



***KELLOGG*** \*

**NO. 3 TOLL  
SWITCHBOARD**

# KELLOGG

## NO. 3 TOLL SWITCHBOARD



**FLEXIBILITY**

**ECONOMY**

**RELIABILITY**

### GENERAL

The purpose of this bulletin is to describe the facilities available in the #3 type toll switchboard manufactured by Kellogg Switchboard and Supply Company and to provide information concerning their method of operation. It should be remembered that the information presented is general and the equipment described is subject to variation in accordance with specific job requirements.

The switchboards covered in subsequent pages provide all necessary facilities for handling all types of toll calls, but they are also frequently used and designed for various other manual services; such as DSA or DSB switchboards.

THE KELLOGG #3 TOLL SWITCHBOARD has been designed to meet the needs of present day expanding toll service. Intertoll dialing systems have considerably increased the toll traffic which required necessary modernization of toll switchboard equipment to serve the increased loads efficiently.

The equipment is separated into two general physical classifications; the switchboard located in the toll operating room and the toll relay rack equipment usually located in a separate equipment room.

The #3-C toll switchboard is arranged so that most of the work of giving service over many different types of lines and trunks is performed in the line equipment of the particular line or trunk involved, instead of in the

cord circuit. The flexibility of the #3-C switchboard can be appreciated when it is realized that any conceivable type of line or trunk circuit can be handled simply by including the necessary features in the terminating equipment associated with that line or trunk.

This arrangement permits the cord circuit to remain extremely simple using only three relays.

The overall design is made for flexibility, economy and reliability, which are achieved without sacrificing outstanding performance. The cost of Kellogg's #3 toll switchboards in comparison with older type toll switchboards is particularly favorable where additional positions are required for expansion.

The use of cord dialing provides a dial pilot lamp and other supervisory features. A dial pilot lamp is furnished to indicate when the switching equipment in the distant office, or any intermediate point, is ready to receive pulses. The operator starts dialing or continues to dial only when the dial pilot is lighted.

On larger installations Kellogg key senders can be furnished with any reasonable number of digits. In some cases intertoll dialing will require ten or more digits. The sender equipment is designed as a complete unit which contains registers, sender relays and control circuits capable of sending up to 14 digits by each sender. Key senders of course are optional and can be added when required.

## POSITIONAL UNIT

Completely assembled lower unit with fuse panel, terminals and framework to allow disconnection of power wires so that position can be withdrawn from the upper jack section to the front for shifting partially and fully equipped position as required by load requirements.

Maximum number of cord pairs per position is 14. The number equipped will be as specified ranging from 5 for special service and C.L.R. outward positions up to the maximum for inward toll positions.

Positional Equipment	Wired	Equipped
Cord Pairs	14	as req'd.
Operator's Telephone	1	1
Dial or Sender Keys as specified	1	1
Common Control	1	1
Line and Fuse Pilots	3	3

Each cord pair is equipped with two supervisory lamps, a combined talking and monitoring key. Ringing may be done from the common ringing keys in

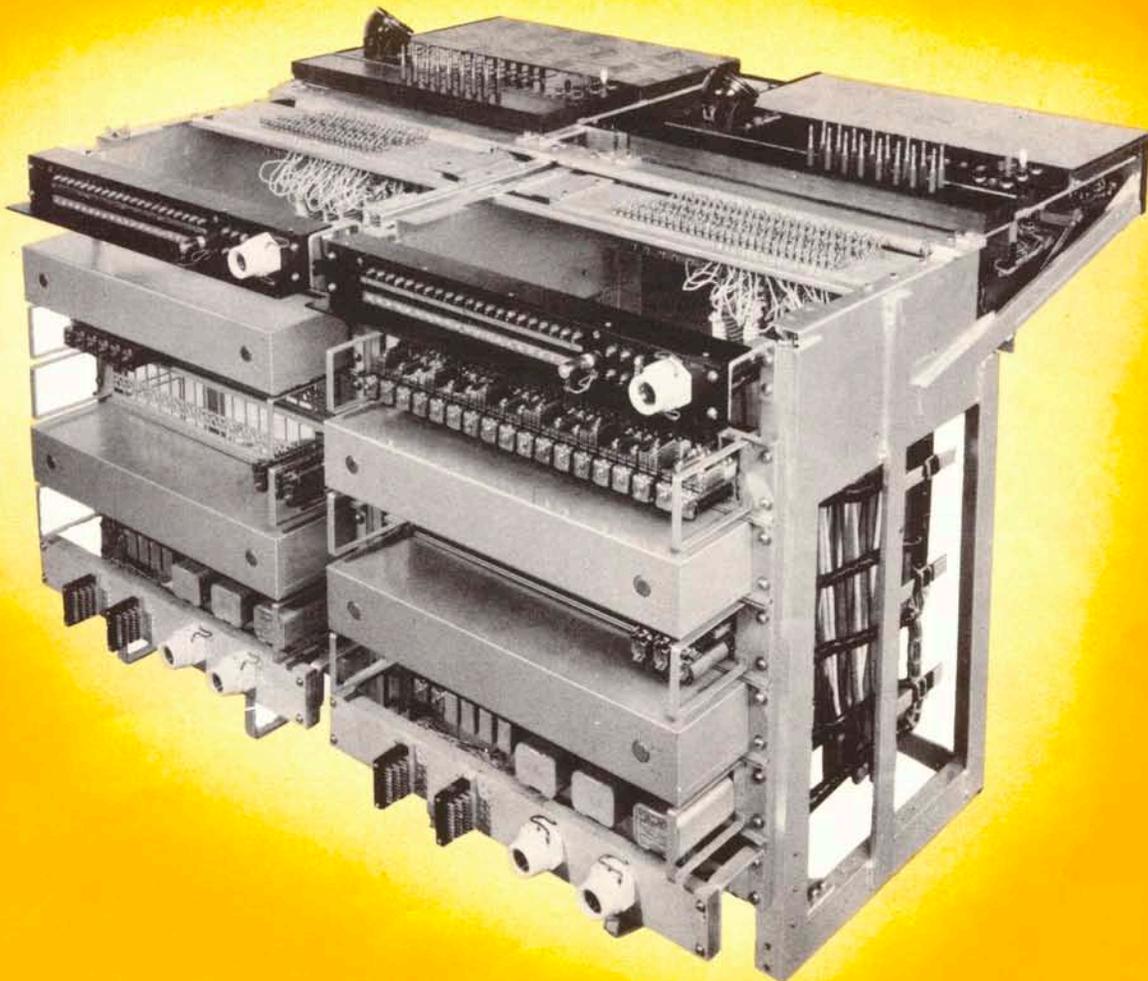
the operator's control with the talk key operated; individual cord ringing keys may be used if traffic conditions so warrant.

Supervision to the cord circuit is controlled by the supervisory relays of the various line circuits over the sleeve conductors.

The signalling current to the line is also applied from the line relay circuit, under control of the operator. It is possible to apply 20 cycle, 135 cycle or 1000 cycle ringing current, as required for the individual line by operating the ring-key.

