

DIAGRAM NOTES (ISSUE 1)

concerning

GBW.13980

titled

U.A.X. N.Z. 13 INCOMING JUNCTION FROM PARENTOR NON-DEPENDENT EXCHANGEGENERAL.

This diagram shows the circuit of the equipment to be used at a U.A.X. No. N.Z. 13 for terminating incoming junctions from a parent or non-dependant exchange.

The following typical diagrams should be considered in conjunction with this diagram:-

- |            |  |
|------------|--|
| GBW.13910) | Subscriber's Line, Linefinder & Allotter |
| or equiv.) | Circuits.                                |
| GBW.13890) | Group Selector.                          |
| or equiv.) |  |
| GBW.13970) | Outgoing Junction to Non-Dependent Auto  |
| or equiv.) | Exchange.                                |
| GBW.13930) | Outgoing Junction to Parent Exchange and |
| or equiv.) | Non-Parent Manual Exchange.              |

FACILITY SCHEDULE.

Provision is made for:-

- .1 Unidirectional incoming working or bothway working when associated with the outgoing equipment.
- .2 Receiving signals from any type of exchange (including 22 or 40 volt manual) other than a dependent U.A.X.
- .3 Routing all calls via the linefinder and selector levels.
- .4 Transmitting Busy conditions to the calling party under premature dialling conditions.
- .5 Completing a "pre-dial" path when a control set is seized.
- .6 Extending a low resistance positive battery over the M wire to provide for trunk offering on calls from the parent operator.
- .7 Extending a high resistance positive battery over the M wire to provide for route unbarring on traffic dialled through the U.A.X.
- .8 Holding the circuit under forced release from C.S.H, or "permanent loop" conditions.

CIRCUIT OUTLINE.

All incoming calls are routed via the linefinders to the group selectors. A group selector is however preselected by the control set and its associated allotter and access is given to this preselected switch via the control set which is taken into use before the linefinder hunts to find the marked outlet, so minimising the possibility of lost calls due to the slow hunting speed of the linefinder. Should dialling occur, however, before this pre-dial path can be established, then, busy conditions are returned to the calling party and the linefinder start condition is disconnected. When the linefinder has completed the normal signalling and speech path, the pre-dial path is disconnected, and a positive battery signal is extended over the M wire to provide either trunk offering by the parent operator or route unbarring, when required, on through traffic.

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1. CIRCUIT DETAIL.(a) Call from a 22 or 40v Manual Exchange.

The calling signal on this class of call consists of a battery on the positive junction wire which operates relay LA.

Relay LA operating.

LA1 operates relay BA.

Relay BA operating.

BA1 extends earth over the incoming junction P wire to the I.D.F., if unidirectional, or to operate relay CC in the outgoing junction relay set, if bothway.

BA2 prepares a circuit for the operation of relay JA under Premature Dialling conditions.

BA3) complete circuits for the operation of relay HA or HB,  
BA4) dependent upon which control relay set is taken into service.

BA5 prepares the circuit for the operation of relay LB.

The battery calling signal from the manual exchange is replaced by the impulsing loop when the operator throws her dialling key. Relay LB operates in series with relay LA.

Relay LB operating.

LB1 performs no useful function at this stage.

The call now proceeds as described below under "All Incoming Calls".

(b) Call from a 50 or 60v Exchange.

A loop calling signal is extended over the junction to operate relays LA and LB in series.

Relay LA operating.

LA1 operates relay BA.

Relay LB operating.

LB1 extends earth over the incoming junction P wire to the I.D.F., if unidirectional, or operates relay CC in the outgoing junction relay set if bothway.

Relay BA operating.

BA1 covers the function of contact LB1.

BA2 prepares a circuit to operate relay JA under Premature Dialling conditions.

BA3) complete circuits for the operation of relay HA or HB  
BA4) dependent upon which control relay set is taken into service.

BA5 performs no useful function at this stage.

The call now proceeds as described below under "All Incoming Calls".

(c) All Incoming Calls.

Relays LA, LB and BA are operated as previously described and relays HA and HB are offered to the linefinder control relay sets.

