

81D1 TELETYPEWRITER SWITCHING SYSTEM

STATION CONTROL CIRCUIT AND SOTUS UNIT

RELAY FUNCTIONS

1. GENERAL

1.01 This section shows the 81D1 teletypewriter switching system, station control circuit, and SOTUS unit relay functions.

1.02 This section is reissued to change its rating from Provisional to Standard and to include the station control circuit theory schematic drawing ES-883395.

1.03 The following symbols are used in the relay function charts and teletypewriters.

(a) Symbols Used in Relay Function Charts

\overline{A} Signifies that A Operates

\overline{A}^L Signifies that A Operates and Locks

\underline{A} Signifies that A Releases

\overline{A} Signifies that A Is Operated

\overline{A}^L Signifies that A Is Operated; now Locks

\underline{A} Signifies that A Is Released

\overline{P}^S Signifies that Polar Relay P Operates to Its Spacing Contact

\overline{P}^M Signifies that Polar Relay P Operates to Its Marking Contact

\overline{P}^3 Signifies that Polar Relay P Operates to Its No. 3 Contact

(b) Teletypewriter Symbols

\uparrow Figures

\leftarrow Carriage Return

\downarrow Letters

\equiv Line Feed

2. RELAY FUNCTION CHARTS

2.01 Refer to Figure 1. This figure is based on theory schematic drawing ES-883395.

RECEIVING TTY CUT-ON

Line Idle & Marking; SOTUS Unit Activated.

$\overline{L}^M \overline{IS}^M$ SOTUS Sel. Mag. \overline{M}^{15} RO TTY Line Rel. \overline{M}^M (M Bias)
 Power Switch P Operated $\overline{P} \overline{OL} \overline{ALA} \overline{SPA}$

CONNECT
 15 RO TTY
 ON STA.
 CODE AB
 OR GROUP
 CODE JA
 (E & K
 WIRING
 OMITTED)

1. \overline{L}^M -S (Follows Rec. Loop Sigs.)
2. \overline{IS}^M -S
3. SOTUS Sel. Mag. \overline{M}^M -S
4. SOTUS \overline{AB} Contact \overline{L} or \overline{JA} Contact \overline{L} (In Accordance with Inc. Sigs.) $\overline{Univ.}$ Cont.
5. $\overline{S1}$ -- Conn. 15 RO TTY to Line Relay \overline{D} (Tape Feed-out Ckt.)

Note: Same Operation for 14 RO Typing Reperf. Except SOTUS AM or JB Contact is Used and Relay $\overline{S2}$ Conn. 14 RO TR to Line Rel. and also \overline{C} of Tape Feed-out Ckt., which causes \overline{B}^L

DEACTIVATE
 SOTUS ON
 LINE FEED

6. When SOTUS Receives \equiv of $\leftarrow \equiv \vee$ Following Msg. Code or Codes, it Deactivates (Mechanically) and SOTUS \overline{LF} Contact \overline{L}
7. \overline{LF} (Supplements \overline{P}) RO TTY Now Ready to Receive Text
8. \overline{D} (Tape Feed-out Ckt.)

DISCONNECT
 15 RO TTY
 ON FIGS.-
 H-LTRS.

9. At End of Message, when SOTUS Receives \wedge of $\wedge H \vee, "H"$ Function Lever of SOTUS is Unblocked
10. On Receipt of "H," SOTUS Becomes Activated and \overline{AB} Contact or \overline{JA} Contact; Also \overline{LF} Contact
11. $\overline{S1}$ Disconn. 15 RO TTY from Line Rel. Same for 14 RO TR, except SOTUS AM or JB Contact is Used and Relay $\overline{S2}$ Disconn. 14 RO TR from Line Rel. and \overline{C} of Tape Feed-out Ckt.

