LINE FINDER FRAME
EQUIPMENT DESIGN REQUIREMENTS
PANEL SYSTEMS

1. GENERAL

Scope

1.01 This specification, together with the supplementary specifications, keysheets, drawings, equipment explanations, and circuit descriptions listed herein, covers the equipment design requirements for the framework, equipment and circuits to be used in the manufacture and installation of the line finder frame for use with subscribers' links and line circuits having either battery or ground on the cut-off relays in panel offices.

1.02 This specification is reissued to incorporate previous appendix changes and to change the rating from "AT&TCo Standard" to "A&M Only." Specification J27401, Issue 3 is superseded by J27402, Issue 1.

Capacity

1.03 The capacity of the line finder frame is as follows:

Line Circuits 28-28 group (1 frame)	800
" " 40 " (2 frames)	1200
" " 60 " (1 frame)	400
" " 80 " (4 frames)	1200
Line Finder Circuits 28-28 group (1 frame)	56
Line Finder Circuits 40, 60 or 80 group (1 frame)	60
Trip Circuits (per 400 lines)	10
Emergency Trip Circuit (per 400 Lines)	1
Start Circuit (per 400 Lines)	1
Emergency Start Circuit (per 400 Lines)	1

Description

Line Finder Frame

1.04 The line finder frame is one of a chain of frames required for the originating traffic. It is a steel structure of a type known as a "double sided" frame designed for mounting ten panel type banks of 40 sets of terminals each, 56 or 60 line finders of the power driven selector type, and associated relays and miscellaneous apparatus.

1.05 A typical line finder frame consists of a center bay in which are mounted the banks, friction roll drive, clutches, brush rods, trip rods, etc., and one or two relay bays in which are mounted the line and trip circuit relays depending on whether the line finder frame is arranged for 28, 40, 60, or 80 line finder groups as described below. There is also a frame without a line relay bay which, under certain conditions, is used in combination with the frame with one line relay bay to complete an 80 selector group. The line relay bay for the line finder frame is an integral part of the frame assembly.

1.06 When a frame has two line relay bays, one bay is located on each side of the frame. When a frame has only one line relay bay, the line relay bay is generally located on the right side of the frame although with certain floor plan arrangements of 40 and 80 selector group frames the line relay bay will be located at the left of the frame.

1.07 It should be noted that the "front" of the frame is arbitrarily chosen as that side on which the odd numbered line finders are located. Actually the framework is the same whether the

line relay bay is at the right or at the left, as the framework is simply turned around.

1.08 The use of the three frames — that is with one or two line relay bays or with no line relay bay — the manner in which they shall be arranged on the floor, and the locations of the divisions in the multiple banks to obtain 28, 40, 60 or 80 selector groups will be understood by referring to the floor plan drawing data sheets.

1.09 The line finder frame may be arranged in two general classifications as described below first, with respect to the construction of the framework and secondly, with respect to capacity.

Line Finder Framework

1.10 As referred to in above there are three types of frames with respect to the construction of the framework; namely a frame complete without a line relay bay, a frame with one line relay bay and a frame with two of these bays, one on each side of the frame.

Frame Without Line Relay Bay

1.11 The line finder frame without a line relay bay consists of a center bay for mounting the multiple banks, friction roll drives, clutches, brush rods, trip rods, etc. The design of this frame is shown on ED-20235-01.

Frame With One Line Relay Bay

1.12 The frame with one line relay bay is the same as the frame described in the above section except that it has a bay on the side for mounting ten line and trip circuit units and one start and emergency trip circuit unit. The design is shown on ED-20236-01.

Frame With Two Line Relay Bays

1.13 The frame with two line relay bays is like the one described above except that it has a line relay bay on each side. The design of this frame is shown on ED-20237-01.

Line Finder Frame Capacity

1.14 Line finder frames are also divided with respect to the number of line finders having access to each group of 400 subscribers' lines into four types known as 28, 40, 60 and 80 group frames. These four capacities are obtained by various arrangements and combinations of bank and selectors, trip rods, etc.

