NO. 12 SERVICE OBSERVING DESK
CORD SERVICE OBSERVING CIRCUITS

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1. GENERAL

1.01 This section covers general descriptive information on the cord service observing circuit and how it is used with the No. 12 service observing desk (covered in Section 961.501.01).

1.02 This section is issued to facilitate the use of material originally contained in Section 961.501.01, Issue 2 and Addendum 1, which is now divided into subsections. (See Section 961.501.01.)

1.03 An important feature of the No. 12 service observing desk is the ability to observe a toll call to completion. Signals encountered and the number keyed or dialed by the operator are displayed at the service observing desk. The cord service observing circuits are connected to the front and rear cords of outward, inward, and through positions. An observer may monitor on both ends of a cord, even when the cord-splitting key is operated.

1.04 Calls handled on a ringdown, dial pulsing, or keypulsing basis may be observed. However, dialing and keypulsing performance may be observed only on the front cords. Generally, observations will not be taken on TX traffic, since the observer has no record of the called number against which to check the accuracy and performance.

2. CORD SERVICE OBSERVING CIRCUITS

2.01 Multiline call-distributing service observing circuits have been developed for observing on toll cords in No. 1, No. 3-type, and DSA switchboards. These cords may be arranged for dialing or keypulsing. Different service observing circuits must be used for the various combinations of switchboards and cords.

2.02 The circuits which have been developed are as follows.

SWITCHBOARD	TYPE OF CORD
No. 1 Toll	Keypulsing, Bridge Supervision
No. 1 Toll	Dial Pulsing, Birdge Supervision
No. 1 Toll	MF Keypulsing, Sleeve Supervision
No. 3-Type Toll	Dial Pulsing
No. 3-Type Toll	Keypulsing
DSA (13C, 13D, 15C, 15D)	Keypulsing
DSA (13C, 13D, 14C, 14D, 15C 15D)	Dial Pulsing

2.03 A block diagram of cord service observing is shown in Fig. 1.

A. Equipment Elements

2.04 The cord service observing trunk circuit provides a maximum of 50 loop connectors. Each loop connector can be connected to a maximum of seven switchboard positions.

2.05 Connection is made to the cord circuit by bringing cord and position leads to relay connectors located in the rear of each switchboard position. Any cord to a maximum of four cords in a given position can be arranged for observing by being cabled to any one connector relay. The connector relays are remotely controlled by manually operated rotary switches that select cord and position. (See Fig. 3.) One cord selector switch is required for each service observing circuit, and one position selector switch for each loop connector. The selector switches and associated control equipment are mounted in a floor- or wall-supported cabinet located in the service observing desk when the observed office and the service observing desk are in the same wire center. (See Fig. 2A and 2C.) When the observed offices are in distant buildings, these control features are relay rack mounted in the switchrooms of the observed offices and enclosed in a sender casing unit. (See Fig. 2B.) The cabinets and casings are supplied with locks.

2.06 An isolation circuit is provided to minimize the capacity effect on tip and ring of the observed cord. This circuit is mounted in the end position of the switchboard line-up.

2.07 Position and cord observing assignments can be changed by the selector switches under control of the service observer. As long as an in-service condition is returned to the observing equipment, connections are held to the selected positions and cords, and resetting of the selector switches is ineffective. When the cord observing out-of-service (OS) key at the service observing desk is operated, the cord and position relays holding the existing connection are released. When the out-of-service key is restored to normal, restoring the cord observing trunk to service, connections to positions and cords are established according to the settings of the selector switches. It is possible by this method to preset new assignments at a convenient time, and place them into effect when desired.

2.08 Each service observing trunk is supplied with OS lamps located on each mounting plate of selector switches. The lamps are under control of the cabinet or casing door. When the door is opened, the OS lamps light to indicate the trunk or trunks out of service.

2.09 In some installations, connection is made to the cord circuit and the dial or keyset by the following means.

(a) Patching at the rear of the position from a multicontact socket appearance of the desired cord leads to a multicontact socket appearance of the service observing loop, or

(b) Clamping to the cord fasteners, a shoe (a No. 615A tool) associated with a cord, the other end of which is plugged into a multicontact socket appearance of the service observing loop.

Method (a) is used for No. 1 and DSA switchboards and No. 3-type switchboards with external fusing. Method (b) is used with No. 3C and 3CL switchboards and No. 3-type switchboards with internal fusing.

2.10 As noted in 2.02, two service observing circuits have been developed for the No. 3-type switchboards, one for observing on dial

pulsing cords, and one for observing on keypulsing cords. Each loop connector of either circuit can be multiplied only to the same kind of switchboard. A separate loop connector is required for each of the following kinds of No. 3-type switchboards.

(a) No. 3 switchboard with external fusing, equipped with keypulsing.

(b) No. 3 switchboard with internal fusing, and No. 3C and 3CL switchboards equipped with keypulsing.

(c) No. 3 switchboard with external fusing, equipped with dial.

(d) No. 3 switchboard with internal fusing, equipped with dial.

(e) No. 3C, 3CF, and 3CL switchboards, equipped with dial.

The same dialing service observing circuit can be used for observing on all No. 3-type switchboards arranged for dialing, and the same keypulsing service observing circuit can be used for observing on all No. 3-type switchboards arranged for keypulsing.

2.11 The loop connectors are located on the equipment bay with the observing trunk.

2.12 Two voice-frequency amplifiers are provided in the trunk circuit when the trunk conductor loss between the service observing desk and the observed office is between 3.0 and 13.5 db at 1000 cycles, or when ever an isolation circuit is provided. These are adjustable plug-in amplifiers located circuitwise in the tranmission paths of the service observing trunk.

2.13 A high-impedance monitoring connection is provided in the service observing circuit. This is done so that the service observing connection has no noticeable effect on the volume or quality of transmission of the commercial connection, or on the operating signals of the commercial toll circuit.

2.14 A loop-reduction feature may be provided on an optional basis as discussed in Section 961.501.01.

2.15 If a cord service observing circuit serves two operating units (chief operator units), a group identification feature may be provided to enable the observer to determine which unit is handling the call. (See Section 961.501.01.)

2.16 The following circuits are provided to function with the various cord service observing circuits.

2.17 The service observing circuit used for No. 1 switchboards with cords arranged for sleeve supervision requires a sleeve supervision monitoring circuit for detecting supervisory signals on the front cord. A DC signal monitoring circuit is used for detecting supervisory signals on the rear cord.

2.18 The circuits for observing on No. 1 switchboard cords arranged for bridge supervision require one or two DC signal monitoring circuits, depending on the type of cords to be observed. When one of the following mixtures of cord types is to be observed on, a control circuit, actuated by the loop connector, is provided to connect one or two monitoring circuits, as required.

