TELETYPEWRITER AUTOMATIC DISPATCH SYSTEM

TADS STATION SELECTOR

For Private Line Teletypewriter
Service Using 60-75 WPM
On Half-Duplex Lines

(Drawing P92.901.03)

CONTENTS PAGE

1. DESCRIPTION

1.01 This section is issued to provide information on the TADS Station Selector P92.901.03, a part of the Mark III TAD System.

1.02 Part of the information in this section was formerly covered in an Appendix No. 1 to Bell System Practice P65.907. This appendix is now discontinued.

SELECTOR REPLACES PREVIOUS MODELS

1.03 The P92.901.03 selector equipment replaces the selective signalling arrangements per P92.901.01 and P92.901.02, described in Bell System Practice P65.907, and which are now rated "Manufacture Discontinued." However, it will work with either of these units. It is housed in a metal cabinet 16 inches long, 12-1/2 inches high and 5 inches deep, finished in the same color as the machine and mounted on the right hand side of the teletypewriter table.

STATION SELECTOR PERMITS AUTOMATIC OPERATION USING TELETYPE CHARACTERS

1.04 This station selector is installed at all stations on a Mark III TAD System described in Bell System Practice P65.906. The Controller used with this selector at the master station is described in Bell System Practice P65.909.

1.05 The selector operates with a typebar teletypewriter to provide selective signalling on a private line multistation teletypewriter circuit operating at 60 or 75 words per minute on single (half-duplex) lines.

1.06 Teletypewriter characters are used to start transmitters, select stations and control operational functions.

CODES AND TERMS

END-OF-ADDRESS CODE - CR (Carriage Return) - Disconnects Unselected Stations.

END-OF-MESSAGE CODE - FIGS H (or character assigned) - Disconnects stations at the end of a message.

CDC - Call Directing Character - The station code in lower case - Used to select stations.

TSC - Transmitter Start Code - The station code in upper case - Used to start transmitters.

MANUAL OPERATION OR KEYBOARD SENDING MAY BE USED WITH THIS SELECTOR

1.07 This selector may be used without a controller to provide manual operation.

1.08 Keyboard sending may be used on the circuit under certain conditions.

2. LIMITATIONS

HAND SENDING CONSIDERATIONS DISCUSSED

2.01 Keyboard sending cannot be used on a circuit using both the P92.901.03 and P92.901.04 station selectors. The fast timing circuits of the P92.901.04 selector operate too rapidly for hand sending.

2.02 However, combinations of P92.901.01 or P92.901.02 in combination with P92.901.03 will permit hand sending.

ASSIGNMENT OF STATION CALLS REQUIRES CAREFUL CONSIDERATION

2.03 The letters M, T, O, V, H and S are not suitable for assignment as station calls. Upper case H (FIGS H) is normally used as the End-Of-Message Code and turns off the teletype. Lower case S is normally used as a Broadcast or Group call.

2.04 If Type Arrangement D (Weather Map) is used on the circuit, FIGS S is assigned as the End-Of-Message Code and the character H is assigned as the Broadcast or Group code.

ONLY SINGLE DIGIT SELECTION OF STATIONS POSSIBLE WITH THE P92.901.03 SELECTOR

2.05 Only single digit station selection can be used with this selector. A station is assigned a single letter as a station code, and another letter as a Broadcast or Group code. The station transmitter is started upon receipt of this code in upper case, and a station is selected for receiving messages upon receipt of its code in lower case.

2.06 All stations are activated upon receipt of a timed open-close sent to the line by the Controller, and unselected station are turned off upon receipt of CR (Carriage Return) LF (Line Feed). A momentary open on the line will cause unwanted stations to be selected in error.

2.07 Upon receipt of an End-Of-Message Code (FIGS H), all selected stations are disconnected.

MORE STATION CODES AVAILABLE WITH FUNCTION PLATE CONTACT ASSEMBLY

2.08 On a teletype equipped with a Function Lever Contact Assembly, a station can be selected by its station code and a Broadcast (Group) code. The letter S is normally assigned as the Broadcast code.

CONTACT ASSIGNMENTS - FUNCTION LEVER ASSEMBLY

Contacts	Function
Position 5	CDC and TSC
Position 6	Broadcast
Position 13	End-Of-Message Code (FIGS H)
S	Cross-Office or TRP Control
CR	End-Of-Address (Deactivate)

2.09 The limitations on the number of code available for assignment for selecting purposes will be alleviated in the near future with the introduction of a new Function Plate and Contact Assembly P92.905.01 described in Bell System Practices P65.917.