If control relay set No. 1 is the first choice and is disengaged or if control set No. 2 is first choice and is engaged, relay HA operates to battery on the T1 lead and to earth on the TA1 or TB1 lead.

Relay HA operating.

- HA1 operates relay P.  
 HA2) switch the junction lines through to the Linefinder control  
 HA6) set No. 1 and its associated allotter, to pre-operate the  
 impulsing relay in the Group Selector. Relays LA and LB  
 release.  
 HA3 marks the junction on level 9 of the linefinder marking  
 bank.  
 HA4 disconnects the operate circuit of relay JA.  
 HA5 holds relay HA over its 25 ohm coil.  
 HA7 applies a start condition to the Linefinder control set  
 No. 1.  
 HA8 disconnects the operate circuit of relay HB.

If control relay set No. 2 is the first choice and is disengaged or if control set No. 1 is the first choice and is engaged, relay HB operates to battery on the T2 lead and to earth on the TA2 or TB2 lead.

Relay HB operating.

- HB1 operates relay P.  
 HB2) switch the junction lines through to the Linefinder  
 HB6) control set No. 2 and its associated allotter, to pre-  
 operate the impulsing relay in the Group Selector.  
 Relays LA and LB release.  
 HB3 marks the junction on level 8 of the linefinder marking  
 bank.  
 HB4 disconnects the operate circuit of relay JA.  
 HB5 holds relay HB over its 25 ohm coil.  
 HB7 applies a start condition to the linefinder control set  
 No. 2.  
 HB8 disconnects the operate circuit of relay HA.

Relay LA releasing.

- LA1 releases relay BA.

Relay LB releasing.

- LB1 performs no useful function at this stage.

Relay P operating.

- P1 maintains earth on the incoming junction P wire  
 independent of BA1.  
 P2 disconnects the operate circuit of relay HA which holds  
 over its 25 ohm coil if previously operated.  
 P3 disconnects the operate circuit of relay HB which holds  
 over its 25 ohm coil if previously operated.  
 P4 prepares the circuit for the re-operation of relays LA and  
 LB in series under forced release conditions on calls from  
 22 or 40v manual exchanges.  
 P5 prepares a hold circuit for relay P on re-operation of LA1.

Relay BA releasing (after its slow release period).

- BA1)  
 BA2)  
 BA3)  
 BA4)  
 BA5)  
 BA6)
- perform no useful function at this stage.

When the marked outlet has been found by the linefinder, an earth condition is returned from the Group Selector over the M lead to operate relay K.

Relay K operating.

- K1 holds relay P independent of HA1 or HB1.
- K2) transfer the control of relay K to the P wire
- K6) conditions of levels 9 and 8 respectively.
- K3) disconnect the junction lines from the pre-dial path
- K4) via the control relay set and associated allotter.
- K5) disconnect the hold circuit of either relay HA or HB
- K7) dependent upon which control set is in use. Relay HA or HB releases
- K8'y' extends positive battery on the M load to 'unbar' any route barred to local subscribers on traffic dialled through the U.A.X., or to operate relay T0 in the final selector (GBW.13900) where trunk offering facilities are provided.

Relay HA releasing (if control set No. 1 was taken into use).

- HA1)
- HA2)
- HA3)
- HA4)
- HA5) performs no useful function at this stage.
- HA6)
- HA7)
- HA8)

Relay HB releasing (if control set No. 2 was taken into use).

- HB1)
- HB2)
- HB3)
- HB4)
- HB5) performs no useful function at this stage.
- HB6)
- HB7)
- HB8)

The incoming call is now connected to the group selector via the linefinder banks.

2. (a) Release of the equipment.

Relays K and P are operated during speech.

When a clear is given by the distant subscriber, in the case of a call from an auto. exchange, or the operator in the case of a call from a manual position; the U.A.X. switching equipment releases. The earth condition is removed from the P wire of the linefinder bank outlet and relay K releases.

Relay K releasing.

- K1 releases relay P.
- K2) restore relay K to the M wire in readiness for the
- K6) next incoming call.
- K3) reconnect relays LA and LB to the
- K4) junction lines.
- K5)
- K7) perform no useful function at this stage.
- K8'y' disconnects the positive battery from the M wire.

Relay P releasing, after its slow release period.

