CD-21236-01 Issue 20-D Appendix 3-D Dwg. Issue 25-D

#### PANEL SYSTEMS MISCELLANEOUS CIRCUIT FOR SENDER MAKE BUSY FRAME

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.l Lead "C" Option "ZT" is added to Fig. 34 at 4T of (TAS) relay. This lead from the Signal Ckt., Sender Group Busy Alarm Ckt. is used when Fig. 11 is not furnished. Lead "C" from Fig. 11 is designated Option "ZS". Both options are rated AT&TCo Standard. D.2 On Sheet 012, Options "ZS" and "ZT" are added to the Feature or Option table.

D.3 On Sheet 013, Note 141 is added to explain the use of Options "ZS" and "ZT".

D.4 On Sheet Ol4, CAD 2 is changed to add lead "C" Option "ZT".

All other headings, no change.

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DEPT. 2335-MBC-FBB-DI

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CD-21236-01 Issue 20-D Appendix 3-D

# EAMEL SYSTEMS MISCELLAMBOUS CIRCUIT FOR SEADER MARE BUSY FRAME

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D.1 Lead "C" Option "ZT" is added to Fig. 34 at AT of (TAS) relay. This Boay Alarm Cat. is used when Fig. 11 is conficuent Coordinad. Lead "C" from Fig. 11 is dosig Constant Option "ZS". Both options are rated

D.2 On Sheet Old, Options 25 and all pre adad to the Feature or Option

-3 On Sheet 013, Note 141 is added to

D.4 On Chect Olt, GAD 2 is chacged to

All other headings, no change.

DEPT. 2335-MBC-PEG-DI

CIRCUIT DESCRIPTION

CD-21236-01 Issue 20-D Appendix 2-AR Dwg. Issue 24-AR

PANEL SYSTEMS MISCELLANEOUS CIRCUIT FOR SENDER MAKE BUSY FRAME

# CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.l Lead "MB" from the MF Adapter Ckt. for Subscriber Sender Test Ckt. to Fig. 35 (MB) jack, is removed.

D.2 Lead "MB" from the Adapter Circuit is also removed from CAD 3, Sheet 014.

All other headings, no change.

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0D-21230-01 Issue 20-0 Appendix 2-AS Dwg. Issue 24-AS

> PANEL FRATERS MINORILANEOUS CINCULT POR STATER MAKE BUSY FRAM

> > CHANGES

STERIELON OF CINCULL CHUNCLES '

D.1 Load "83" from the AF Adapter Oct. for Subscriber Sender Test Ckt. 4: 21g. 35 (MB) jack, is removed.

1.2 Lead "M8" from the Adapter Circuit is also removed from CAD 3, Shart 614.

All other headings, no change.

BELL TELEPRONE LABORATORIES, INCORPERATED

DEPT. 2335-MBC-F8B-AS

CIRCUIT DESCRIPTION SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT CD-21236-01 Issue 20D Appendix 1D Dwg. Issue 23D

# PANEL SYSTEMS MISCELLANEOUS CIRCUIT FOR SENDER MAKE BUSY FRAME

### CHANGES

B.1

B. CHANGES IN APPARATUS

SupersededSuperseded By531A-3Subset,0ption"W",Fig. 18Fig. 18

B.2 Added:

Requirements for the parallel combination of register (SS) and the auxiliary stuck sender register in the traffic register circuit.

# D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Option "ZY" is rated Mfr. Disc. and

is superseded by option "ZZ" and "ZV", Fig. 34, to insure that the alarm cannot be released until a sender is idle when alarms are transferred to an alarm receiving center. Option "ZW" is designated to be furnished when alarms are not arranged to be transferred. D.2 Option "W", Fig. 18, is rated Mfr. Disc. and is superseded by option "ZU".

D.3 Reference to note 140 is added to note 116.

D.4 Options "ZY" and "ZZ" are removed from note 132 and are replaced by options "ZV" and "ZW", respectively. Quantity is removed since it duplicates information in title.

- D.5 Features information in notes 115 and 129 are integrated into note 132.
- D.6 Note 139 is added to cover options "ZV", "ZW", "ZY" and "ZZ".
- D.7 Note 140 is added to cover option "ZU".
- D.8 These changes are reflected in the Options Used table.
- D.9 The M.D. rating of note 114 was changed to refer to note 124, instead of note 104.

