECTION 7 : NZ 13 M-UNITS

7.1 GENERAL

7.1.1 The typical equipment of M-units is shown on GEC Drwg 700355.

7.1.2 3 - 5 party lines under 1000 ohms loop CR and not less than 50,000 ohms IR are classified as M lines.

7.1.3 A UAX NZ 13 M-unit should generally be installed at a UAX if the number of M subscribers will be in excess of 25. (See also para 4.4.2)

7.2 FINAL SELECTOR RELAY SETS, GBW 14400

7.2.1 Specify as required or as per the table below.

7.2.2 Traffic rates of 0.015E/sub and 0.024E/sub are considered typical of M subscribers message-rate and flat-rate respectively on the Group Centre parent. These rates should be used if no other are available, and the final selector quantities shown in the table below should at least be sufficient initially. After cut-over, traffic checks will indicate if any equipment changes are required.

Subscribers Served	Final Selectors Required	
	Message-Rate (0.016E/Sub)	Flat-Rate (0.024E/Sub)
Up to 50	4	5
51 to 70	5	6
71 to 80	5	7
81 to 100	6	7

7.2.3 M-units are supplied equipped complete with eight final selector uniselector mechanisms. The uniselector mechanisms of the final selector not in use are to be left in position.

SECTION 8 : NZ 13 ATTACHED R-UNITS (NZ 13R) AND REMOTE R-UNITS (NZ 13RR) OR M-UNITS (NZ 13 RM)

8.1 GENERAL

8.1.1 Definitions of 'R' and 'M' type service are given on page 11.

8.1.2 R-units can be attached to a UAX - i.e., installed in the same building (attached R-units), or installed in a separate building some distance from a parent UAX or other type of parent exchange (remote R- or M-units).

8.1.3 A remote M-unit (RM-unit) is an R-unit modified to give 'M'-type service; and as the NZPO current policy is for installation of 'R'-type service only with prior approval from the Engineer-in-Chief, and for progressive elimination of existing 'R'-type service, the main use for R-unit equipment in the future will be for remote M-unit application.

8.1.4 If a remote M-unit in not available, an R-unit should be ordered and modified in accordance with IS 1137. The following is a list of R-unit circuits which would require modification to provide for remote M-unit working :-

Line Circuit	GBW 13640	convert to NZ 31691
Discriminator Circuit etc.	GBW 13650	convert to NZ 31692
Final Selector Circuit	GBW 13660	convert to NZ 31693
Ringing Tones and Alarm Circuit	GBW 13690/1	convert to NZ 31694
Rack Common Service	GBW 13700	convert to NZ 33739
Line Test Circuit	GBW 13710	convert to GBW 13710 MOD A

8.1.5 The typical equipment of R-units is shown on GEC Drwg 700030, and typical equipment of RM-units is shown on Drwg NZPO 33700.

8.2 PROVISION OF AN ATTACHED R-UNIT

8.2.1 An attached R-unit is specified when there are in excess of 35 'R' subscribers to be served ultimately from a UAX. For less than 35 'R' subscribers, R-relay sets to GBW 14410 are to be used.

8.3 PROVISION OF A REMOTE R- OR M-UNIT

8.3.1 Generally a remote R- or M-unit (RR-unit or RM-unit) is specified for a low growth, compact area containing some 30 - 60 subscribers which is sufficiently distant from the Group Centre to allow subscriber acceptance of mainly multi-party service. An economic study is necessary to ensure that the RR- or RM-unit is the most economic solution for the case concerned.

8.4 CAPACITY

8.4.1 An R-unit and RR or RM-unit has a maximum capacity of 20 lines/100 subscribers. However, if AC3 signalling or carrier is used on the junctions to the Group Centre in order to permit alarms test calls from the Group Centre, allocation of a line circuit for this purpose will reduce the unit capacity to 19 lines/95 subscribers.

8.5 LINE CIRCUITS, GBW 13640 FOR R-UNITS, NZ 31691 FOR RM-UNITS (5 CCTS/PLATE)

8.5.1 Specify line circuits in multiples of five to suit the requirements of the provision period.

8.6 LINE FINDER AND DISCRIMINATING SELECTOR, GBW 13650 FIG 1 FOR R-UNITS, NZ 31962 FIG 1 FOR RM-UNITS

8.6.1 Specify as required, or as in para 8.6.2.

8.6.2 Traffic rates of 0.015E/sub and 0.024E/ sub are considered typical of attached R-unit and RR- or RM subscribers message-rate and flat-rate respectively on the Group Centre. These rates should be used if no other are available, and the final selector quantities shown in the table below should at least be sufficient initially. After cut-over, traffic checks will indicate if any equipment changes are required.