28 Selector Group

1.15 On the 28 group frame there is a distinct electrical division in the middle of the multiple banks. There is no connection between the terminals in the two halves of the banks or between the trip rods associated with the selectors having access to the terminals in the two halves of the banks. The frame has a total of 56 selector positions, 28 of which appear before each half of the multiple banks. The frame is virtually divided vertically into two equal parts and 400 subscribers lines can be terminated on each half of 400 subscribers lines each served by 28 line finders.

1.16 For multiple slip reasons there is a further division of each half of each bank on the 28 group frame into two equal parts the terminals of which are connected with hand-formed cables. The two halves of each group, together with their associated line finders, are called "sub-groups" and are designated by the letters A and B.

1.17 Since a line relay bay is required for each group of 400 subscribers lines, a framework per ED-20237-01 is always required for the 28 group frame.

40 Selector Group

1.18 On the 40 group frame the complete division in the multiple banks is so located that 40 selectors have access to the terminals in one part of the bank and 20 selectors have access to the terminals in the remaining portion of the bank. Two associated frames are required to form three groups, the 20 selectors on the first frame being combined with 20 selectors on the second frame to form the middle one of the three groups. The banks of the two frames are turned with the 20 selector ends toward each other and the multiple slip between the banks is taken care of by means of the unit local cables which connect the two frames.

1.19 Considering the second group, sub-group A is on one frame and sub-group B is on the other.

1.20 Two frames arranged in the above manner have a capacity of three groups of 400 subscribers lines each served by 40 line finders. One framework having two line relay bays per ED-20237-01 and one framework having one line relay bay per ED-20236-01 are thus required for the combination.

60 Selector Group

1.21 The 60 selector group is self-contained on one frame with the multiple slip between the sub-groups taking place in the center of the banks. The one line relay bay frame per ED-20236-01 is always required for mounting this group.

80 Selector Group

1.22 Four frames are required to obtain three groups of 80 selectors each. Two kinds of banks are used. The banks on the first frame are divided at the 40-20 point and connected with slip cables. There is a complete electrical division in the banks on the second frame at the 20-40 point. The 20 selector portions of the banks on the first and second frames are connected by unit local cables without slip.

1.23 The banks on the third frame are the same as those on the second frame except so turned that the complete electrical division occurs at the 40-20 point. The 40 selector portions of the banks on the second and third frames are connected with unit local cables with slip.

1.24 The banks on the last frame are the same as those on the first frame except so turned that the slip cables occur at the 20-40 point. The 20 selector portions of the banks on the third and last frames are connected with unit local cables without slip.

1.25 From the above description it will be noted that the first group occupies all of the first frame and one third of the second frame. The second group occupies two-thirds of each of the second and third frames. The third group occupies one third of the third frame and all of the last frame. This is shown clearly on equipment drawing ED-20243-01.

1.26 Three one line relay bay frames ED-20236-01 and one frame without a line relay bay ED-20235-01 are required to mount three 80 selector groups.

1.27 The line finder frames are available in but the standard height, 11'-6".

Building Requirements

Ceiling Heights

1.28 The recommended ceiling height of rooms in which line finder frames are located, as well as for other panel type selector frames, is 13'-0" under the floor slab and 12'-6" clear under the girders. If the Telephone Co.'s floor plans show lower ceiling heights than the above, an investigation shall be made to determine whether or not the standard 11'-6" frame can be used. In deciding this, the location and the arrangement of the frames with reference to the ceiling girders and beams, the superstructure to be used and the cabling requirements shall be taken into consideration. If the standard height of frame cannot be used, the question regarding the design of the frame to be furnished shall be referred to the Bell Telephone Laboratories.

Floor Plan Arrangement

1.29 Since the 28 group frame is symmetrical, the arrangement on the floor is the same for either left to right or right to left growth.

1.30 In arranging 40 group frames, the first frame of a pair shall always be a frame having two line relay bays.

1.31 The 60 group frame shall always be so arranged that the line relay bay will be at the right side.

1.32 In arranging 80 group frames, the first frame of a group of four frames shall be a frame with a line relay bay.

1.33 On account of the close relation between the line finder and district selector circuits it is desirable for maintenance reasons that the line finder and district frames be located near each other on the same floor. This is also desirable for cabling reasons. The line finder frames should also be located as near the intermediate distributing frame as practicable

in order to shorten the lengths of the subscribers' line cable runs.