(a) When the observed cords are any combination of these three types: DC supervisory bridge on front cord only; bridge on rear cord only; bridges on both front and rear cords.

(b) When a combination of type A and nontype A cords are observed on and the nontype A cords are arranged for DC supervision on the front cord only.

2.19 Since the service observing desk is arranged to receive only MF pulses, a DC/MF converter is provided if the observed cords are arranged for DC keypulsing, and a DP/MF converter is provided if the cords are arranged for dialing.

2.20 One cord service observing trunk, the associated loop connectors, and other associated circuits require slightly more than one relay rack bay for mounting if the maximum number of connectors is provided.

B. Method of Operation

2.21 The general method of operation of the multiline call-distributing circuits is given in Section 961.501.01.

2.22 When a cord service observing circuit has been out of service and is placed in service by the operation of a key at the service observing desk, the circuit may not receive requests for observations until it is in an operative condition. A timing circuit operates to permit heating of all the tube heaters before the circuit is permitted to accept a request for an observation. The time interval may be 17.5 to 44 seconds.

2.23 Prior to the selection of a cord for observation at the time the circuit is put into service, a test is made, automatically, of the multiple wiring of the connector relays for low resistance (4000 ohms or less) to ground or 48-volt battery. This test is made to prevent the service observing connection from interfering with the cord circuit. (See 2.70.)

2.24 The loop connectors are in a chain arrangement, and if more than one cord patched for observing is plugged up simultaneously, the lowest-numbered connector is cut through to the service observing trunk. When the trunk is placed in service, the continuity of the chains in the connector circuits is checked to prevent limitation of observations to only part of the connectors. If the chain is broken, the trunk is automatically removed from service. (See 2.69 and 2.70.)

2.25 When a cord is selected for observation, a seizure signal is sent to the service observing desk. A time interval of approximately 0.4 to 0.7 second is allowed between the seizure signal to the desk and a call-accepted signal returned to the trunk. If the call is not accepted within this time interval, the loop connector is disconnected. This timing is provided to avoid encumbering an observer with partial observations.

2.26 When a toll operator answers a call with a rear cord, or originates a call with a front cord which is patched up for observation, the call may be followed to completion if it is accepted at the desk. Supervisory signals which the toll operator receives are duplicated at the service observing desk, with the exception of a ringback signal in the No. 1 toll and DSA switchboards. In this case, an audible signal may be heard by the observer. In addition, KP or DP signals and the digits keyed or dialed on the front cord are displayed at the desk. The service observing trunk enbales the desk position circuit to light the various lamps.

2.27 Front and rear supervisory signals are detected and transmitted to the service observing desk by the following means.

(a) In No. 1 toll switchboards, the use of DC signal monitoring circuits when cords are arranged for bridge supervision, and a sleeve supervision monitoring circuit when cords are arranged for sleeve supervision.

(b) In No. 3-type toll switchboards, electron tubes as high-impedance monitoring devices in the front and rear cord circuits.

(c) In DSA switchboards, leads tapped onto the front and rear cord lamps and brought out to supervisory relays in the service observing trunk circuit.

2.28 A time-out feature is provided for timing the interval between front cord plug-up and the time the keyset or dial circuit is attached to the cord circuit. If the dial or keyset is not attached within the predetermined time interval, 3.5 to 16.1 seconds, no lamp signal is received to indicate that a dial or keyset has been attached and the digits dialed or keyed are not displayed at the service observing desk. The observer may hear the pulses. This time-out feature is provided to prevent interference with an observation in progress by the subsequent use of the dial or keyset with another cord in the same position. The time interval is adjustable. The time period should be long enough to insure receiving the digits on the observed cord, but not so long as to receive signals when the keyset or dial is used with another cord.

2.29 All the lamps displayed at the service observing desk will be extinguished when the circuit is released by the operation of a key at the desk. If the service observing circuit is not released by the observer, the circuit remains connected to the same observing position, and calls on the same cord may be observed indefinitely.

2.30 The observers may hear the entire conversation. Two transmission paths, one for each end of the cord, terminate in separate receivers of the observer headset.

C. Signals to Observer

2.31 The signals at the service observing desk are given on a chart in Fig. 4.

Position Supervisory Signals

2.32 The lamps for giving supervisory signals at the service observing desk are designated RPU, FPU, RSV, FSV, RR, and FR. (See Section 961.501.01.)

2.33 When a cord at a toll or DSA switchboard is plugged into a jack and the service observing circuit is connected to the desk, the trunk lamp lights corresponding to the service observing trunk in use. If the cord observing trunk serves two operating units, this trunk lamp may light steadily or flash at a 120-ipm rate to indicate to which unit the trunk is connected. If the trunk lamp flashes, the flashing will continue for 15 to 30 seconds, and thereafter, the lamp will be lighted steadily on that call.

2.34 Simultaneously with the lighting of the trunk lamp, the front plug up (FPU) or rear plug up (RPU) lamp lights to indicate which cord is in use. The FPU and RPU lamps light when the front and rear cords are inserted into jacks, and these lamps are extinguished when the cords are removed.

2.35 The FSV and RSV lamps give front and rear supervisory signals. The FSV lamp is usually lighted when the front cord is plugged up. Exceptions to this are given in Fig. 4. The FSV lamp is extinguished when the called party answers. The lamp again lights when a disconnect signal is received from the forward end of the connection. This lamp also receives other supervisory indications discussed in 2.51 through 2.68. When the front cord is plugged into a ringdown trunk circuit, the FSV lamp remains dark.

2.36 The RSV lamp lights when the calling customer hangs up or when the trunk at the originating switchboard is released. This lamp follows the calling party's flash or flashing recall lamp. When the rear cord is connected to a ringdown trunk, ringing to the observed office will light this lamp steadily for the duration of ring, or lock in the lamp flashing at 120 ipm.

2.37 When observing on a cord with a removable DC bridge in a No. 1 switchboard, on a through connection, front or rear on-hook will light both the FSV and RSV lamps when the TALK key is normal. When the TALK key is operated, the proper lamp remains lighted.

2.38 The supervisory lamps are extinguished when the associated cord is pulled down.

2.39 The front ring (FR) and rear ring (RR) lamps light for the duration of ring on the front and rear cords by the observed operator at No. 3-type switchboards only. If the dial key is operated, ring indication is not received at the service observing desk. When observing on toll cords at No. 1 or DSA switchboards, 20-cycle audible ringing is received by the observer, but no lamp signal is given.

Keypulsing Signals

2.40 At switchboard positions arranged for keypulsing, the following signals are received at the service observing desk in connection with the keypulsing operation.