CONTACT ASSIGNMENTS - FUNCTION PLATE ASSEMBLY

Position		Function
21		Spare
22		CDC (LC)
23		TSC (UC)
24		Broadcast (LC)
25		2X0 or TRP Control (LC)
26		Group Code (LC)
27	CR	End-Of-Address (Deactivate) (UC & LC)
28		End-Of-Message (FIGS H) (UC)

Note - UC - Upper Case
LC - Lower Case

Note: In the event a customer requires special arrangements such as tabulator operation, the advice of plant or engineering groups should be obtained before making contact assignments to ensure proper operation of the circuit.

2.10 The P92.901.03 selector is not compatible with priority, circuit assurance or two-digit station selection. These features are available only in the P92.901.04 Selector.

TADS SWITCHING REQUIRES SPECIAL MESSAGE FORMAT

2.11 A special message format must be used on the circuit. Failure to follow the specified format will allow unwanted stations to intercept messages, and other stations fail to receive messages intended for them.

PRINTING SUPPRESSOR NOW AVAILABLE TO PREVENT PILE-UP OF SEARCH CODES

2.12 Station codes in upper case will be printed during search sequences and will sometimes overline. Transmitter Start Codes may be suppressed by installing the TADS Selecting Code Printing Suppressor P92.904.01 described in Bell System Practice P65.918.

OPERATION OF SELECTOR IN CONNECTION WITH CONCENTRATOR AT RELAY CENTER FEASIBLE

2.13 The P92.901.03 selector can be used on circuits associated with a semi-automatic concentrator at a torn-tape relay center.

FUNCTION PLATE AND CONTACT ASSEMBLY BASE WIRING SAME FOR TWO SELECTORS

2.14 If a teletype is equipped with the Function Plate and Contact Assembly P92.905.01, the base wiring is applicable to either the P92.901.03 or P92.901.04 selector. Typing units may be swapped out at will.

3. OPERATION

METHODS OF MOTOR CONTROL USED

3.01 Two methods of motor control are used in the P92.901.03 selector:

Type A - The motor shuts OFF and the machine is disconnected from the line following each End-Of-Transmission Code. The motor turns ON and the machine

is re-connected to the line when the Controller sends an open-close signal prior to starting the search sequence.

Type B - The machines are disconnected from the line following each End-Of-Transmission Code and are re-connected in response to the open-close signal from the Controller. The motors shut OFF following an idle circuit condition of 15 to 60 seconds. The motors then re-start in response to the open-close signal from the Controller.

STATIONS SEND WHEN THEY RECEIVE THEIR TRANSMITTER START CODES FROM CONTROLLER

3.02 Following an idle line condition, the Controller starts to automatically poll each station on the circuit for traffic. It first sends FIGS, - shifting all teletypewriters to the upper case position. Then it sends each station's TSC (Transmitter Start Code) in a sequence desired by the customer.

3.03 Upon receipt of the TSC at a 19 type station having tape in the transmitter, the transmitter will start and the message will be sent.

3.04 If there is no tape in the transmitter, the Controller will pause for approximately 2 seconds and then send the next TSC.

3.05 When polling a 15 type S & R station, a buzzer will sound if the attendant has operated the SEND key on the station selector to indicate that a message is waiting to be sent. The Controller will wait for 15 seconds for the attendant to start sending, and then will wait another 15 seconds following transmission, before resuming the search sequence.

3.06 If there is no traffic at the 15 type station - the Controller will wait for 15 seconds, regardless, before resuming the search.

STATIONS ARE SELECTED BY THEIR CODES SENT IN LOWER CASE

3.07 Stations are selected by CDCs (Call Directing Characters) perforated in the tape or transmitted by keyboard. They are the station codes in lower case.

3.08 The transmission of LTRS characters preceding a group of address codes conditions the teletypewriters to receive their CDCs. It is important that LTRS characters precede and follow each CDC and also precede the text material in the message. This is covered more fully in the information on message formats.

3.09 The End-Of-Address Code (CR) is sent following the CDCs to disconnect the unselected stations and the LF character advances the line feed of the selected stations. The End-Of-Message Code sent at the end of the message disconnects the selected stations and operates the motor shut-off arrangement according to the type of motor control that is provided. (See Par. 3.01)

3.10 While there is transmission on the circuit, the BUSY lamp will flicker. When the circuit is idle the BUSY lamp is OFF.

3.11 A buzzer will sound when the station receives a call. Momentary operation of the CONTROL key to the BZ RLS position will silence the buzzer. Operation of the buzzer may be prevented by operating the BZ CO key.

3.12 During an idle line condition, an emergency message may be sent by placing a perforated tape in the transmitter, operating the CONTROL key to the ON position until the BUSY lamp is lighted and then to the ST position to start the transmitter.