Assume Lines 1-3 Have Occurred

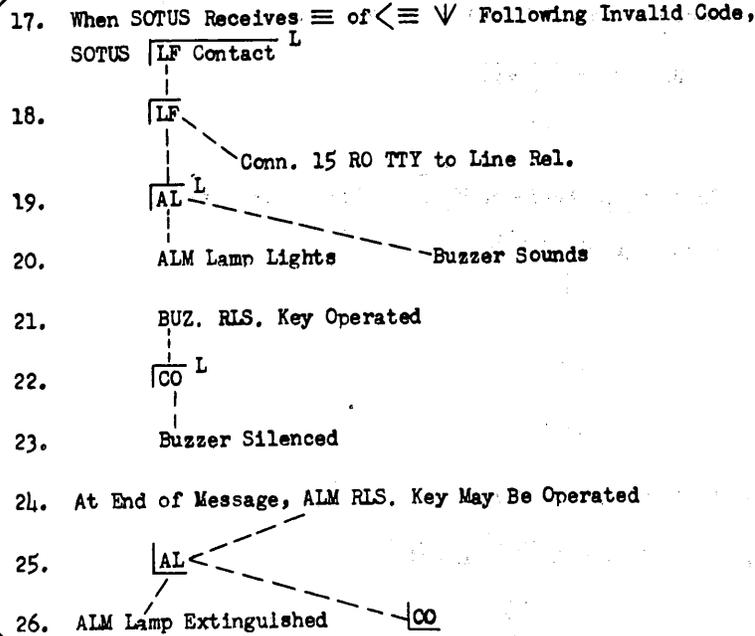
CONNECT
 15 RO TTY
 & 14 RO
 TYPING
 REPERF.
 ON COMMON
 GROUP
 CODE JJ

12. SOTUS \overline{JJ} Contact \overline{L}
13. \overline{G}
14. $\overline{S1}$ $\overline{S2}$
15. Conn. 15 RO TTY to Line Rel. Conn. 14 RO TR to Line Rel. \overline{C} (Tape Feed-out Ckt.)
16. \overline{B}^L (Tape Feed-out Ckt.)

When E Wiring Is Provided, All Valid & Invalid Codes Are Received on 15 RO TTY.

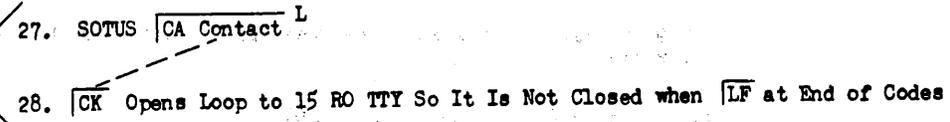
Assume Only Invalid Code Is Received by SOTUS.

CONNECT
15 RO TTY
ON INVALID
CODE
(K & B
WIRING)



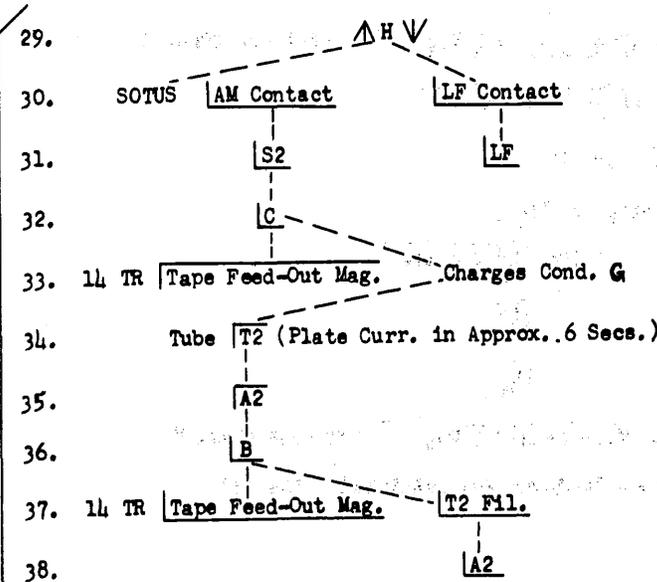
Assume Code Valid for Another Station Is Received by SOTUS, but No Codes Valid for This Station.

