

SPECIAL STUDIES SET NO. 1A

CONNECTION AND OPERATION

1. GENERAL

1.01 This section describes the procedure for connecting and operating the Special Studies Set No. 1A.

1.02 This set is arranged for service observing on 2- or 4-wire subscriber lines with either loop or E&M signaling in all electro-mechanical offices. It may also be used in No. 1 ESS offices if an equivalent sleeve lead (pseudo sleeve) is provided.

2. DESCRIPTION

2.01 The portable Special studies Set No. 1A consists of two units: the Call Data Recorder (CDR) circuit and a Signal Converter (SIG CONV) circuit, interconnected by cables and a power cord (Fig. 1). These units when connected to a single subscriber line provide a printed record of call information. The number called and the date and time of call origination are recorded on impact sensitive tape.

2.02 The CDR contains the tape printer, digital clock, electronic scanner and control circuitry, and TOUCH-TONE® amplifiers.

2.03 The SIG CONV contains the signal translating circuit, the information register and printer control circuit, and the power supply for both units.

2.04 The interconnecting cables and a power cord are furnished with the set. Two general purpose patch cords, 3W6A, are furnished for making connections to a single line (Fig. 2). An optional patching cord, 3P3A, is available for use in No. 5 Crossbar offices when the offices are equipped with the No. 7A Service Observing Set patching panel.

2.05 The units require power from the -48 volt office supply. Connection to the 117-volt 60-Hz commercial supply is required to operate the synchronous motor of the digital clock.

2.06 The digital clock contains three visual readouts which indicate the day, hour, and minute. Electrical readout is accomplished through cam actuated contacts associated with the mechanism for each time increment. The clock is set manually by operating a push-button for each time increment.

2.07 Keys, switches, lamp locations, and associated functions are listed in Table A.

3. PREPARATION

3.01 Make the following connections to and between the units of the set before operating the Special Studies Set No. 1A (Fig. 1).

Note: Operate PWR (power) switch on the SIG CONV circuit to OFF and operate the PWR switch on digital clock to OFF before making any connections.

(1) Using the P3BB cord, connect PA1 connector on SIG CONV to PA2 connector on CDR.

(2) Connect PTR (printer) cable from SIG CONV to PTR connector on CDR.

(3) Connect INF (information) cable from SIG CONV to the INF connector on CDR.

(4) Connect SCN (scan) cable from CDR to SCN connector on SIG CONV.

(5) Connect MP1 cord to MP plug on SIG CONV. The other end of the MP1 cord is equipped with two rubber insulated clips. Connect clips to -48 volt office supply. The red rubber insulated clip is connected to a -48 volt terminal, and the black rubber insulated clip is connected to ground.

Note: Make sure these clips are properly connected.

(6) Connect ac power cord from CDR to 117-volt 60-Hz commercial supply.