No supervisory relays are required in the cord circuits. The only relays associated with the cord in the switchboard are for control and switching action. The circuits are arranged so the operator can only get in on one connection at a time with the talk key, but may monitor on other cords at all times.

An individual ticket slot is mounted in the keyshelf adjacent to the keys of each cord circuit.



Positional Unit Removeable Type which may be Transferred to other Positions

### Cord Circuits

The cord circuits are Kellogg's standard #3-C type cord circuits having three relays per cord with the following features:

1. Pulsing on Calling and Answering Cord —
  - (a) Pulse on calling cord without operation of dial key;
  - (b) Pulse on answering cord by operation of dial transfer key.
2. Key control permitting release and re-dial without removal of plug from jack.
3. Guard circuit permitting operator on only one cord at a time.
4. Key set locked to cord circuit for duration of dialing interval.
5. High low supervision over the sleeve of the calling and answering cords.
6. During pulsing interval, the sleeve of the cord circuit is transferred to the dial pilot for start stop pulsing and supervision is then on dial pilot lamp.
7. By opening the cord circuit key to the talk

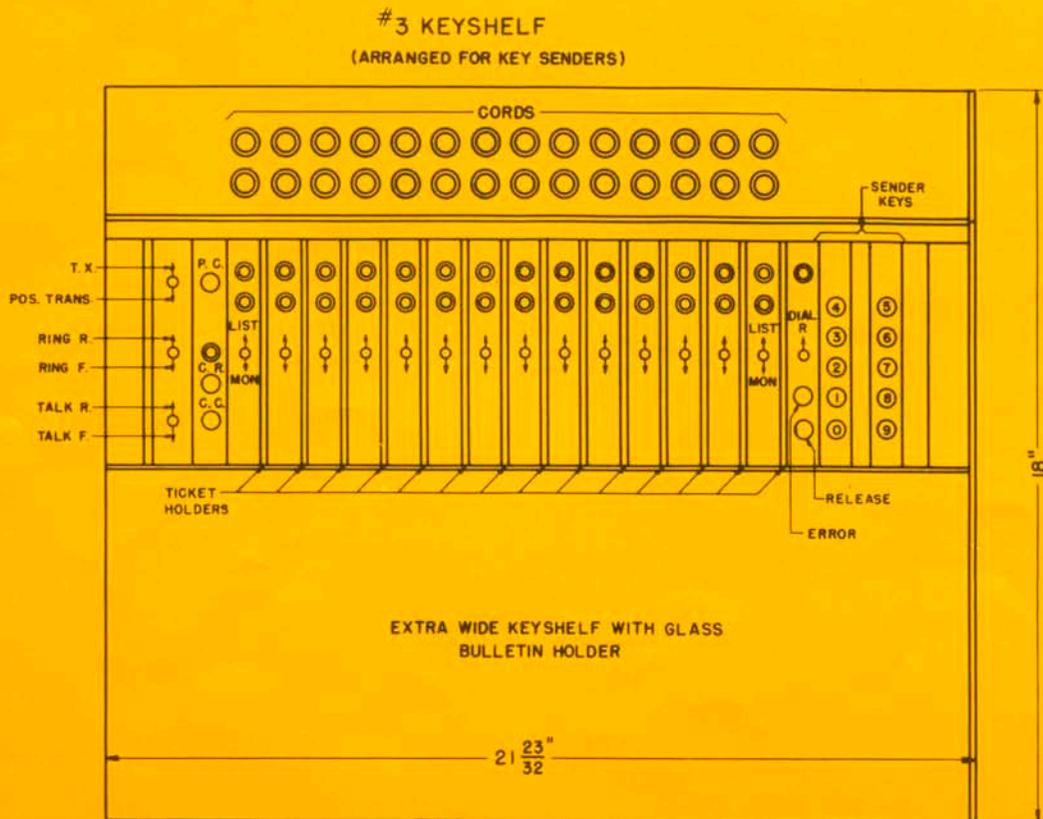
position, the cord circuit is extended to the position circuit where the following features are provided on a position basis:

- (a) Coin control.
  - (b) Ring rear, ring front.
  - (c) TX forwarding.
  - (d) Cord splitting.
  - (e) Pulse, dial transfer.
  - (f) Automatic or Manual start of ringing under control of operator.
  - (g) Operation of the dial release key prepares the sender to automatically disengage from the cord circuit when last digit has been sent.
  - (h) Transfer of the sleeve to different resistance values for certain functions in trunk circuits, then supervision lamps are operated by relay in position circuit.
8. Monitoring, by opening the cord circuit key to the monitor position, permits the operator to monitor a call with only her receiver across the line through a high impedance coil.

### Position Grouping (Night Transfer)

Cord circuits on any number of positions can be transferred to the operator's telephone circuit of any

one position by the operation of the position transfer key located on each position.



# TOLL SWITCHBOARDS

## *Ticket Holders*

1-A ticket holders are provided for each cord circuit equipped. These holders are located adjacent to each talk and monitor key associated with the cord circuit.

## *Position Common Keys*

The position common keys and dial or key pulsing key-sets are located at the extreme ends of the keyshelves, permitting a fully equipped keyshelf of 14 cords between the common position equipment.

## *Operators Telephone Circuit*

Each position is equipped with an operator's telephone circuit arranged for a 52-type operator's headset.

## *Stile Strips*

The stile strips between panels are arranged to show the panel number. The stile strips are slotted so that various colored markers can be placed in the stile strip to indicate at a glance what type service is completed on a particular strip.

## *Positioning Monitoring Circuit*

This circuit provides a means to observe the listening taps of all positions and special desk. This circuit is cord ended and when plugged into the listening tap

jacks of the position permits the observing operator to hear the observed operator without impairing transmission. Any desired level of transmission can be maintained at the observer's end, as this circuit has a one stage audio amplifier with an adjustable gain control.

## *School Equipment*

Any designated positions can be arranged to permit an instructor and one or two students to simulate all types of calls, tones and flashing signals. The instructor serving as a local subscriber, distant toll operator or supervisor.

