

Caution: In the past, schematics published in this manual have been found to contain inaccuracies.

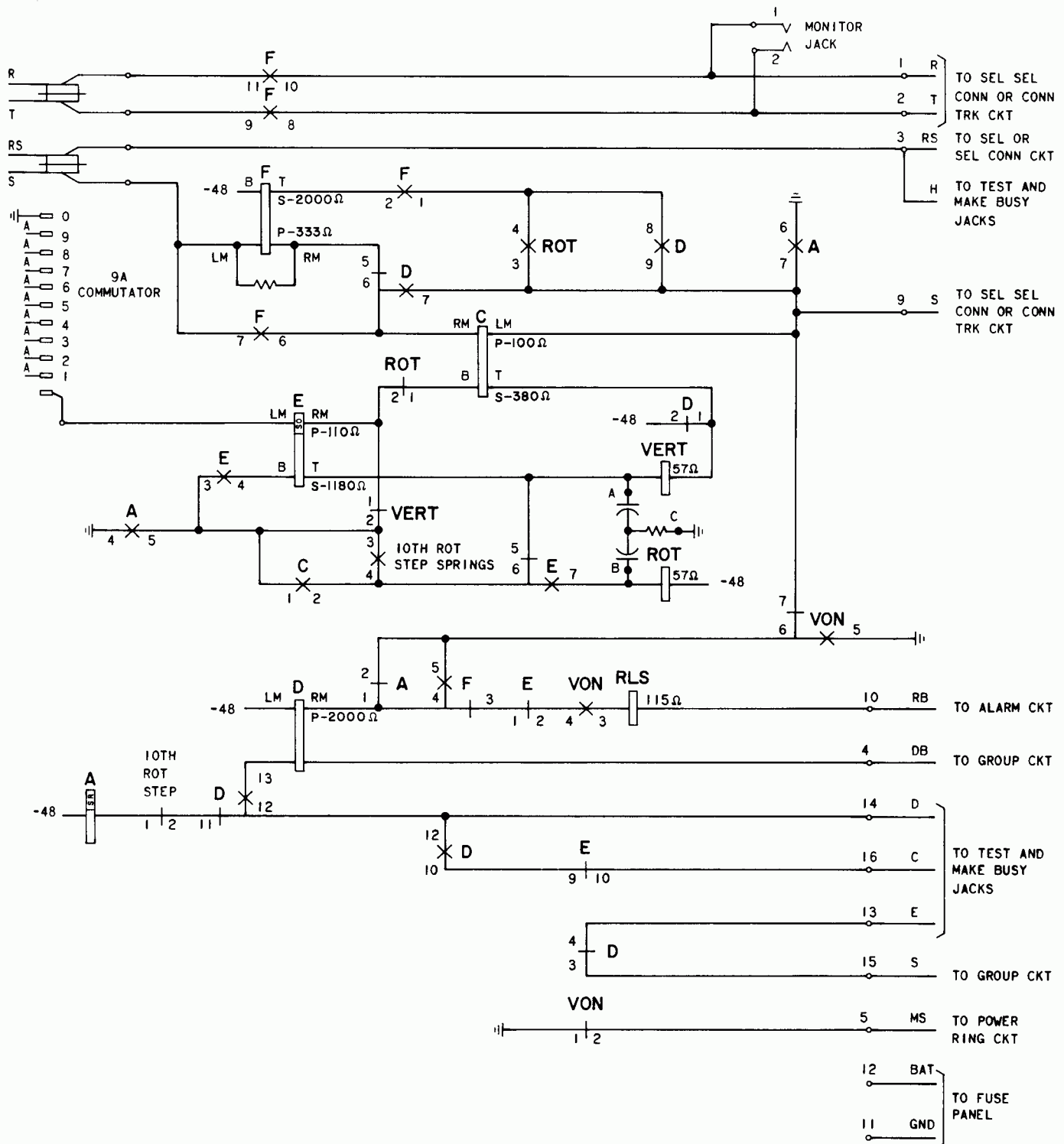


Fig. 19 — 100-Point Line Finder Circuit SD-65720-01, 740E PBX

Corrections:

2-18.12 SK - Added F relay contacts 1&2; Added 10-Rotary contact sprg 3 & 4 notations

