

PUSHBUTTON CALLING CIRCUIT

FOR THE 83B1 TELETYPEWRITER SELECTIVE CALLING SYSTEM

DESCRIPTION AND OPERATING PRINCIPLES

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1. GENERAL

1.01 This section gives a description and the operating principles of the pushbutton calling circuit designed primarily to be used as an optional circuit unit with the 83B1 teletypewriter selective calling system. Refer to the section covering the description of the 83B1 system.

1.02 The purpose of this circuit is to transmit automatically, by means of pushbuttons, the call directing code or codes (CDCs) which designate the station or stations to receive a message. The lockout code is transmitted automatically; the disconnect code, if not contained in the tape, is also sent automatically by the circuit. Without the pushbutton calling circuit the CDCs and control codes would be punched in the tape at a tape-sending station or sent by the keyboard at a keyboard sending station. The

pushbutton calling circuit is used in those cases where it is not desirable or practical to transmit the codes by these means.

1.03 The pushbutton circuit may be used at either a control station or any outlying station of an 83B1 system.

1.04 In general, an attendant at any station on a system, having prepared a message tape, inserts it in the transmitter distributor gate, pushes the button or buttons for the desired stations, and lowers the tight-tape stoparm or equivalent. On receipt of the station transmitter start code (TSC) this circuit will send the CDCs and the lockout code, after which the tape transmitter will send the message to the desired station or stations.

1.05 At a keyboard sending station the pushbutton circuit will function in a similar manner, sending the CDCs and lockout code when the station gets its turn to send. The operator then sends the text from the keyboard, followed by the disconnect signal.

2. BASIC FEATURES

2.01 The call directing code (CDC) is a two-letter combination always followed by a LTRS character.

2.02 The circuit has a maximum assignment capacity of 40 CDCs, with choice of four first letters. Any one of the four first letters may be associated with any one of the second letters.

2.03 The second letters of the CDCs are associated with the station pushbuttons and lamps in a prearranged manner.

2.04 The CDCs may be for on-line or off-line stations, thus facilitating interline traffic switching.

2.05 CDCs for signal or multiple address, including off-line relay, can be sent.

2.06 The lockout code (end-of-address) is transmitted automatically by the pushbutton circuit following the CDCs and before the

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tape starts or the keyboard of a KSR machine is unblinded.

2.07 If the disconnect code is not punched in the tape or sent from the keyboard following the message:

(a) At a tape sending station with torn-tape operation: following the operation of the 6th pin, there is a 2-second time-out, after which the pushbutton circuit will transmit the disconnect code.

(b) At a tape sending station with continuous tape operation: tape transmission will continue until stopped by the action of the tight-tape stoparm. There is a 2-second time-out, after which the pushbutton circuit will transmit the disconnect code. The operator should raise the stoparm, lowering it only after another message has been completely punched, the tape reset, if necessary, and the proper buttons pushed.

(c) At a keyboard sending station: idle line condition for 10 seconds will allow the transmitter start circuit to time out and to transmit the disconnect code.

2.08 Transmission may be at speeds of 60, 75, or 100 words per minute.

2.09 An associated lamp is lighted when a pushbutton is operated. The lamp remains lit until the lockout code has been transmitted.

2.10 When an on-line CDC is sent the equipment stops and waits until a V answerback is received. If the answer back is not received within 2 seconds, the circuit will automatically repeat the CDC.

2.11 Failure to receive the V answer back on a repeated CDC will cause the pushbutton equipment to time out for 2 seconds and then operate an audible alarm, light the ALP lamp, and flash the associated station lamp. The operator may elect to omit the station that fails to answer back by sending V from the keyboard within 8 seconds, in which case the pushbutton equipment will proceed to send the next code. If nothing is done during the 8-second period, the transmitter start equipment will send FIGS H LTRS V to the line and the pushbutton equipment

will be restored to normal. When an off-line CDC is sent, to be punched in a reperforator tape, an answerback is not required and circuit operation does not stop.

2.12 The required interconnections between the pushbutton calling circuit and the station control and transmitter start circuits at a control station, or between the pushbutton calling circuit and the station control circuit at an outlying station, are on a plug-in cord basis.

2.13 The station pushbutton keys and lamps are mounted in two panels of 20 keys and lamps per panel. They may be installed in any number required, up to a maximum of 40.

3. SUMMARY OF OPERATIONS

A. Automatic Station

3.01 The operator places the message tape in the transmitter distributor gate, leaving the tight-tape stoparm raised, and pushes the pushbutton or pushbuttons corresponding to the station or stations which are to receive the message. As each pushbutton is operated, the corresponding station lamp is lit.