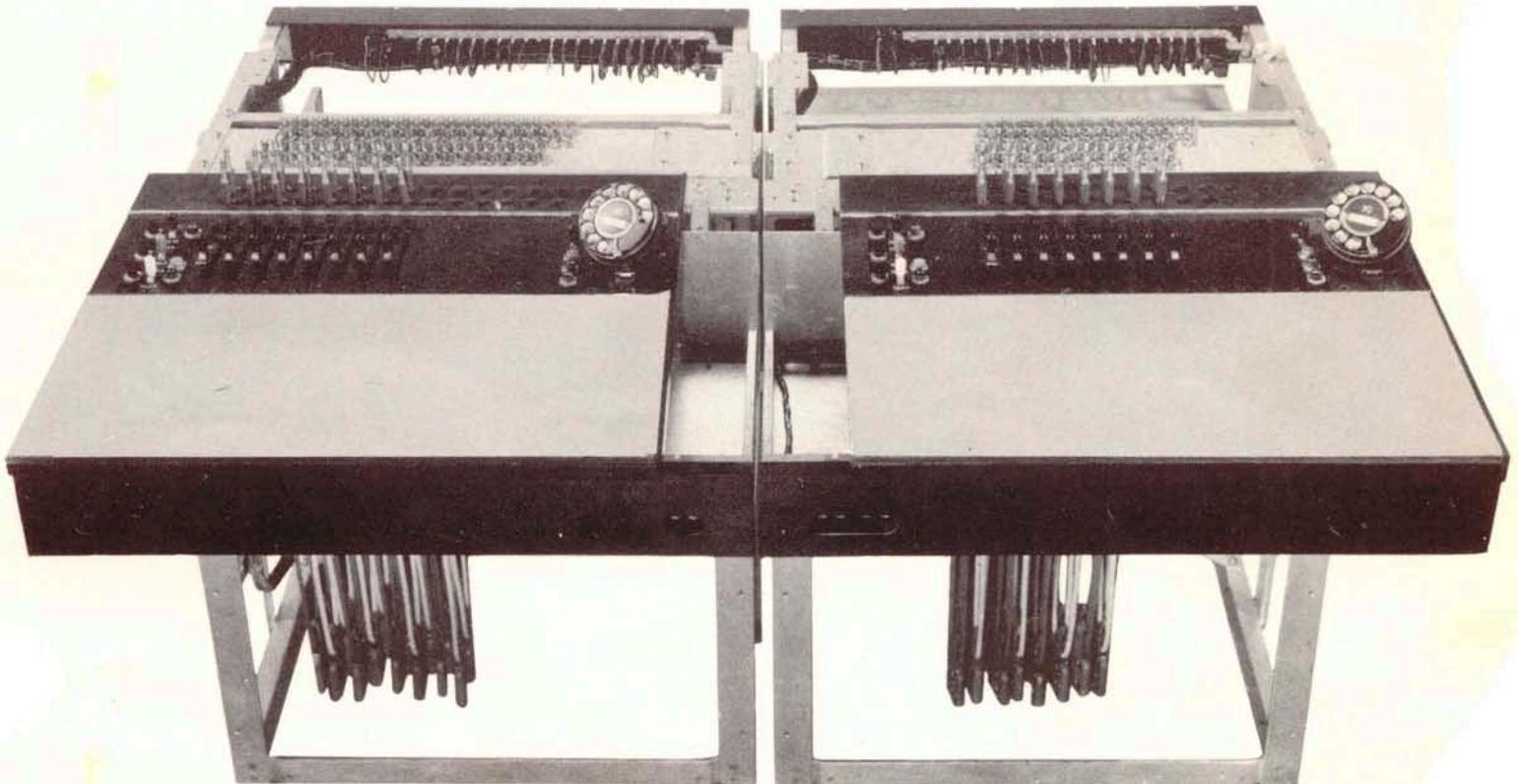
## *Trouble, Observation and Test Trunk*

Trouble observation and test trunks are used to permit the manual operator to perform the following on dial subscriber lines:

1. Monitor on incoming and outgoing calls.
2. Intercept incoming calls and extend them manually.
3. Extend calls manually to the observed telephones.

## *Traffic Meters*

Traffic meters are generally mounted in cable turning section.



Front View of Keyshelves Positional Framework

## MULTIPLE ARRANGEMENTS

Five panel multiple is generally used except on large installations when it is generally considered an advantage to have a seven panel multiple. Where seven panel multiple is used the head end and foot end position are generally non-operative positions.

Ordinarily twenty per strip jacks are used for all multiple. However, ten per strip jacks are available and can be specified.

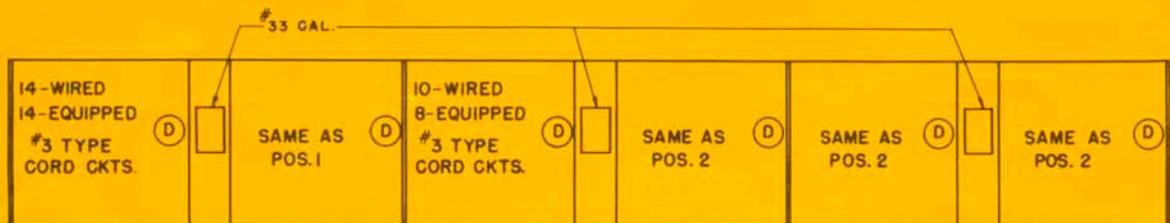
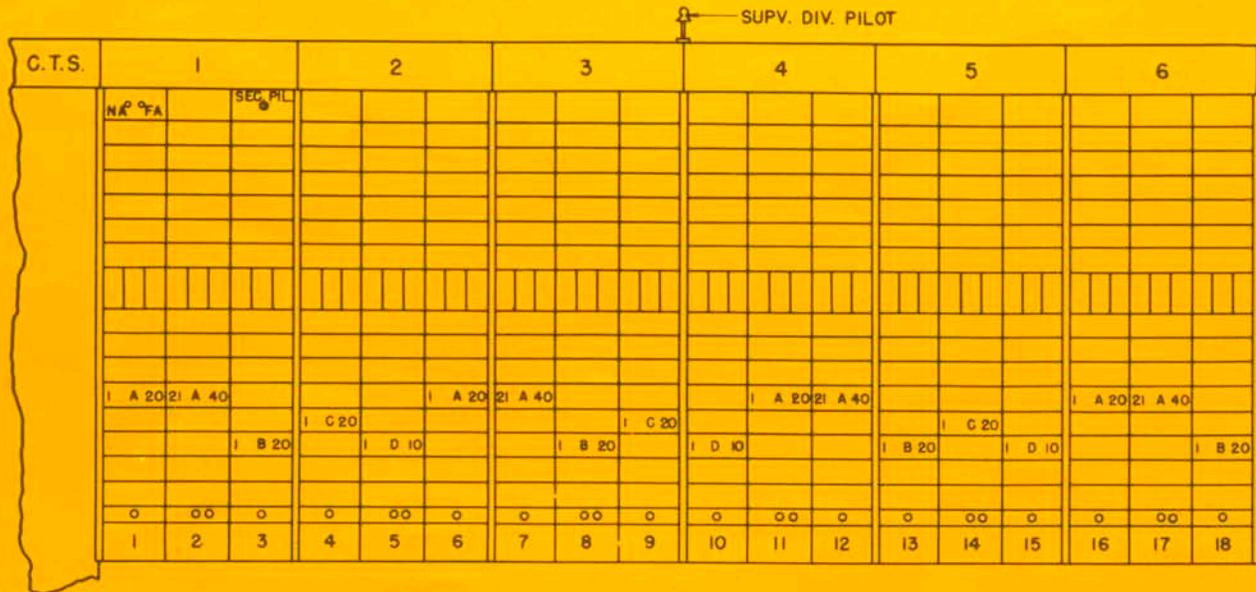
The following arrangement is generally used in arranging the multiple.

Ticket boxes are normally mounted immediately above the piling rail. The ticket boxes have three

compartments. One ticket box is furnished for each C.L.R. position generally in the left hand panel. At delayed call positions three ticket boxes are furnished, one in each panel.

