

American Telephone and Telegraph Company

BELL SYSTEM PRACTICES
Teletypewriter and Manual
Telegraph Station and P.B.X.
Installation and Maintenance

SECTION P33.901
Issue A, 6-1-52
Long Lines Department
Dist. Class. 600AC

81C1 SWITCHING SYSTEM

SOTUS BY-PASS AND ALARM ARRANGEMENT

1. GENERAL

1.01 This section covers conditions that may be encountered in the operation of the SOTUS By-Pass and Alarm Arrangement used at outlying stations of the 81C1 Switching Systems, and summarizes miscellaneous information that has been made available in other forms.

1.02 When a message is transmitted to an outgoing line without a directing code or with a code that is not valid for any receiving station on that line, the standard station control circuits cannot act to connect a receiving machine and the message may be lost.

1.03 The SOTUS By-Pass and Alarm Arrangement is furnished at selected outlying points on the various 81C1 circuits as an adjunct to the station control circuit to provide, in addition to the normal functions, a means for intercepting messages with missing, mutilated or incorrect codes. Upon receipt of a non-valid code, the receiving machine is cut on, following the first CARR-RET character, to record the remainder of the message. This action is alarmed so that the intercepted message may be re-introduced into the system with the correct directing code.

2. OPERATING CONDITIONS

2.01 A tabulation of some of the operating conditions that may be encountered and the effect on the station equipped with the By-Pass feature is shown in Fig. 1.

3. CIRCUIT DESCRIPTION

3.01 General.

This brief circuit description is based on Figs. 2 and 3 which are simplified schematics derived from Drawing 22568-SD-116, Issue 6. The issue is indicated since it includes the latest modifications to the By-Pass circuit which has been authorized for all existing installations. A more complete schematic, together with relay operation sequence charts, is covered by Drawing GP1253-902. All contacts in Fig. 2 are shown with the SOTUS in the activate condition. Receiving machine relays (RO-Pr1) and (RO-Sec) are biased marking.

SCRM BY-PASS AND ALARM ARRANGEMENT
Operating Conditions

Prevalent Condition	Effect on Station Equipment with By-Pass Section
<p>1. In the case of a detector with a change address to a line:</p> <p>A. Code reading and transfer non-OK for two line runs to termination difficulty brought about by resistor-bridge-temperature trouble at detecting center or line or incoming trouble, or;</p> <p>B. SCRM selecting mechanism fails to recognize code as valid for the line.</p>	<p>A. After the "Call-Line Feed" (Intermittent Signal) following the code is recognized by the SCRM, the alarm buzzer sounds and the station is connected. The buzzer will be silenced and the station disconnected when the SCRM recognizes the end-of-message "Line 2" (Station Signal) code, or;</p> <p>B. Line or line-termination difficulty the "Call-Line Feed" signal recognized by the SCRM may be part of the next station then immediately following the same. In such a case, however, will be the same as in (A) above, or;</p> <p>C. If the SCRM fails to recognize a "Call" or "Line Feed" in the message, the station will not be connected on next detector.</p>
<p>2. In the case of a message with multiple address to a line:</p> <p>A. If any code is recognized as valid for the line, the change address as non-valid, in the same message.</p>	<p>A. If the code is valid for the controlled station, the SCRM will cause the station to be connected in the normal manner, without wiring for the non-valid code, regardless of the order in which the code, are received, or;</p> <p>B. If the code is valid for some other station on the line, the SCRM upon recognizing that text will endeavor to connect the station from succeeding on a result of random non-valid codes in sections, regardless of the order in which the codes are received.</p>
<p>B. If no code is recognized as valid for the line.</p> <p>3. "Quick-Release" contacts break in SCRM unit.</p>	<p>The station is connected and alarmed and subsequently disconnected and alarm silencing or striking occurs as described above in all cases of a message with a single address to a line.</p> <p>A. If station is already connected when trouble occurs, once after the occurrence the buzzer will sound. The buzzer will be silenced and the station disconnected when the end-of-message code is recognized by the SCRM.</p> <p>B. If station is not connected at time of trouble, the station will be connected and the buzzer will sound when the SCRM recognizes the "Call-Line Feed" (Intermittent Signal) following the code or code unless a valid code for some other station or section on the line is received and recognized as such by the SCRM. The buzzer will be silenced and station disconnected when the end-of-message code is received by the SCRM. Station buzzer will take place on succeeding messages until trouble is cleared.</p>
<p>4. Firefighter calls to Station Control Unit.</p> <p>5. Standby opening (open condition on line or loop facilities between indicating number on protecting station equipped with by-pass feature).</p>	<p>Driver will sound, SCRM unit will run open and receiving station machine (or machines) will stand clear and will open if necessary and receiving copy of the trouble occurs.</p> <p>Line and Light on any opening condition and, in addition, stand condition remains for approximately 30 seconds the buzzer sounds. After approximately 30 seconds of "Line Buzzer Equipment" key to "Call" position, the buzzer will again sound when the line circuit goes making (release). Following this action, the buzzer can be suppressed by operating the key to the "Off" (Normal) position.</p>