SECTION 252-232-301

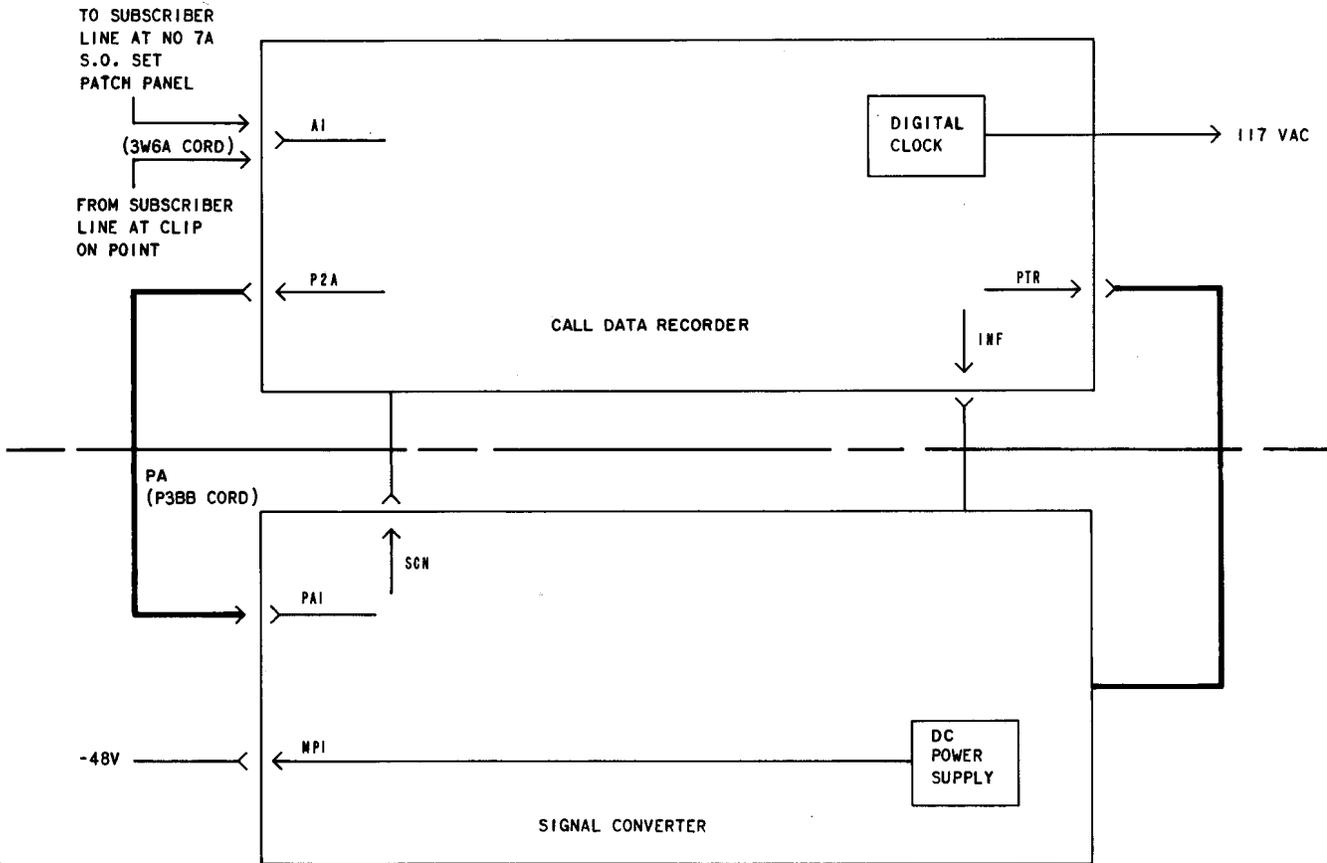


Fig. 1—Connections For Special Studies Set No. 1A

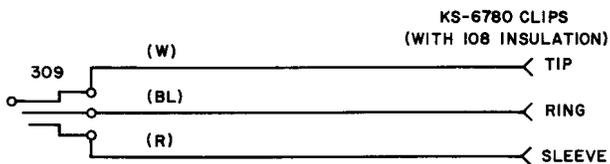


Fig. 2—3W6A Patch Cord

3.02 Set digital clock in the following sequential order.

- (1) Operate clock switch to ON.
- (2) Operate clock switch to OFF immediately following a minute increment advance.
- (3) Set clock 1 or 2 minutes ahead of present time by operating the proper manual pushbuttons, beginning with the minute increment.

(4) When the present time corresponds exactly with the digital clock setting, turn clock switch to ON.

3.03 Set LDT (last-digit-timer) adjustment and check printout as follows.

- (1) Operate PWR switch on SIG CONV to ON; PB lamp lights if the MP1 cord is properly connected. The printing of any symbols upon application of power is normal and should be disregarded.
- (2) Operate DIR (direction) and SIG (signal) switches to ORIG (originating) and LOOP, respectively, and operate PGC (panel ground cut-off) key to NORMAL.
- (3) Set LDT potentiometer maximum clockwise.
- (4) Check setting of the LDT by the following method.

TABLE A
KEYS, SWITCHES, AND LAMP LOCATIONS AND FUNCTIONS

UNIT	KEY OR SWITCH	LAMP	FUNCTION
Call Data Recorder	DIR		Chooses between originating and terminating calls.
	SIG		Selects office signaling (loop or E&M).
	PGC		Indicates connection to a panel ground cut-off office.
	TST		Verifies proper operation of cut-through, last digit time-out, and data recording.
		CT	Indicates cut-through of line to call data recorder.
	Clock Unit, Power Switch		Controls power to clock motor.
Signal Converter	PWR		Applies power to circuit.
	DS		10 PPS Position — Used when all dials on line are 10 pps. 20 PPS Position — Used only when 20-pps dialing may be received.
		PB	Indicates power on in signal converter.

(a) Operate and release TST (test) key. The CT (cut-through) lamp lights, and after approximately 30 seconds a sequential printout occurs as shown in the example of Fig. 3. (The symbols printed on the tape are listed in Table B.)

(b) Note the time interval between the lighting of the CT lamp and the beginning of the printout.