2.41 Only keypulses on the front cord are registered at the service observing desk. Pulsing on the rear cord may be heard by the observer as tones if MF is pulsing, and as clicks if DC pulsing. A keyset-attached signal for the rear cord may be received if both cords are plugged up and the cord circuit is associated with a keyset having a common KP key which depends on the operation of the splitting key to direct the pulsing to the proper end of the cord, and if the splitting and talking keys are set for the rear cord.

2.42 When a KP key is operated to attach a keyset, the K lamp lights. When a sender is attached and ready to receive pulses, the

S lamp lights. The KP key is usually operated before a sender is attached. (These lamps are located on the digit display panel. See Fig. 5.)

2.43 However, in some No. 1 toll switchboards with an early type of keyset circuit, the sender attached signal is taken on the cord supervisory lamp. Subsequently, the KP key is operated to associate the keyset with the cord. In this case, the K and S lamps will light when the KP key is operated. Since the keyset must be attached within a given time interval after front cord plug-up (see 2.28), the observer will not receive a display of the keyed number if long sender delays are encountered and the time-out period is exceeded.

2.44 The D lamp lights at the service observing desk if a second KP signal is received on the same attempt. The D lamp gives this indication for MF keysets only. No indication is given of a second KP key operation with DC keypulsing.

2.45 If a digit is keyed before the sender is attached, the S lamp will flash at a 120-ipm rate. However, if the front cord only is plugged up, this lamp does not flash. The preliminary digit is registered at the service observing desk as the digit keyed if an MF keyset is used. Otherwise, it is registered as the digit 3. In the No. 1 switchboards discussed in 2.43, if a digit is keyed before a sender is attached, the D lamp lights. In this case, the D lamp is not an indication of a second KP signal. When the digit pulse ends, the S lamp lights.

2.46 When the start signal is received, the F lamp is lighted. The release of the keyset from the position circuit causes the K and S lamps to be extinguished and the W lamp to light. (See Fig. 5.)

2.47 In cases where a fixed number of digits is keyed over some groups of toll switching trunks (for example, on inward calls), it is not necessary for the operator to operate the start key since the sender will release the keyset after receiving the required number of digits. The F lamp does not light. The K and S lamps are extinguished and the W lamp lighted when the keyset is released.

2.48 The digits keyed are displayed at the service observing desk. (See Fig. 5.) The observer telephone circuit is disconnected during digit registration. A DC/MF converter is required when DC keypulsing is provided. When a combined DC and MF keyset is used, the converter is automatically connected, when required. Release of the front cord wipes out the digit display.

2.49 If a toll operator recognizes an error in keying, she will pull the cord down and replug it. All lamps in the digit display panel are wiped out, but the observer remains connected to the cord. In cases where the keyset is arranged for release key operation, operation of the release key is required in addition to pulling down the cord to extinguish the display lamps. If the release key is not operated, the number rekeyed will not be displayed. When the toll operator replugs the cord and the keyset is attached, the digits are again displayed as they are keyed. When the operator has keyed the correct number, she operates the start key when required, which releases the keyset. The K and S lamps are extinguished and the W lamp is lighted as above.

2.50 If more than two MF frequencies are received simultaneously because of two keys being operated simultaneously or circuit trouble, the R lamp lights. The digit on which a false frequency is received is not displayed. Extra digits keyed (twelfth or fifteenth digit) result in the lighting of an X pattern in the twelfth or fifteenth digit space. The lamps numbered 1, 3, 5, 7, and 9 give this X pattern. (See Fig. 5.) If a 14-digit display panel is used on an 11-digit call, the twelfth digit is registered as the digit received and no X pattern is displayed.

2.51 When a front cord DC signal monitoring circuit is used, no FSV lamp is received while a converter is connected. When the converter is released, the FSV lamp lights.

2.52 The FSV lamp flashes when a flashing signal is received. On a ringback from a distant point, this lamp is locked in on a flashing basis on ringdown trunks in No. 3-type switchboards and locked in steady on No. 1 switchboards.

2.53 Any lamps which are lighted are extinguished when the observation is released.

Dial Pulsing Signals

2.54 At switchboard positions equipped with dials, the following signals are displayed at the service observing desk in connection with the dialing operation.

2.55 Dial signals may be received on the front cord only. Dialing on the rear cord may be detected by hearing clicks.

2.56 When the dial circuit is connected to the cord circuit by the operation of a monitoring key or a dial key, or the dial off-normal, the FSV and S lamps light at the service observing desk as an indication that the dial pilot at the switchboard is lighted or that a sender is attached and ready to receive pulses. The K lamp lights as a dial-attached indication.

2.57 When observing on a loop-dialing nontype A cord used for inward and through toll calls, the FPU lamp lights simultaneously with the K lamp. No observations will be made on outward calls with nontype A cords.

2.58 In some DSA switchboards arranged for dialing and not equipped with dial pilots, it is necessary that the sender-attached signal be received on the front cord supervisory lamp before the dial is associated with the cord. The operation of the dial key or the dial off-normal will light the FSV, S, and K lamps at the service observing desk.

2.59 Preliminary dialing results in the digits dialed being registered at the service observing desk, but the FSV and S lamps do not light.

2.60 If a stop-dial signal is received, the FSV and S lamps are extinguished. They light when a go signal is received. If the dial is operated under a stop-dial condition, these lamps will not light again when a go signal is received. The digits dialed may be mutilated at the service observing desk. However, the observer will recognize this condition as improper operation of the dial.

2.61 In some DSA switchboards the cords are not equipped with dial keys. The dial is associated with the cord by the movement of the dial off-normal. In the service observing circuit for observing on dialing cords in DSA switchboards, a 5-second time-out period from the return of the dial to normal is used to indicate the end of dialing and the release of the dial circuit. In this case, if a go signal is received in this time interval, the FSV and S lamps will relight. If a go signal is received after the elapse of interdigital timing, the S lamp remains out, the K lamp is extinguished, and the W lamp is lighted. The FSV lamp lights, but no further digits will be displayed.

2.62 When the digits are dialed by the toll operator, the dial pulses are converted to MF pulses in a DP/MF converter circuit, and the digits are displayed at the service observing desk. Provision is made for display of 11 or 14 digits. If a twelfth or fifteenth digit is dialed, this extra digit is indicated by an X pattern (lamps 1, 3, 5, 7 and 9 lighted) in the twelfth or fifteenth digit space. (See Fig. 5.) If a 14-digit display panel is used on an 11-digit call, the twelfth digit is registered as the digit received and no X pattern is displayed.

2.63 When the dial circuit is disconnected from the cord circuit and the converter is released from the service observing circuit, the FSV, S, and K lamps are extinguished and the W lamp lights.

