83B3 TELETYPEWRITER SELECTIVE CALLING SYSTEM DESCRIPTION OF INTERFACE CONNECTION TO A CUSTOMER-OWNED BUSINESS MACHINE

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1. GENERAL

1.01 This section covers the description and operating principles of the 83B3 teletypewriter selective calling system when it is connected to a customer-owned business machine. Section 581-100-103 describes the general operating principles of the 83B3 system; this section describes the interface between the 83B3 circuit and the business machine, and the station arrangements at such a location.

1.02 The business machine must be arranged to send and receive 5-unit (Baudot code) teletypewriter signals at standard teletypewriter speeds (normally 100 words per minute) on either a serial or parallel basis, at locations where 60-cycle 110-volt ac power is available.

2. METHOD OF OPERATION

General

2.01 An interconnecting control circuit provides the interface between the 83B3 line and the business machine. A sequence selector is included in this interconnecting circuit to control sending and receiving by the business machine. An automatic sending and receiving (ASR) teletypewriter, also controlled by the sequence selector, may be provided for handling teletypewriter traffic at the station.

2.02 A single business machine station may be connected to a line, to receive from and send to teletypewriter stations also connected to the line, or two or more machines may be connected to the line. In this case the machines may communicate with each other only, or also with the teletypewriter stations on the line.

2.03 The business machine may send and receive on a parallel or serial basis. In the case of parallel operation, code reading contacts in the sequence selector convert the serial signals of the line to the parallel signals furnished the business machine, while the parallel signals from the machine code a distributor which converts them to serial signals furnished the line sending relay. In the case of serial operation, the serial signals received from the line are repeated by the line receiving relay to the business machine, while the serial signals from the business machine control the line sending relay directly.

2.04 The interconnecting control circuit includes two sections, designated A and B. Only the B section is arranged to interface with a business machine, the A section being used to control an ASR teletypewriter, if desired. Since the sequence selector of the interconnecting circuit includes a stunt box for control, the ASR teletypewriter employs a nonselective typing unit.

Stunt Box Control

2.05 The stunt box of the sequence selector operates in a manner similar, in general, to the stunt box of the ASR teletypewriter, described in Section 581-100-103. There are, however, two differences. Since the stunt box may control two sending sources, such as two reperforator-transmitters (RTs) at an automatic relay station or a business machine and a teletypewriter at a business machine station, contacts are provided to respond to two different transmitter

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start codes (TSCs), so each sending machine may be started independently. Also, since the sequence selector may be used to control a business machine, end-of-data (EOD) and start-of-data (SOD) contacts are provided in the stunt box. These contacts are also required in the stunt box of an ASR teletypewriter arranged to send to or receive from a business machine on the same line, where this feature is required. Since it is thought that these contacts will be required in only a small proportion of ASR teletypewriters, they are arranged to be added as required.

Note: This feature can not be used where the ASR teletypewriter is on one line and the business machine is on another line.

2.06 The purpose of the EOD and SOD contacts is to permit stopping and starting a teletypewriter or business machine already in the nonselect (text) condition so as to permit a reply from a called station to a calling station during a connection. The data reply feature functions as follows. Assume an ASR teletypewriter upon being polled originates a message to a business machine. The call directing code (CDC) for the business machine includes the character H (normally the first character), and upon receipt of this character, the EOD function of both the sending and receiving stunt boxes (controlling the ASR and the business machine) is unblocked. The transmitter start circuit also recognizes the H of the CDC and increases its time-out feature from 2 to 20 seconds, to give the business machine that longer interval to generate a V answerback, in case the machine is busy when called.