(c) Verify that the CT lamp extinguishes at the termination of the printout. The printout should indicate an off-hook condition (unit not connected to a subscriber line), and the time recorded in the printout should agree with the digital clock reading at the time of the printout.

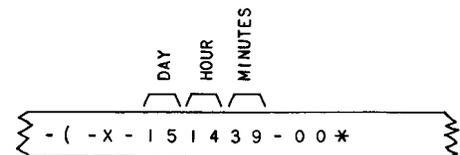


Fig. 3—Example of Printout Following TST Key Operation

(d) If a shorter last-digit-timing interval is desired, rotate the LDT adjustment counterclockwise and repeat (a), (b), and (c).

4. Connection to line.

4.01 Connect The Special Studies Set No. 1A to the line to be monitored in the following manner.

TABLE B
PRINTER SYMBOLS

SEQUENCE OF PRINTOUT	SYMBOL PRINTED	SIGNIFICANCE
See Note 1	@	Subscriber disconnect
1	-	Separation mark
2	(Off-hook or line seized
)	On-hook or line released
3	-	Separation mark
4	X	Originating call
	Y	Terminating call
5	-	Separation mark
6	0 thru 3	Day — tens
7	0 thru 9	Day — units
8	0 thru 2	Hour — tens
9	0 thru 9	Hour — units
10	0 thru 5	Minute — tens
11	0 thru 9	Minute — units
12	-	Separation mark
13	0	Reserved
14	0	Reserved
15	*	End of scan and cut-through release
See Note 2	•	Interrupt scan

Note 1: Subscriber disconnect prior to time-out of LDT.

Note 2: Anytime during scan.

- (a) For 2-wire loop signaling offices, connect one of the 3W6A patch cords (Fig. 2) to the A1 jack. Connect the tip, ring, and sleeve clips to the T, R, and S leads of the line at the distributing frame or at any other convenient clip-on points.
- (b) For 4-wire loop signaling offices, connect the tip, ring, and sleeve clips to the T1, R1 (office receive pair), and S leads of 4-wire lines.
- (c) For 4-wire E&M signaling offices, both 3W6A patch cords are required. Plug one cord into the A1 jack of CDR and connect the tip, ring, and sleeve clips to the T1, R1, and M leads of the line. Plug the other cord into the B1 jack and connect only the sleeve clip to the E lead of the line.
- (d) An optional cord, 3P3A, is available for use in 4-wire No. 5 Crossbar offices equipped with a No. 7A Service Observing Set patching panel. For monitoring 4-wire loop signaling lines, plug the patching cord into A1 jack of CDR and into A jack of the No. 7A Service Observing Set patching panel.
- (e) If more convenient, existing service observing patching cords available in offices may be used with the Special Studies Set No. 1A. Jack pairs A0-B0 will accept 347-type plugs and A2-B2 will accept 310-type profile plugs. The following examples indicate available patching cords that can be used with the Special Studies Set No. 1A.
- (1) In panel and No. 1 Cross bar offices, the existing 4P9A patch cord (19 feet 6 inches shoe-ended) at the VIDF can plug into jacks A0-B0.
 - (2) In 2-wire No. 1 and No. 5 Crossbar offices, the existing 4P16A and 3P34A patch cords, respectively, (7 feet, shoe-ended) used at the line link frame and the existing 4P18C or D patch cord at the service observing patch panel can plug into the A0-B0 jacks.
 - (3) In 4-wire No. 5 Crossbar offices, the existing 5P6A patch cord (7 feet shoe-ended) at the line link frame can plug into the A2-B2 jacks.

Note: In all cases where the patch cord terminates in a double plug at the Special Studies Set No. 1A end, the knurled side of the plug should be nearest to the A-jack.

5. OPERATION

5.01 When the Special Studies Set No.1A is connected to accept originating calls, it operates in the following manner.

- (1) Upon initiation of the originating call, the CT lamp lights indicating cut-through and the last-digit-timing interval begins.
- (2) The tape printer prints the called number as pulsing is received by resetting the last-digit-timer as each digit is recorded. The lower case letters *a* through *f* are printed to represent the additional codes on 12-and 16-button TOUCH-TONE sets. The assignment of these letters is shown in Fig. 4.
- (3) Upon expiration of the last-digit-timing interval (following whatever digits were pulsed), a programmed sequence of 15 symbols representing call data is printed as shown in the example of Fig. 5 and listed in Table B. No further recording of information on this call will occur following the end-of-scan symbol.

