DIAGRAM NOTES

concerning

DIAGRAM GBW. 14720

titled

20, 35 & 49 LINE P.A.B.X. - ATTENDANT'S LINE CIRCUIT

NIGHT SERVICE EXTENSION AND MISCELLANEOUS ALARM CIRCUITS

1. GENERAL

The circuits covered by this diagram are:-

Fig. 1 Attendants Line Circuit.
Fig. 2 Night Service Extension Circuit.
Fig. 3 Start, Alarms and Misc. Circuits.

The Attendants line circuit is used by the Attendant to set up a call to, or to receive calls from extensions.

The Night Service Extension circuit enables an incoming exchange line call to be routed to a selected night service extension.
Fig. 3 covers miscellaneous start and alarm relays.

2. CIRCUIT DESCRIPTIONS

2.1 Attendant's Line Circuit (Fig. 1)

2.1.1 Attendant Dials an Extension

The attendant operating an '0' level key (KO) energises relay SA from earth on the Flash key (KF) to a 250 ohm battery on the OP lead.

Relay SA operating

SA1 prepares a holding circuit for relay SB.
SA2 transfers holding circuit for relay SA to battery on S relay in marker circuit thereby operating it.
SA3 operates relays SB and LS from earth at KA2.
SA4 disconnects operating circuit for relay KA.

Relay SB operating

SB1 completes holding circuit for relay SB to earth on SA1.
SB2 not effective.
SB3) extend the attendant's +ve and -ve OUT leads to line finder
SB4) multiple.
SB5 reconnects relay KA (see SA4).

Relay LS operating

LS1 connects earth to line start, this earth is extended via the Pulse circuit to a free connecting circuit which hunts for the marked contact on the HF bank of the line finder.
LS2 connects an 1150 ohm battery to HF bank.
LS3 connects relay CO to the OLHF lead.

The connecting circuit line finder hunts and when the contact marked by the 1150 ohm battery is reached relay FT operates and cuts the drive. The earth via relay FT extended over the OLHF lead from the connecting circuit operates relay CO.

Relay CO operating

CO1 prepares holding circuit for relay CO on release of relay LS.
CO2 disconnects the original operate circuit for the SA relay.
CO3 releases relay LS.

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Relay LS releasing

LS1 disconnects earth on line start lead.
LS2 disconnects the 1150 ohm battery on the OLHF lead.
LS3 disconnects original operating circuit for relay CO.

The operator's +ve and -ve OUT leads are now extended to the connecting circuit and when dial tone is received the required extension may be dialled, in the normal way.

2.1.2 Release

At the end of the conversation the attendant restores the 'O' level key, which releases relay SA. Relay SB is released by SA3, contacts SB3 and SB4 release the connecting circuit, thus removing the earth on the OLHF lead, thus releasing relay CO. SA2 contact releases relay S.

The circuit is now restored to normal.

2.1.3 Incoming Call to Attendant

When an extension dials the digit 'O', the connecting circuit H relay will operate to the KA relay battery on the OLW lead. An earth is extended on the OLW lead to operate relay KA.

Relay KA operating

KA1 prepares to connect the DM lead.
KA2 connects earth to audible alarm, thus sounding the alarm buzzer if the audible alarm key is operated.
KA3 applies flicker to 'O' level lamp, on attendant's cabinet.

On the attendant answering by throwing the 'O' level key (KO) relay SA operates as described in para. 2.1.1, and at SA1 earths the DM lead during the release time of relay KA which is released by SA4 disconnecting its holding circuit. The connecting circuit on receipt of the pulse steps on to the 'O' level circuit and relays SB and CO operate as previously described, relay CO to earth extended from the connecting circuit on the OLH lead.

Should a second call be made while the attendant is dealing with the first one, relay KA will operate as described above, but as SB relay is operated the call waiting lamp will flash to flicker earth. Ring tone being returned to the caller.

When the attendant, having dealt with the original call, restores the 'O' level key (KO) relays SA and SB release, the flicker earth is transferred to the 'O' level lamp and the attendant proceeds as for an incoming call as previously described.

2.1.4 Release

At the end of conversation, the attendant restores the 'O' level key, which releases relay SA. Relay SB is released by SA3, contacts SB3 and SB4 release the connecting circuit, thus removing the earth on the OLHF lead, thus releasing relay CO.