All other headings, no change.

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# PANEL SYSTEMS MISCELLANKOUS CIACUIT FOR SEADES MAKE HUSY FRAME

		r is idle when alarma alarm receiving cen- cipated to be fur-	p.9	The M.D. rating of note lik was changed to refer to note 124, in- stead of note 104.

All other headings, no change.

HELL TELEPHONE LABORATORIES, INCORPORATEI

DEPT, 7314-BSP-COM-D3

CIRCUIT DESCRIPTION SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT CD-21236-01 Issue 20-D Dwg. Issue 22-D

# PANEL SYSTEMS MISCELLANEOUS CIRCUIT FOR SENDER MAKE BUSY FRAME

# CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Sheet -011

D.11 Note 102 is changed to make minor corrections to agree with manufacturing information on fusing for Figs. 32, 37 and 38.

D.2 Sheet -012

D.21 Note 302 is added to explain the use of the 7F bell.

- D.3 Sheet -013
- D.31 Reference to Note 138 is added to the network in Fig. 34.
- D.32 Reference to Note 302 is added to Fig. 37.

D.33 Ground, and ground designation GL is added to Message Register SS of Fig. 38.

D.4 Sheet -014

D.41 CAD-3 cross-connections information is corrected to agree with manufacturing information.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 To provide the circuit for miscellaneous apparatus on the sender make busy frame.

- 2. WORKING LIMITS
- 2.1 None.
- 3. FUNCTIONS
- 3.1 To provide an alarm when a frame fuse operates.
- 3.2 To provide test battery terminals.
- 3.3 To provide sender make busy jacks and lamps.
- 3.4 To provide jacks and patching cord for service observing circuits.
- 3.5 To provide registers for counting the number of stuck senders.

3.6 To provide a link down drive alarm.

3.7 To provide stuck sender signals and cancel priming keys for the associated senders.

3.8 To provide an alarm when a sender load register operates.

3.9 To provide for transfer of alarms to a master office during unattended light load periods.

3.10 To provide for a delayed alarm when subscriber senders arranged for automatic priming after time-out fail to restore to normal after automatic priming.

3.11 To provide a make busy jack and lamp for concentrating circuits for permanent signal holding trunks.

3.12 To provide a jack circuit and patching cord for detecting district selectors involved in double connections with sender selector type senders.

- 3.13 To provide an overflow alarm for permanent signal trunk groups.
- 3.14 To provide control keys for the Permanent Signal Alarm Circuit.

3.15 To provide a make busy jack, stuck sender signals, cancel timed release; and an all senders busy time alarm for the Auxiliary Senders.

4. CONNECTING CIRCUITS

When this circuit is listed on a keysheet, the connecting information thereon is to be followed.

- 4.01 Floor Alarm Board Alarm Circuit for Decoder, SD-21318-01.
- 4.02 Floor Alarm Board Fuse and Time Alarm Circuit, SD-21201-01.
- 4.03 Sender Circuit, SD-21193-01.
- 4.04 Key Pulsing Sender Circuit, SD-21382-01.
- 4.05 Service Observing Circuit, SD-21279-01.
- 4.06 Miscellaneous Circuit for Sender Frame, SD-21234-01.

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- 4.07 Miscellaneous Register Circuit, SD-21537-01.
- 4.08 "A" Switchboard Auxiliary Signal Circuit, SD-90464-01.
- 4.09 Alarm Transfer Circuit, SD-20733-01.
- 4.10 Sender Circuit, SD-21193-05.
- 4.11 Permanent Signal Holding Trunk, SD-95554-01.
- 4.12 Concentrating Circuit for Permanent Signal Holding Trunks, SD-25766-01.
- 4.13 Miscellaneous Alarm Circuit, ES-226189 and SD-20241-01.
- 4.14 Permanent Signal Alarm Circuit, SD-20745-01.
- 4.15 Auxiliary Sender Circuit, SD-96479-01.
- 4.16 Automatic Test Circuit for Subscriber Senders, SD-21186-01.
- 4.17 Auxiliary Sender Link Circuit, SD-96483-01.

DESCRIPTION OF OPERATION

5. FUSE ALARM (FIG. 1)

When the 15-ampere fuse opens, the associated 1-1/3-ampere fuse operates, lighting lamp (15 AMP FA). When any other frame fuse operates, lamp (1-1/3 AMP FA) is lighted. Operation of any 1-1/3-ampere fuse on the fuse panel causes continuous operation of the minor alarms. When the operated 1-1/3-ampere fuse is removed, the alarms are retired.