8.6.3

Subscribers Served	Selectors Required	
	Message-Rate (0.016E/Sub)	Flat-Rate (0.024E/Sub)
Up to 50	4	5
51 to 70	5	6
71 to 78	-	6
71 to 80	5	-
81 to 100	6	-

8.6.4 It will be noted that the maximum number of subscribers shown in this table for a traffic rate of 0.024E/sub is 78. If the traffic rate is 0.024E/sub, the maximum number of subscribers that can be connected without the grade of service falling below 0.01 is limited by the number of final and discriminating selectors it is possible to equip - i.e., 6 in both cases.

8.6.5 R-units or RM-units are supplied equipped complete with six line finder uniselector mechanisms. The uniselector mechanisms not in use are to be left in position.

8.7 FINAL SELECTORS, GBW 13660 FOR R-UNITS, NZ 31693 FOR RM-UNITS

8.7.1 Specify as required or as in para 8.6.3 above. The terminated rate is assumed to be the same as the originated rate.

8.7.2 R-units or RM-units are supplied complete with six final selector uniselector mechanisms. The uniselector mechanisms not in use are to be left in position.

8.8 ALLOTTER, GBW 13650 FIG 4 FOR R-UNITS, NZ 13962 FIG 4 FOR RM-UNITS

8.8.1 Specify one per R-unit or RM-unit.

8.9 RINGING AND PULSE RELAY SET, GBW 13691 FOR R-UNITS, NZ 31694 FOR RM-UNITS

8.9.1 Specify one for the first R- or RM-unit. Three attached R-units may be served from one relay set.

8.10 CODE RINGING RELAY SET, GBW 13691 FOR R-UNITS, NZ 31694 FOR RM-UNITS.

8.10.1 Specify one for the first R- or RM-unit. Three attached R-units may be served from one relay set.

8.11 ALARM AND TIME PULSE RELAY SET, GBW 13691 FOR R-UNITS, NZ 31694 FOR RM-UNITS

8.11.1 Specify one for the first R- or RM-unit. Three attached R-units may be served from one relay set.

8.12 LINE TEST SET, GBW 13710 FOR R-UNIT, GBW 13710 MOD A FOR RM-UNIT

8.12.1 Specify one GBW 13710 at each remote R-unit or one GBW 13710 MOD A at each remote RM-Unit.

Note Not required at an attached R-unit.

8.13 LINE TEST TELEPHONE

8.13 At UAX's with rural lines and at remote R- or M-units, specify one standard rural-automatic or automatic wall telephone for association with the Line Test Set GBW 13710, GBW 13710 MOD A, or GBW 13871 as applicable.

8.14 PRESS BUTTON, ALARM LAMP

8.14 Specify one for the first R- or RM-unit, and an additional button for a second attached R-unit if not adjacent to the first.

8.15 JUNCTIONS FROM AN ATTACHED R-UNIT

8.15.1 the number of junctions provided should be based on the number of subscribers to be served, and on the estimated O/G junction traffic rate per subscriber. The grade of service is not to fall below 0.01 and the C/10 traffic tables are to be used to calculate the number of junctions required.

8.15.2 If it is not possible to estimate the junction traffic for a proposed attached R-unit then junctions should be provided in accordance with the table shown below. After cut-over, traffic checks will indicate if any equipment changes are necessary.

8.15.3 This table is based on the following :-

(a) Message-rate on Group Centre
- Originated rate of 0.016E/sub
- O/G junction rate of 1.3E/100 subs

(b) Flat-rate on Group Centre
- Originated rate of 0.024E/sub
- O/G junction rate of 1.8E/100 subs

8.15.4

Subscribers Served	Junctions Required	
	Message-Rate (1.3E/100 Subs)	Flat-Rate (1.8E/100 Subs)
Up to 40	4	4
41 to 70	4	5
71 to 78	-	6
71 to 100	5	

8.15.5 It will be noted that the maximum number of subscribers shown in this table for an O/G junction rate of 1.8E/100 subs is 78. If the originated traffic is 0.024E/sub then the maximum number of discriminating selectors (6) limit the number of subscribers that can be connected without the grade of service falling below 0.01.

8.15.6 The table above may also be used if required for the provision of I/C junctions from the A-units. The terminated rate is assumed to be the same as the originated rate. The maximum number of final selectors it is possible to fit (6) is also a limiting factor on the number of subscribers that can be connected.

8.15.7 Junction relay sets are not required in the R-unit when it is attached to a UAX. At some earlier installations, GBW 13680 relay sets were used but they are not to be used for any new work. The R-unit final selectors are directly connected, four wire, from the allotted A-unit group selector level. For the type of relay set to be used to terminate the O/G junctions from an attached R-unit see para 4.7.19.

8.15.8 After cut-over, traffic checks will indicate if any equipment changes are required.

8.16 JUNCTIONS FROM A REMOTE R- OR RM-UNIT

8.16.1 The number of junctions provided should be based on the number of subscribers to be served, and on the estimated B/W junction traffic rate per subscriber. The grade of service is not to fall below 0.02 and L (partial division) traffic tables are to be used to calculate the number of junctions required.