2.64 While the dial circuit is connected to a No. 1 switchboard cord, the front cord DC signal monitoring circuit is disabled, which prevents supervisory signals from reaching the desk. After the dial circuit is disconnected, the front cord signal monitoring circuit is again enabled and the FSV lamp at the desk lights. From then on, the FSV lamp gives front cord indication of supervision.

2.65 When observing on DP cords in No. 1 and No. 3-type switchboards, flashes on the front cord cause the FSV lamp to flash. When flashes are received on a dialing cord in a DSA switchboard, the FSV and S lamps flash until completion of the time-out period following the return of the dial to normal. (See 2.61.) Then the FSV lamp only flashes.

2.66 Ringing forward on a front cord connected to a dial-type trunk will light the FSV lamp steadily for the duration of the ringing signal.

2.67 Normally, observations start with rear cord plug-up which gives time to associate and condition equipment for detecting the pulsing. With front cord plug-up only, this equipment may not be ready to receive pulsing and an incorrect registration of digits may result.

2.68 Any lamps which are lighted are extinguished when the observation is released.

D. Alarm Facilities

2.69 Connection is made from the service observing circuit to the central office alarm system.

2.70 When a circuit is put into service, two tests are made as discussed in 2.23 and 2.24. If the chain is blocked (open-chain circuits) or if trouble ground or 48-volt battery connection to the connector relay is encountered, the alarm facilities are enabled. A minor alarm is given, the alarm lamp lights at the trunk equipment, and the observing circuit is automatically removed from service. The alarm cutoff key silences the audible alarm and keeps the alarm lamp lit. When the trouble is cleared, the alarm key is released, the lamp is extinguished, and the observing circuit is ready for operation.

3. POSITION CIRCUIT

3.01 The call-distributing service observing circuits for cord and all other classes of service observing are brought into the service observing desk through the incoming trunk and distribution circuit. This circuit connects the service observing circuits to the position circuits of the desk. (See Section 961.501.01.)

A. Equipment Elements

3.02 Digit recording circuits and lamps are required to display the called number. Spaces for 11 or 14 digits are required.

3.03 Toll supervisory lamps designated FSV, RSV, FPU, RPU, FR, and RR are used for cord observing. The functions of these lamps are shown on the signal chart. (See Fig. 4.)

3.04 Dial progress lamps designated S, D, R, F, K, and W are used in group 1 indicator (called number display) for cord observing. The functions of these lamps are shown on the signal chart. (See Fig. 5.)

3.05 If cord observing circuits are arranged for group identification, a figure for trunk lamp control is required.

3.06 If the cords observed on are equipped with dials, the position circuit must be modified accordingly.

4. MAINTENANCE FEATURES OF CORD SERVICE OBSERVING CIRCUITS

A. Keypulsing

4.01 The cord service observing circuits, the DC/MF pulse converter, and the DC signal monitoring circuits can be tested on an operational basis from a toll or DSA switchboard position to a No. 12 service observing desk position with a testman at each location. A talking path between the testmen at the No. 12 position, the No. 12 desk relay rack equipment, and the switchboard position under test is required and is established as indicated in a figure in Section 961.501.01.

B. Dial Pulsing

4.02 The cord service observing circuits, with the DP/MF pulse converter circuit, DP monitoring circuit, and DC signal monitoring circuit are also tested on an operational basis from a toll or DSA switchboard position to a No. 12 service observing desk position with a testman at each location. A talking path between the testmen at the switchboard position and the No. 12 desk position is required and is established as indicated in a figure in Section 961.501.01.