The miscellaneous answering jack multiple is generally located immediately above the ticket boxes and is not necessarily multiplied throughout the switchboard.

Inter-toll and tributary answering jack multiple is placed immediately above the miscellaneous answering jack multiple and is multiplied in front of the inward and through operator only.



- A TOLL LINES
- B OUT DIAL
- C C.L.R.
- D MISC.

3-TWO POS. SECTIONS #3 TYPE TOLL SWBD.

# TOLL SWITCHBOARDS

The recording trunk multiple usually is multiplied in front of all operators and generally handles the following traffic:

- Special Service Trunks
- Subscriber Recording Completing Trunks
- Recording Trunks from Manual Boards
- Two-way Trunks from CDO (Community Dial Office) Offices Answering End
- Toll Subscriber Lines

Inter-toll and tributary outgoing trunk multiple: this multiple is used for the out ends of ring down or dial trunks and is generally placed before all operators. Switching trunk multiple: this multiple consists of all types of toll switching trunks and the completing end of CDO (Community Dial Office) operator office trunks.

Miscellaneous outgoing trunk multiple terminate the outward end of the following type of trunks:

- Delayed Outward Position
- Information
- Repair Service
- Directory

- Rate & Route
- Charge Assistants
- Chief Operator
- Toll Test Board
- Local Test Board
- Tone Demonstration

Ticket distribution may be either track type or pneumatic tube or by messenger. Track type system is usually used up to twelve positions if the rate and route work is handled at the positions. On large installation or where the ticket work is handled from a separate desk, the pneumatic tube system is recommended.

It is generally recommended that a toll I.D.F. be used on all #3 toll board installations, with the switchboard multiple equipment terminated on the vertical side and the relay rack equipment on the horizontal side. Through the use of an *I.D.F.* full flexibility is provided when multiple rearrangement is necessary due to growth in trunk groups or for other traffic reasons.

rate  
and  
route  
desk...



### Toll Relay Rack Equipment

Figure #3 shows a typical relay rack installation of 11 ft. 6 in. racks. All line and trunk relay equipment, key pulsing apparatus (with the exception of key

pulsing key sets), and any miscellaneous equipment is mounted on the toll relay rack. All relay rack equipment is unit mounted, with dust covers front and rear. The mountings are as follows:

Use	Code	Relay Mounting Space	Mounting Centers	Width	Vertical Spacing
Trunk & Line Circuits	6001	20	29-11/16"	30-7/16"	3-1/2"
"	6002	40	"	"	7"
"	6003	60	"	"	10-1/2"
"	6004	80	"	"	14"
"	6005	100	"	"	17-1/2"
"	6006	120	"	"	21"
"	6007	140	"	"	24-1/2"
Sender Finders	6009	40 Relays 20 Stepping Switches	"	"	20-15/16"

Each relay unit is wired and tested in the factory and shipped separately from the relay rack. Each unit has a terminal block that is connected with a machine made cable to the toll distributing frame. Fusing for the unit is provided on a 5 circuit basis at the top of each relay bay.

## GENERAL SERVICE FACILITIES

### Ring Down Toll Lines

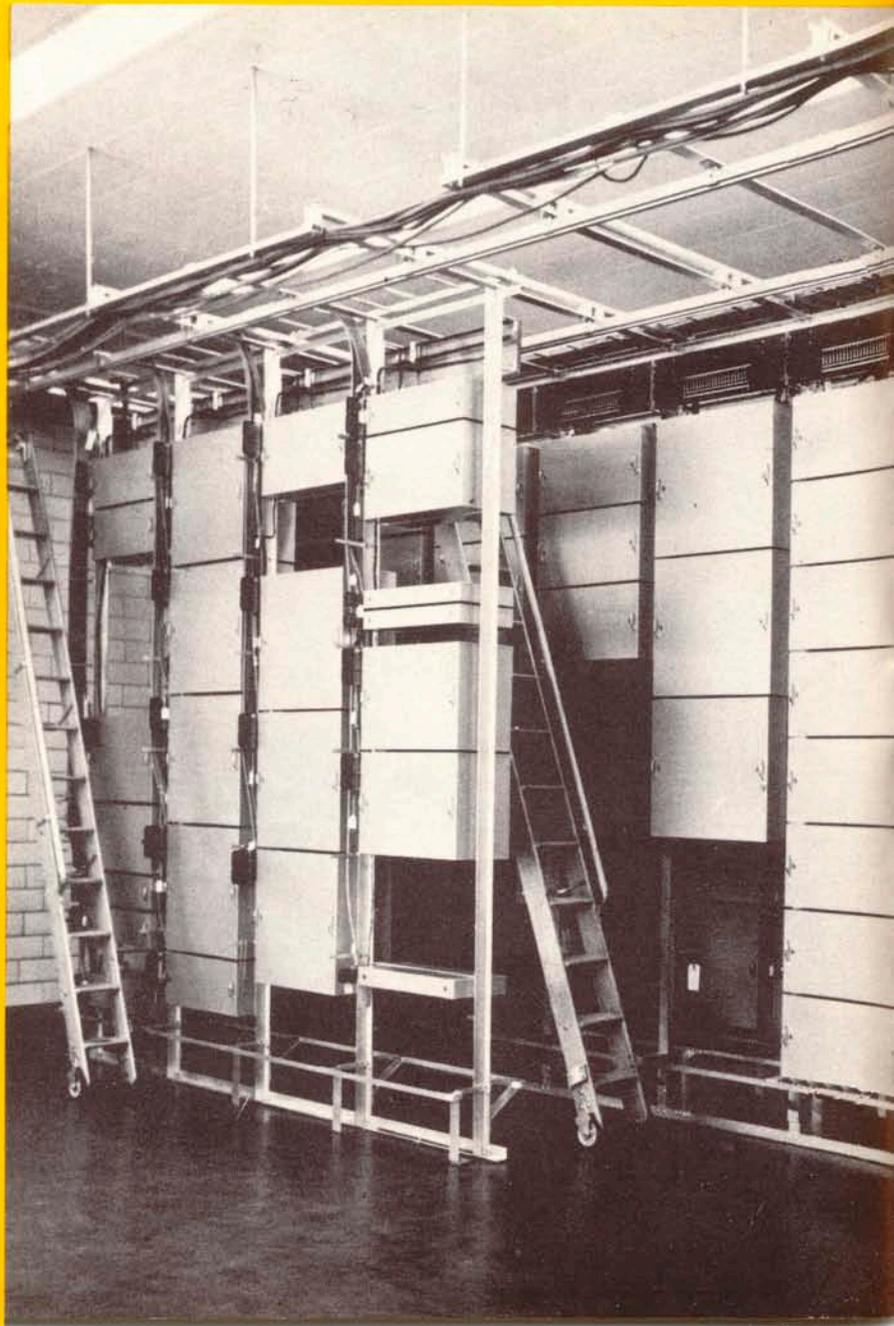
This trunk can be used as inter toll or tributary ring down termination and can be used with or without TX forwarding.