Note: If the subscriber should disconnect during the last-digit-timing interval, a subscriber disconnect symbol is first to be printed, followed by an immediate printout of the 15 call data symbols, and the end-of-scan symbol.

- (4) If a new call (subsequent attempt) is initiated during the 1.5-second time period required to print call data, a partial printout occurs as indicated by the printing of the interrupt scan symbol (Table B) at the time of interruption. The subsequent attempt is treated as a new call origination.

5.02 When the Special Studies Set No. 1A is connected to accept terminating calls, it operates in the following manner.

- (1) Upon seizure of the line on a terminating call, the CT lamp lights indicating cut-through and the last-digit-timing interval begins.

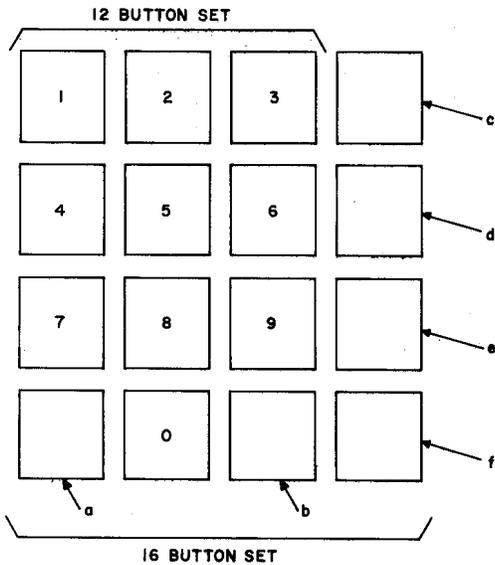


Fig. 4—Printed Characters For 12 and 16 Button TOUCH TONE Sets

(2) Upon expiration of the timing interval, a programmed sequence of 15 symbols, representing call data is printed as shown in the example of Fig. 6 and Table B. No further recording of information on this call will occur following the end-of-scan symbol.

Note: Release of the line by the office prior to expiration of the last-digit-timing interval results in the printing of a subscriber disconnect symbol, followed by an immediate printout of the call data symbols.

5.03 Use the following procedure to prepare the Special Studies Set No. 1A for operation.

(1) Operate DIR (direction) switch to either ORIG (originating) or TERM (terminating), depending upon the type of calls being monitored.

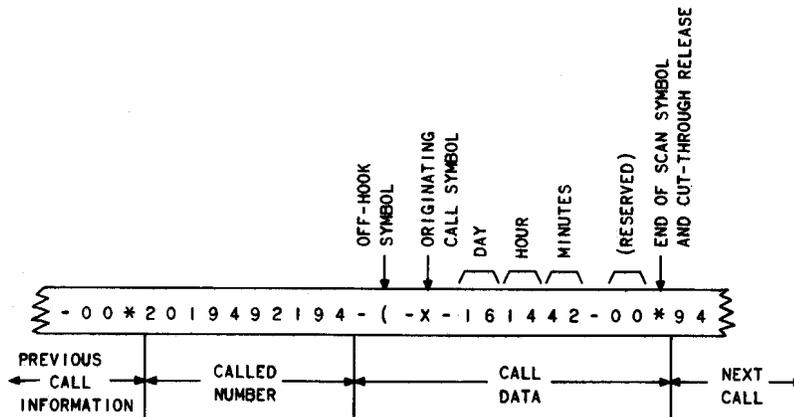


Fig. 5—Format of Call Information Recorded on Paper Tape Printer For Typical Originating Call

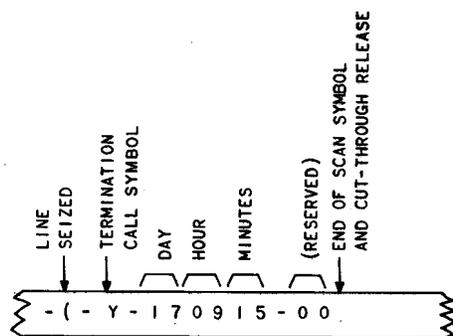


Fig. 6—Format of Call Information Recorded on Paper Tape For Typical Terminating Call

(2) Operate SIG (signal) switch to either Loop or E&M, depending upon the type of signaling.

(3) Operate PGC (panel ground cut-off) key to PGC, only if monitoring in a panel ground cut-off office.

(4) Operate DS (dial speed) key to 10 PPS. If any of the 20 PPS dials are being used on-line, operate DS key to 20 PPS.

Note: The Special Studies Set No. 1A is now ready to record call information from the line to be monitored.