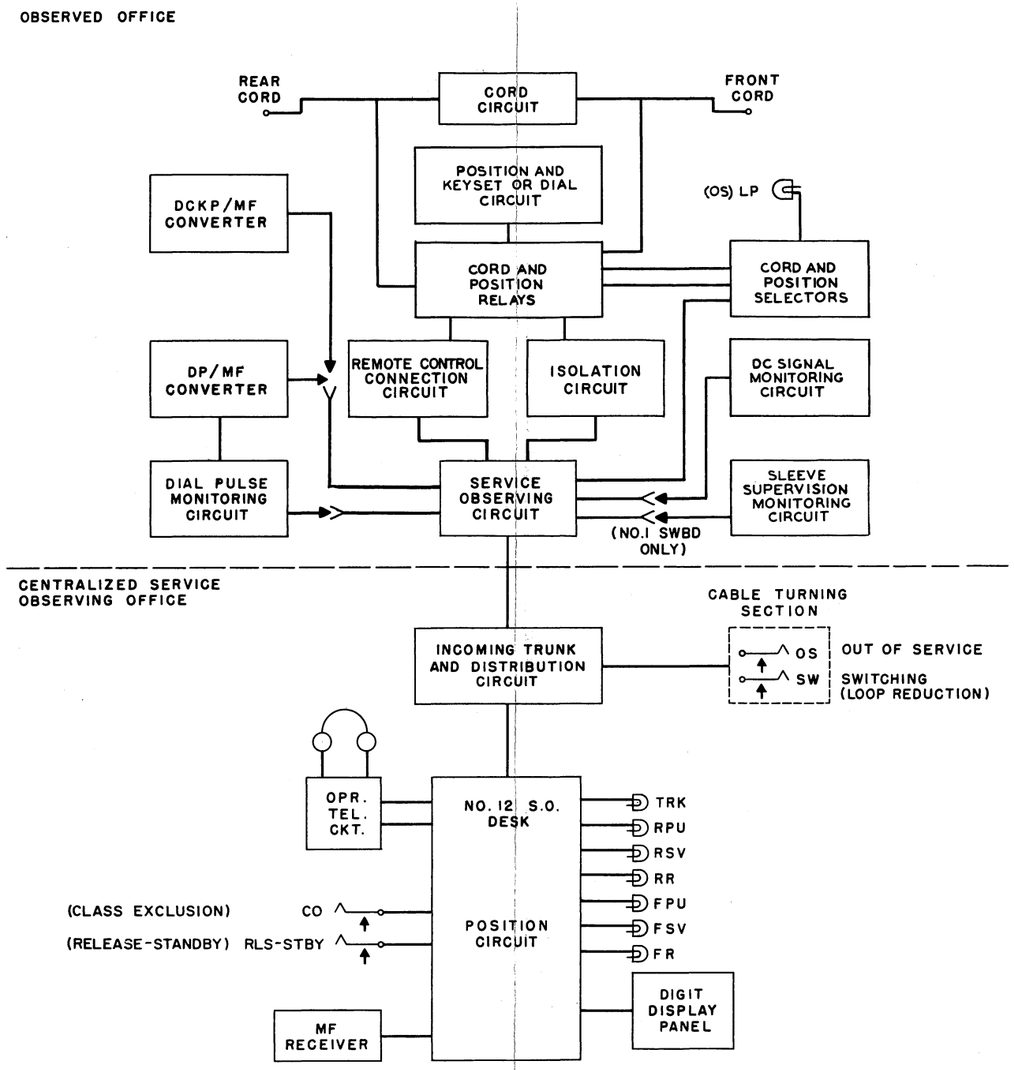


Fig. 1 — Cord Service Observing

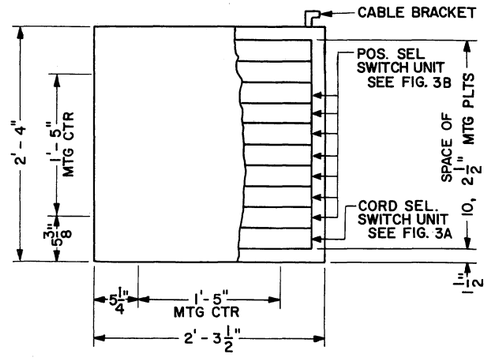


FIG. 2C – WALL MOUNTED CABINET FOR SERVICE OBSERVING DESK

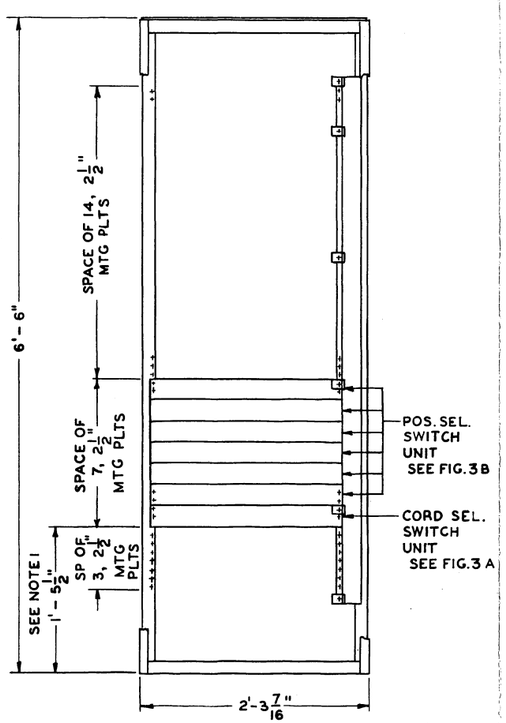


Fig. 2A – Floor-Supported Cabinet for Service Observing Desk

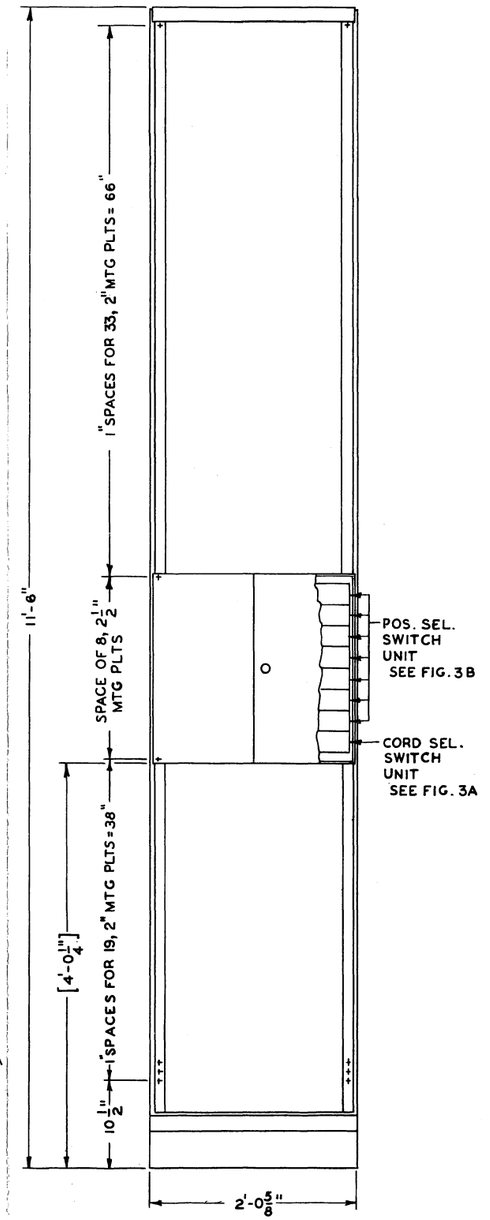


Fig. 2B – Relay Rack Mounted Sender Casing for Terminal Room in Distant Observed Office

NOTES:
1. THIS DIMENSION IS A SUGGESTED HEIGHT FROM THE FLOOR FOR THE INITIAL EQUIPMENT INSTALLED IN ORDER TO MAINTAIN CONVENIENT ACCESS TO SWITCH KNOBS. THE SPACE BELOW MAY BE USED WHEN ALL SPACE ABOVE HAS BEEN USED.

Fig. 2 – Cord Service Observing Mounting for Selector Switches

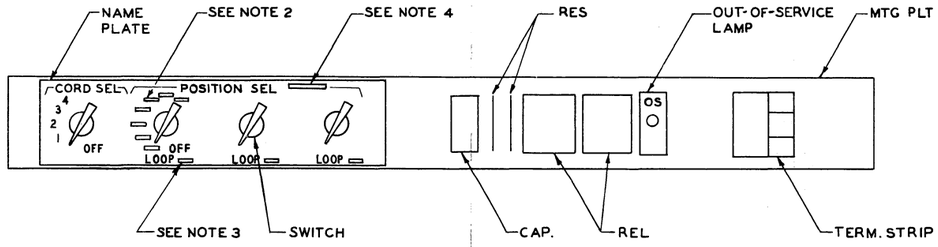


FIG. 3A - CORD SELECTOR SWITCH UNIT
SEE NOTE 1

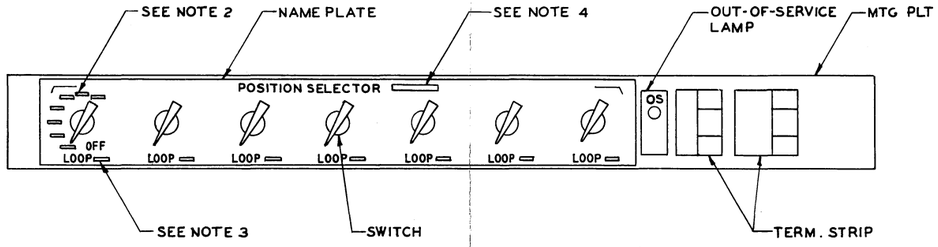


FIG. 3B - POSITION SELECTOR SWITCH UNIT
SEE NOTE 1

NOTES:

1. FIGURE 3A CONTAINS THE FIRST THREE POSITION SELECTOR SWITCHES PER SERVICE OBSERVING TRUNK. THE BALANCE OF POSITION SELECTOR SWITCHES PER FIG. 3B TO BE NUMBERED FROM BOTTOM UP.
2. POSITION NUMBERS TO BE STAMPED ON A JOB BASIS.
3. LOOP CONNECTORS TO BE STAMPED ON A JOB BASIS.
4. SERVICE OBSERVING TRUNK TO BE STAMPED ON A JOB BASIS.