### Inter-Toll Dial Lines

Generally two-way inter-toll type polar-duplex trunks are furnished. The incoming and terminates on a toll first selector and the outgoing end on jacks in the multiple. This type of trunk furnishes hook switch supervision.

### Combined Line and Recording Trunks (C.L.R.) Regular

CLR trunks are used for giving local subscribers access to the toll board from the local selectors. A single party re-ring feature can be provided, if specified.



Relay Frames in Terminal Room at (Warren, O.)

# TOLL SWITCHBOARDS

## *Combined Line and Recording Trunk (CLR) Prepay Pay Station*

Toll calls from prepay pay stations reaches the toll switching via this type trunk. This circuit is arranged to refund the deposited coin automatically when the toll operator answers. After the call has been extended to the desired station, the operator requests the calling party to deposit the required coins. The operator

may collect or refund coins any time before or after the calling party disconnects. The toll operator may re-ring the calling party over this trunk.

## *Toll Recording Trunks (for local manual service)*

This type of trunk provides the local operator access to the toll board. This is not a completing type trunk, as the subscriber's hook switch supervision is not extended to the toll operator.

## *Community Dial Office Trunks (CDO):*

Various type of trunks are used between the parent exchange and the outlying community dial office.

Where free service is not permitted, two-way trunks are provided and calls to and from the CDO are completed at the toll board. Where free service is permitted, one way trunks are usually provided for extending calls to the CDO.

## *Toll Terminal Lines (Common Battery)*

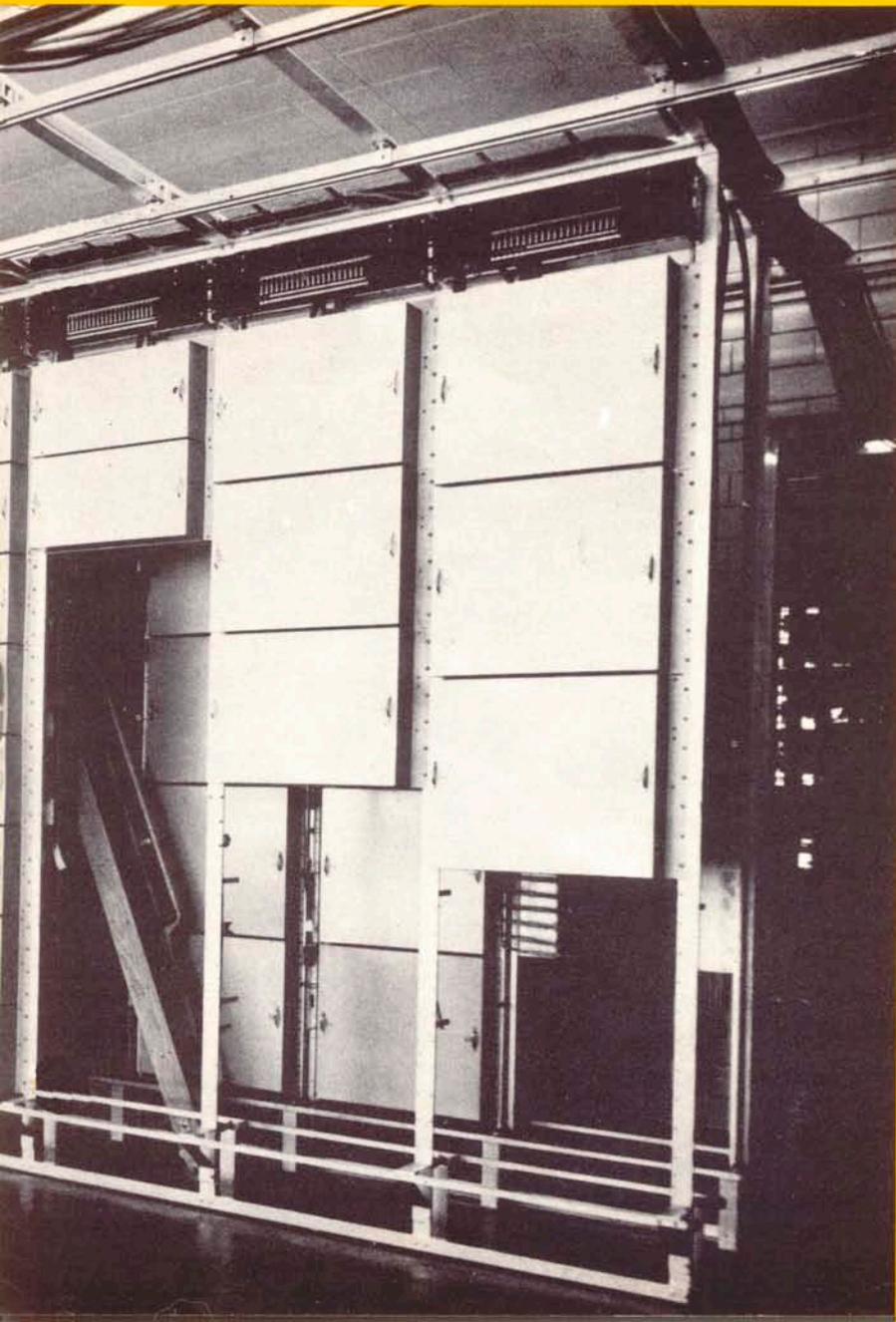
This type of trunk is used for heavy toll users to give them direct access to the toll switchboard. This same trunk can be used for post pay manual paystation lines.

## *Trunks to Toll Train (Toll Switching Trunks)*

An incoming call to a local subscriber is extended over a toll train trunk whenever a toll train has been provided. The toll train is designed to provide for all necessary supervision of a call. It is arranged to furnish flash busy to the toll operator when the called line is busy and busy tone to the calling subscriber. The toll train generally has controlled start of ringing. When specified, this trunk can be provided with coin control for prepay paystation.

## *Toll Switching Trunks (Manual)*

Various types of toll switching trunks can be provided. However, a straight forward type is generally recommended. This trunk is used for completing calls from the toll board to local manual stations, so that the toll operator will receive hook switch supervision and will have control of the start of ringing.



**Incoming Trunks from Toll Auxiliary Selector:**

On nation-wide operator toll dialing it is necessary to have trunks accessing the toll board from the inter toll selector banks and the following numbers are usually assigned for this purpose:

Inter toll inward	121
" " T X	11X or XX
" " Information	131
" " Call Order	151

**Inter-Position Trunks**

Inter-position trunks are one way automatic type trunks and are used for access from one position to another.

**Inter-Desk Trunks**

Inter-desk trunks are either one or two way automatic type trunks from the toll board to

- Rate Operator
- Route Operator
- Charge Operator
- Service Assistants
- Chief Operator
- Complaint Desk
- Local Information
- Toll Information
- Test Boards
- Repair Clerk

**Verification Trunk**

Verification trunks are used by the operator to verify busy numbers and CLR verification.

**Service Assistant's Circuit (Supervisors Circuit)**

Each 3 sections of switchboard constitutes one service assistant's division.