15 RO TTY
NOT CONN.
ON VALID
CODE (CA)
FOR ANOTHER
STA. ON LINE
(K WIRING)



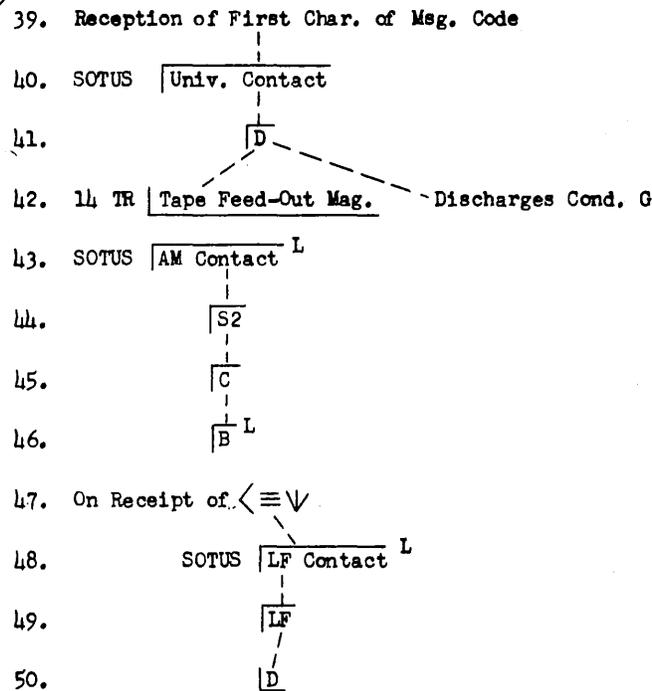
When Relay S2 Operates $\overline{\text{C}}$ $\overline{\text{B}}$ $\overline{\text{L}}$ & $\overline{\text{T2}}$ Fil. in Tape Feed-Out Ckt.
Assume \wedge H \vee at End of Message

AUTOMATIC
TAPE
FEED-OUT
FOLLOWING
MESSAGE
TO 14 RO
TYPING
REPERF



Assume Another Message Arrives for 14 RO TR During Feed-Out (Line 33)

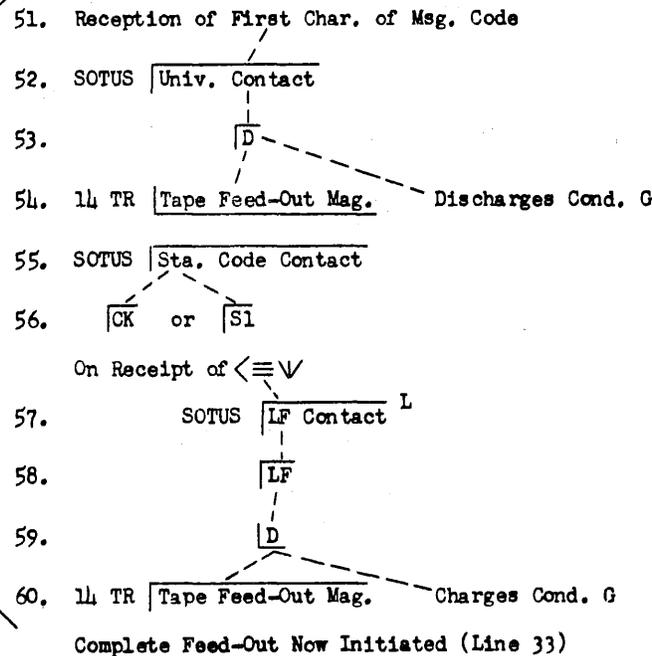
RECEIPT OF ANOTHER MESSAGE FOR 14 RO TYPING REPERF. DURING FEED-OUT



Ckt. Is Now Normal and Ready to Initiate Another Feed-Out at End of Message (Line 29)

Assume Message for Station Other than 14 RO TR Arrives During Feed-Out (Line 33)

RECEIPT OF MESSAGE FOR ANOTHER STATION DURING FEED-OUT OF 14 RO TYPING REPERF.