8.16.2 If it is not possible to estimate the junction traffic for a proposed remote R- or M-unit the junctions should be provided in accordance with the table shown below. After cut-over, traffic checks will indicate if any equipment changes are necessary. This table is based on B/W junction traffic of 2E/100 subs and 3E/100 subs. These rates are considered typical of a remote R- or M-unit either message-rate or flat-rate respectively on its group centre parent.

8.16.3

Subscribers Served	Junctions Required	
	Message-Rate (2E/100 Subs)	Flat-Rate (3E/100 Subs)
Up to 30	3	4
31 to 40	4	5
41 to 50	4	5
51 to 60	5	6
61 to 80	5	2 I/C, 2 O/G, 3 B/W
81 to 100	6	2 I/C, 2 O/G, 4 B/W

8.17 JUNCTION RELAY SETS AT A REMOTE R OR M-UNIT

8.17.1 Circuits have been developed for parenting remote R- or M-units on UAX's, AMX's and direct on Group Centres (CAX, UMX or BMSB). Provision has not been made, however, for solely rural carrier signalling between a remote R- or M-unit and a UAX or AMX for limited facility message-rate applications. In such cases, AC3 signalling will be necessary in conjunction with the carrier equipment, or the carrier equipment dispensed with and the junctions brought up to full loop disconnect standards.

8.17.2 Typical trunking for remote R- and M-units is included in Drwg NZPO 37140 attached.

8.17.3 Bothway Junction Relay Set, GBW 13670

This circuit (installed in the remote R- or M-unit) is used for all remote R- or M-unit B/W junctions.

Specify one per bothway junction.

Note 1 If the remote R- or M-unit is parented on an AMX or Group Centre on a non-linked basis a digit absorbing and discriminating relay set will also be necessary for each B/W junction

Note 2 R-unit or remote M-unit are supplied equipped complete with six bothway (or incoming junction) uniselector mechanisms. The uniselector mechanisms not in use are to be left in position.

Note 3 If relay sets GBW 13670 are unavailable, it will be necessary to utilise incoming relay sets GBW 13680 or GBW 14500 in conjunction with outgoing relay sets GBW 16831 for bothway junctions (GBW 16831 relay sets will require mounting in the associated B-unit at the remote R- or M-unit). Similar use of GBW 13680 or GBW 24500 will be required for unidirectional incoming junctions and GBW 16831 for unidirectional outgoing junctions.

8.17.4 Unidirectional Junction Relay Set, GBW 13760 MOD B

This circuit (installed in the remote R- or M-unit rack) is used for all remote R- or M-unit unidirectional junctions.

Specify relay set GBW 13670 per pair of junctions (i.e, one incoming and one outgoing junction) and modify locally.

Note 1 If the remote R- or M-unit is parented on an AMX or Group Centre on a non-linked basis a digit absorbing and discriminating relay set will also be necessary for each B/W junction

Note 2 R-unit or remote M-unit are supplied equipped complete with six bothway (or incoming junction) uniselector mechanisms. The uniselector mechanisms not in use are to be left in position.

Note 3 If relay sets GBW 13670 are unavailable, it will be necessary to utilise incoming relay sets GBW 13680 or GBW 14500 in conjunction with outgoing relay sets GBW 16831 for bothway junctions (GBW 16831 relay sets will require mounting in the associated B-unit at the remote R- or M-unit). Similar use of GBW 13680 or GBW 24500 will be required for unidirectional incoming junctions and GBW 16831 for unidirectional outgoing junctions.

8.17.5 Bothway Simplex Adapter Relay Set, NZ 26996

This circuit is for association with GBW 13670 to provide for limited facility message-rate applications where the junctions are not up to full facility loop disconnect standards.

Specify one for each such bothway junction.

Note This circuit must be mounted in a B-unit associated with the remote R- or M-unit.

8.17.6 AC3 Relay Sets

See Section 9

8.17.7 Carrier Adapters

These are to be mounted in a B-unit associated with the remote R- or M-unit. Rural Carrier adapters (STC, GEC and Fujitsu) and OOB carrier adapters are covered in ER/TP 1403 Basis of Design Keysheets, Section 7.4 and 7.3 respectively.

8.17.8 Revertive Relay Sets, GBW 13770

These are to be mounted in a B-unit associated with the remote R- or M-unit. See para 4.4.1.

8.17.9 Other relay sets, i.e., those which have been developed for special cases and therefore have only limited application are included in the complete list of UAX, NZPO and GBW relay sets. Ref Appendix 1 attached.