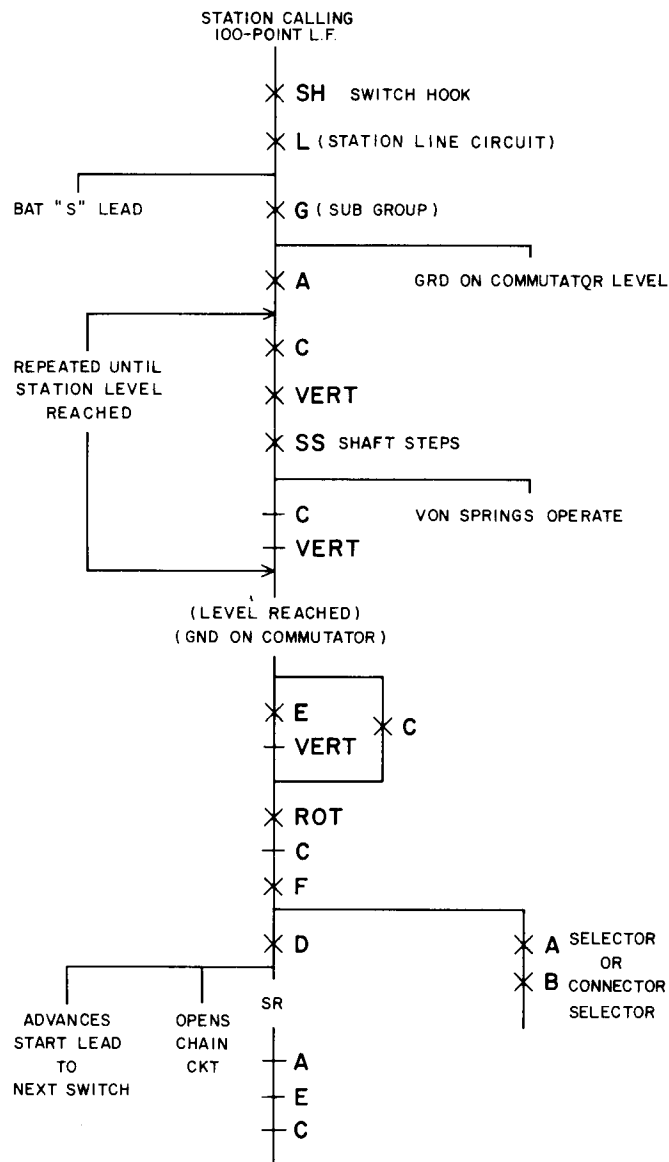


Fig. 20 — 100-Point Line Finder Sequence Chart — Station Calling — SD-65720-01, 740E PBX

Page 1

the line finder bank and also connects ground to lead "G" of Figs. 2, 3 or 4 causing the (G) relay to operate. Relay (G) grounds a segment of the commutator corresponding to the level in which the line is located. Relay (G) also grounds the start lead which operates relay (A) of the finder circuit. Relay (A) grounds the "S" lead, opens the release circuit and operates the stepping relay (C) on its secondary winding. The stepping relay (C) operates the vertical magnet which steps the shaft up and releases relay (C). The release of the (C) relay releases the vertical magnet which again operates the (C) relay. This cycle repeats until the commutator brush reaches the segment which is grounded by the operation of relay (G). When this segment is reached relay (E) operates in series with the secondary winding of relay (C). This holds relay (C) in the operated position to prevent further stepping. Relay (E) is made slow in operating to give a short time between the last vertical step and the first rotary step to prevent snagging of wipers due to vibration. The operation of the (E) relay transfers the stepping circuit from the vertical to the rotary magnet. The rotary magnet then steps the shaft around until the sleeve wiper reaches the terminal which is connected to battery thru the winding of a relay in the line circuit. When the S wiper finds the battery on the calling sleeve terminal, relay (F) is operated in series with the primary winding of relay (C), sufficiently to close contacts 1 and 2 and relay (C) is held operated to prevent further stepping. On the closure of contacts 1 and 2 on relay (F) its secondary winding is energized. The relay then fully operates and locks under control of the rotary magnet and (A) relay. The operation of the (F) relay closes the tip and ring through from the line to the selector or selector connector, short circuits its primary winding, opens the release circuit and operates relay (D). The operation of relay (D) closes the sleeve lead through from the selector or selector connector to the line, closes the locking circuit for relay (F) in multiple with contacts on the rotary magnet; opens the test circuit to the S brush; opens the multiple chain circuit, transfers the "in" start lead from relay (A) to the "out" start lead and secondary winding of relay (D), removes battery from the (C) and (E) relays and the vertical magnet; and releases relay (C) by short-circuiting its P winding. This allows relay (E) to release. Relay (A) is made slow to release for the purpose of holding a ground on the sleeve lead during the time required by the associated selector or selector connector to connect ground to the sleeve lead.

When the line finder cuts thru to the calling line, relay (G) releases, providing there is no other line in the subgroup originating a call. The release of relay (G) removes the ground from the "ST" lead in order to prevent false starting of the line finder to which the start lead has been extended.

6. RELEASE

When the originating station disconnects before the line is found, ground is removed from lead "G" releasing the (G) relay of Figs. 2, 3 or 4. The (G) relay released releases the (A) relay of the finder. This closes a circuit for energizing the release magnet.

When the originating station disconnects after the line is found, the associated selector or selector connector functions, removing ground from the sleeve lead which allows relay (F) to release. The release of relay (F) closes a circuit to energize the release magnet. Relay (D) is held until the finder returns to normal. The purpose of the secondary winding of relay (D) is to hold the relay operated if the finder is returned to normal at a time when the start lead is advanced through this finder circuit and has started a succeeding finder, until the finder thus started has found the line.