- P1 removes the earth condition from the incoming junction P wire
  - P2) prepare circuits for the operation of relays HA and HB
  - P3) on the next incoming call.
  - P4 performs no useful function at this stage.
  - P5 reconnects relay BA in preparation for the next call.
- (GBW.13980)

The equipment is now restored to normal preparatory to the next incoming call.

(b) Forced Release under (a) C.S.H. or (b) Permanent Loop conditions. Relays K and P are operated during a call.

(a) When the call is completed, should the calling subscriber fail to clear, the called subscriber is held, until the forced release of the connection removes the earth on the P wire in the final selector, to effect the release of relay K in this equipment.

or (b) In the case of a "permanent loop" condition when the forced release is from the Group Selector to release relay K.

Relay K releasing.

K1 disconnects relay P which holds for its slow release period.  
 K2) restore control of the K relay to  
 K6) the M wire conditions.  
 K3) re-operate relays LA and LB in series to the loop  
 K4) condition on the junction.  
 K5) perform no useful function  
 K7) at this stage.  
 K8'y' disconnects the positive battery from the M wire.

Relay LA operating.

LA1 re-energises relay P.

Relay LB operating.

LB1 performs no useful function at this stage.

The equipment is held in this condition until the fault condition is removed. Relays LA and LB will release when the holding loop is removed.

Relay LA releasing.

LA1 releases relay P.

Relay LB releasing.

LB1 performs no useful function at this stage.

Relay P releasing (after its slow release period).

P1 removes earth condition from the incoming junction P wire.  
 P2) prepare circuits for the operation of relays HA or  
 P3) HB, on the next incoming call.  
 P4 performs no useful function at this stage.  
 P5 performs no useful function at this stage.

The equipment is now fully restored.

3. (a) Premature Dialling Conditions.

Relays operated on seizure:- LA, LB and BA.

Should the calling subscriber or operator attempt to dial prior to the operation of relay HA or HB, i.e., before the pre-dial path is established, relays LA and LB will release to the first break period in dialling.

Relay LA releasing.

LA1 operates relay JA. Relay BA holds during impulsing.

Relay LB releasing.

LB1 performs no useful function at this stage.

Relay JA operating.

JA1 returns Busy Tone to the calling party.  
 JA2) disconnects the operate circuits of  
 JA3) relays HA and HB.  
 JA4 extends "Ringer Start" conditions to the U.A.X.  
 common equipment.  
 JA5 holds relay JA independent of LA1.

At the end of each impulse train and at the end of impulsing, relays LA and LB re-operate.

Relay LA re-operating.

LA1 re-energises relay BA.

Relay LB re-operating.

LB1 performs no useful function at this stage.

Busy Tone is returned to the calling subscriber or operator, relays LA and LB being held over the junction loop during tone periods.

(b) Release from Premature Dialling Conditions. The calling subscriber clears on receipt of Busy Tone.

Relay LA releasing.

LA1 releases relay BA.

Relay LB releasing.

LB1 performs no useful function at this stage.

Relay BA releasing (after its slow release period).

BA1 removes the earth condition from the incoming junction P wire.

BA2 releases relay JA.

BA3)  
 BA4) perform no useful function at this stage.  
 BA5)

Relay JA releasing.

JA1 disconnects the "Busy Tone Earth" common.

JA4 disconnects the "Ringer Start" lead.

JA2)  
 JA5) perform no useful function at this stage.  
 JA3)

The circuit is now restored to normal ready for the next call.

#### 4. DESIGN DETAILS.

The following relays were made slow to release because:-

Relay BA to provide a junction guard and to hold during impulsing under "Premature dialling" conditions.

Relay P to provide a junction guard on clear down from a normal call and to hold for the period between the release of K1 and the re-operation of LA1 under forced release from C.S.H. or permanent loop conditions.

Other circuit features are:-

Rectifiers MR1 and MR2 prevent irregular operation of relays LA and LB to exchange battery or earth potential differences.

Contact K8'y' was made a 'y' contact to ensure that the positive battery circuit is never connected via the K relay; i.e., K8 makes after the operation of K2 and K6, and releases before the release of K2 and K6.

END.