

DIAGRAM NOTES
RELATING TO DIAGRAM GEN 16910 (ISSUE 3)
UAX NZ13 FULL FACILITY
OUTGOING JUNCTION RELAY SET 2000-T
(PULSE GENERATION TYPE)

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1. GENERAL.

The diagram shows the cct. of equipment provided at a UAX 13 exchange providing for outgoing junction working and discrimination for regular or CCB subscribers.

Contacts not mentioned at time of operation or release of a relay are ineffective at that stage.

2. FACILITIES.

Provision is made for --

- 2.1 Access from a group selector level '0'.
- 2.2 Access from a group selector level '1'.
- 2.3 Seizing and guarding the equipment from intrusion.
- 2.4 Discrimination dependent on which access is used.
- 2.5 Transmission Bridge.
- 2.6 Junction seizure and bothway working of same.
- 2.7 Silicon diodes to combat exchange potential difference.
- 2.8 Recognition of "called subscriber answer" signal.
- 2.9 Battery testing.
- 2.10 Times pulse release.
- 2.11 N.U. Tone.
- 2.12 Barretter feed from transmission bridge to calling subscriber.
- 2.13 Ringing Machine start.

3. CIRCUIT OUTLINE.

Access is gained to the cct via selector levels 0 or 1. An outgoing junction is seized whenever access is made from selector levels.

Level 0 Regular Subscribers access causes the relay set to generate and send one impulse via the junction to step the distant selector to level 9. Access from level 1 CCB Subscribers, causes the preceding equipment (GBW 16900) to generate 10 pulses and step the distant selectors via the junction to level '0'.

M1 lead provides discrimination for route barring, the signal being pos. batt. which operates relay NU to provide N.U. tone to the calling party. Should the calling party hold the connection in this case, timed forced release follows to clear down the cct. The same thing happens should the calling subscriber hold after the called subscriber has released.

Potential difference diodes are provided to cover a difference of potential between the UAX and the Parent exchange.

4. CIRCUIT DETAIL.

Call via level "0" of group selectors (Regular Subscribers)

The "P" lead of the level "0" access is tested for "free" or "Busy" by the preceding group selector and being found free switches to the 150 ohm batt. on the "P" lead followed by the "looping" of the +ve and -ve leads. Relay A operates.

Relay A operating,
 A1 prepares to extend loop forward to junction.
 A2 completes the operate path for relay B.

Relay B operating,
 B1 prepares operate path for CD relay.
 B3 completes operate path for BA and IP relays.

Relay BA operating,
 BA1 prepares loop to junction.
 BA2 prepares operate path for BB relay.
 BA3 completes operate path for BA relay.
 BA4 replaces 150 ohm batt. on the P lead with a guarding ct

Relay IP operating,
 IP1 prepares ct to provide one pulse to junction.
 IP2 prepares operate path for relay PR.

Relay HA operating,
 HA1 s/c "a3" winding of CD relay but ineffective throughout class
 of call.
 HA2) extend loop forward to junction to seize
 HA5) the distant incoming selector at the CAX.
 HA3 applies guard cth to terminal 3 - "P" lead.
 HA4 disconnects hold path for IP relay.
 HA6 completes operate path of PR relay for the release time
 of relay IP.

Relay IP releasing, (slowly)
 IP1 disconnects the loop to junction to step the distant
 selector to level 9.
 IP2 disconnects the hold path for PR relay which releases
 slowly, due to the non-inductive shunt of 4K ohms connected
 across its relay coil.

The distant selector in the CAX has now been stepped to level 9 and searches for a free outlet to a relay set associated with the distant manual board.

On answering, the manual board relay set sends a reversal over the junction to operate relay DA.

Relay DA operating,
 DA1 provides s/c across A springs 1 & 2 in case A relay
 flips when DD relay operates to provide supervisory reversal.
 DA2 completes operate path of the DD relay (Eth, BA1, DA2, 2000DD,
 Batt.).

Relay DD operating,
DD4 completes operate path for TS relay (Eth, B3, DD4, 2000TS).
DD5) reverse potential to the -ve and +ve incoming leads for
DD5) supervisory purposes - i.e., for use on PABAs.
DD4 disconnects cct to "timing out" relay TM.

Conversation may now proceed between called and calling party.

Called subscriber clears

This condition is signalled by restoring of junction potentials to normal, relay DA releases.

Relay DD releasing,
DA2 disconnects hold path for relay DD which releases.

Relay DD releasing,
DD5) restore potential on the incoming -ve &
DD5) +ve leads for supervisory purposes.
DD4 completes start cct via "timing out" relay TM (Eth, DD4, TS2, 1000TH, TM3, Time Pulse Start). This starts the time pulse unit and after a time a batt appears on the Time Pulse Start to operate relay TM.

Relay TM operating,
TM1 completes operate path for PR relay via Time Pulse release lead.
TM2 prepares to remove guarding eth off "P" lead.
TM3 provides alternative hold path for TM relay (Eth, TS2, 1000TH, TM3, Time Pulse Hold).

Relay PR operating,
PR1 completes operate path for CD relay (Eth, PR1, 5000D, Batt.).
PR2 disconnects loop to junction to release the distant selectors or equivalent.
PR3 disconnects busy eth from "P" lead to release preceding selectors.

Relay CD operating,
CD2 completes operate path for relay BB.
CD3 applies eth to P1 lead and completes operate path to CC relay.
CD5 prepares to apply busy eth to incoming P lead.