3.02 After all the station pushbuttons have been operated, the tight-tape arm is lowered, lighting the BID lamp.

3.03 If the message has a priority rating, the PR button should be operated.

3.04 When the station TSC is received, the SEND lamp is lit, and the pushbutton circuit starts to send the CDC or CDCs.

3.05 After each on-line CDC, transmission is stopped until the V answerback is received. If the V answerback is not received in 2 seconds, the pushbutton circuit will repeat the code. If answerback is not received on the repeat, the circuit alarms and stops, and the corresponding station lamp flashes. Transmission does not stop when sending off-line CDCs.

3.06 The operator may elect to omit the station failing to answer back by sending V from the temporarily-enabled keyboard within 8 seconds, in which case the pushbutton equipment will proceed to send the next code. (For the station arrangement where an auxiliary 28RO teletypewriter is provided, the line test key in the 15 printer must be thrown to the LINE position to send the V from the keyboard. As soon

as the V is sent, the line test key should be returned to the TEST position.) This V will be printed on the home copy and can be used to identify the station which did not receive the message. If the operator fails to send V from the keyboard within 8 seconds, the transmitter start equipment will send FIGS H LTRS V and resume start patterns, and this automatically restores the pushbutton equipment and all stations on the line to normal. This procedure is applicable to manual keyboard stations as well as to automatic stations.

3.07 When all CDCs have been sent, the pushbutton circuit sends the lockout code which puts out the station lamp or lamps and starts the message transmitter. The disconnect code should be punched in the tape.

3.08 If the disconnect code has not been punched in the tape, it will be sent by the pushbutton circuit 2 seconds after the 6th pin is operated at the end of the message or the tight-tape stoparm is operated. Operation of the 6th pin or the stoparm puts out the BID lamp and operates an audible alarm. When the disconnect code is sent, the audible alarm stops and the AL lamp lights. The AR button should be pushed to put out the AL lamp, otherwise the transmitter would not start, even if tape were in it, on the next TSC.

3.09 If the operator has pushed a station pushbutton in error, or wishes to cancel the call before the pushbutton equipment has seized the line, the cancel (CA) button should be operated. This action restores the circuit to normal, putting out all station lamps that were lit.

3.10 For sending off-line codes to a reperforator, an optional provision is made for sending the reperforator code twice, once before and once after the off-line CDCs. The second reperforator code is needed to obtain the required V answerback just preceding the lockout code. If this feature is provided, the codes should be so assigned that the on-line codes are sent first, followed by the reperforator code, the off-line codes, and the second reperforator code. The button for the reperforator needs to be pushed only once; the second transmission at the proper time is automatic.

B. Manual Keyboard Station

3.11 The operator first pushes the station pushbuttons corresponding to the stations to receive the message. As each pushbutton is operated, including her own station, the associated station lamp is lighted.

3.12 The KS button is now operated, lighting the BID lamp.

3.13 If the message has a priority rating, the PR button is pushed.

3.14 When the TSC for this station is received, an audible signal is operated and the SEND lamp is lighted. The AG key should be operated to the AGD position to silence the alarm.

3.15 The pushbutton circuit transmits the CDCs. If an expected answerback is not received in 2 seconds, the pushbutton circuit will repeat the code. If the answerback is not received on the repeat, the circuit alarms and stops, and the corresponding station lamp flashes.

3.16 If the message is a multiple address message, the operator may elect to follow the procedures discussed in 3.06, which are applicable to both manual keyboard stations and automatic stations.

3.17 After the CDCs have been sent, the pushbutton circuit transmits the lockout code. This removes the short circuit from the keyboard and disables the 2-second time-out circuit. The time-out period is now 10 seconds, controlled by the transmitter start circuit.

3.18 After the message has been sent, the operator can either (1) send the disconnect code from the keyboard, or (2) wait for 10 seconds, after which time the disconnect code will be sent by the transmitter start circuit.

3.19 The disconnect code (1) normalizes the pushbutton circuit, (2) reoperates the audible alarm and lights the ALP lamp.

3.20 The AG key should be operated to the normal position to silence the alarm and the AR button should be pushed to put out the AL lamp.

3.21 Various alarms by means of lamps and audible signals which indicate improper circuit operation are described in 5. of this section.

4. CDC CODING

4.01 The first letters of the CDCs, obtained from relays, can be any one of four letters on a particular circuit. One or two of these, depending on the number of stations on the circuit, would be the first letters of the on-line codes of the circuit and the others can be

used for off-line codes where switching between lines is involved. If the number of stations per line is such that a single first CDC letter per line is adequate, the pushbutton circuit can serve four lines if each line has a unique first CDC letter, or more than four lines if a particular first CDC letter is used for more than one line.

4.02 A flexible strapping arrangement is provided so that any one of the four first letters can be associated with any of the possible 20 second letters each used twice. The total capacity is 40 two-letter CDCs.