3.13 A MONITOR key may be provided at any station to receive all messages being sent on the circuit.

CORRECT MESSAGE FORMATS IMPORTANT FOR PROPER OPERATION OF TADS EQUIPMENT

3.14 Use of correct message formats is not only important for smooth traffic operation, but also to ensure that the equipment will function correctly. The automatic features of TADS are dependent upon having tapes made up in a specified manner. In fact, TADS Intercept Equipment is arranged so that tapes will be intercepted if there are errors in the address format.

3.15 A minimum of 10 LTRS characters should precede and follow each message. This is to ensure that a FIGS H or an assigned End-Of-Message Code will be transmitted. Failure to include LTRS characters as shown in the formats could result in messages being intercepted. If FIGS H or the assigned End-Of-Message Code is omitted, a transmitter would fail to stop on continuous tape transmission, resulting in lost messages. At typing reperforator locations, tape will not be fed out if FIGS H is not received.

SAMPLE MESSAGE FORMATS

Note: 10 LTRS means LTRS, LTRS, LTRS repeated ten times.

3.16 Station A to Station B on the same line.

10 LTRS A LTRS B LTRS CR LF LTRS TEXT FIGS H 10 LTRS.

A selects own station. B selects Station B. CR disconnects unselected stations. LF advances line feed of Stations A & B. FIGS H disconnects Stations A & B.

3.17 Station A to a group of stations as B, D, F - all on the same line.

10 LTRS A LTRS B LTRS D LTRS F LTRS CR LF LTRS TEXT FIGS H 10 LTRS

A selects own station. B, D, F selects Stations B, D, & F. CR disconnects unselected stations. LF advances line feed of Stations A, B, D & F. FIGS H disconnects Station A, B, D & F.

3.18 Broadcast from Station A to all stations - S assigned as broadcast code.

10 LTRS A LTRS S LTRS CR LF LTRS TEXT FIGS H 10 LTRS

A selects own station. S selects all stations on the line. CR (all stations were selected - none to disconnect). LF advances line feed of all stations. FIGS H disconnects all stations.

3.19 Station B on Circuit No. 1 to Station C on Circuit No. 2 with automatic two-line cross-office switching - R assigned as the cross-office code.

10 LTRS B LTRS R LTRS C LTRS CR LF LTRS TEXT FIGS H 10 LTRS

B selects own station. R selects cross-office. (R code also disconnects all unselected station on Circuit No. 1). C selects Station C on Circuit No. 2. CR disconnects all unselected stations when the tape is re-transmitted on Circuit No. 2. LF advances the line feed of Station B on Circuit No. 1, and when the tape is re-transmitted to Circuit No. 2, it advances the line feed of Station C. FIGS H disconnects Station B on Circuit No. 1 and cross-office, and when the tape is re-transmitted on Circuit No. 2 it stops the cross-office transmitter and disconnects Station C.

3.20 Station C on Circuit No. 1 to a typing reperforator at Station A for manual relay to Station F on Circuit No. 2 - R assigned as the selection code for the typing reperforator.

10 LTRS C LTRS A LTRS R LTRS F LTRS CR LF LTRS TEXT FIGS H 10 LTRS

C selects own station. A selects control teletypewriter for typing reperforator. R code selects typing reperforator. (R code also disconnects all unselected stations on Circuit No. 1) F selects Station F when the tape is re-transmitted on Circuit No. 2. CR disconnects all unselected stations when the tape is sent on Circuit No. 2. FIGS H stops the transmitter of the sending station on Circuit No. 2 and disconnects Station F.

Note: The above format is for the typing reperforator control unit P92.902.01 which is the Standard for the TADS Mark III System.

3.21 If pushbutton calling is provided at the relay point, the codes for stations on Circuit No. 2 can be omitted. These can be supplied by the TADS Pushbutton Code Generator providing that addresses are included to permit the relay attendant to identify the stations to which the messages should go.

4. CONNECTING CIRCUITS

4.01 Automatic Transmitter Start Unit (Controller) P92.911.01 installed at the master station - now rated M.D.

4.02 Automatic Transmitter Start Unit (Controller) P92.911.02 installed at the master station - rating Standard.

4.03 Push Button Code Generator P92.903.31 - rating Standard.

4.04 No. 14 Typing Reperforator Control Unit P92.902.01 - rating Standard.

5. ROUTINE TESTS AND ADJUSTMENTS

5.01 Relay adjustments are in accordance with the mechanical and electrical requirements tables in B.S.P. Section P92.901.03. Other references are as follows:

For 280 type relays - B.S.P. B460.059

For U type relays - B.S.P. B461.011

For Y type relays - B.S.P. B461.010

5.02 No routine test schedule for the selector as a whole has been established.

5.03 The teletypewriter is routined according to the regular P practices that apply.

5.04 Tool and test equipment recommended for maintenance are:

35F Test Set.