SECTION 9 : NZ 13 S-UNIT

9.1 GENERAL

9.1.1 The typical equipment of S-units is shown on :-

AC3 S1-Unit	ATE Drwg 495331
AC3 S2-Unit	ATE Drwg 495380
AC3T S1T-Unit	ATE Drwg 496420
AC3T S1T-Unit	ATE Drwg 496424

9.1.2 Specify for use on carrier junctions when full facility working is required, or on metallic junctions when they do not meet the required signalling standard.

Note The approval of the Engineer-in-Chief is required before AC3 signalling is used on metallic junctions.

9.2 UAX NZ 13 S1-UNITS

9.2.1 These units are designed to be equipped with valve type AC3 relay sets for either four bothway junctions, eight unidirectional (four incoming, four outgoing) junctions, or a combination of both.

9.2.2 Specify as the first AC3 unit to be installed at a UAX. If more than 18 AC3 junctions are equipped, another such unit will be required to provide sufficient positive battery supply.

Note These units, although still available from recoveries, are superseded by the transistor type as per the next item.

9.3 UAX NZ 13 S1T-UNITS

9.3.1 These units are designed to be equipped with transistor type AC3 relay sets for either five bothway junctions, ten unidirectional (five incoming, five outgoing) junctions, or a combination of both.

9.3.2 Specify as the first AC3 unit to be installed at a UAX. If more than 60 AC3 junctions are equipped, another such unit will be required to provide sufficient oscillator output.

9.4 UAX NZ 13 S2- AND S2T-UNITS

9.4.1 These units are designed to be equipped with valve or transistor type AC3 relay sets respectively. Each unit has a capacity for either six bothway junctions, 12 unidirectional (six incoming, six outgoing) junctions, or a combination of both.

9.4.2 Specify as required for second and successive AC3 units.

Note 1 Transistor type AC3 relay sets are interchangeable with valve type relay sets in S1- and S2-units. It is not possible, however, to install valve type relay sets in S1T and S2T units, (there is no provision for positive battery supply or a 6.3-volt heater supply).

Note 2 An S2T-unit can only be added to an S1-unit if an S1T-unit is already equipped. An S2-unit, however, cannot be added to an S1T-unit unless transistor type AC3 relay sets are installed in the S2-unit.

9.5 VALVE TYPE AC3 RELAY SETS

Note These relay sets, although still available, are superseded by the transistorised type.

9.5.1 Outgoing Relay Set for Bothway Junction, GBW 15050

This relay set is used in conjunction with Incoming Relay Set, GBW 15080

Part 1 = 18 pt relay plate.
Part 2 = 18 pt relay plate.

Specify one per bothway junction.

9.5.2 Incoming Relay Set for Unidirectional or Bothway Junction, GBW 15080

24 pt relay plate.

Specify one per incoming or bothway junction.

Note This relay set has built-in dial tone suppression.

9.5.3 Outgoing Relay Set for Unidirectional Junction, GBW 15090

Part 1 = 18 pt relay plate.
Part 2 = 22 pt relay plate.

Specify one per outgoing junction.

9.6 TRANSISTOR TYPE AC3 RELAY SETS (AC3T)

9.6.1 Outgoing Relay Set for Bothway Junction, GBW 16490

This relay set is used in conjunction with incoming relay set, GBW 16520.

Part 1 = 18 pt relay plate.
Part 2 = 18 pt relay plate.

Specify one per bothway junction.

9.6.2 Incoming Relay Set for Unidirectional or Bothway Junction, GBW 16520

24 pt relay plate.

Specify one per incoming or bothway junction.

Note This relay set has built-in dial tone suppression.

9.6.3 Outgoing Relay Set for Unidirectional Junction, GBW 16530

Part 1 = 16 pt relay plate.
Part 2 = 20 pt relay plate.

Specify one per outgoing junction.

9.7 PARENT AC3 RELAY SETS

9.7.1 The following parent relay sets can be used at a UAX with AC3 junctions to a dependant UAX :-

Valve Type	Transistor Type
GBW 15070	GBW 16510
GBW 15060	GBW 16500
GBW 15100	GBW 16540

9.7.2 If it is proposed to install these relay sets at a parent UAX it will be necessary to request from the Engineer-in-Chief a direction in regard to the type of unit in which to mount this equipment - i.e., an S-unit with possible modifications or a B-unit. (Refer ATE Drwg 494064 Sheets 4 and 6.)

9.7.3 An S1T-unit with dependant type AC3T relay sets can be used at a parent UAX in lieu of parent type AC3T type equipment to obviate the modification requirement referred to in para 9.7.2. See typical UAX trunking Drwg NZPO 37140 Sheet 24.

9.8 S1-UNIT COMMON EQUIPMENT

9.8.1 2280 c.p.s. Oscillator Relay Set, GBW 11690 (8 pt relay plate)

Specify two per exchange.

Note Each oscillator should serve a maximum of 30 junctions.

9.8.2 Positive Battery Supply Relay Set, GBW 15530 (18 pt relay plate)

Specify one per nine junctions.