6. FRAME TEST BATTERY (FIGS. 2 & 3)

One connecting block is furnished on each side of the frame to supply 24-volt battery, 48-volt battery, ground and ground through 12000 ohms resistance for testing purposes. The battery and resistances required for Fig. 3 are supplied by Fig. 2.

7. SENDER BUSY JACK (FIG. 4)

When a make busy plug is inserted in jack (MB), the associated sender is made busy. The (MB) lamp is lighted from the "A" board as a signal that the corresponding sender has failed to function.

8. SERVICE OBSERVING JACKS (FIGS. 5 & 6)

Jacks (SO) and (T) are provided for connecting a service observing circuit to a sender. The cord shown in Fig. 6 is plugged into the two jacks to make the connection. 9. SENDER FRAME MAKE BUSY JACK (FIG. 7)

Insertion of a make busy plug in jack (FB), makes busy all senders on the frame.

10. FUSE ALARM AISLE PILOT LAMP (FIG. 8)

Operation of the fuse alarm, Fig. 1, causes operation of relay (A1) at the floor alarm board, lighting lamp (FP).

11. STUCK SENDER REGISTER (FIG. 9) (MFR. DISC.)

When any sender in the group fails to complete its cycle of operation, ground is connected to lead "SS," operating relay (L) which insures complete operation of the register by locking up until the contact of the register closes. When the register is fully operated, its contact short circuits the winding of relay (L), which releases and permits the register to release.

12. LINK DOWN DRIVE ALARM, SENDER LOAD ALARM OR ALL AUXILIARY SENDERS BUSY ALARM (FIGS. 10, 11 & 12)

12.1 Attended Operation ("Z" Option)

When the link down drive or sender load register is operated, ground is connected to lead "LR" to operate relay (GL) which locks under control of the alarm release key, lights lamp (GL) at the sender make busy frame, lights lamp (GLA) at the sender monitor position of the "A" switchboard and operates audible and visible signals at the floor alarm board. When the alarm release key is operated, the relay is restored to normal. Where "B" wiring is furnished, the "A" switchboard lamp is controlled by relay (SW), Fig. 19. Operation of the link down drive or sender load alarm causes operation of the (GA) relay at the floor alarm board, lighting lamp (GP).

12.2 Unattended Operation ("Y" Option)

When "Y" wiring is furnished, the circuit functions as described in paragraph 12.1 except that relay (GL) locks under control of the ground on lead "ARl" from the Alarm Transfer Circuit and the audible alarm may be transferred to a distant master office. The alarm can be retired by the operation of an alarm release key in the master office which removes ground from the ARl lead.

13. STUCK SENDER REGISTER (FIGS. 13, 27 OR 32)

When any sender in the group fails to complete its cycle of operation, ground is connected to lead "SS," operating relay (L) which insures complete operation of the register by locking up until the contact of the

To provide registers for consting the manher of stuck senders.

Page 2

register closes. When the register is fully operated, its contact short circuits the winding of relay (L), which releases and permits the register to release.

14. KEY PULSING SENDER MAKE BUSY JACK, CANCEL PRIMING KEY AND STUCK SENDER LAMP (FIG. 14)

When a make busy plug is inserted in jack (MB), the associated sender is made busy. Operation of key (CP) opens the priming lead and prevents automatic priming of the sender. If the sender fails to complete its cycle of operation, ground is connected to lead "SL," lighting lamp (SS) and operating the audible alarm.

15. KEY PULSING SENDER STUCK SENDER RELAY (FIG. 15) (MFR. DISC.)

When lamp (SS) of Fig. 14 is lighted to indicate that the sender has failed to complete its cycle of operation relay (SS) operates, closing the circuit of buzzer (A), Fig. 16.

16. KIY PULSING SENDER STUCK SENDER BUZZER (FIG. 16) (MFR. DISC.)

16.1 Attended Operation ("Z" Option)

Operation of buzzer (A) indicates that a sender has failed to complete its cycle of operation.

16.2 Unattended Operation ("Y" Option)

When "Y" wiring is furnished, the alarm may be transferred to a distant master office.