Fig. 3 — Cord Service Observing — Cord and Position Selector Switches

SWITCHBOARD AND SERVICE OBSERVING DESK LAMP SIGNALS

WITH KEY PULSING OPERATION

EVENTS	SWITCHBOARD POSITION					SERVICE OBSERVING DESK													
	TRK	FSV	KP FRONT	SENDER	RSV	TRK	RPU	FSV	FPU	K	S	DIGITS	W	F	RR	FR	RSV	D	R	NOTES
TYPICAL CALL SEQUENCE:																				
CALL ORIGINATED	○																			
OPERATOR PLUGS UP REAR CORD	●					○(1)	○													1
OPERATOR PLUGS UP FRONT CORD		○(4)						○(4)	○											4
KEYSET ATTACHED		↓	○					↓		○										
SENDER ATTACHED		↓	↓	○				↓		↓	○									
NUMBER KEYED		↓	↓	↓				↓		↓	↓	○(5)								5
KEYSET RELEASED		↓	●	●				↓		●	●	↓	○	○(13)						13
CALLED PARTY ANSWERS		●	↓	↓				●		↓	↓	↓	↓	↓						
OPERATOR RINGS ON REAR CORD		↓	↓	↓				↓		↓	↓	↓	↓	↓	○(14)					14
DISTANT OPERATOR RINGS BACK ON I.T. TRK		(15)	↓	↓				(15)		↓	↓	↓	↓	↓	↓					15
OPERATOR RINGS ON FRONT CORD		↓	↓	↓				↓		↓	↓	↓	↓	↓	↓	○(14)				14
CALLED PARTY HANGS UP		○	↓	↓				○		↓	↓	↓	↓	↓	↓	↓				
CALLING PARTY HANGS UP		↓	↓	↓	○			↓	↓	↓	↓	↓	↓	↓	↓	↓	○			
OPERATOR PULLS DOWN FRONT CORD		●	↓	↓	↓			●	●	↓	↓	●	●	●	↓	↓	↓	↓		
OPERATOR PULLS DOWN REAR CORD		↓	↓	↓	●		●	↓	↓	↓	↓	↓	↓	↓	↓	↓	●	↓		
OBSERVATION RELEASED		↓	↓	↓	↓	●	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
OTHER CONDITIONS:																				
CUSTOMER ABANDONS CALL					○												○			
CUSTOMER FLASHES					⊕(2)												⊕(2)			2
DIGIT KEYED BEFORE SENDER ATTACHED											(3)	(3)						(3)		3
KEYSET ATTACHED:																				
A. SENDER TIME OUT		⊕	●(6)	●(6)				⊕		●(6)	●(6)			○(6)						6
B. BUSY TRUNK OR LINE OR NO CIRCUIT CONDITION		⊕(7)						⊕(7)												7
C. OPERATOR RECOGNIZES OWN ERROR									●			●								8
D. MORE THAN 2 MF FREQ RECEIVED		⊕	●(6)	●(6)				⊕		●(6)	●(6)	(9)	○(6)						○	6,9
E. EXTRA DIGIT KEYED		⊕	●(6)	●(6)				⊕		●(6)	●(6)	(10)	○(6)							6,10
F. KP KEY OPERATED TWICE		⊕						⊕		○(10)	○(10)	(11)						○(11)		11
KEYSET RELEASED:																				
A. SENDER TIME OUT, REORDER, BUSY TRUNK OR LINE		⊕	●					●(12)						○(13)						12,13

○ LAMP ON
● LAMP OFF
⊕ LAMP FLASHING (120 IPM)
↓ CONTINUING LIGHTED CONDITION
( )NOTES

WITH DIAL OPERATION

EVENTS	SWITCHBOARD POS.				SERVICE OBSERVING DESK													
	TRK	FSV	DIAL PILOT	RSV	TRK	RPU	FPU	K	FSV	S	DIGITS	W	RR	FR	RSV	NOTES
TYPICAL CALL SEQUENCE:																
CALL ORIGINATED	○															
OPERATOR PLUGS UP REAR CORD	●				○(1)	○										1
OPERATOR PLUGS UP FRONT CORD							○(17)									17
DIAL ATTACHED								○								
SENDER ATTACHED		○	○					↓	○(18)	○						18
NUMBER DIALED		↓	↓					↓	↓	↓	○					
DIAL CIRCUIT RELEASED		↓	●					●	↓	●	↓	○				
CALLED PARTY ANSWERS		●	↓					↓	●	↓	↓	↓				
OPERATOR RINGS ON REAR CORD		↓	↓					↓	↓	↓	↓	↓	○(14)			14
DISTANT OPERATOR RINGS BACK ON I.T. TRK		(15)	↓					↓	(15)	↓	↓	↓	↓			15
OPERATOR RINGS ON FRONT CORD		↓	↓					↓	↓	↓	↓	↓	↓	○(14)		14
CALLED PARTY HANGS UP		○	↓					↓	○	↓	↓	↓	↓	↓		
CALLING PARTY HANGS UP		↓	↓	○			↓	↓	↓	↓	↓	↓	↓	↓	○	
OPERATOR PULLS DOWN FRONT CORD		●	↓	↓			●	↓	●	↓	●	●	↓	↓	↓	
OPERATOR PULLS DOWN REAR CORD		↓	↓	●		●	↓	↓	↓	↓	↓	↓	↓	↓	●	
OBSERVATION RELEASED		↓	↓	↓	●	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
OTHER CONDITIONS:																
CUSTOMER ABANDONS CALL				○											○	
CUSTOMER FLASHES				⊕(2)											⊕(2)	2
PRELIMINARY DIALING											○					16
DIAL CKT ATTACHED:																
A. SENDER TIME OUT, BUSY TRK OR LINE OR NO CIRCUIT CONDITION		⊕	●(6)					●(6)	⊕	●(6)		○(6)				6,19
B. EXTRA DIGITS DIALED		⊕	●(6)					●(6)	⊕	●(6)	(10)	○(6)				6,10
DIALING TO SXS OFFICE OR TRAIN:																
A. "STOP DIAL" SIGNAL RECEIVED		●	●						●	●						20
B. "GO" SIGNAL RECEIVED		○	○						○	○						
C. "GO" SIGNAL NOT RECEIVED IN 3-5 SECONDS - TIME OUT PERIOD								●				○				19
D. "GO" SIGNAL RECEIVED AFTER 3-5 SECONDS - TIME OUT PERIOD		○							○		(21)					19,21
DIAL CKT RELEASED:																
A. AFTER EXTRA DIGITS		(22)	●					●	(22)	●	(11)	○				11,22

NOTES:

1. IF GROUP IDENTIFICATION IS PROVIDED, THE TRK LAMP IS LIGHTED STEADILY FOR THE FIRST GROUP AND FLASHES AT 120 IPM FOR THE SECOND. THE FLASHING LAMP LIGHTS STEADILY AFTER 15 TO 30 SECONDS.