Figure 1

Trouble Condition

1. In the case of a message with a single address to a line:

- A. Code garbled and rendered non-valid for the line due to transmission difficulty brought about by reperformer-transmitter trouble at Switching Center or line or repeater trouble, or,
- B. SOTUS selecting mechanism fails to recognize code as valid for the line.

2. In the case of a message with multiple address to a line:

- A. If any code is recognized as valid for the line, and others appear as non-valid, in the same message.

- B. If no code is recognized as valid for the line.

3. "Blank-Pause" contacts break in SOTUS unit. '

4. Rectifier fails in Station Control Unit.

5. Steady spacing (open) condition on line or loop facilities between switching center and receiving station equipped with by-pass feature.

SOTUS By-Pass and Alarm Arrangement
Operating Conditions

	Effect at Station Equipped with By-Pass
to a line: line due perform- or line code as	<p>A. After the "C.R.-Line Feed" (deactivate signals) following the buzzer sounds and the station is connected. The buzzer will be silenced when the SOTUS recognizes the end-of-message "Figs. H" (activate signals).</p> <p>B. Due to transmission difficulties the "C.R.-Line Feed" signals may be received in text rather than those immediately following the codes. Resulting in (A) above, or,</p> <p>C. If the SOTUS fails to recognize a "C.R." or "Line Feed" in the message, the station will connect on that message.</p>
to a line: ne, and ge.	<p>A. If the code is valid for the controlled station, the SOTUS will connect in normal manner, without alarm for the non-valid codes, regardless of the order in which the codes are received, or,</p> <p>B. If the code is valid for some other station on the line, the SOTUS will connect to prevent the station from connecting as a result of receiving the code of the order in which the codes are received.</p>
e.	The station is connected and alarmed and subsequently disconnected as described above in all cases of a message with a single address.
	<p>A. If station is already connected when breakage occurs, soon after the buzzer will be silenced and the station disconnected when the SOTUS.</p> <p>B. If station is not connected at time of breakage, the station will connect when the SOTUS recognizes the "C.R.-Line Feed" (deactivate signals) and a valid code for some other station or stations on the line is received. The buzzer will be silenced and station disconnected when SOTUS recognizes the code. Similar action will take place on succeeding messages until the station is connected.</p>
	Buzzer will sound, SOTUS unit will run open and receiving station will be idle even if connected and receiving copy at time trouble occurs.
facilities equipped	Line lamp lights on any spacing condition and, in addition, after .25 seconds the buzzer sounds. After suppressing buzzer by operating the key to "CL" position, the buzzer will again sound when the line circuit is restored. In any action, the buzzer can be suppressed by operating the key to "CL" position.

Figure 1

on Equipped with By-Pass Feature

als) following the code is recognized by the SOTUS, the alarm
The buzzer will be silenced and the station disconnected
ge "Figs. H" (activate signal) code, or,

-Line Feed" signals recognized by the SOTUS may be part of the
ng the codes. Resultant action, however, will be the same as

r "Line Feed" in the message, the station will not be connected

ation, the SOTUS will cause the station to be connected in the
valid codes, regardless of the order in which the codes are re-

n on the line, the SOTUS upon recognizing that fact will operate
a result of receiving non-valid codes in addition, regardless
ed.

ubsequently disconnected and alarm silenced in similar manner
ge with a single address to a line.

age occurs, soon after this occurrence the buzzer will sound.
n disconnected when the end-of-message code is recognized by

akage, the station will be connected and the buzzer will sound
eed" (deactivate signals) following the code or codes unless a
ons on the line is received and recognized as such by the SOTUS.
sconnected when SOTUS is activated by receipt of end-of-message
ucceeding messages until trouble is cleared.

n and receiving station machine (or machines) will stand closed
opy at time trouble occurs.

and, in addition, after condition persists for approximately
ressing buzzer by operation of "Line Buzzer Suppress" Key to
when the line circuit goes marking (closes). Following this
erating the key to the "OL" (Normal) position.