17. KEY PULSING SENDER STUCK SENDER RELAY (FIG. 17)

When lamp (SS) of Fig. 14 is lighted to indicate that the sender has failed to complete its cycle of operation, relay (SS) operates, closing the circuit to operate subset (A), Fig. 18.

18. KEY PULSING SENDER STUCK SENDER RINGER (FIG. 18)

18.1 Attended Operation ("Z" Option)

Operation of ringer (A) indicates that a sender has failed to complete its cycle of operation.

18.2 Unattended Operation ("Y" Option)

When "I" option is furnished, the alarm may be transferred to a distant master office. 19. LINK DOWN DRIVE OR SENDER LOAD ALARM FOR "A" SWBD. (FIG. 19)

When the link down drive or sender load register is operated, the (GL) relay, Fig. 10, operates, operating relay (SW) which locks up under control of an "A" switchboard key and lights a lamp and operates the auxiliary signal at the "A" switchboard.

20. SENDER MAKE BUSY JACK, CANCEL TIMED RELEASE KEY AND STUCK SENDER LAMP (FIG. 20)

When a make busy plug is inserted in a jack, (MB), the associated sender is made busy. Operation of key (CTR) opens the priming lead and prevents timed release of the sender. If the sender fails to complete its cycle of operation, ground is connected to lead "J" lighting the lamp (SS).

21. PARTIAL DIAL REGISTER (FIG. 21 OR 28)

When Fig. 21 is furnished and any sender in the group fails to receive a complete set of dial pulses, ground is connected to lead "PD," operating relay (P) which insures complete operation of the register by locking up until the contact of the register closes. When the register is fully operated, its contact short circuits the winding of the relay (P), which releases and permits the register to release. Fig. 28 has no relay (P) since the 14-type register operates fast enough in this case.

22. TIME ALARM CIRCUIT (FIG. 22)

Fig. 22 is provided for use with senders which are arranged for automatic priming after time out. When any sender be-comes stuck, the TA lead is grounded, being a lead common to all senders. Senders which are made busy, however, do not ground the TA lead. The TS relay operates on a grounded TA lead. The CT interrupter is engaged, and as long as the TS relay remains operated the TA relay operates and operates the TB relay on CT interrupter contact closure. The TB relay locks, but the TA relay re-leases when the TC interrupter contact opens, and the (TC) relay operates and locks. The next closure of the CT interrupter operates the TA relay again, which now locks. The TA and TC relays both operated light the AL lamp, and start the aisle pilot and audible alarm. All relays release if the TS relay releases, therefore an alarm is produced only in case one or more senders keep the TA lead grounded for at least six seconds. Any one sender will produce the alarm only if it fails to restore to normal after automatic priming.

23. STUCK SENDER AISLE PILOT LAMP (FIG. 23)

Closure of the contacts in the sender circuit operates relay (SS) at the floor alarm board, lighting lamp (SP).

24. (CTR) KEY (FIG. 24)

This figure is provided for senders having automatic priming after time out, and the CTR key opens the circuit which would release the sender, in case it is desired to trace a stuck sender. The subscriber line is released. When the CTR key is operated, a stuck sender will produce the audible alarm per Fig. 22. The alarm may be retired by making those senders busy which have CTR keys operated.

25. CONCENTRATING CIRCUIT FOR PERMANENT SIGNAL HOLDING TRUNK MAKE BUSY JACK AND BUSY LAMP (FIG. 25)

When a make busy plug is inserted in the (CCB) jack the concentrating circuit is made busy and the (CCB) lamp lights. The (CCB) lamp also lights whenever the concentrating circuit is seized by Permanent Signal Holding Trunks.

26. TEST JACK AND SIGNAL LAMPS, PERMANENT SIGNAL HOLDING TRUNK (FIG. 26)

When a permanent signal condition occurs, the (NC) lamp (noncoin - non-PBX), (PB) lamp (PBX) or (C) lamp (coin) lights, depending upon the class of service involved. The signal lamp lights steadily until the timing circuit associated with the trunk has functioned, at which time the signal changes to a rapid flash. The attendant inserts the patching cord from the telephone circuit on the sender make busy frame into the (T) jack, challenges and makes such tests as are required, then removes the cord. The (NC), (PB) or (C) lamp changes to a slow flash when the cord is inserted which continues until the trunk releases.