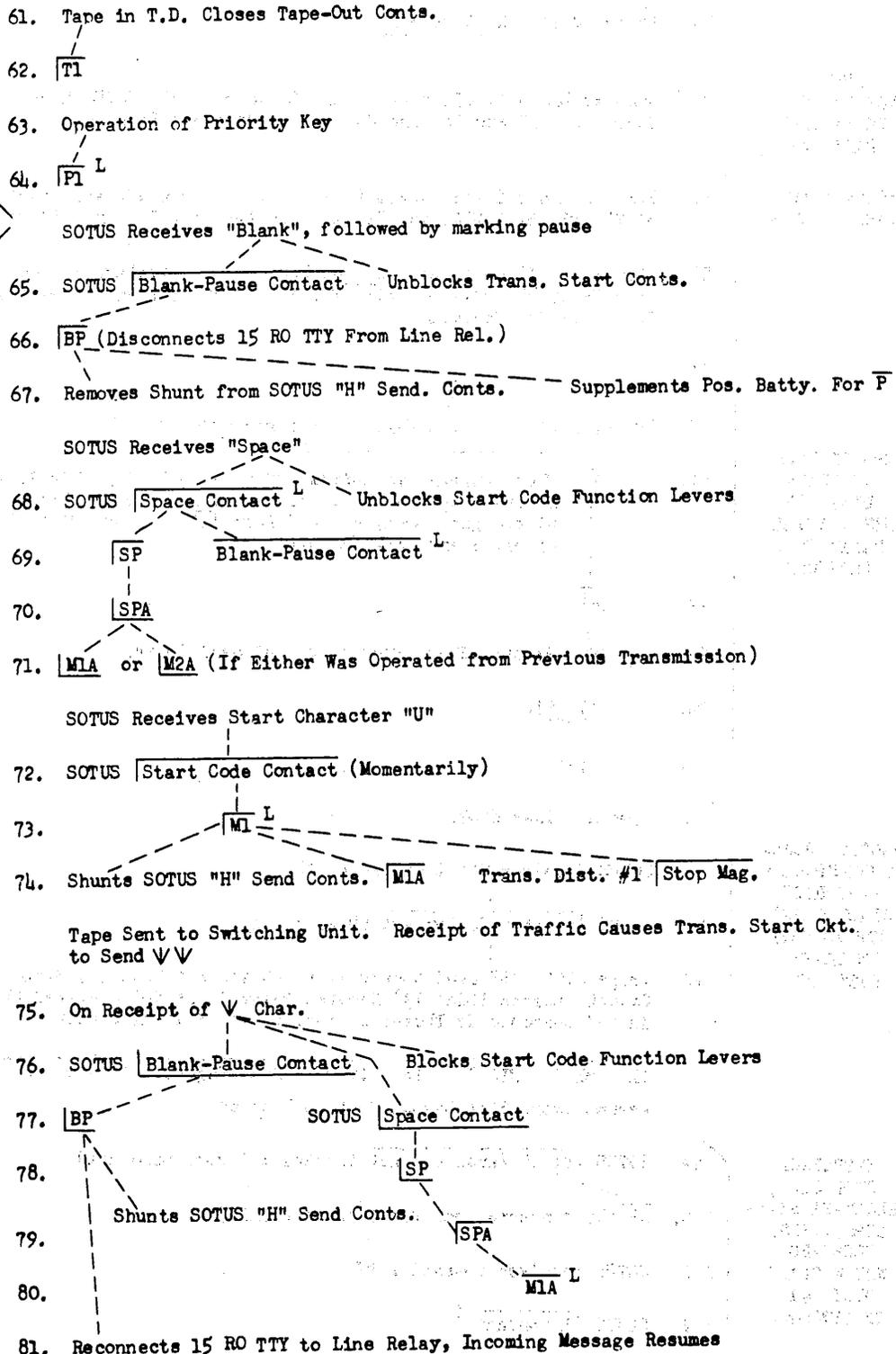
TRANSMITTER START

Assume Message Being Received by 15 RO TTY

LF P OL ALA SPA S1

INSERT
PRIORITY
TAPE IN
TRANS.
DIST. #1

RECEIVE
BLANK-
PAUSE-
SPACE-U
(PRIORITY
START
CODE)



END OF
TAPE IN
TRANS.
DIST. #1

- 82. At End of Tape In Transmitter, T.D. Tape-Out Contacts Open
- 83. T1 P1
- 84. M1 Removes Shunt from SOTUS "H" Conts.
- 85. Trans. Dist. #1 Stop Mag.