3.02 Controlled Station Code - Primary Receiver.

Receipt of code for controlled station primary receiving machine will cause SOTUS to close (Pri) contact connecting (RO-Pri) relay to spacing contact of (Line Relay) by way of (AL) relay, (Pri) contact, and (Blk-Pause) contact to receive the message. Carriage return character following the code will cause SOTUS to close (CR) contact to establish (AP) relay path which at this point has no effect since it is shorted out by the connect path. Fig. H at the end of message will open operated SOTUS contacts and disconnect the receiving machine.

3.03 Controlled Station Code - Secondary Receiver.

Receipt of code for secondary receiver will cause SOTUS to close the (Sec) contact to connect (RO-Sec) relay to the spacing contact of the (Line Relay) by way of the (Blk-Pause) contact for reception of the message. This connection does not provide the short circuit around the (AP) relay as before, so the (AD) relay is arranged to operate with the (RO-Sec) relay, hold on TTY signals, and open the operate path of the (AP) relay. Fig. H at the end of message restores the operated SOTUS contacts.

3.04 Other Station Codes.

Receipt of valid codes for other stations on the line will cause SOTUS to close the corresponding (Other Station) contact which opens the operating path of the (AP) relay.

3.05 Missing, Mutilated or Non-Valid Codes.

Following a missing, mutilated or non-valid code, no cut on contact will be operated in SOTUS. After closure of (CR) contact (AP) relay will operate on next spacing pulse, releasing (AL) relay. Release of (AL) relay connects (RO-Pri) relay directly to the spacing contact of (Line Relay) to record message and operates audible alarm. (AP) relay will hold on TTY signals until message is completed. Release of (CR) contact and termination of TTY signals permit (AP) relay to release and re-operate (AL) relay which disconnects receiving machine and silences alarm.

3.06 Transmitter Starts Codes.

On receipt of BLANK character of transmitter start pattern, (Blk-Pause) contact of SOTUS operates. If the controlled station is not connected at this time, no further action takes place and the (Blk-Pause) contact restores. If the controlled station has been connected, (Pri) and (CR) contacts closed, operation of the (Blk-Pause) contacts opens the operate path of the (RO-Pri) relay so the receiving machine will not record transmitter start characters and removes the short circuit around the (AP) relay. To prevent release of the (AL) relay, an added contact of the (Blk-Pause) contact assembly holds the (AL) relay operated while the (AP) relay follows the transmitter start pattern. The (AP) relay current of 3.5-4.0 mils has no effect on the (RO-Pri) relay which is biased at 10 mils.

3.07 Other Functions and Supervisory Features.

(a) Open line alarm feature, Fig. 3, is provided by the (OLA) relay which is locked to the marking contact of the (Line Relay) and holds on TTY signals. If the (Line Relay) should remain in the spacing condition for longer than one-quarter second, the (OLA) relay will release to operate the audible alarm. Operation of the Line Buzzer Suppress Key (B) to CL position will silence the alarm and close the operate path of the (OLA) relay. Re-operation of the (OLA) relay, on line closure, will cause the alarm to sound again. The alarm is silenced by release of the (B) key to the OL position.

(b) The busy indicator (Line Lamp) follows line signals from the spacing contact of the (Line Relay).

(c) Operation of the (A) key to Buzzer Suppress disconnects the audible alarm from the (AL) relay and substitutes a visual signal (Guard Lamp) for indication of station connect on non-valid codes. Operation of the (A) key to TTY Cut-On releases the (AL) relay which lights the

(Guard Lamp) and connects the primary teletype-writer directly to the (Line Relay) Fig. 2, to record all incoming traffic independent of the SOTUS.

4. MAINTENANCE

4.01 The additional contact for the BLANK-PAUSE contact assembly, provided in accordance with Issue 6 of 22568-SD-116, shall be adjusted so that the combined spring tension of the assembly does not exceed 4-1/2 ounces measured per P33.005, paragraph 2.66(b).

4.02 The inner contact points of the adjoining TP121068 contact springs shall not make contact. If required, file off part of the upper contact point of the added contact spring.