27. JACK CIRCUIT FOR DETECTION OF DISTRICT SELECTORS INVOLVED IN DOUBLE CONNEC-TIONS WITH SENDER SELECTOR TYPE SENDERS (FIG. 29)

A jack (DC) provides for patching 100 ohms to the "SC" lead through the (MB) jack, Fig. 4, thus allowing the stuck connection finder circuit to function and at the same time not cause the release of the district (D) relays. A direct ground on the "SC" lead would cause the release of the (D) relays and trace of the double connection would be lost.

28. OVERFLOW ALARM FOR PERMANENT SIGNAL TRUNK (FIGS. 30 AND 31)

28.1 Attended Operation (Option "J")

When a district selector makes connection to the overflow terminals of the permanent signal trunk group and advances, relay (OF) operates, locks under the control of the (OF) key, lights lamp (OF) and the aisle pilot (P) lamp and causes intermittent operation of the minor alarms. When the district selector reaches overflow position the energizing circuit for relay (OF) is opened. Momentary operation of key (OF) then releases relay (OF), retiring the alarm.

28.2 Unattended Operation (Option "K")

When a district selector makes connection to the overflow terminals of the permanent signal trunk and advances, relay (OF) operates, locks under control of the ground on lead "AR2" from the alarm transfer circuit, lights lamp (OF), and connects ground to lead "PS1" to operate an alarm at the alarm receiving center. When the district selector reaches overflow position the energizing circuit for relay (OF) is opened. Momentary operation of a relay in the alarm transfer circuit removes ground from lead "AR2", releases relay (OF) and retires the alarm.

29. PERMANENT SIGNAL ALARM CIRCUIT CONTROL KEYS AND GUARD LAMP (FIG. 33)

When the Permanent Signal Alarm Circuit functions in response to a predetermined number of permanent signals, a major alarm is operated and lead "PSL" is grounded to light the (PS) lamp.

If the permanent signal condition no longer exists, operation of the (PSAR) key or removal of ground or lead "AR2" from the Alarm Transfer Circuit, retires the alarm nd extinguishes the (PS) lamp.

If the permanent signal condition still exists, the alarms will be reactivated. Operation of the (PSCO) key will cut off the audible alarm. Lamp (PS), however, remains lit as a reminder that the permanent signal condition still exists.

30. AUXILIARY SENDER MAKE BUSY JACK AND CTR KEY (FIG. 35)

When a make busy plug is inserted in jack (MB), the associated Auxiliary Sender is made busy. Operation of the (CTR) key opens the priming lead and prevents timed release of the associated Auxiliary Sender. If an Auxiliary Sender fails to complete a cycle of operation the Auxiliary Sender (BK) relay will operate. The operation of relay (BK) will open the shunt across interrupter (SS) in the Auxiliary Sender, causing lamp (SS) (Fig. 25) to flash at approximately two flashes per second.

31. AUXILIARY SENDER STUCK SENDER LAMP (FIG. 36)

Lead "J" is grounded lighting lamp (SS) whenever the Auxiliary Sender is off

Page 4

normal or made busy. The operation of Auxiliary Sender relay (BK), changes the steady lamp to a flashing lamp. The lamp will continue to flash until a timed out sender (either stuck or able to release) has been restored to normal.

32. AUXILIARY SENDER STUCK SENDER BELL (FIG. 37), AUXILIARY SENDER STUCK SENDER REGISTER AND ALL SENDERS BUSY TIME ALARM LAMP (FIG. 38)

Lead "G" of Figure 38 is connected to all Auxiliary Senders in a group. When an Auxiliary Sender fails to complete a cycle of operation, lead "G" is grounded, causing the Auxiliary Sender Stuck Sender Register to operate. This register grounds lead "B" to Fig. 37 causing the Stuck Sender bell (Aux Sdr) to ring. The Stuck Sender Bell, type 7F, is used as a single tap bell and will sound only once to indicate that an Auxiliary Sender is stuck. If all Auxiliary Senders are busy, the (TD) and (TF) relays of Fig. 34 extend ground to lead "ASB" to light the (ASB) lamp.

