DIAGRAM NOTES (ISSUE 1)

concerning

DIAGRAM GBW.14230

titled

50/1200 LINE P.A.B.X.

MANUAL RING AND ALARM CIRCUITS.

1. GENERAL.

This diagram shows the circuit of the ringing vibrator which supplies continuous ringing current for use on the manual switchboard. The visual and audible alarm extension circuits are also included.

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

Manual switchboard (GBW.14200)
C.T.S. Alarm Panel (GBW.14220)

2. FACILITY SCHEDULE.

Provision is made for:-

(1) Connecting a ringing start condition to the ringing vibrator when a cord circuit ring key is operated, and connecting ringing to the manual suite.
(2) An audible and visual alarm to be given on the manual suite if the ringing circuit fails.
(3) An audible and visual alarm to be given on the manual suite if charge current from the rectifier fails.
(4) A visual alarm to be given on the Manual suite when an extension line circuit becomes P.G.
(5) Disconnecting the audible alarm when the alarm cut-off key is operated.
(6) Restoring the audible alarm circuit when the fault condition is removed.
(7) Connecting a pulse start condition to the pulsing relays, and connecting flicker earth to the suite.

3. CIRCUIT DESCRIPTION.

3.1 Outline.

Manual ring and alarm circuits are provided on the basis of one per installation.

When a manual cord circuit ring key is operated, an earth is connected to the ring start lead. Relay VB vibrates and approximately 70 volts, 20 c.p.s. A.C. is induced in the secondary winding of the transformer. This current is connected to the continuous ring lead for the cord circuits. Under normal conditions the continuous ringing current operates relay RR which in turn disconnects the ring fail alarm. When a ringing failure occurs, the ring fail lamp is lighted and an audible alarm is given.

When operator re-call facilities are required on local calls via the manual board, an earth is connected to the pulse start lead to pulse relays PA and PB and flicker earth is returned to the cord circuit.

3.2 Detail.

Continuous ringing supply for the manual suite.

Relay RS operates to the earth applied by the cord circuit ring key.

Reprinted by N.Z.P.O. September, 1955.

Relay RS operating

RS1 connects earth via VB1 to VB relay thereby operating it.
RS2 connects earth to FA relay thereby operating it (slow operate).

Relay VB operating

VB1 disconnects the operate circuit to relay VB thereby releasing it, and connects earth to one half of the primary of transformer TR1.

Relay VB releasing

VB1 re-connects earth to VB relay thereby operating it, and transfers the earth connection to the other half of the primary of transformer TR1.

Thus relay VB vibrates at a frequency of approximately 20 operations per second with a make to break ratio of 50 : 50 as long as a start condition is received. The reversals of current through the primary winding of TR1 cause an alternating E.M.F. of approx. 70 volts 20 c.p.s. to be induced in the secondary winding.

The ringing supply is fed via capacitor C4 to operate relay RR.

Relay RR operating

RR1 disconnects the circuit for relay FB.

When the cord circuit ring key is restored the earth is disconnected from the ring start lead and relay RS releases.

Relay RS releasing

RS1 disconnects the earth from the VB relay.
RS2 disconnects relay FA, thereby releasing it.

The supply of ringing ceases and relay RR releases.

Ring fail condition.

In the event of a failure of the ringing supply relay RS will operate to the earth on the ring start lead but relay RR will not operate.

Relay RS operating

RS2 connects earth to relay FA thereby operating it.

Relay FA operating

FA1 connects earth to relay FB thereby operating it.

Relay FB operating

FB1 disconnects earth to relay FA thereby releasing it, and holds FB relay operated.
FB2 locks relay FB till fault is cleared. When relay RR operates relay FB releases.
FB3 prepares to light manual ring fail lamp.
FB4 prepares to sound the audible alarm.

Relay FA releasing

FA1 provides alternative hold circuit for relay FB against release of relay RS.
FA2 lights the manual ring fail lamp.
FA3 sounds the audible alarm.

Thus a manual ring fail alarm is given on the manual suite.

Manual Fuse Alarm.

A "blown" fuse on the manual suite operates the Fuse Alarm relay in the manual position concerned which connects an earth to U2 of the Manual Ring and Alarm Circuit to operate the audible alarm.

Auto Alarm.

In the event of a major fault on the equipment, i.e. fuse "blown", or selector fails to release etc., an earth is extended from the FA or RA relay on the rack concerned to operate the AL relay.

Relay AL operating

AL1 lights the auto alarm lamp.
AL2 sounds the audible alarm.

Mains Fail Alarm.

If the charge current from the rectifier unit fails, a relay in the unit releases and extends an earth to operate relay MF.

Relay MF operating

MF1 lights the mains fail lamp.
MF2 sounds the audible alarm.

Audible Alarm Cut-off.

The audible alarm, associated with the alarm extension circuits described in the previous paragraphs, may be disconnected by operating the non-locking alarm cut-off key which operates relay AO.

Relay AO operating

AO1 disconnects the audible alarm, and provides a holding circuit for relay AO to the earth applied by the alarm extension relay.

When the fault condition is removed the associated alarm extension relay releases and relay AO releases. The audible alarm circuit is then reconnected to the contacts of the alarm extension relays.

Any 1st or incoming Group Selector in the PG condition connects an earth via the relay set lamp to operate relays PG and PR (Rack Common Services.) Relay PR connects an earth to the DA lead to operate the thermal relay TH after approximately 30 seconds.

Relay TH operating

TH1 operates relay DA.

Relay DA operating

DA1 lights the PG lamp.
DA2 locks relay DA to earth extended by the PR relay and releases relay TH.

Relay DA is released when the P.G. condition is disconnected.

Flicker Earth supply for the Manual Suite.

Relay PA operates to the earth extended by the DR relay in the cord circuit.

Relay PA operating

PA1 operates relay PB, and removes earth on Flicker Earth (Even Positions) lead.
PA2 removes earth on Flicker Earth (Odd Positions) lead

Relay PB operating

PB1 releases relay PA.

Relay PA releasing

PA1 releases relay PB and restores earth to Flicker Earth lead.
PA2 restores earth on Flicker Earth lead.

The interaction of relays PA and PB continues as long as a pulse start condition is received.

END