Note The three circuits on the plate combine to give one positive supply for up to 9 junctions, including the oscillator.

9.8.3 Positive Battery Alarm Relay Set, GBW 15670 (8pt relay plate)

Specify one per positive battery supply relay set GBW 15530.

9.8.4 The following circuits are part of the S1-unit equipment :-

(a) Test circuit for receivers and oscillators to GBW 15590.

(b) 6.3 volt AC heater supply to GBW 15661.

(c) Rack Common Services to GBW 13730.

9.9 S1T-UNIT COMMON EQUIPMENT

9.9.1 2280 c.p.s. Oscillator Relay Sets, GBW 16480

Specify two per exchange.

Note Each oscillator should serve a maximum of 30 junctions.

9.9.2 The following circuits are part of the S1T-unit equipment

(a) Test circuit for receivers and oscillators.

(b) Rack Common Services to GBW 13730.

SECTION 10 : MISC UAX NZ 13 EQUIPMENT

10.1 CLOCKS BPO NO. 46, GBW 14641

10.1.1 Specify one at UAX's equipped with message-rate subscriber dialling.

10.2 TELEPHONE BUTTINSKY

10.2.1 Specify one per UAX.

10.3 STANDS TEST NO. 17

10.3.1 Specify one per UAX.

10.4 SPARE PARTS

10.4.1 See E.I.'s TELES Auto A 5480 for list of spare parts to be held at both the UAX and at the Maintenance Control Centre. Supply and requisition accordingly.

10.5 TOOL KITS UAX NZ 13

10.5.1 One or more to be provided at each UAX Maintenance Control Center.

10.6 TESTER SELECTOR, GBW 14000

10.6.1 One provided at each UAX Maintenance Control Center.

10.7 OSCILLATOR, GBW 14320

10.7.1 One provided per Engineering District for issue when required for making transmission performance tests on internal switching equipment.

10.8 TRANSMISSION TESTER, GBW 14330

10.8.1 As for oscillators - Ref para 10.8.1.

10.9 DIAL UNIT, GBW 14340

10.9.1 As for oscillators - Ref para 10.8.1.

10.10 STOCK LISTING OF UAX EQUIPMENT

10.10.1 The JB stock list covers most major UAX equipment likely to be required and reference to this should be made when requisitioning for material. There is, however, other equipment that will be required and which is not included in the JB stock list. The more commonly used items in this category are as follows :-

Description	GBW No	S.L. No.
Fuse Panel		LH 313
Transformers BPO No. 50A	GBW 13730 Fig 28	K 78
Meters overflow 100C	GBW 13730 Fig 22	K 740A
Brackets V		KE 115D
Brackets numbering		KE 116B
Jacks, test No.4		KE 117
Fuse mountings BPO No. 4001		KE 450
Fuse mountings APO type		KE 460
Protector mountings		KE 603
Stands Test		KG 629
Stands Test R.S. adaptor		KG 630
Telephones Buttinsky		KG 720
Links N green		LC 215
Links N red		LC 216
Hioki Multi-meter THS		AC 659
Rectifier 10 amp		AD 161E
Power Panel		AD 716
Cells primary		AE 66
Pegs No.47 for use with jacks test No.4		KE 118B
Dial speed tester No. 43		KG 765
Cams No. 1/SCA/72, 1 level		LC 185
Cams No. 2/SCA/72, 2 level		LC 186
Screws No. 1/SSC/198 for cams		LC 409
Fuse Mountings 40 PR BPO 8064A		KE 470

10.11 DRAWINGS : TYPICAL

10.11.1 One complete set of UAX Typical Assembly Drawings appropriate to each of the two supplying Contractors, ATE and GEC, to be held at each Maintenance Control Centre.

10.11.2 One Complete set of UAX Typical Assembly Drawings particular to the equipment installed to be held at each UAX.

10.12 DRAWINGS : STANDARD

10.12.1 One print of each GBW, GBU, GBX and RCCL diagram particular to the UAX installation is to be held at the UAX in a suitable container.

10.12.2 One print of each GBW GBU, GBX and RCCL diagram particular to every UAX in his maintenance are is to be held by the Senior Technician at the Maintenance Control Area.

10.12.3 One print of each GBW, GBU, GBX and RCCL diagram particular to every UAX in his district is to be held at the Engineer’s Office.

10.12.4 The above distribution should also apply to Diagram Notes when available.

10.12.5 For each new UAX, copies of the Number Allocation Chart (NZPO Drwg 24593) should be ordered and bound into suitable folders. The distribution should be as follows :-

One copy to be held at the UAX.
One copy to be held at the Fault Control Centre.

Additional copies as required should also be ordered for use in the Engineers office and Telephone Services Branch.

10.13 DRAWINGS : SPECIFIC

10.13.1 As part of each UAX Installation Project (or extension) the following specific drawings in the District series are to be prepared (or amended) and prints issued as follows :-

Specific Drawings

Trunking and Equipment Diagram (including fixed-fee or multi-fee relay set strapping charts).