4.03 The second letters of the CDCs are obtained from a stepping selector. Two fixed coding patterns are provided, the one used being determined by an optional strapping.

4.04 The first coding pattern consists of two groups of 20 letters each. The letters of the first group are A, C, E, I, L, N, P, R, S, Z, B, F, J, Q, X, G, U, D, K, and W. The letters of the second group are the same letters but in the reverse order, W to A.

4.05 The second optional coding pattern consists of four groups of ten letters each. The first and third groups have the letters in the order A, C, E, I, L, N, P, R, S, and Z. The second and fourth groups have the letters in the reverse order, Z to A. The reverse arrangement was chosen to make more usable the method described in the next paragraph for sending off-line codes to a reperforator.

4.06 Arrangement for Sending the Reperforator Code Twice: For interline switching, in order to insure proper V answerback, on-line codes are sent first, followed by the reperforator code, and the off-line CDCs; then the reperforator code is repeated the second time. Here advantage is taken of the second-letter coding patterns, with the letter series in two groups, first forward and then backwards. By means of strapping together the positions for two identical second letters, the circuit can be arranged so that the second transmission of the reperforator code is made automatically from a single operation of the pushbutton.

(a) As an illustrative example, consider the first coding pattern, consisting of 20 letters with the first group in one order and the second group in the reverse order. Assume that the letters A, C, E, I, L, N, and P are used as the second letters of the on-line codes

for the circuit. The next letter in the pattern, R, might then be assigned as the second letter of the reperforator code. The following letters, S, Z, B, etc, until the next appearance of R in the second (reverse order) group, would then be available for off-line codes. Finally, the remaining letters in the second group following the R, which would be, in this case, P, N, L, I, E, C, A, would not be used.

(b) Thus it may be seen that the letter for the reperforator code can be flexibly located, depending on the relative number of on-line and off-line codes required. This example is limited to the second letters of the CDCs. The first letters would also have to be arranged appropriately.

(c) If the requirements of the system cannot be met within the limitations of the fixed second-letter coding patterns, the alternative is to change the strapping of the stepping selector.

5. LAMPS, KEYS, AND ALARMS

A. General

5.01 This section describes the operation of the keys, lamps, pushbuttons, etc, associated with the operation and the alarm conditions of the circuit.

B. List of Lamp and Button Designations

5.02 Table A summarizes the functions of the lamps and pushbuttons.

TABLE A

EQUIPMENT	FUNCTION
PB Pushbutton (Station)	Selects the desired CDC to be sent.
STA Lamp (Station)	Lights when the associated pushbutton (PB) is operated. Goes out when the lockout code is sent or when the CA button is operated.
CA Button (Cancel)	Cancel all pushbuttons (PB) that have been operated and puts out the associated STA lamps.
ALP Lamp (Alarm)	Lights under circuit alarm conditions.

C. Alarms

5.03 When an on-line CDC is sent the second time and a V answerback is not received within 2 seconds, (1) and ALP lamp lights, (2) the corresponding station lamp flashes, (3) an audible alarm is operated, and (4) the keyboard short circuit is removed. The operator can do either of the following:

- (1) Allow the transmitter start circuit to time out and send FIGS H LTRS V, after which the pushbutton circuit will restore to normal.
- (2) Send V from the keyboard before the end of the time-out period, thus restoring the normal cycle of circuit operation.

6. EQUIPMENT ARRANGEMENTS

A. Pushbutton Calling Unit

6.01 The pushbutton calling circuit unit is mounted in the equipment cabinet along with the other units of the 83B1 system. Pushbutton equipment may be added and connected to existing equipment merely by plugging in the proper cords.

B. Key and Lamp Cabinet

6.02 The key and lamp facilities are housed in a metal cabinet arranged to mount on the side of the 19 set table or the 28KSR cabinet. Two panels are provided, one for the first 20 stations and one for the second 20. Pushbuttons and lamps may be installed in any number required. The common control keys and lamps

for the station will normally be in the same panel with the first 20 pushbuttons.

C. 28-Type Distributor

6.03 If the pushbutton unit is at an outlying station, a 28-type distributor is needed to send the CDCs. This distributor mounts on the base of the sequence selector or teletypewriter. At a control station, the pushbutton circuit makes use of the distributor already provided for the transmitter start circuit.

D. Power Supply

6.04 The pushbutton circuit requires a 48-volt rectifier, which must be added at an outlying station. At a control station, it shares the 48-volt rectifier with the transmitter start circuit.

6.05 The required 120-volt rectifier is associated with the station control circuit at all stations.

7. REFERENCES

A. Schematic Drawings

- SD-70832-01 Station Control Circuit
- SD-70835-01 Pushbutton Calling Circuit

B. Specification

- J70125
- AA286.040 } —83B1 Selective Calling System—HDX