Subdivisions of Equipment

J27401D (A&M Only) — Line Relay and Trip Circuit Unit — Battery on the (CO) Relay

J27401J (A&M Only) — Line Relay and Trip Circuit Unit — Ground on the (CO) Relay

2. SUPPLEMENTARY INFORMATION

815-000-000 — Panel Systems Index

AA128.006 — List of General Engineering Requirement Specifications

X-61400 — List of Engineering Requirement Specifications — Battery on the Cut-Off Relay

X-61200 — List of Engineering Requirement Specifications — Ground on the Cut-Off Relay

3. DRAWINGS

Framework

ED-20235-01 — Assembly of Frame with No Line Relay Bay

ED-20236-01 — Assembly of Frame with 1 Line Relay Bay

ED-20237-01 — Assembly of Frame with 2 Line Relay Bays

ED-20238-01 — Assembly of Line Relay and Trip Circuit Unit

ED-20239-01 — Assembly of Start and Emergency Trip Circuit Unit

ED-20509-01 — Assembly of Fuse Panel — (Item 38 — Battery on (CO) Relay, Item 22 — Ground on (CO) Relay)

ED-20182-01 — Oil Guards

ED-20293-01 — Framework Limits

Circuits

SD-21300-01 — Master Keysheet — Battery on (CO) Relay

ES-262858 — Master Keysheet — 3 Digit Office Code — Panel Link Equipment — Ground on (CO) Relay

ES-262859 — Master Keysheet — 2 & 2-3 Digit Office Codes Panel Link Equipment — Ground on (CO) Relay

ES-262829 — Master Keysheet — 3 Digit Office Code Rotary Link Equipment — Ground on (CO) Relay

ES-262849 — Master Keysheet — 2 & 2-3 Digit Office Codes Rotary Link Equipment — Ground on (CO) Relay

Equipment and Numbering

ED-20240-01 — Equipment for 28 — Selector Group

ED-20241-01 — Equipment for 40 — Selector Group

ED-20242-01 — Equipment for 60 — Selector Group

ED-20243-01 — Equipment for 80 — Selector Group

ED-20244-01 — Equipment for Line Relay and Trip Circuit Unit

ED-20245-01 — Equipment for Start and Emergency Trip Circuit Unit

ED-20153-01 — Fuse Panel — Equipment — Battery on (CO) Relay

ED-20507-01 — Fuse Panel Equipment — Ground on (CO) Relay

ED-20246-01 — Terminal Strip Equipment

Wiring and Cabling

ED-20247-01 — Frame Local Cable

ED-20248-01 — Local Cable Line Relay and Trip Circuit Unit

ED-20249-01 — Local Cable Start and Emergency Trip Circuit Unit

ED-20253-01 — Local Power Cable

ED-20250-01 — Method of Cabling

ED-20251-01 — Cabling Schematic Between Line Finder Frames and District Frames

ED-20252-01 — Typical Schematic Layout — Battery (CO) Relay

ES-420200 — Typical Schematic Layout (Panel Link — Ground on (CO) Relay)

ES-299914 — Typical Schematic Layout (Rotary Link) — Ground on (CO) Relay

ED-20257-01 — Method of Wiring Line Circuit — Battery (CO) Relay

ED-20623-01 — Method of Running and Supporting Frame Battery and Ground Leads

ED-20459-01 — Arrangements at D.P.T.S.

ES-224278 — Line Circuit Arrangement of Cross Connections — Ground on (CO) Relay

4. EQUIPMENT

J27401D (A&M Only) — Covers wiring and equipment for one Line Relay and Trip Circuit unit — Battery on the (CO) relay.

Equipment — ED-20244-01

List 1 — For Flat Rate, M.R.I. (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20294-01 or similar circuits)	40	40	5.11
Trip Circuit	1	1	

List 2 — For Flat Rate, M.R.I. where the multiple is split between two frames (Units 1 to 9 only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 1.

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20294-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 3 — For Message Rate Two Party Lines. (Units 1 to 9 Only.)

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20294-01 or similar ckts.	40	40	5.11
Trip Circuit	1	1	

List 4 — For Message Rate Two Party lines where the multiple is split between two frames (Units 1 to 9 Only).