INSERT
NON-PRIORITY
TAPE IN TRANS.
DIST. #1

- 86. Same as Lines 61-85, Except Omit Lines 63 & 64, SOTUS Receives Start Character "A" and In Line 83 Rel. P1 Does Not Release

INSERT TAPE IN
TRANS. DIST. #2

- 87. Same as Lines 61-86 Except Relays T2, P2, M2 & M2A Are Involved Instead of T1, P1, M1 & M1A, and Start Characters Are "F" and "S", Respectively

END OF TAPE
IN TRANS.
DIST. #2,
LINE RELEASE
DELAY CNT.
PROVIDED

- 88. When Relay T2 Operates (Same as Line 62) It Discharges Cond. E. & F. When Relay M2 Operates, Fil. T1. At End of Tape in Transmitter, T.D. Tape Out Contacts Open

- 89. T2
- 90. Trans. Dist. #2 Stop Mag. Charges Cond. E & F

- 91. T1 (Plate Current in Approx. 20 Secs. - During This Interval Another Tape Can Be Placed in Trans. Dist. & Relay T2, Discharging Cond. E & F Before A1 Trans. Dist. Stop Mag. Operates and Tape Is Sent)

- 92. A1
- 93. M2 Removes Shunt From SOTUS "H" Send Conts.
- 94. T1 Fil.
- 95. A1

RECEIVE BLANK-
PAUSE-SPACE-U
(PRIORITY
START CODE)
WITH NO TAPE
IN TRANS.
DIST. #1

- 96. Same as Lines 65-71
- SOTUS Receives Start Character "U"
- 97. SOTUS Start Code Contact (Momentarily)
- 98. Trips SOTUS "H" Send Contacts, Which Are Not Shunted, Since Relay M1 Cannot Operate (Line 73) Because Relay T1 Is Not Operated (Lines 61-62). An "H" Response Is Therefore Sent to the Switching Unit.

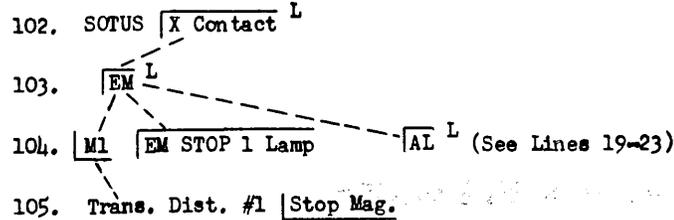
T1 M1 L M1A L SPA TD #1 Stop Magnet Tape Out Cont.

Assume Emcy. Stop Signal Sent to Station

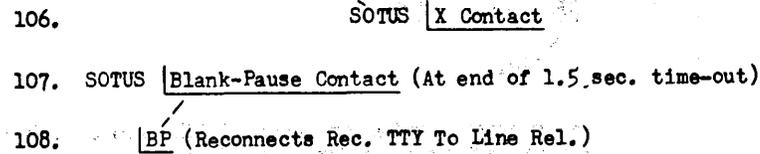
EMERGENCY
STOP SIG.,
BLANK-PAUSE-X-
LTRS.-LTRS.,
RECEIVED
WHILE TRANS.
DIST. #1
IS SENDING

- 99. SOTUS Blank-Pause Contact (During 1.5 sec. time-out)
- 100. BP (Disconnects Rec. TTY from Line Rel.)
- 101. SOTUS Receives Character "X"
- 102. SOTUS X Contact L

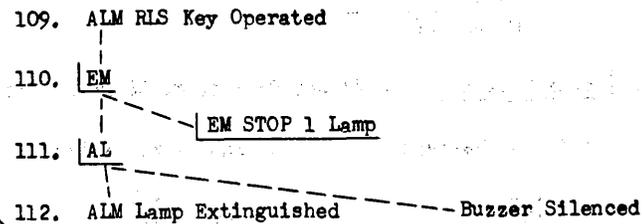
EMERGENCY
STOP SIG.,
BLANK-PAUSE-X-
LTRS.-LTRS.,
RECEIVED
WHILE TRANS.
DIST. #1
IS SENDING
(CONT'D)



SOTUS Receives \checkmark Char.

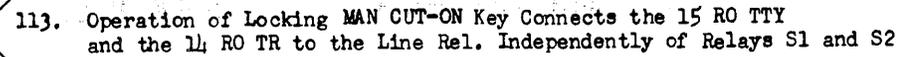


Assume Tape Is Reset In Trans. Dist.