2. THE RSV LAMP FOLLOWS SWITCHHOOK SUPERVISION EXCEPT IN DSA SWITCHBOARDS WHERE THE FLASHING RECALL FEATURE IS PROVIDED. IN SUCH DSA SWITCHBOARDS, THE SUBSCRIBER FLASH MAY BE LOCKED UNDER CONTROL OF THE TALK KEY.

3. THE DIGIT KEYED IS DISPLAYED IF MF PULSING IS USED; OTHERWISE THE PRELIMINARY DIGIT IS SHOWN AS THE DIGIT "3". THE S LAMP FLASHES: HOWEVER IF ONLY THE FRONT CORD HAS BEEN PLUGGED UP, THE S LAMP REMAINS STEADILY LIGHTED. AT NO. 1 SWITCHBOARDS WITH KEYSETS THAT ARE ARRANGED TO GIVE THE SENDER ATTACHED SIGNAL ON THE CORD SUPERVISORY LAMP (FSV), THE D LAMP LIGHTS AND THE S LAMP LIGHTS WHEN THE DIGIT PULSE ENDS.

4. IN NO. 1 TOLL SWITCHBOARDS THAT HAVE NON-TYPE A, BRIDGE SUPERVISION CORDS AND SLEEVE SUPERVISION CORDS EQUIPPED WITH KEYSETS WITHOUT SENDER LAMPS, THE SENDER MUST BE ATTACHED BEFORE THE KEYSET IS ASSOCIATED WITH THE CORD; THEREFORE SUPERVISION BEFORE THE KEYSET IS ASSOCIATED IS TAKEN ON THE FSV LAMP. IN A NO. 3 SWITCHBOARD ARRANGED FOR DCKP, THE FSV LAMP LIGHTS WHEN THE CALLED LINE IS REACHED, IF THE TRUNK IS ARRANGED TO GIVE DARK LAMP SUPERVISION (TOLL SUPERVISION). IN A DSA SWITCHBOARD ARRANGED FOR MF PULSING AND IN THE 15D SWITCHBOARD, THE FSV LAMP LIGHTS WHEN THE KEYSET IS ATTACHED.

5. KEY PULSES AND DIAL PULSES ARE REGISTERED AT THE OBSERVING DESK ONLY WHEN PULSING OR DIALING IS ON THE FRONT CORD. IF PULSING OR DIALING IS ON THE REAR CORD, THE OBSERVER HEARS TONES WHEN THE PULSING IS MF, AND CLICKS IF THE NUMBER IS PULSED BY DC OR DIALED.

6. THESE SIGNALS ARE GIVEN ONLY FOR NO. 1 AND NO. 3 SWITCHBOARDS ARRANGED FOR DCKP, AND FOR DSA SWITCHBOARDS WITH DCKP, MFKP, OR WITH DIALS NOT MODIFIED FOR INTERTOLL DIALING. WITH DIALS MODIFIED FOR INTERTOLL DIALING, THE DIAL AND S LAMPS FLASH, THE K LAMP REMAINS LIGHTED, AND THE W LAMP REMAINS DARK.

7. THE FSV LAMP FLASHES AS A REORDER SIGNAL ONLY AFTER THE SENDER IS RELEASED BY OPERATION OF THE ST KEY OR BY TIMING OUT.

8. THE OPERATOR PULLS DOWN THE CORD, EXTINGUISHING ALL DIGITS, AND RE-PLUGS. THE DIGITS ARE DISPLAYED AS KEYED. SOME KEYSETS REQUIRE A KEY RELEASE OPERATION AS WELL AS UNPLUGGING THE CORD TO RELEASE THE DIALED DIGITS. IN THESE KEYSETS THE KEY MUST BE OPERATED OR THE RE-KEYED DIGITS WILL NOT BE DISPLAYED.

9. ALL DIGITS ARE DISPLAYED EXCEPT THE ONE FOR WHICH MORE THAN 2 MF FREQUENCIES ARE RECEIVED.

10. DIGITS AS KEYED OR DIALED ARE DISPLAYED TO THE CAPACITY OF THE DIGIT INDICATOR AT THE OBSERVING DESK. FURTHER DIGITS LIGHT AN "X" PATTERN, FORMED OF NUMBERS 1, 3, 5, 7, AND 9, IN THE 12TH OR 15TH DIGIT SPACE OF THE INDICATOR (SEE FIG. 5)

11. ALL DIGITS ARE DISPLAYED UNTIL THE KP KEY IS OPERATED FOR THE SECOND TIME. THE D LAMP LIGHTS AS AN INDICATION OF THE SECOND KP KEY OPERATION ONLY WITH MF KEYSETS. WITH DSA SWITCHBOARDS THE K AND S LAMPS DO NOT LIGHT.

12. THE SENDER TIMEOUT AND REORDER CONDITIONS ARE DISTINGUISHED ONLY BY THE TIME INTERVAL THE SENDER TAKES TO TIME OUT.

13. THE F LAMP DOES NOT LIGHT WHEN THE KEYSET IS AUTOMATICALLY RELEASED BY THE SENDER.

14. THIS LAMP IS LIGHTED FOR THE DURATION OF THE RINGING AND IS GIVEN ONLY FOR OBSERVATIONS ON THE 3-TYPE SWITCHBOARD. FOR OBSERVATIONS ON NO. 1 TOLL SWITCHBOARDS AND DSA SWITCHBOARDS THE OBSERVER RECEIVES AUDIBLE RING. WHEN OBSERVING ON A CALL FOR WHICH THE REAR CORD HAS BEEN CONNECTED TO A RINGDOWN TRUNK, THE RSV LAMP WILL LIGHT STEADILY FOR THE DURATION OF THE RING OR WILL LOCK FLASHING AT 120 IPM.