Floor Plan.

Skeleton Equipment of B-units etc.

Print Issues

Engineer-in-Chief's Office.

Regional or District Engineer's Office.

Maintenance Control Centre.

UAX.

10.14 CABLE

10.14.1 Specify in accordance with IS 1130 para 3.8.

10.15 LOCALLY MANUFACTURED TROUGHING

10.15.1 Specify as required. Reference IS 1130 para 2.6.

10.16 TUBULAR HEATERS

10.16.1 Specify if required. Reference E.I. POWER Building Services B 3043.

SECTION 11 : POWER PLANT

11.1 POWER PANEL

11.1.1 Specify one panel (S.L. AD 716) per installation.

11.2 RECTIFIERS

11.2.1 Specify one for single remote R- or M-unit installations and UAX installations of 100 - 200 multiple.

11.2.2 Specify two for UAX installations of 200 - 600 multiple.

11.2.3 An existing UAX having increased 50-volt load, whether due to equipment extension, and high calling rate or special junction equipment (carrier, AC3), may have a further rectifier specified if the need is proved by a load chart.

11.3 CELL, SECONDARY

11.3.1 The total anticipated ultimate 24 hour load (exchange and carrier) should be calculated, using the following tables as a guide :-

	EXCHANGE 24 HR LOAD		RURAL CARRIER 24 HR LOAD			
			EQUIPMENT		EQUIPMENT	
UAX SIZE	TYP LOADS* B.H.L.	TYP LOADS* 24 HR	NO OF JUNCS	STC or GEC 24V	NO. OF JUNCS	FUJITSU 50V
200 mult	7½ Ah	60 Ah	3	10 Ah	2	6 Ah
400 mult	14 Ah	110 Ah	6	20 Ah	3 - 5	15 Ah
600 mult	20 Ah	160 Ah	10	36 Ah	6 -10	30 Ah

* Interpolation should be used to estimate the 24 hour load corresponding for an intermediate size UAX.

11.3.2 Specify a battery of 24 cells of the nearest available capacity above the anticipated ultimate 24 hour load - i.e., the actual battery capacity chosen will depend on the various stock listed type available at the time - e.g., typically 60Ah, 100Ah, 200Ah & 400Ah. See AE class stock list.

11.4 CELLS, PRIMARY

11.4.1 Specify a positive battery of 34 dry cells (S.L. AE 66) per UAX system (required for trunk offering and route unbarring).

Note 1 A positive battery is not required at a remote R- or M-unit.

Note 2 When a positive battery generator is equipped for valve type AC3 equipment, it is not to be used in place of the positive battery for other junction equipment. This is because the trunk-offering signal draws 192 mA for 10 - 40 mS after the seizure of the final selector; the route-unbarring signal draws 17 mA between the setting up of the call and the called subscriber answer signal.

11.5 BATTERY CABINETS'

11.5.1 To be manufactured locally by the NZPO to suit the size of the battery :-

(a) for the secondary battery, see Drwg NZPO 20288 & 34773.

(b) for the primary battery, see Drwg NZPO 26248.

11.6 INSTALLATION AND CABLING

11.6.1 Refer to E.I. POWER General F 3401 and Drwg NZPO 29314.

APPENDIX 1

(A) GBW DRAWINGS

GBW 11690	2280 c.p.s. Oscillator 1-VF System. See GBW 16480
GBW 13730	UAX NZ 13 Rack Common Services.
GBW 13730 MOD A	UAX NZ 13 Rack Common Services (modified to permit the connection of UAX alarms to the NEC Alarm Sender, For use at Local/Outgoing Register Scheme).
GBW 13750	UAX NZ 13 M-Line Relay Set.
GBW 13760	UAX NZ 13 Ringing Codes for 5 Party Lines.
GBW 13761	UAX NZ 13 Ringing Codes for 5 Party Lines.
GBW 13762	UAX NZ 13 Ringing Codes for 5 Party Lines, Transistorised.
GBW 13770	UAX NZ 13 Revertive Call Relay Set.
GBW 13770 MOD A	UAX NZ 13 Revertive Call Relay Set (for use at UAX equipped with Local Registers).
GBW 13780	UAX NZ 13 I/C Junction Relay Set from attached UAX NZ 13 R-Unit.
GBW 13780 MOD A	UAX NZ 13 I/C Junction Relay Set from Parent or Non-dependant Exchange (for use in lieu of GBW 13980/1).
GBW 13890	UAX NZ 13 Group Selector (see GBW 15960)
GBW 13890 MOD A	UAX NZ 13 Group Selector (modified to provide same facilities as GBW 15960).
GBW 13900/1	UAX NZ 13 2 - 10 PBX 100 Line Final Selector.
GBW 13920	UAX NZ 13 Route Discriminating and Timing Circuit.
GBW 13930	UAX NZ 13 O/G Junction relay Set to Parent Exchange.(see GBW 16670)
GBW 13940	UAX NZ 13 Route Restricting and Timing Circuit.
GBW 13950	UAX NZ 13 O/G Junction Relay Set to Dependant UAX (terminal traffic only).
GBW 13950 MOD C	UAX NZ 13 O/G Junction Relay Set to Dependant UAX (for use in lieu of GBW 16830/1).
GBW 13960	UAX NZ 13 O/G Junction Relay Set to Dependant Exchange (non-terminating traffic).
GBW 13960 MOD A	UAX NZ 13 O/G Junction Relay Set to Non-Dependant Auto Exchange with I/C Junction barring facility. (for use in lieu of GBW 16830/1).
GBW 13970	UAX NZ 13 O/G Junction Relay Set to Non-Dependant Auto Exchange (see GBW 16831).
GBW 13980	UAX NZ 13 I/C Junction Relay Set from Parent or Non-Dependant Exchange. (see GBW 16880).
GBW 13990	UAX NZ 13 I/C Junction Relay Set from Dependant UAX.
GBW 14010	UAX NZ 13 Route Discriminating Relay Set.
GBW 14020	UAX NZ 13 6 Second Time Pulse Distribution Relays.