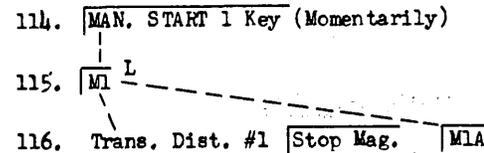
MISCELLANEOUS

MANUAL CONN.
OF RO TTY



Assume Tape in Trans. Dist #1 T1

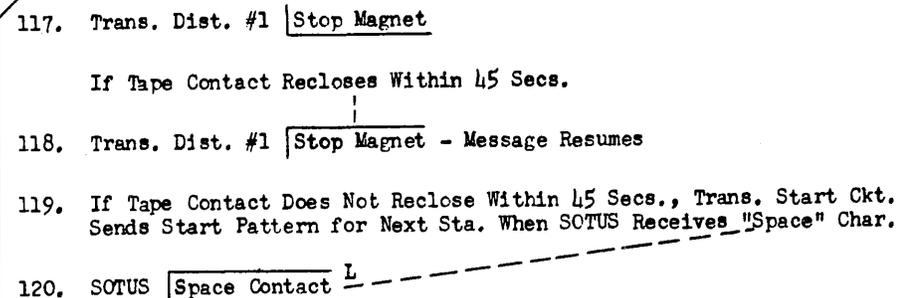
MANUAL
START OF
TRANS.-DIST.



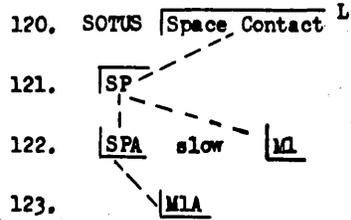
During This Operation There Is No Interference With the Path to the 15 RO TTY or 14 RO TR. For Action At End of Tape, See Lines 82-85

Assume Transmission Proceeding (Line 74) and Tape Stop Contact Opens, As by a Tape Snarl

STOP
TRANSMISSION
FROM
TRANS. DIST.
WITHOUT
SENDING
END-OF-
TRANS.
SIGNAL



STOP
TRANSMISSION
FROM
TRANS. DIST.
WITHOUT
SENDING
END-OF-
TRANS.
SIGNAL
(CONT'D)

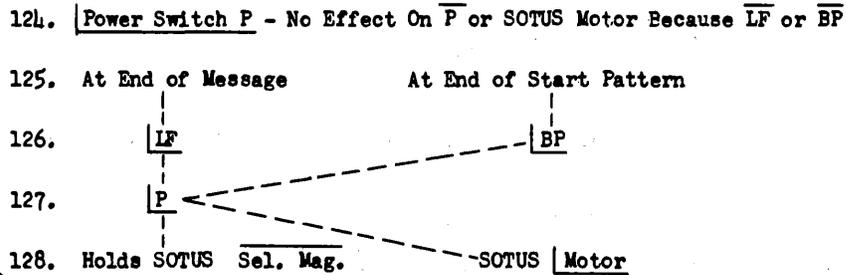


Transmission Now Cannot Resume Until Tape Stop Contact Recloses and Transmitter Receives Its Start Pattern

Assume SOTUS Turned Off During Deactivate Condition or While Receiving Start Pattern