To call a service assistant the operator plugs into an outgoing trunk jack, this automatically lights the service assistant's division and section lamp. When the service assistant answers by placing her headset plug in the service assistant's jacks, associated with the division circuit, the lamps are extinguished and a talking path is established.

**Flashing Circuit**

The toll board positions can be equipped if specified

with flashing line lamps if a call is not answered within a period of 1-15 seconds (adjustable).

**Wire Chief's Test Cord**

Usually this cord is placed on a position that is equipped for DSA service or on large installations on the unequipped head end position.

This cord is designed to permit the test board to dial or ring on any circuit from the test board and receive supervision.

**Cord Test**

This circuit is generally provided one in each section and is arranged to test cord supervision, ringing, coin control and dial pulses.

**Intercept Trunks**

Intercept trunks are used to direct unassigned numbers and levels to a special operator.

## KEY SENDERS

Kellogg senders are unit mounted and consist of 1 pulsing circuit and 12 digit register circuits per base. This circuit is regenerative for two digits making it possible to send a 14 digit number.

Two general plans are provided:

1. Sender per Position.
2. Common group of Senders.

When Plan 1 is used, a sender is furnished for each position with 1 or 2 spare senders so in event of failure a spare sender can be patched in its place.

Plan 2 - The senders are pooled and a sender finder per position is provided, so that an operator can pick an idle sender out of the common group. This is done by pressing the K P key. The sender busy lamp will light when the sender is attached to the position circuit and will continue to glow as long as the sender is in use. A stop dial pilot lamp will glow as long as the sender is sending pulses to the trunk circuit. In a stop dial condition it is not necessary for the operator to stop keying the number.

# TOLL SWITCHBOARDS

## EQUIPMENT ARRANGEMENT

A toll I.D.F. is recommended with a #3-C type installation and is for the purpose of cross connecting the various line and trunk circuits to the proper switchboard appearances.

Lamp and jack equipment is usually furnished on a 5 or 7 panel basis.

Relays for toll lines and trunks are furnished in units arranged for relay rack mounting. The number of relays required per trunk circuit vary in number in accordance with the features included.

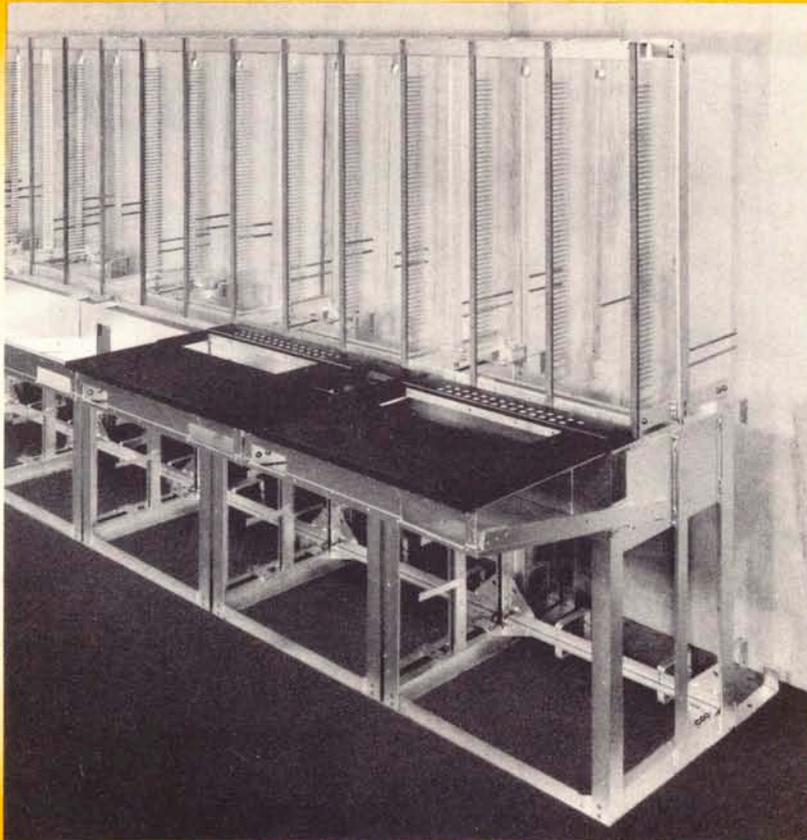
Some of the line and trunk circuits available are as follows:

- a. Ringdown line (20 cycle, composite, voice frequency or D.C.).
- b. Dial tributary line.

- c. Dial to dial line.
- d. Out dialing trunks to couplers or selectors.
- e. Combination line and recording (CLR) trunks.
- f. Interposition trunks.
- g. Intercepting trunks.
- h. Verification trunks.
- i. Supervisor section and division trunks.
- j. Intertoll dial trunks.

Position grouping is normally from left to right and cord circuits in any number of positions may be transferred to the position common equipment of one position by operating a cam key located on each keyshelf.

The positional equipment includes dial transfer, coin control, TX forwarding, key splitting, ringing control, night transfer, and peg count. As many as 14 cord circuits may be equipped in each position.



## GENERAL DESIGN AND SIZE

The toll board section is normally furnished with a low type 30" keyshelf having an overall height of 5'-2 $\frac{3}{4}$ " for switchboards which do not require pneu-

matic tubes. However, for boards requiring pneumatic tube and receiving valves a section 6'-2 $\frac{5}{8}$ " in height is available.

## SECTIONS

Single panel end section for multiple extension in low section only.

Calculagraph (33) panel half on between 2 positions. Completely wired lower positional unit removable. Box and end panels for either direction of growth #11 Birch.

Mahogany woodwork standard lift-out doors front and rear.

Large bulletin holder made of clear plastic flush with the top of the keyshelf fitted on the front of the keyshelf, which is 10 $\frac{3}{8}$ " from front to back and runs the full length of the keyshelf.

Black plastic finishing stiles with concealed mounting

screws are used to provide insulated face of switchboard.

Finishing stiles provide slots to insert number plates with colored sections.