Line Relay & Trip Unit Loc. Ca. ED-20248-01, Fig. 1.

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20294-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 5 — For Flat Rate, M.R.I. arranged for testing purposes (Unit "0" Only).

Line Rel. and Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 6 — For Flat Rate, M.R.I. arranged for testing purposes and where the multiple is split between two frames (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 1

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 7 — For Message Rate Two Party lines arranged for testing purposes (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 8 — For Message Rate Two Party lines arranged for testing purposes and where the multiple is split between two frames — (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 1.

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 9 — For Coin Box lines with or without the Coin Deposit Before Dial Tone feature (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20294-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 10 — For Coin Box Lines with or without the Coin Deposit Before Dial Tone feature and where the multiple is split between two frames (Units 1 to 9 Only).

Line Relay & Trip Unit Loc. Ca. ED-20248-01, Fig. 1

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20294-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 11 — For Coin Box lines with or without the Coin Deposit Before Dial Tone feature and arranged for test purposes (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 2.

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 12 — For Coin Box lines with or without the Coin Deposit Before Dial Tone feature. (Unit "0" Only) arranged for test purposes and having the multiple split between two frames.

Line Rel. & Trip Unit Loc. Ca. ED-20248-01, Fig. 1.

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (ED-20294-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 13 — For Message Rate Two Party lines with zone and Overtime Charging (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-21460-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 14 — For Message Rate Two Party lines with Zone and Overtime Charging and where the multiple is split between two frames (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-21460-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 15 — For Message Rate Two Party lines with Zone and Overtime Charging and arranged for testing purposes (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-21460-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 16 — For Message Rate Two Party Lines with Zone & Overtime Charging and arranged for testing purpose where the multiple is split between two frames (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-21460-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

J27401J (A&M Only) — Covers wiring and common equipment for one Line Relay and Trip Circuit unit — Ground on the CO relay.

Equipment — ED-20244-01

List 1 — For Flat Rate, M.R.I., also for Message Rate Two Party lines with Zone and Overtime Charging (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuit (SD-20298-01 & SD-21463-01 or similar circuits)	40	40	5.11
Trip Circuit	1	1	

List 2 — For Flat Rate, M.R.I., also for Message Rate Two Party lines with Zone and Overtime Charging and where the multiple is split between two frames (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20298-01 and SD-21463-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 3 — For Message Rate Two Party Lines (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20298-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 4 — For Message Rate Two Party lines where the multiple is split between two frames (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20298-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 5 — For Flat Rate, M.R.I., also Message Rate Two Party lines with Zone and Overtime Charging. (Unit "0" Only) and arranged for testing purposes.

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	

	WIRE	EQUIP	SEE NOTE
Line Circuits (SD-20298-01 and SD-21463-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 6 — For Flat Rate, M.R.I., also for Message Rate Two Party lines with Zone and Overtime Charging. (Unit "0" Only) arranged for testing purposes and where the multiple is split between two frames.

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20298-01 and SD-21463-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 7 — For Message Rate Two Party lines arranged for testing purposes (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20298-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 8 — For Message Rate Two Party lines arranged for testing purposes and where the multiple is split between two frames (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1.)

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20298-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 9 — For Coin Box Lines with or without the coin deposit Before Dial Tone feature (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2.)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20298-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 10 — For Coin Box lines with or without the Coin Deposit Before Dial Tone feature and where the multiple is split between two frames (Units 1 to 9 Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1)

	WIRE	EQUIP	SEE NOTE
Line Relay & Trip Unit Framework ED-20238-01	–	1	
Line Circuits SD-20298-01 or similar circuits	40	40	5.11
Trip Circuit	1	1	

List 11 — For Coin Box Lines with or without the Coin Deposit Before Dial Tone Feature and arranged for testing purposes (Unit "0" Only).

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 2).

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20298-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

List 12 — For Coin Box lines with or without the Coin Deposit Before Dial Tone feature. (Unit "0" Only) arranged for test purposes and having the multiple split between two frames.

Line Rel. & Trip Unit Loc. Ca. (ED-20248-01, Fig. 1).