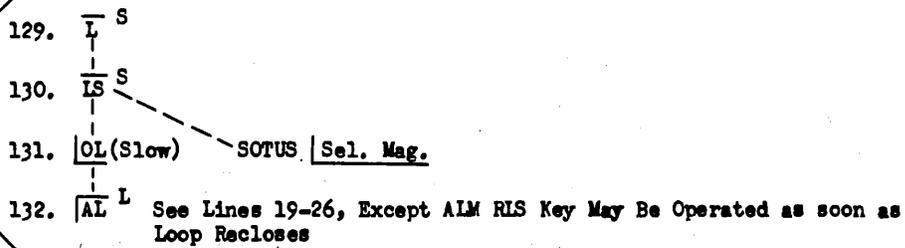
\overline{LF} or \overline{BP} P

POWER
SWITCH
TURNED OFF
WHILE
SOTUS IS
IN
DEACTIVATE
CONDITION



Assume Receiving Loop Goes Open

ALARM
OPEN
RECEIVING
LOOP



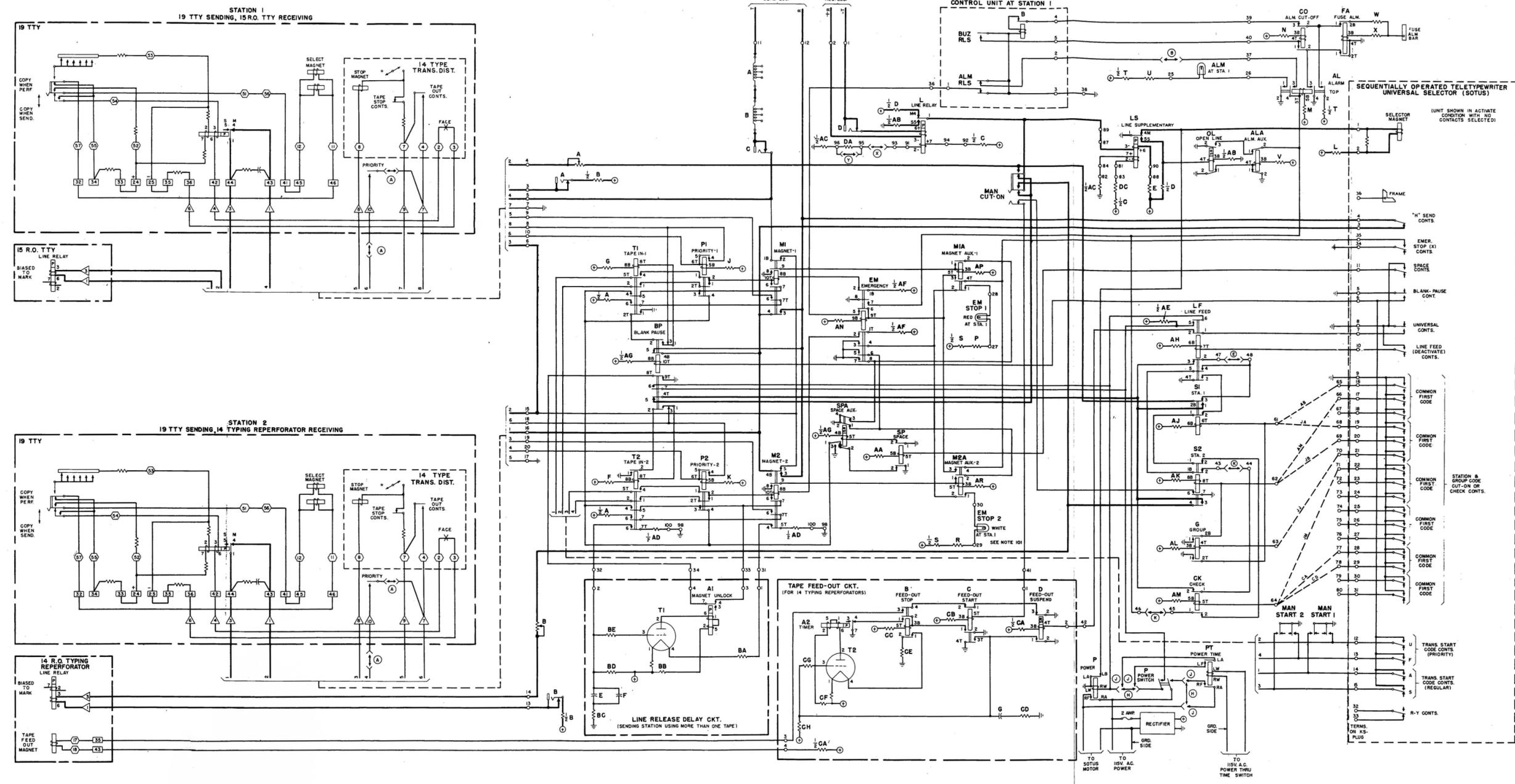


Figure 1 — 81D1 Teletypewriter Switching Unit Station Control Circuit and SOTUS Unit Relay Functions