2.07 On receipt of the answerback the ASR teletypewriter starts sending to the business machine. Upon sending a specific EOD code (an upper case character) included in the text of the message, the sending ASR transmitter sends two LTRS characters following the EOD character before it stops. Upon receipt of EOD, the sequence stunt box contact closes, causing the business machine to send to the line, after a delay sufficient to permit the two characters following EOD to be received. The business machine now sends its reply, ending with the SOD code. The reply may be merely the SOD code if the business machine wishes the ASR teletypewriter to resume sending. The SOD code is also an upper case character, and upon its receipt in the sequence selector stunt box a relay which was operated on EOD is released, restoring the interconnecting control circuit (and the interface connection) to the receiving condition. Receipt of SOD at the ASR causes that teletypewriter to resume sending.

2.08 The ASR teletypewriter therefore sends data to the business machine, stops, awaits a reply from the machine, sends more data, etc. When the last data is sent by the ASR and an SOD reply is received, the ASR sends the end-of-message (EOM) combination, whereupon the transmitter start circuit restores its time-out feature to 2 seconds and resumes polling.

Message Format

2.09 As covered in more detail in Section 581-100-103, a specific message format must be employed with the 83B3 system. Each message must start with the 2-character call directing code(s) (CDCs) for the called station(s), followed by the end-of-address (EOA) combination, the text of the message, and ending in the EOM combination.

2.10 Upon receipt of its TSC, a station with a message to send sends the first CDC (two characters followed by LTRS), stops to await an answerback from the called station (the character V), sends the next CDC, etc, until all have been sent and answerbacks received. If a business machine is to be connected, its CDC should be the last sent in the case of a multiple address message so that no CDC will be received by the business machine. The station then sends EOA, followed by text and EOM, whereupon the transmitter start circuit polls the next station in order.

Detailed Operation

2.11 Fig. 1 shows the interface connection between the 83B3 interconnecting control circuit and the business machine in detail. The IFO connector of the control circuit connects to the receiving side of the business machine and the IFI connector connects to the sending side of the machine, by means of cords furnished with the business machine.

2.12 On receipt of the CDC for the station the sequence selector grounds LR lead to the business machine, as a signal to the machine that it is being called. If the machine is idle, or when

it becomes idle, it grounds DPR lead, operating FY1 relay, causing the V answerback to be sent. The LC lead is then grounded, the selector code reading contact RDC common lead is connected to the business machine receiving circuit and the RPL lead is connected (for use in the case of parallel operation).

2.13 The sending station now sends EOA, shifting the sequence selector stunt box into the nonselect condition and grounding the TX lead, signaling the business machine that text is to follow. In case of serial operation of the business machine, this text is repeated to the machine over RS lead, while in the case of parallel operation the code reading contacts of the sequence selector repeat the five intelligence pulses of each character to the machine over B1 through B5 leads. The RPL lead is grounded by the sequence selector universal contacts approximately 40 milliseconds after the pulse combination has been established on B1 through B5 leads and is opened approximately 30 milliseconds before the pulse combination is changed to the next character. Ground on RPL lead signals the business machine to read the character established on B1 through B5 leads. Upon receipt of EOM all control leads (except RS in the case of serial operation) are removed from the receiving side of the business machine.

2.14 If the data reply feature is employed, reception of the EOD code by the receiving sequence selector causes the XC lead to be grounded, thereby signaling the business machine to reply to the calling station. When the business machine sends SOD at the end of its reply, the XC lead is opened and the machine stops. The sending station now sends another message or EOM.

2.15 When the business machine wishes to originate a call, it places a bid on the line by grounding the SB lead. The machine should be arranged to send a message in the usual format, that is, CDC, await a V answerback, EOA, text, and EOM. Upon receipt of the TSC for the business machine, the RD lead is grounded, indicating to the machine that it may send. The STC lead is also grounded, operating the sending distributor magnet over the ST lead in the case of parallel sending, to start distributor rotation. The business machine codes the distributor over the B1 through B5 leads (a different set of leads from the B1 through B5 set referred to in 2.14) and as the distributor rotates, the LS relay is operated in accordance with the character furnished by the business machine. The LS relay in turn sends to the line. Also as the distributor rotates, its auxiliary contact grounds the CT lead, and upon the opening of this lead, during the stop pulse of the character being sent, the business machine codes the distributor for the next character to be sent. In the case of serial sending, the LS relay is operated directly by the business machine, over the T lead.