GBW 14410	UAX NZ 13 R-Line Relay Set.
GBW 14450	UAX NZ 13 B/W Junction to Parent Exchange Limited Facility Type.
GBW 15050	Dependant Exchange O/G AC3 Line Circuit for B/W Junctions to Parent. (see GBW 16490).
GBW 15070/1	Parent Exchange O/G AC3 Line Circuit for B/W Junctions to Dependant.
GBW 15080	Dependant Exchange I/C AC3 Line Circuit from Parent. (see GBW 16520).
GBW 15090/1	Dependant Exchange O/G AC3 Line Circuit for Unidirectional Junctions to Parent. (see GBW 16530).
GBW 15100/1	Parent Exchange O/G AC3 Line Circuit for Unidirectional Junctions to Dependant. (see GBW 16540).
GBW 15390	Auto to Auto Repeater I/C Circuit for Rural Carrier.
GBW 15440	Main Exchange Relay Set for Rural Carrier Earth or Loop Dialling.
GBW 15510	UAX NZ 13 Dial Tone Suppression Circuit on Dialled VF Toll Calls. (see GBW 16880).
GBW 15530	UAX NZ 13 Transistor 50V Positive Supply for 1-VF System.
GBW 15590	UAX NZ 13 Test Circuit for 1-VF Receivers and Oscillators.
GBW 15660	UAX NZ 12 6.3V AC Heater Supply for 1-VF System with AC/DC Changeover.
GBW 15661	UAX NZ 12 6.3V AC Heater Supply for 1-VF System with AC/DC Changeover. (Not to be used for new work.)
GBW 15670	UAX NZ 13 Transistor 50V Positive Supply Fail Alarm for 1-VF System.
GBW 15960	UAX NZ 13 Group Selector.
GBW 16000	UAX NZ 13 O/G Junction Relay Set from Terminal UAX to Parent Exchange.
GBW 16200 MOD A	Auto to Auto Relay Set Non-metering two wire Intermediate Pulse Repeater. To be mounted on shelf (S.L. JB 265) in B-Unit.
GBW 16490	Dependant Exchange O/G AC3T Line Circuit for B/W Junctions to Parent.
GBW 16520	Dependant Exchange I/C AC3T Line Circuit for B/W Junction from Parent.
GBW 16530	Dependant Exchange O/G AC3T Line Circuit for U/D Junction to Parent.
GBW 16540	Parent Exchange O/G AC3T Line Circuit for U/D Junction to Dependant.
GBW 16660	UAX NZ 13 100 Line Final Selector Ordinary.
GBW 16670/1	UAX NZ 13 Outgoing Junction Relay Set.
GBW 16830	UAX NZ 13 O/G Junction to Non-dependant Auto with I/C Junction Barring Facilities.
GBW 16831	UAX NZ 13 O/G Junction to Non-dependant Auto with I/C Junction Barring Facilities.

GBW 16880	UAX NZ 13 I/C Junction from Parent or Non-dependant Exchange.
GBW 16900	S-M Set CCB Line Route Restriction Circuit with Discriminating Facilities.
GBW 16910	UAX NZ 13 Full Facility Outgoing Junction Relay Set 2000 type. (Pulse Generation type).
GBW 20100	UAX NZ 13 Outgoing Junction for Terminal UAX to Parent.