Relay BB operating,
BB1 completes alternative hold path for BB relay.
BB2 provides alternative hold path for CD relay.

The release of preceding selectors (by PR3) causes the loop on the incoming +ve and -ve leads to be removed and relay A releases.

Relay A releasing,
A2 disconnects hold path for relay B which releases slowly. Also A2 normal applies eth via B1 & BB2 to hold the CD relay operated during the slow release period of B-BA and BB relays.

Relay B releasing,
B3 disconnects the hold path for relays BA and TS.

Relay TS releasing,
TS2 disconnects hold path for TM relay which releases.

Relay TM releasing,
TM1 disconnects relay PR from time pulse release lead. Relay PR releases.

TR2 reconnects busy eth from BAA to "P" lead to guard the cct and junction during the release period of the equipment.

The release guarding period provided for the equipment comprises the release time of relays B-BA-BB-CD and CC.

The release of CD relay allows relay CC to release, CC4 applies the 150 ohm batt. (R1) to the "P" lead and disconnects hold path for BA relay which releases.

Calling subscriber releases, called party holds (Manual Hold)

The call proceeds to the point where the calling party clears. Relays A-B-BA-TS-DD release but the batt. on the +ve junction wire operates relay MH once relay BA restores.

Relay MH operating,
MH1 completes hold path for CD relay (Eth, MH1, 500CD, Batt.).

Relay CD holding,
CD3 maintains eth on P1 lead and holds relay CC operated.
CD5 applies holding and guarding eth on the incoming P lead.

Relay CC holding,
CC3 maintains hold path for BA relay.
CC4 removes 150 ohm test batt. off the P lead.

The cct is thus held for call tracing etc. with relays MH-CD, CC and BA operated.

Access from selector level "1" (CCB subscribers)

Incoming call via selector level "1" seizes via +ve', -ve', P' and M' leads.

The loop on +ve' and -ve' operates relay A in series with the 200 ohm coil of relay CO which operates. This is normally CCB subscribers access.

Relay A operates relay B which in turn operates relay BA as outlined in previous paragraphs.

However relay CO operating,
CO1 disconnects the operate path for IP relay to prevent the generation of one pulse.

This access is normally associated with group selector levels in which preceding these selectors is associated relay set GBW 16900. This relay set is arranged to generate 10 pulses under the control of a discriminating digit.

Therefore after seizure of GBW 16910 there immediately follows a train of ten pulses which steps the distant incoming selector to level "0" to gain access to a manual board relay set and thus the Manual Operator.

Summarising the access arrangements, both Regular and CCB subscribers dial "0" for operator access, the incoming selector at the distant exchange being stepped to level "0" under control of relay set GBW 16900 associated with CCB lines. Regular subscribers cause the distant incoming selector to step to level 9 under control of the single-pulse generation feature provided in GBW 16910.

Both types of subscriber are enabled to dial "1" without hindrance but if a CCB subscriber then dialled "9" this would correspond to the Regular demand level and NU tone is returned to the CCB subscriber. If the CCB subscriber on dialling the second digit, had chosen 2 to 8 instead of 9 the call would not be hindered as dialling codes beginning with 12 to 18 indicate single fee calls.

CCB calls - cancellation of single digit regeneration

This is achieved by a receipt of 150 ohm batt. on the M lead via the vertical bank level "0" of the selector (GBW 15960) and the normal past springs, of the line finder, set to operate on levels corresponding to CCB lines.

The receipt of the 150 ohm batt. on the M lead causes relay C0 to operate (Eth, HA6, D2, 200C0, 'M' lead, 150 ohm batt.).

Relay C0 operating, disconnects the operate path of relay IP to prevent the generation of one pulse to the junction.

CCB subscriber dials Regular demand level

If the CCB dials 1 followed by 9 (instead of digits 2 to 8) a 3K positive operates relay NU via selector vertical marking bank and the 'M' lead.

Relay NU operating,
NU1 completes operate path for relay TS.
NU2 releases HA relay and hold path for NU relay.
NU3 extends eth on the ringing machine start lead.
NU4 extends N.U. tone to calling subscriber via transmission bridge transformer T1.

Relay TS operating, prepares time pulse release cct and if the subscriber holds the equipment long enough for the time pulse to mature the equipment is forcibly released by the operation of TM and PR relays.

Bothway Working

The various outgoing call arrangements have been described but a call incoming from a CAX comes in via pos. and neg. leads HA relay contacts and diodes D4 & 5 to arrive at the incoming junction relay set.

The seizure of the incoming junction relay set provides an eth on the P1 lead to operate relay CC.

Relay CC operated,
CC1 s/c diode D5.
CC2 s/c diode D4.

CC4 disconnects the 150 ohm test batt. off the incoming P lead to prevent intrusion from incoming selectors.

The diodes D4 & 5 are s/c to prevent interference to pulses via the junction. Similar diodes are provided at the distant end of the junction to prevent potential difference between exchanges operating relays associated with the junction.

5. DESIGN DETAILS

5.1 Capacitors C3 and R2 provide spark quench across springs 1 & 2 of relay A.

5.2 Diode D1 is provided to detect potential reversal across relay DA.

5.3 RX1 non-linear resistor is to reduce sparking at B21 & 22.

5.4 Test jack TJ1 to 8 are provided to facilitate maintenance.

END OF DIAGRAM NOTES