33. AUXILIARY SENDER ALL SENDERS BUSY TIME ALARM (FIG. 34)

Fig. 34 is provided to give a minor alarm when all Auxiliary Senders are busy from 15 to 30 seconds. When the Auxiliary Sender Link sends an all senders busy signal, lead "SB" is grounded, operating relay (TAS). On the first closure of the back contact of the (TM) interrupter, relay (TD) will operate, thru a make contact on relay (TAS). Relay (TD) operated, operates relay (TE) through a make contact on relay (TD), a break contact on relay (TF) from ground on a make contact on relay (TAS). Relay (TE) operated, locks through either relay

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(TAS) or (TF) (when operated) to the alarm release key of Fig. 11.

When the back contact of interrupter (TM) opens, relay (TD) releases and operates relay (TF) which locks to a make contact ground on relay (TAS).

On the next closure of interrupter (TM), relay (TD) reoperates, and locks through a make contact on relay (TF) through its own make contact to ground on relay (TAS). Relays (TD) and (TE) are locked to relay (TAS) or relays (TD), (TE) or (TF).

Relay (TD) operated gives an all senders busy signal by closing ground to a minor alarm and lighting the (ASB) lamp in Fig. 38.

Operation of the alarm release key in Fig. 11, releases relay (TE) silencing the audible alarm. If the all senders busy condition still exists, relays (TD) and (TF) will remain locked up to the relay (TAS), and the (ASB) lamp of Fig. 38 will remain lit until the condition is cleared.

If the all senders busy condition disappears before the alarm release key is operated, relays (TD), (TE) and (TF) remains locked to themselves. The operation of the alarm release key will release relay (TE) which will release relays (TD) and (TF) silencing the audible alarm and extinguishing the (ASB) lamp.

If relay (TAS) releases before the alarm is sounded, relays (TD), (TE) and (TF) will release.

Provision is made to transfer the alarm signal to a distant office (Option "ZY").

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normal at made busy. The operation of Auxlitary Sander relay (SR), changes the steady lump to a flaming damp, the tamp will continue to flamh until a timed out mender (sither damph or shis to release) has been restored to munsal, .(

2. AUXILIARY SEADER STOCY SENDER HELL [FIG. 37], AUXILIARY SENDER STUCK SENDER REGISTER AND ALL SENDERS HUSY TIME ALASH LAAF (FIG. 36)

And "" of rights is controled to all Antility Senders in a group. When an Auxiliary Senders fails to complete a cycla of operation, lead "G" is grounded, causing the Auxiliary Sender Stuck Sender Kellster to Fig. 37 causing the Stuck Sender bell (Aux Shr) to ring. The Stuck Sender bell (Aux Shr) to ring. The Stuck Sender Bell, type TV, is used as a single top bell and Mixiliary Sender is stuck. [ If all Auxiliary Sendert stribuey, the (TM) and (TV) relays of Fig. 14 pround to lead "ASS" to Might the visib) lamp.

ALAIN (FIG. 34)

Fig. 34 is provided to give a minor alarm when all Anxiltary Senders are busy from 15 to 30 seconds. When the Auxiliary Sender Link sends an all senders busy signal, lead "ASS" is grounded, operating relay (TAS). On the first closure of the bac contact of the [TM] interrupter, relay (TD] (TAS). Relay (TD) operated, operates relay will operate, thru a make contact on relay (TAS). Relay (TD) operated, operates relay (TB) inrough a make contact on relay (TD). A break contact on relay (TAS). Relay CD a make contact on relay (TAS).

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(TM) opbds, relay (TD) releases and opertions relay (TP) which locks to a make conact ground on relay (TAS).

(TM), relay (TD) requestives, and hocks chrough a make contact on relay (TF) through the own make contact to ground on relay (TAS). Relays (TD) and (TE) are locked to relay (TAS) or relays (TD). (TE) of (TF).

Halay (TD) derated gives an all senders busy bignal by closicg ground to a minor alarm and lighting the (458) long in Fig. 38.

Operation of the algra release key in Fig. 11, releases relay (TE) stlanding the coulde steme if the she all senders bary ton dition still carists, relays (TD) and (TT) will remain jorded up to the relay (TAS), and the (ASB) lamp of Fig. 36 will remain the until the condition is cleared.

If the all senders busy condition disappears baiors the alarm release key is operated, relays (TD), (TE) and (TT) remains locked to themselves. The operation of the elarm release key will release relay (TE) which will release relays (TD) and (TF) allowing the audible alarm and extinguishing the (ABB) lamo.

If relay (TAS) releases before the alarm is sounded, relays (TD), (TE) and (TV) vill release

Provision is made to transfer the