7. RELEASE ON 10TH ROTARY STEP

If, for any reason, this switch fails to stop on the calling line it will rotate to the 10th step, operating the 10th step springs. This releases the (A) relay and short-circuits the springs of relay (C), preventing further stepping. The release of relay (A) permits the switch to release, unless the line on the 10th step is calling, in which case relay (F) will operate to open the circuit of the release magnet.

8. ALL FINDERS BUSY

When all finders are busy the multiple chain circuit is opened allowing relays (CH) and (S) of Figure 6 to release, which operates relay (OB). Relay (OB) closes a circuit to operate the all finders busy register, except when the (TST) key is operated, and removes the ground from the top armature springs of all the (G) relays in the group. This removes the ground from the start lead to allow the (D) relay of any finder which may become idle, to release. When any of the finders become idle the multiple chain circuit is closed operating relays (CH) and (S) and allowing relay (OB) to release.

9. TROUBLE ON CHAIN CIRCUIT

If any part of the chain circuit becomes crossed with battery or ground either relay (S) or (CH), depending upon whether the lead is crossed with battery or ground, releases. This lights the (C) lamp in series with a relay in the alarm circuit.

10. CALL BLOCKED ALARM

The operation of any (G) relay in the group grounds the (CB) lead which operates a relay in the alarm circuit and brings in an alarm if the (CB) lead remains grounded for a predetermined length of time.

11. SWITCH ACTION WHEN START WIRE IS FALSELY GROUNDED OR WHEN CALLING LINE IS NOT FOUND

In case of a false ground on the start lead, or if for any reason the calling line is not found when the start lead is grounded, the switch will go to the tenth rotary step, closing the rotary step springs. This releases relay (A) and holds the rotary magnet to prevent further stepping. The release of relay (A) operates relay (D) and releases relay (E) and the rotary magnet. The release of the (E) relay operates the release magnet restoring the switch to normal. The (D) relay locks on its secondary winding to the ground on the start lead and together with the release of the (E) relay advances the start wire to the next switch.

11.1 Circuit Operation on False Ground On Start Lead

As soon as the (D) relays of all finders are operated the (CH) and (S) relays release and the (OB) relay operates. The (OB) relay operated operates relay (GD) from ground on the start lead. Relay (GD) operated operates relay (AL) which in turn locks to ground at the (AR) key, lights the (S) lamp in series with a relay in the alarm circuit and operates relay (CI). The operation of relay (CI) removes the battery from the secondary windings of the (D) relays in all finders, allowing the (D) relays of idle finders to release. The first (D) relay to release operates (CH) and (S) relays which in turn releases relays (OB), (GD) and (CI). The release of the (D) relays again causes the finders to hunt in sequence.

However, if any line is attempting to make a call a finder will stop on the proper level and connect such line through to the selector or selector

connector. Relay (AL) will remain locked and give an alarm until the trouble is cleared and the relay is released by means of the (AR) key.

11.2 Circuit Operation When Calling Line is Not Found

As soon as the (D) relays of all finders are operated, the (CH) and (S) relays release and the (OB) relay operates. The (OB) relay operated removes the ground from the start lead in turn allowing the (D) relays of all idle finders to release. The first (D) relay to release operates relays (CH) and (S) which in turn release relay (OB). The release of relay (OB) again grounds the start lead and causes the finders to hunt in sequence. After a predetermined length of time a call block alarm is brought in, see paragraph 10 above. However, if any line is attempting to make a call, a finder will stop on the proper level and connect such line through to the selector or selector connector.

12. TEST JACK

The test jack is provided for making routine tests of the finder and also serves as a means for making the finder busy. When a make busy plug is inserted in the test jack the start lead is advanced to the succeeding finder and the multiple chain circuit is opened. The monitor jack provides means for connecting a talking set with the talking circuit of the finder.

13. RELEASE SIGNAL

Battery for the release magnets is supplied through a supervisory relay in the alarm circuit for the purpose of providing an alarm if a finder fails to release. This relay is also used for obtaining a peg count of the number of originating calls.

14. RESISTANCES

Resistances (C) and (S) in Fig. 6 are provided to assure operating current for the associated alarm relay and also to operate the alarm relay if the lamp is open.

15. CONTACT PROTECTION

The (C) network in Fig. 1 is provided for the purpose of protecting the contacts that make and break the circuit to the stepping magnets.

16. TEST LINE JACKS FIGURE 8

The test line jacks are provided for convenience in making routine tests of the finders.

G-46477
3

17. FINDER START TEST KEY FIGURE 6

A finder start test key (TST) is wired to the winding of the group relay in the first group. The operation of the (TST) key operates the associated (G) relay. The purpose of this is to enable the test man to make a quick test of the start lead and all finders in a line finder unit. The operation of a group relay in the finder circuit without the operation of any line relay to connect battery to the sleeve lead of the finder bank starts one finder at a

time, each finder goes to overflow and the circuit is extended to the next finder, until all finders have gone to their overflow position. If the test is repeated without releasing the key, then the last finder operated on the first cycle of the test will not operate on the succeeding test. The operation of the (TST) key opens the operating circuit for the "all finders busy" register but if the key is released during the time that all finders are busy the register may operate.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3320-RBL-RCD-UH