	WIRE	EQUIP	SEE NOTE
Line Relay and Trip Unit Framework ED-20238-01	–	1	
Line Circuits (SD-20298-01 or similar circuits)	38	38	5.11
Trip Circuit	1	1	
Exercise Test Circuit	1	1	
Originating Test Circuit	1	–	

5. EQUIPMENT NOTES

General

5.01 The number of line finder frames equipped and cabled shall conform with the information contained on ED-20251-01.

5.02 This frame will be used only as the fourth frame of an 80 selector group.

5.03 The frame local cable consists of the leads from the commutators, clutches, test and talking jacks, and other common alarm leads which terminate on the frame terminal strips.

5.04 The relay bay local cable consists of the leads from the fuse panel and start jack which terminate on the line relay and trip circuit unit and start and emergency trip unit terminal strips. One local cable is required for each line relay bay.

5.05 The line relay and trip circuit unit local cable shall be furnished in accordance with ED-20248-01, Fig. 2 where the multiple from the relays is not split and shall be furnished per ED-20248-01, Fig. 1 where the multiple is split and is wired to the bank on an adjacent frame.

5.06 With the exception of the battery and ground leads all wires in the local cables for the line, trip, and start circuits shall be #24 gauge wire.

5.07 Where less than a full group of lines is terminated on a frame and one or more banks are not needed initially or ultimately, the banks and their associated trip mechanism multiple brushes and line relay units will be omitted, beginning at the top of the frame, when specified by the Telephone Company.

5.08 Wherever possible fully equipped line units of 40 circuits should be used since it is more economical to manufacture complete units.

5.09 The line finder circuits shall be equipped as required in accordance with the traffic layout.

5.10 On the bottom bank the line and cut-off relays for circuit #0 shall be omitted for testing purposes. Circuit #39 of the bottom bank is to be used for the Exercise Test.

5.11 Where one frame of a pair of 40 group frames or one, two or three frames of four 80 group frames are furnished the last frame shall be equipped with a maximum of 200 lines. If the last sub-group furnished is an "A" sub-group only the lower two mounting plates of each line and trip circuit unit should be equipped and if a "B" sub-group only the upper two mounting plates of each unit should be equipped.

5.12 Where only the "B" sub-group of a group is furnished two line finders in this sub-group "B" shall be used as test selectors. They shall be the left-hand selectors on front when facing the front and the left-hand selector on the rear when facing the rear of the frame.

5.13 Motor and drive equipment shall not be furnished as a part of this list, but should be furnished separately as required.

PBX Lines

5.14 Unless otherwise specified by the Telephone Company PBX lines shall be the lowest numbered lines in the "A" sub-group of the unit and the highest numbered lines in the "B" sub-group. This arrangement will give a minimum hunting time for the PBX lines.

Line Finder Frame Multiple

5.15 The line finder frame multiple consists of 10 panel type banks each having 41 sets of terminals and two sets of guide terminals. The two sets of guide terminals are located at the top of each bank and are used for guiding the brushes in the tell-tale position. The 41st terminal is used for overflow and is arranged to return the line finder to normal in case the subscriber hangs up before the selector finds the calling line.

5.16 As previously explained, the banks on the 60 group frame form the multiple of 400 subscribers lines. On the 28 group frame by a division in the middle of each bank, they form the multiples of two groups of 400 lines each or a total of 800 lines. The banks on two 40 group frames form the multiples of three groups of 400 lines each or a total of 1200 lines. Similarly, the banks on four 80 group frames form the multiples of three groups of 400 lines each or a total of 1200 lines.

Interrupters

5.17 Four #165 type interrupters shall be furnished for each thirty line relay bays or less in an office. The STA regular leads shall be connected to one interrupter and STB regular to the second, the STA emergency to the third and the STB emergency to the fourth.

5.18 One 166 type interrupter shall be furnished for each two line relay bays in an office. The ten regular trip TA leads, the one set of emergency trip TA leads and the one set of common TA leads for each of two line relay bays shall be connected to one interrupter.

5.19 These interrupters shall be mounted on the line finder interrupter frame as covered in the engineering requirement specification for that frame.