Volt-Ohm meter KS-14510 L-1, or equivalent.

J94724A Contact Closure Test Set.

6. INSTALLATION

6.01 The teletypewriter used in this service is to be installed in accordance with the other sections of the P practices as indicated in Part 4, and in B.S.P. Section P92.901.03. All materials needed are listed in each P92 Section.

6.02 On the initial installation and in subsequent tests, the requirements of B.S.P. P30.002, Orientation Test and Distortion Tolerances, must be met.

6.03 Adjust rectifier to 120 volts+ or - 5 volts.

6.04 Use special care to avoid:

A. Reversing the rectifier, or varistors will be damaged.

B. Using a Head Test set for testing, as low resistance in head set can damage varistors.

C. Overheating the wiring to varistors or the terminals of the micro-switches. Either can be damaged with a soldering iron, - use long nose pliers to disipate heat.

6.05 Check the following items which have been a source of trouble:

A. Tightness of clamping screws in contact assemblies in typing unit.

B. Sixth pin operation. The pin should operate when tape lid is closed slowly with tape in transmitter.

C. Preliminary make of contacts 5 & 6T and 5 & 6B, of the CA and S relays. Both should close with over-travel when armature is operated against buffer springs.

7. LOCAL TEST PREPARATION

7.01 The machine must not be removed from the circuit until the toll testboard and the master station are notified. This is necessary to allow the master station to take steps to prevent the loss of messages. The master station may send a broadcast call advising all stations. When a station is returned to a circuit, the master station must again be notified.

7.02 The machine should have line current supplied from the telegraph office over the regular line facility. This line current shall be supplied for the duration of the test.

8. TEST PROCEDURE, INSTALLATION OR TROUBLE

8.01 Perform Part 7 before starting test.

8.02 All relays released, BUSY lamp ON.

8.03 Operate the M & D relays.	M & D relay remain operated Motor turns OFF

8.04 Open line circuit manually.	M & M1 relay releases
8.05 Close line circuit manually.	D relay releases BUSY lamp ON Motor ON, PNUF
8.06 Shift platen to letters position	
8.07 Close CDC contacts manually.	CA relay half steps BZ relay operates Buzzer operates.
8.08 Release CDC contacts	CA relay full steps.
8.09 Send CR from Keyboard	No action takes place
8.10 Send FIGS H from Keyboard	H relay operates VT tube fires D relay operates BUSY lamp out Motor OFF M & M1 relays operate H & CA relays release BZ relay releases Buzzer releases
8.11 Release M & D relays manually	M1 relay releases BUSY lamp ON.
8.12 Send CR from Keyboard	M relay operates M1 relay operates VT tube fires D relay operates BUSY lamp out.
8.13 Prepare a Test Tape	10 LTRS, A, LTRS, B, LTRS, C. LTRS CR, LF, LTRS Text, FIGS H 10 LTRS Station code not included
8.14 Install tape in TD	No action
8.15 Operate CONTROL Key up (ON)	Line open CA relay full step M & M1 relays release BUSY lamp ON

8.16 Operate CONTROL Key to normal	Line close D relay releases
8.17 Operate CONTROL Key down (start)	S relay 1/2 step S relay full step CA relay releases TD starts sends tape FIGS H received H relay operates S relay releases TD stops VT tube fires D relay operates BUSY lamp OFF Motor OFF M & M1 relays operate.
8.18 Repeat 8.03, 8.04, 8.05 & 8.06	Same action takes place.
8.19 Send own CDC	CA relay 1/2 step BZ relay operates CA relay full step Buzzer operates
8.20 Operate CONTROL Key to ST position	BZ relay releases Buzzer releases
8.21 Send FIGS H from Keyboard	H relay operates VT tube fires D relay operates BUSY lamp OFF Motor OFF M & M1 relays operate H relay releases
8.22 Test 15 S & R operate SEND Key to "send" position	No action
8.23 Have test board open & close loop and then send TSC for this station	M, M1, D relays release BUSY lamp ON TSC Received S relay 1/2 step BZ operates Buzzer operates
8.24 Operate the SEND Key to the pos. Momentarily operate CONTROL Key to ST pos.	S relay full step BZ relay releases Buzzer releases

8.25	Send LTRS and own TSC from Keyboard	Observe CA relay does not operate or the Buzzer sound
8.26	Send CR from Keyboard	No relay operation
8.27	Repeat par. 8.20	Same action

8.28 Upon completing test - make equipment regular and notify the Toll Testboard and the Master Station.

9. CIRCUIT DESCRIPTION

9.01 The circuit description of this equipment is covered by sequence charts in P92.901.03.