4.03 Place a light film of grease on the adjoining surfaces of the contact spring insulating blocks.

5. TESTING

5.01 The SOTUS By-Pass and Alarm Circuit shall be tested in accordance with Section E12.733, under the direction of the serving testroom, in the same manner as the normal SOTUS operated station control circuit.

6. REFERENCES

6.01 Drawings - SOTUS By-Pass and Alarm Circuit.

GP1253-902	-	Relay Sequence Chart
22568-SD-116	-	Schematic
22568-T-131	-	Wiring
22568-ED-131	-	Equipment

6.02 Related Information.

- P33.004 - SOTUS Wiring Diagram
- P33.005 - SOTUS Requirements and Procedures
- P33.006 - Maintenance Inspections and Tests
- P96.035 - 81C1 Switching System - SOTUS
Lever Arrangement
- P96.043) - 81C1 Switching System - Station
- P96.044) - Control Circuit - Station Ar-
rangements

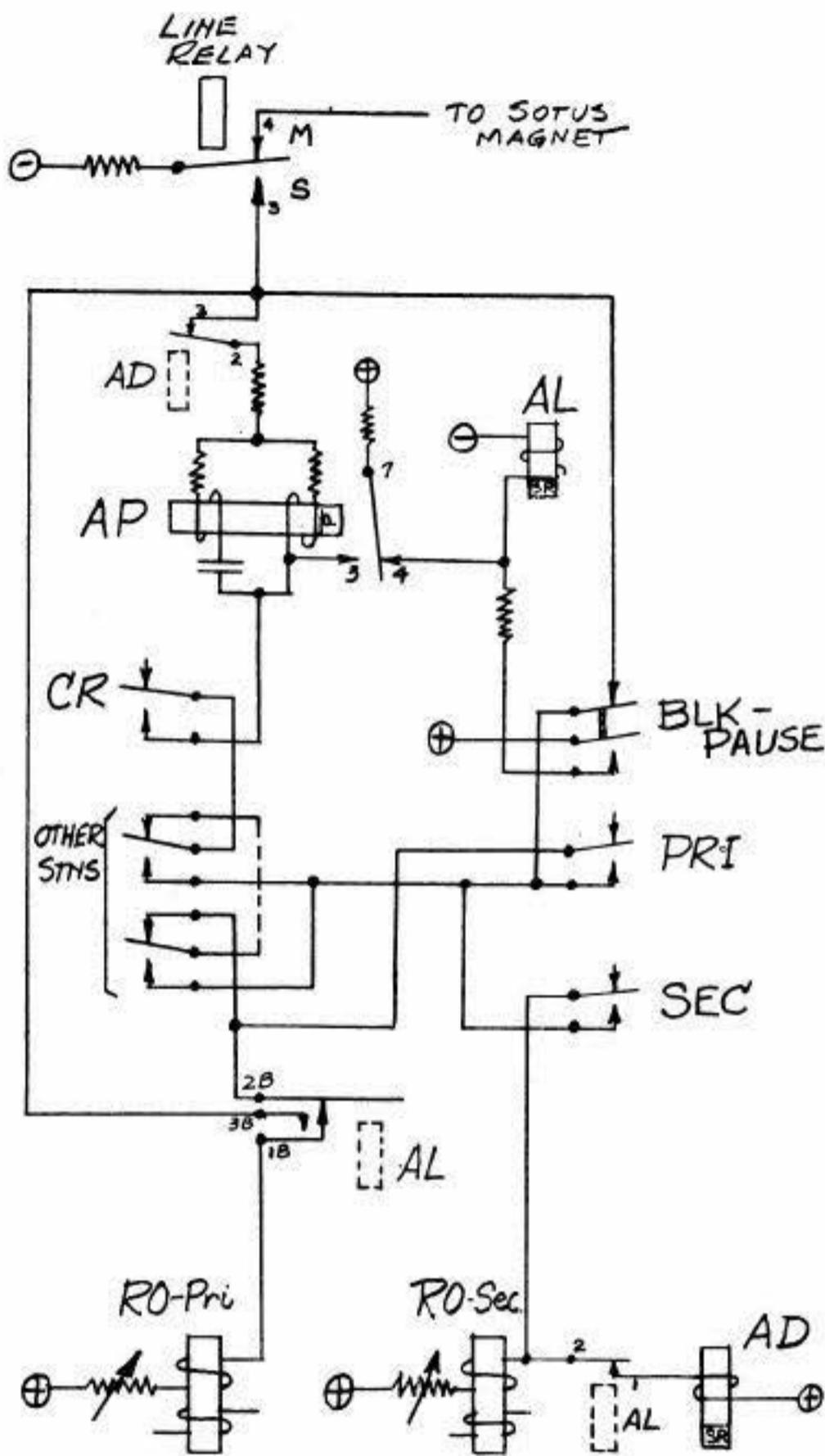


FIG. 2

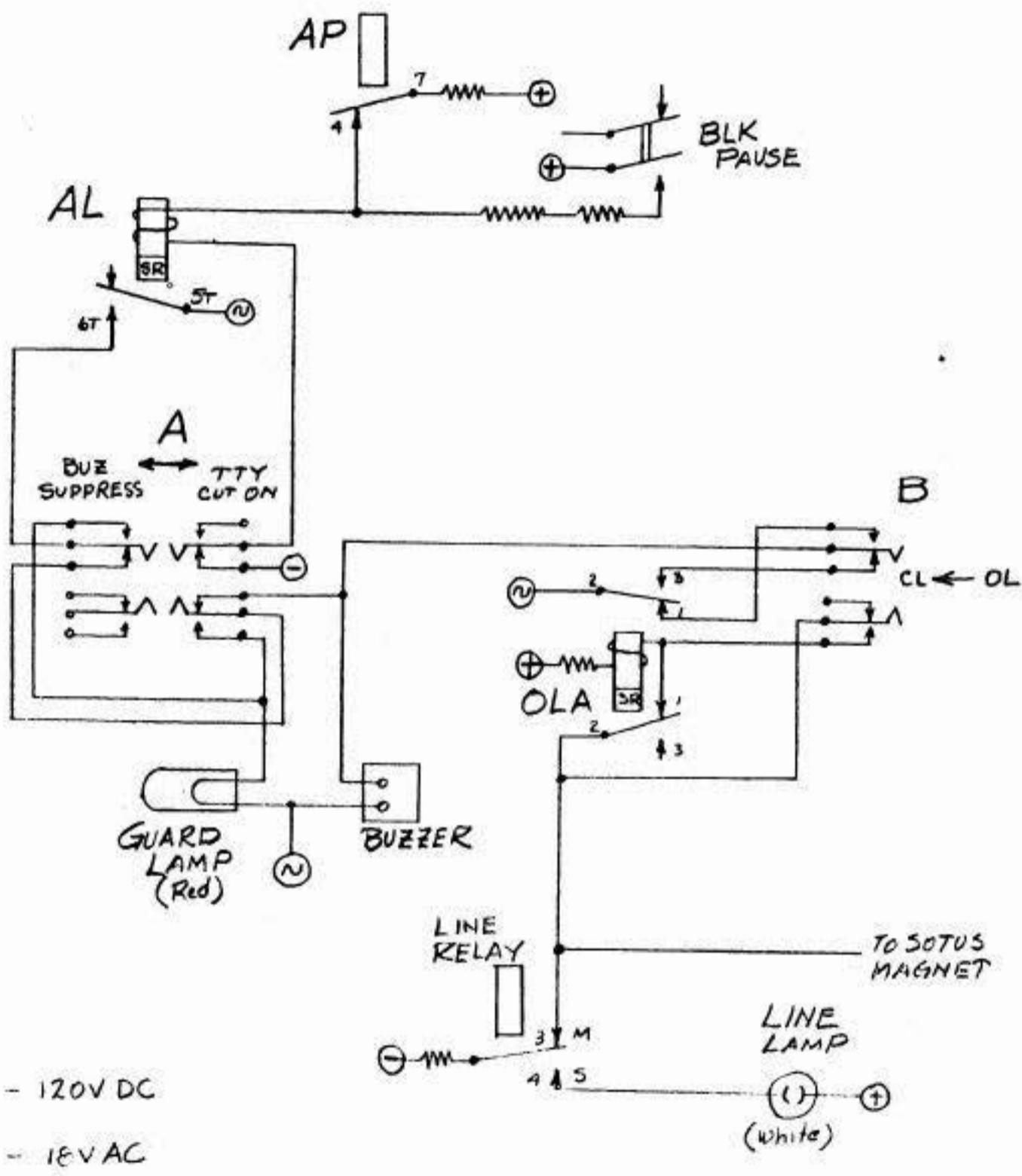


FIG 3