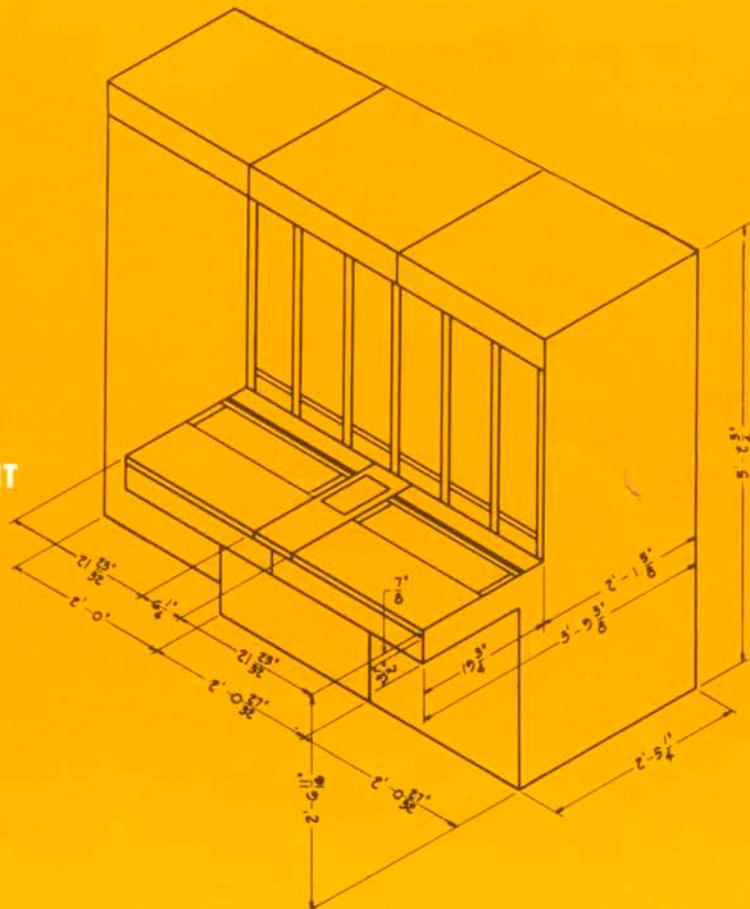
Small jacks are used with stile centers 8' $\frac{9}{32}$ ".

Line jacks can be laid out on a 5-panel multiple basis within easy reach of the end position operators or on a 7-panel multiple basis with end panel sections to provide the same access.

10 or 20 per strip spring jacks and lamp jacks are standard.

Combined lamp and designation strips can be used to reduce vertical height when extreme ultimate capacity is required.

**DIMENSIONS —  
CABLE TURNING SECTION  
AND TWO POSITION UNIT  
(STANDARD 2 POSITION  
6 PANEL SECTION)**



# TOLL SWITCHBOARDS

## METHOD OF OPERATING PROCEDURE

### *Answering Calls*

Place back cord (nearest the face equipment) into jack and operate talk key forward.

### *Completing Calls to Ring Down Type Trunks*

Place front (calling) cord into jack with talk key operated and operate the common ring key to the ring front position.

### *Completing Calls to Automatic Type Trunks*

Place front (calling) cord in jack and operate talk key.

### *Completing Calls to Dial Type Trunks (With Dial)*

Place calling cord into jack with talk key operated. If calling cord supervisory lamp is burning, the operator pulls the first digit. As soon as the dial is pulled off normal, the supervision is removed from the calling cord supervisory lamp and placed on the dial pilot lamp. The operator will then dial only while this lamp glows.

If dial pilot lamp gives flashing signals as below, operator stops dialing and follows flashed instruction.

- (1) 120 IPM flash reorder. Release by depressing error key and re-dial.
- (2) 30 IPM flash, no circuit available condition (NC). When a circuit becomes available, flash changes to 120 IPM. Release by depressing error key and re-dial. When dial returns to normal after last digit in number is dialed, depress dial release key.

### *Completing calls to dial type trunks (with senders)*

Place front "calling" cord into jack. With trunk key operated press key pulse key (KP). This causes a sender to be selected. When a sender is selected the number is keyed by depressing one key at a time of the key pulsing key set. These keys are designated numerically and alphabetically.

The sender will automatically disengage after it has finished pulsing.

### **ERRORS**

If the operator makes an error in keying or dialing a number, depress error key which releases the sender or dial and also the trunk circuit. (It is not necessary to remove plug from the jack except on completion of call.)

### **CORD SPLITTING**

- (1) To talk to calling party only, operate talk rear key.
- (2) To talk to called party only, operate talk front key.
- (3) To collect coin: depress coin collect key (CC).
- (4) To return coin: depress coin return key (CR). Coin pilot lamp will glow when coin is collected.

*TX Forwarding* — (If TX appearances are provided). With talk key operated momentarily operated TX forwarding key (TX) and remove answering cord from line jack. This operation will extinguish the incoming line lamp and light the line lamp in the TX appearance.

### *Dialing or Key Pulsing*

Dial or sender is associated with the calling cords as described in preceding paragraphs. To dial on answer cord proceed as described in preceding paragraphs except operate dial rear key in addition.

### *Manual Ringing*

- (1) With Talk Key Operated to ring on answering cord; operate ring rear key.
- (2) With Talk Key Operated to ring on calling cord; operate ring front key.

### *Master Ring Control*

The master ring control key (MRC) is located in the lock rail of each position. The master ring control key may be set for either delayed start of ringing or automatic start of ringing as desired.

### *Peg Count*

A peg count key is provided on each position and if connected to peg count meters will cause the meter to stop once each time the peg count key is depressed.

### *Monitoring — Cord Circuits*

To monitor a call, the monitor key is operated. This permits the operator to hear on the cord, but not be heard.

### *Overlapping*

The cord circuit is designed not to overlap calls as the first talk key operated automatically locks out all other talk keys.

Listening can be accomplished on two cords at one time by operating one talk key and one monitoring key. However, the talk key overrides the monitoring feature and any conversation can be heard on either cord.

When senders are used there can be no overlapping of calls. The talk key on the cord where the operator is key pulsing can be closed as soon as the keying of the number is completed. The talk key of another cord can then be operated while the sender is completing the dialing.