2.2 Night Service Extension Circuit (Fig. 2)

2.2.1 Incoming Exchange Line Call to Night Service Extension

Extension 89 may, by strapping, be converted into a night service extension. An incoming exchange line call will ring the extension's instrument bell continuously, and when answered, direct connection to the calling exchange line is established. It is to be noted that the dial 2 facility is still available.

An incoming exchange line call operates relay EC which at EC1 operates relay ECR via NA1 and terminals 82-83 strapped, and rings the external bells if equipped.

Relay ECR operating

ECR1 connects earth to the HT relay which tests to incoming 'selected' line circuit. Relay HT operates in series with line circuit CO relay if the Night Service extension line circuit is free.
ECR2 prepares to connect 89 +ve lead to warn tone or ringing return.
ECR3 earths ringer start lead.

Relay HT operating

HT1 connects the 50 ohm winding of relay HT in parallel with the 500 ohm winding to guard the H lead.
HT2 operates relay NE.

Relay NE operating

NE1 connects continuous ringing to extension 89 -ve lead via F relay.
NE2 connects ring return to extension 89 +ve lead.

When the extension answers:-

Relay F operates

F1 operates relay BS (Fig. 3).
F2 prepares to connect 1150 ohm battery to exchange line finder J bank.

Relay BS operating

BS1 earths the night service start lead to the Exchange line circuit and operates relay ST. EF switch drives to find battery on J lead on EF2 bank.
BS2 opens circuit of AS.
BS3 completes test battery circuit to J lead.

Relay ET operates to the battery on the J lead and cuts the drive circuit of EF.

ET operating operates relay H in the exchange line circuit. A contact of relay H applies earth to the H lead and short circuits relay HT in Night Service extension circuit. The release of relay HT releases relay NE. The release of relay NE connects the night service extension to the exchange line via A and B line and line Finder banks EF3 and 4.

The night telephone extension can now converse with the calling main exchange subscriber.

Should a second incoming exchange line call be made whilst the night service extension is conversing, the operation of relay EC will re-operate relay ECR, which at ECR2, connects warn tone to the night service extension's +ve lead, and thus notifies the extension that a call is waiting to be dealt with.

2.3 Night Service Relay NA

This relay is permanently operated during the day and is released at night by operation of KNS.

Relay NA released

NA1 prepares circuit of external bell.
NA2 prepares a circuit for the enquiry circuit to give busy tone if '0' is dialled at night.
NA3 removes earth from NSK lead to exchange line circuits.
NA4 open circuits OLW lead to connector circuit (Night busy condition).
NA5 removes alternative earth from Night Service busy lead.

2.4 Trunk Offering Relay TO

Relay TO is operated by the attendant operating the 'Speak Extension' key (KSS) from earth at ML lead via KSS3, D lead, Exchange Line Circuit TJ16-15, CA3, H8 to battery on EF magnet.

TO1 connects Warn tone to +ve IN line.
TO2) switch the +ve and -ve IN leads of the exchange line circuit to the
TO3) attendants Tele. set.

2.5 Exchange Line Relay EC

Operates to an incoming exchange line call via CR6.

EC1 earths external bell circuit, and/or operates relay ECR.
EC2 earths pulse start lead.

2.6 Exchange Line Start Relay AS

Operates in series with G relay when connecting circuit is dialled to obtain an exchange line.

AS1 earths pulse start lead.
AS2 open circuits Night Start circuit of BS relay.
AS3 earths lead to pulse switch Wiper 5 for start chains.

2.7 Night Service Start Relay BS

Operates when a connecting circuit is dialled to answer an incoming exchange line call (dial 2 facility) or when the night service extension answers.

BS1 earths Night Service Start earth lead to exchange line circuits.
BS2 open circuits Exchange line start relay AS.
BS3 prepares part of battery circuit to Night Service extension line circuit.

2.8 Alarm Relay AL

(1) operates when a fuse blows, or
(2) connecting circuit heat coil blows or
(3) mains fail, when exchange is battery operated.
(4) When ringing fails.

AL1 completes Alarm buzzer circuit and prepares part of circuit of AO relay.
AL2 lights Alarm lamp on attendants cabinet (daytime only).

2.9 Alarm Cut off Relay AO

Operated by Alarm Cut-off key (KCO) on Attendants cabinet.

AO1 disconnects buzzer circuit and locks AO to earth at AL1.

When the fault is cleared relay AL is released and in turn releases relay AO.

END