2.16 The business machine now sends the two characters and LTRS of the CDC, whereupon ground is removed from the STC lead, causing the machine to stop sending. Upon receipt of the V answerback from the called station, ground is reapplied to the STC lead, whereupon the machine sends the next CDC. When the last CDC has been sent and the answerback received, the machine sends EOA. This disables all selective functions of the stunt box except EOD, SOD, and EOM and the machine continues to send. The EOD and SOD functions are described in 2.05 through 2.08. Upon receipt of EOM in the stunt box, ground is removed from the RD lead causing the machine to stop sending.

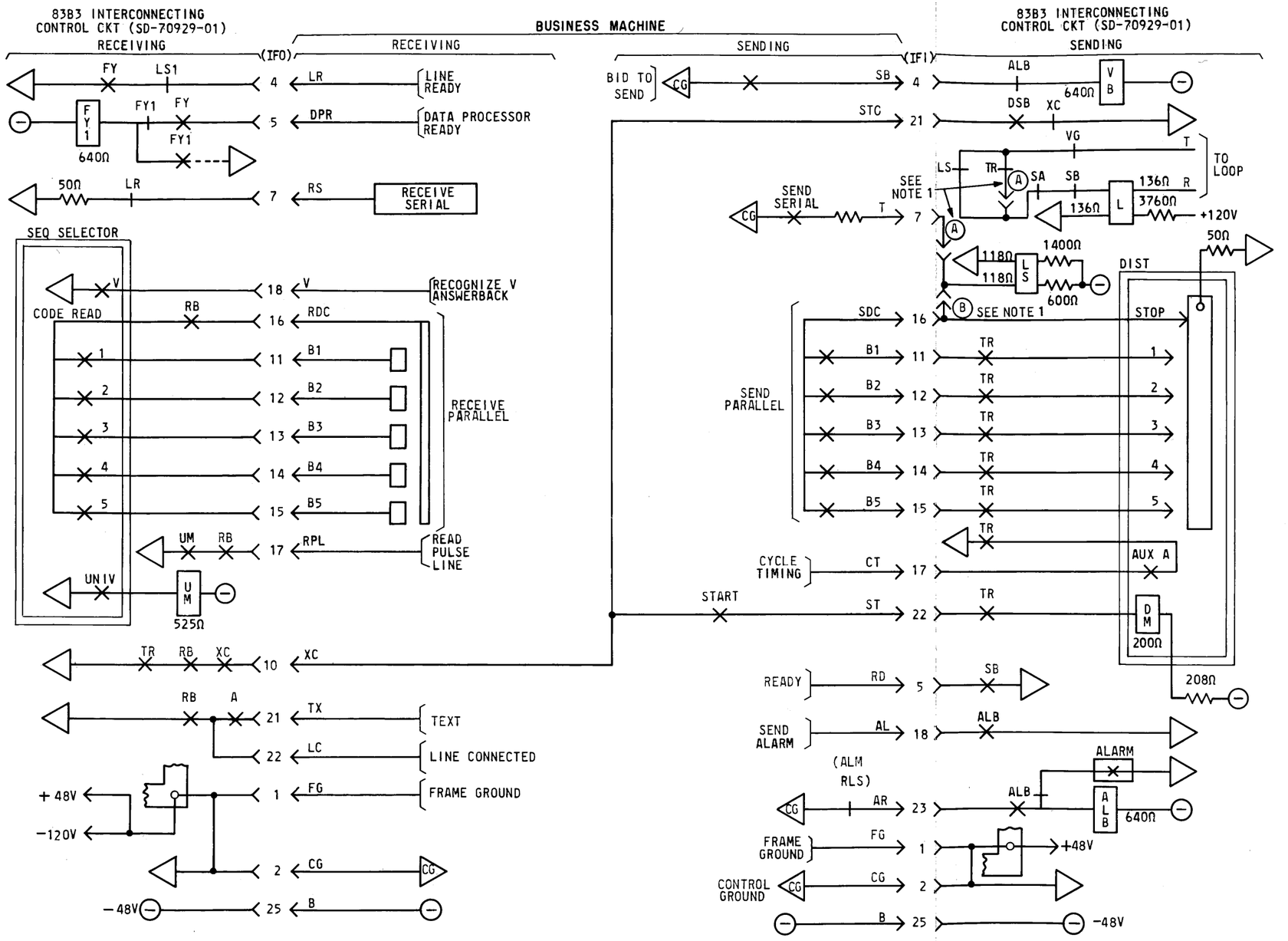
2.17 An option is available in the transmitter start circuit whereby that circuit polls the business machine repeatedly as long as it has traffic to send. As long as a bid is maintained by the machine on the SB lead, a data message is sent on receipt of each poll. When the last message has been sent, ground is removed from the SB lead and the station gives a no-traffic response to the next poll. The transmitter start circuit thereupon polls the next station in order.