Fuses

5.20 The line finder circuits shall be fused on the district frame fuse panels.

6. WIRING

Local

Cross-Connection Between Sub-Groups

6.01 In order to reduce the time required to find a line originating a call, each multiple bank is arranged so that the 40 lines terminating on one set of multiple terminals will appear before one half of the line finders in the reverse order to that in which they appear before the other half. To accomplish this, a slip multiple local cable is provided in the middle of each line finder group, dividing the group into two sub-groups. In the first sub-group the subscribers' lines number from bottom up and in the second sub-group from top down. The slip cable is furnished as a part of the coded bank where the slip occurs on the bank and is made in the local cable where the slip occurs between frames.

Test Terminals

6.02 The bottom terminals of the bottom bank of every line finder frame are required for selector test purposes. Since the selectors are arranged in groups, the leads in the slip multiple cables for the bottom and top terminals of the bottom bank or banks shall be disconnected and the terminals for both the bottom and top lines of the bottom bank or banks of each group shall be connected straight across.

Local Power Cable

6.03 A local power cable containing the miscellaneous leads running between the two sides of a line finder frame, from frame to frame, from line finder frame to line relay bay, and from line relay bay to line relay bay in the same lineup or from frames to fuse panels, alarm boards, etc., similar to that shown on ED-20253-01, shall be provided for each lineup of frames.

Registers

6.04 The overflow register, which is provided one for each line finder group, shall be wired from the line finder start circuit, in the local cable to the miscellaneous terminal strip, at the top of each frame, thence in the local power cable to the distributing power terminal

strip and finally in switchboard cable to the traffic register rack via the H.I.D.F.

6.05 The peg count register which is provided one for each line finder group, shall be wired from the line finder trip circuit in the local cable to the miscellaneous terminal strip at the top of each frame, thence in the local power cable to the distributing power terminal strip and finally in switchboard cable to the link finder frame.

Alarm Circuits

6.06 The relays in the various alarm circuits shall be mounted on the floor alarm board. The wiring between the line finder frames and the floor alarm board shall be carried to the miscellaneous terminal strip at the top of each frame thence in the local power cable to the distributing power terminal strip, and finally in switchboard cable to the floor alarm board.

Grounding of Commutators

6.07 The "G" segments of the commutators on each side of the frame shall be wired to the ground bars on the frame. One lead of #20 BBE wire shall be provided for each group of 14 or 15 circuits.

Grounding of Punchings

6.08 Line circuits having the "H" lead ("M" punchings) cabled to the I.D.F. and which serve Flat Rate lines in a Message Rate group shall be strapped together and grounded at the I.D.F. Where these leads are not cabled to the I.D.F. they shall be strapped together and grounded on the Line Unit terminal strip.

Cabling

General

6.09 The code numbers of the switchboard cables ordinarily used in cabling the various circuits are given under the circuits listed below. The circuits should, however, be checked to insure that the proper codes are specified to meet the latest circuit requirements.

Line Finder Multiple to V.I.D.F.

6.10 The line finder multiples are connected by local cables to ten terminal strips mounted in the line relay bay, whence they are cabled to the V.I.D.F. with codes 6233, 6234, or 6235 cable, depending on whether they are arranged for flat rate, coin box and message rate individual, or message rate party line service respectively.

6.11 When for equipment reasons it is desirable to provide an odd number of shelves at the I.D.F. for terminating the lines, 20 circuit cable shall be provided between the line finder frame and the I.D.F.

Line Finders to District Selectors

6.12 A cable large enough to accommodate 5 circuits shall be run between the line finders and district selectors. Since the odd and even circuits are run in separate cables, six cables are required for the circuits on the front of a fully cabled frame and six cables for the circuits on the rear of the frame. Typical arrangements of the cabling between the line finders and the district selectors is shown on the cabling schematic drawing ED-20251-01.

Line Finder to Line Finder Interrupter Frame

6.13 One cable shall be run between each line relay bay and the line finder interrupter frame.

Miscellaneous

6.14 Cables consisting of #20 BBE wires shall be used for the battery, ground, interrupter, test and alarm leads from the distributing power interrupter, test and alarm leads from the distributing power terminal strips to the miscellaneous fuse board.

6.15 The cabling between the distributing power terminal strips and points of termination for the various circuits shall be run in the largest switchboard cables possible consistent with the grouping of leads and points of termination. Cables shall be of #22 gauge wire, except battery, ground, interrupter, test and alarm leads requiring larger gauge wire.