NOTES (CONT):

15. WHEN OBSERVING ON DIAL INTERTOLL TRUNKS, THE FSV LAMP LIGHTS STEADILY FOR THE DURATION OF THE RING. WHEN OBSERVING ON RINGDOWN TRUNKS IN 3-TYPE SWITCHBOARDS, THE FSV LAMP LOCKS IN FLASHING. WHEN OBSERVING ON RINGDOWN TRUNKS IN NO. 1 TOLL SWITCHBOARDS, THE FSV LAMP LIGHTS STEADILY AT THE SWITCHBOARD AND AN AUDIBLE RING IS RECEIVED AT THE OBSERVING DESK.

16. DIGITS DIALED ARE DISPLAYED AT THE OBSERVING DESK, BUT THE FSV AND S LAMPS DO NOT LIGHT.

17. WHEN OBSERVING ON NON-TYPE A CORDS, THE FPU LAMP LIGHTS WHEN THE K LAMP LIGHTS.

18. WHEN OBSERVING ON SENDER-TYPE OFFICES, THE SIGNALS ON THE K, FSV, AND S LAMPS ARE RECEIVED IN THE ORDER SHOWN ON THE SIGNAL CHART.

    ON DSA SWITCHBOARDS GENERALLY, THE FSV LAMP IS LIGHTED WHILE THE DIAL IS ASSOCIATED WITH THE CORD AND GOES OUT WHEN THE DIAL KEY IS OPERATED OR THE DIAL IS MOVED OFF NORMAL.

    ON DSA SWITCHBOARDS NOT EQUIPPED WITH DIAL PILOTS, THE SENDER ATTACHED SIGNAL MUST BE RECEIVED BEFORE THE DIAL IS ASSOCIATED WITH THE CORD. WHEN THE DIAL KEY IS OPERATED OR THE DIAL IS OFF NORMAL, THE FSV, S, AND K LAMPS LIGHT.

    ON DSA SWITCHBOARDS NOT ARRANGED FOR DIALING SUPERVISION (STOP-GO), THE SENDER MUST BE ATTACHED BEFORE THE DIAL IS ASSOCIATED. THE FSV LAMP GIVES SUPERVISION BEFORE THE DIAL IS ASSOCIATED.

    ON 13C, 13D, AND 15C SWITCHBOARDS, THE FSV LAMP TAKES DIAL SUPERVISION UNTIL THE DIAL IS MOVED OFF NORMAL AND THEN THE DIAL PILOT LAMP LIGHTS.

    ON THE 15D SWITCHBOARD, THE FSV LAMP LIGHTS WHEN THE DIAL IS ATTACHED.

    ON TOLL SWITCHBOARD NO. 1 EQUIPPED WITH NON-TYPE A CORDS, THE FSV LAMP GOES OUT WHEN THE DIAL CIRCUIT IS ATTACHED AND LIGHTS WHEN THE DIAL CIRCUIT IS DISCONNECTED.

    ON NO. 3 SWITCHBOARDS HAVING DCKP OR LOOP DIALING, THE FSV LAMP LIGHTS WHEN THE OPERATOR PLUGS UP THE FRONT CORD, EXCEPT WHEN THE TRUNK IS ARRANGED TO GIVE DARK LAMP SUPERVISION UNTIL THE CALLED LINE IS REACHED (TOLL SUPERVISION).

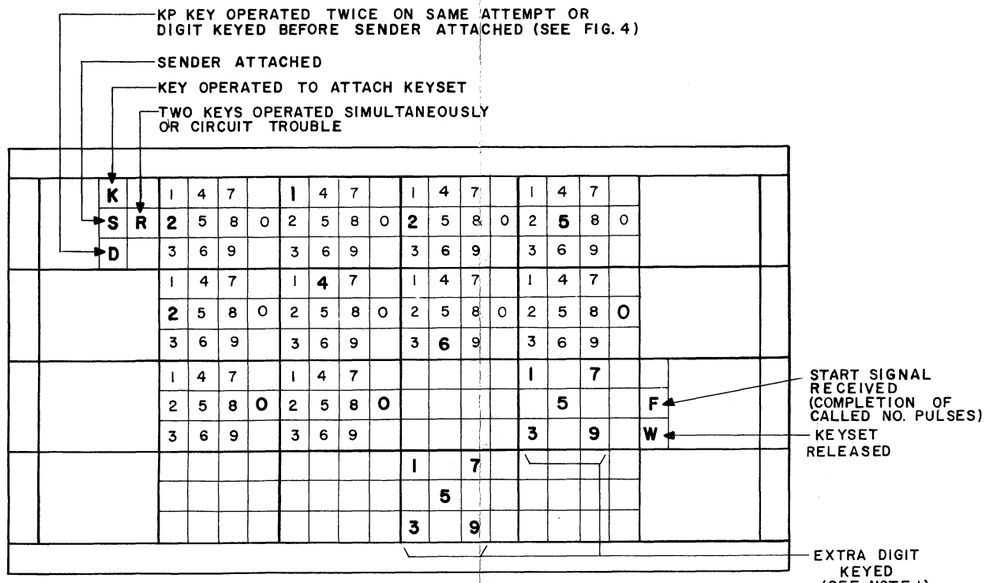
19. A 3-5 SECONDS TIME OUT PERIOD IS PROVIDED ONLY FOR DSA DIAL CIRCUITS NOT MODIFIED FOR INTERTOLL DIALING. (LOCKED-IN DIAL CIRCUIT AND DIAL PILOT.)

20. IF AN OPERATOR DIALS AGAINST A "STOP DIAL" CONDITION, THE DIGITS RECEIVED AT THE OBSERVING DESK MAY BE MUTILATED. THE FSV AND S LAMPS DO NOT LIGHT WHEN THE "GO" SIGNAL IS RECEIVED.

21. THE DIGITS DIALED SUBSEQUENTLY WILL NOT BE DISPLAYED.

22. THE FSV LAMP MAY BE DARK OR FLASHING ON THE TRUNK CONNECTION. AN EXCESS OF DIGITS ON A FIXED CLASS CALL DOES NOT ROUTE THE CALL TO A REORDER CIRCUIT.

Fig. 4 — Signal Chart for Cord Service Observing



GROUP I INDICATOR
CALLED NUMBER DISPLAY PANEL
(N.Y. AREA LA-4-6000 DISPLAYED)

NOTES:
1. WHEN AN ELEVEN DIGIT DISPLAY PANEL IS USED, AN EXTRA DIGIT IS DISPLAYED IN THE 12TH DIGIT SPACE.

Fig. 5 – Display Panel for Cord Service Observing