(B) NZPO DRAWINGS

NZ 23160	UAX B/W Parent Junction Circuit - Limited Facility Type.
NZ 25646	UAX NZ 13 Adapter Circuit Farm Line Circuit.
NZ 25647	UAX NZ 13 Adapter Circuit Rural Line.
NZ 25947	Fire Call-Out Scheme 'E'.
NZ 26106	UAX NZ 13R Radio Junction adapter Relay Set.
NZ 26174	I/C Adapter Circuit from Attached UAX NZ 13R-Unit.
NZ 26996	B/W Junction Adapter Circuit for UAX NZ 13R to Remote UMX.
NZ 27985	Fire Call-Out Scheme 'F' (For use in UAX and AMX).
NZ 28293	Adapter Circuit for RAX or UAX Limited Facility Junction on STC Rural Carrier System (Not to be used for new work).
NZ 28319	Adapter Circuit UAX NZ 13 Limited Facility Junction (STO-C or C.E.P. Carrier).
NZ 29037	Adapter Circuits for Limited Facility Carrier - Physical Junctions to UAX or RAX.
NZ 29143	Level '0' Relay Set, AC3 Outgoing to UAX NZ 13R. (not to be used for new work).
NZ 29337	B/W Adapter Circuit for UAX NZ 13 to Remote UMX on Rural Carrier System.
NZ 29469	Main Exchange Relay Set for Rural Carrier Earth or Loop Dialling.
NZ 30058	B/W Adaptor Circuit RAX or UAX Limited Facility type Physical Line - Rural Carrier.
NZ 30973	UAX NZ 13 Selector Level Relay Set to Attached UMX.
NZ 30974	UAX NZ 13 Toll to Auto Relay set from Attached UMX.
NZ 30975	UAX NZ 13 Subscriber Controlled Diversion Service Basic Switching Circuit.
NZ 31383	Mobile Radio Telephone Service Line Switching Relay Set.
NZ 31391	B/W Relay Set Manual Board to UAX Rural Carrier System (Limited Facility).
NZ 31392	I/C Relay Set Manual Board to UAX Rural Carrier System (Limited Facility).
NZ 31487	UAX NZ 13 O/G Junction Circuit to Auto. Loop Signalling.

NZ 31496	Junction Relay Set I/C from Parent Manual Exchange Limited Facility Working 2000 Type.
NZ 31610	UAX NZ 13 'R' Line Relay Set 6 - 10 Party Lines Simplex Dialling.
NZ 31611	UAX NZ 13 Auxiliary Relay Set for 6 - 10 'R' Line Relay Sets.
NZ 31863	UAX NZ 13 I/C Relay Set from Manual Board, O.O.B. Carrier System.
NZ 31864	UAX NZ 13 B/W Relay Set from Manual Board, O.O.B. Carrier System.
NZ 31959	O/G Relay Set from F/S Multiple to Parent Manual Exchange via Junction.
NZ 32356	UAX NZ 13R Adapter Relay Set B/W Working with Manual Parent, O.O.B. Carrier System.
NZ 32544	Long Line Adapter Circuit 'R' type Subscribers Line to 'M' type Line Circuit.
NZ 33177	VF Repeater (LM Ericsson Aust.(Trimax Terminating Units).
NZ 33561	P-Wire Repeaters for 2000 type Switching Equipment, Non-metering.
NZ 34179	Outgoing Junction Relay Set, Out-of-Band Signalling, 2000 Type.
NZ 34195	Incoming Junction Relay Set with Toll Facilities, Out-of-Band Signalling, 2000 Type.
NZ 36601	Exchange Line Relay Set for CB, Auto 'M' and 'R' Lines, Fujitsu Rural Carrier.
NZ 36603	UAX NZ 13 B/W Junction Relay Set, Fujitsu Rural Carrier.
NZ 36883	UAX NZ 13 Adapter Relay Set P and M lines.
NZ 38743	Subscriber Line Signalling Extender Relay Set for Ind., 2-Party or PABX Extension.
NZ 38744	Subscriber Line Signalling Extender Relay Set for 'M' and 'R' Lines.
NZ 38982	P-Wire Control Circuit for CCB Lines from UAX to GCX.

(C) LIST OF UAX SUPPLY NO. 1 SELECTORS AND RELAY SETS

NZ 23400	Revertive Call Relay Set. Not to be used - Use GBW 13770.
NZ 24999 } NZ 33827 }	Test Line Circuit.
NZ 25088	Wiring of Rack Alarm Circuit for UAX NZ 13.
NZ 25089	Subscribers Line, Linefinder and Control Set UAX NZ 13.
NZ 27820	Subscribers Line, Linefinder and Control Set UAX NZ 13. Mod to jack into GBU 13910.
NZ 25090	Group Selectors UAX NZ 13.
NZ 27821	Group Selectors UAX NZ 13. Mod to jack into GBU 13890/15960.
NZ 25091	2 - 10 PBX 100 Line Final Selectors UAX NZ 13.
NZ 27755	2 - 10 PBX 100 Line Final Selectors UAX NZ 13. Mod to jack into GBU 13900