2.18 In case the line remains marking for 20 seconds, the transmitter start circuit times out and sends EOM to restore the circuit to normal. This operates the ALB relay, which locks to the AR lead from the business machine, grounds the AL lead to the machine to give an alarm at that unit, and operates the CAB alarm of the power distribution circuit. The CAB alarm may be released by an alarm release key in the AR lead in the business machine.

3. STATION ASSEMBLIES

3.01 Fig. 2 illustrates the arrangement at a typical business machine control station, while Fig. 3 illustrates the arrangement at a noncontrol station. The difference between the two arrangements is that the transmitter start circuit for the line is provided only at the control station. In each case an ASR machine is shown for handling teletypewriter traffic, and a push-button calling circuit is shown for automatically inserting addresses at the start of the tape. This circuit may be omitted if not required.

3.02 The skip keys and lamps shown in Fig. 2 may be mounted in the apparatus cabinet rather than adjacent to the teletypewriter, if desired. The apparatus cabinet is similar in contour to the 28 RT cabinet and is arranged with two pull-out relay racks, on which are mounted the equipment units and the sequence selector, the latter on spring mounts.



KEY TO SYMBOLS

— NORMALLY OPEN CONTACTS THAT CLOSE ON A FUNCTION.

— NORMALLY CLOSED CONTACTS THAT OPEN ON A FUNCTION.

LEAD DESIGNATION

RECEIVING

LR - LINE READY
DPR - DATA PROCESSOR READY
RS - RECEIVE SERIAL
RDC - RECEIVE DATA COMMON
B1 TO B5 - BITS 1 TO 5
RPL - READ PULSE LINE
XC - SOD CONTROL
TX - TEXT
LC - LINE CONNECTED
V - RECOGNIZE V ANSWERBACK

SENDING

SB - SEND BID
RD - READY
T - SEND SERIAL

STC - START COMMON
SDC - SEND DATA COMMON
B1 TO B5 - BITS 1 TO 5
ST - START
CT - CYCLE TIMING
AL - TRANSMITTING ALARM
AR - TRANSMITTING ALARM RELEASE

CODE SYMBOLS

CDC - STATION CODE
BMC - BUSINESS MACHINE CODE
EOA - END OF ADDRESS (CR-LF-LTRS)
EOD - END OF DATA LINE
SOD - START OF DATA LINE
EOM - END OF MESSAGE - DISCONNECT CODE (U/C H-LTRS)

NOTES:

1. PROVIDE (A) OPTION FOR SERIAL SENDING ONLY. PROVIDE (B) OPTION FOR PARALLEL SENDING ONLY.

Fig. 1 – Business Machine Interface Connection

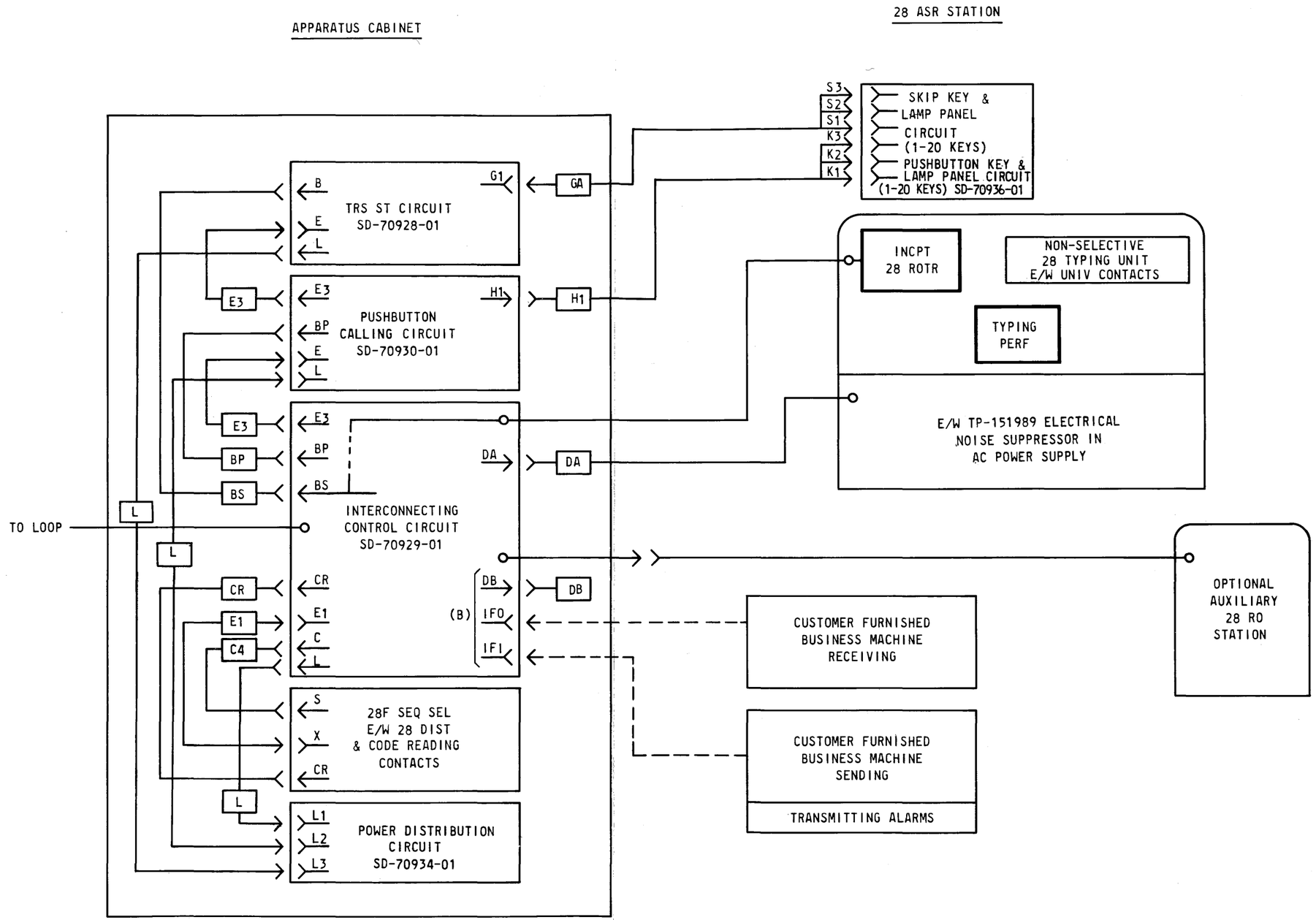


Fig. 2 – Business Machine Control Station

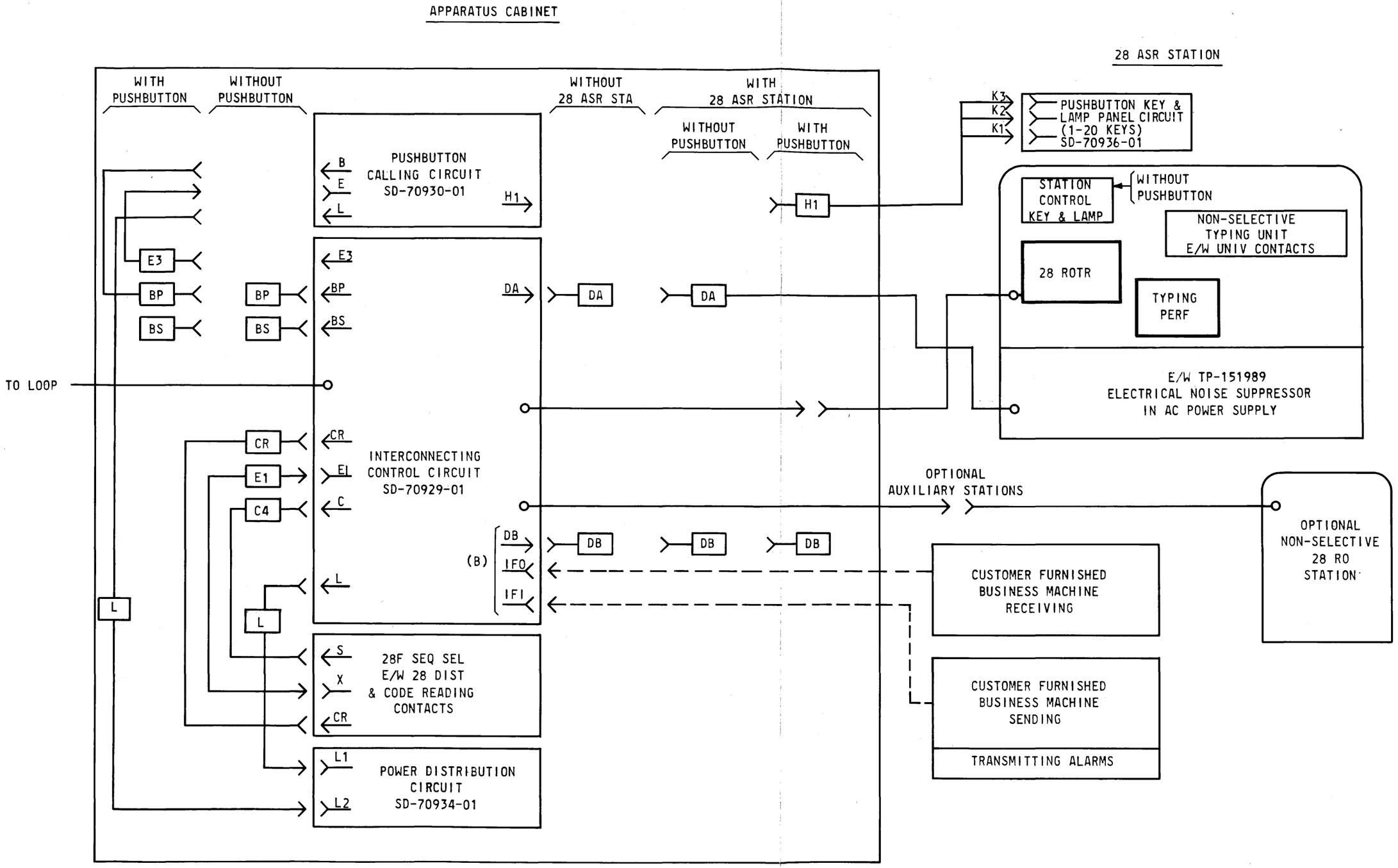


Fig. 3 – Business Machine Noncontrol Station