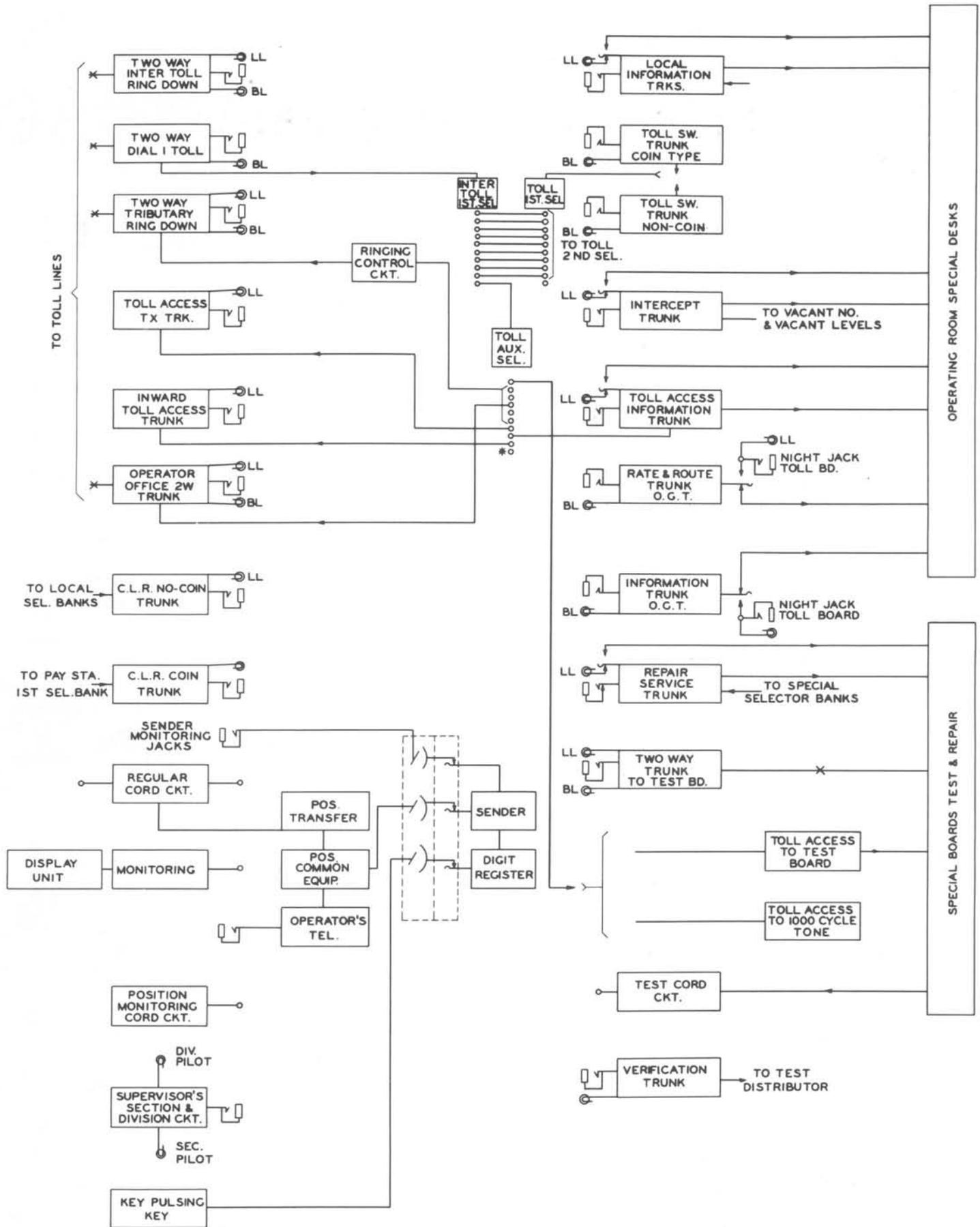
### *Cord Supervision*

Dark key shelf; off hook supervision.

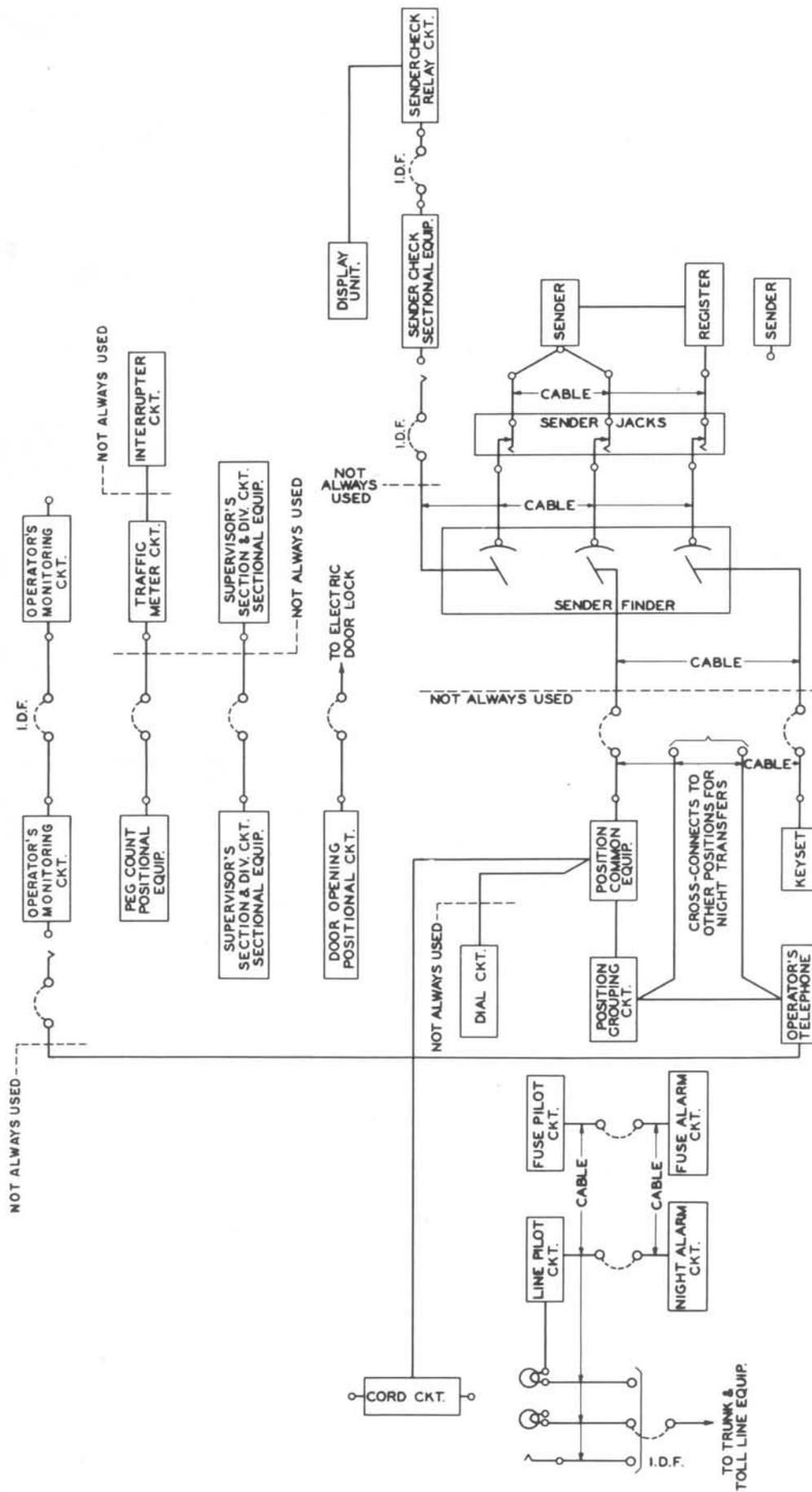
Light key shelf; on hook supervision, except while dialing or key pulsing. During dialing or key pulsing interval the supervision is transferred to the dial pilot lamp and regular supervisory lamp is dark.

### *Position Transfer*

To transfer the cord circuits of one position to an adjacent position, operate the position transfer key.



TYPICAL TRUNKING SCHEME FOR INTER TOLL DIALING NO.3 C.L. SWITCHBOARD



KEY SHEET FOR #3 TOLL BOARD



WARREN, OHIO  
KELLOGG 3C TOLL SWITCHBOARD



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**KELLOGG SWITCHBOARD AND SUPPLY COMPANY**

*A Division of International Telephone and Telegraph Corporation*  
Sales Offices: 79 West Monroe Street, Chicago 3, Illinois



## *Kellogg Bulletin 5410, 1954*

### *Kellogg No. 3 Toll Switchboard*

Published in a vertical format 8½ inches wide and 11 inches high, and lithographed on 60# coated paper in two colors, black and yellow.

Also of note is the Kellogg griffin logo from the 1930's and the absence of the ITT logo.

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