

ASSIGNMENT OF LINE AND STATION NUMBERS
(TERMINAL PER STATION SYSTEMS)

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1. GENERAL

1.1 This section provides REA borrowers, consulting engineers, contractors, and other interested parties with technical information for use in the design and operation of REA borrowers' telephone systems. It discusses in particular considerations in the assignment of line and station numbers associated with automatic terminal-per-station systems.

1.2 This section, which replaces Section 221, Issue No. 2, September 1959, and Addendum No. 1, dated January 1960, was revised to update the example material, stress the importance of initial and subsequent traffic load balance, and to include an example of verification of traffic load balancing by using average or measured unit call data.

1.3 It is assumed the reader has familiarized himself with the traffic sections in this manual, particularly sections 325, 500, 510, 515, and 520, and Telephone Operations Manual sections 1625 and 1720. These sections deal with all aspects of traffic engineering, coordination, and dial office management.

1.4 The assignment of line and station numbers has long been considered by operating telephone companies as one of the most important duties in a dial central office. Careless and indifferent line assignment upsets the balance of switch and trunk groups and could bring about a serious downgrade in the service through inefficient use of equipment. The heavy investment in dial central office facilities demands that such equipment be properly balanced and loaded if there is to be an ultimate usage of all equipment and trunk paths.

1.5 Those in charge of dial administration should have enough mechanical aptitude to understand dial equipment operation, the ability to master the art of computation, and the talent to interpret statistical traffic data after it has been obtained. Such a person should have a good knowledge of the physical layout of dial equipment, its method of operation, the capacity of line and trunk groups, and the provision of registers and alarms. He should be able to follow the progress of a call from calling to called station and know the critical points at which traffic congestion normally appears, and have a full knowledge of the basis on which the offices are engineered.

1.6 New dial offices are engineered by using either average or measured unit call data. At this writing there are more and more conversions from dial to dial operation where the CCS (100 call seconds) also referred to as UC (unit calls) are known. The key to traffic balance is to assign the line and station numbers in accordance with the as-built specifications.

1.7 A balance of PBX, other business, urban residential and rural service among equipment groups is desirable since these various classes of service have different busy hours and characteristics and therefore tend to balance each other. In the initial engineering of an office, especially where average unit calls are used, the various classes of service are equally divided in determining the CCS per group. The closer this same distribution among groups can be maintained the more equal will be the traffic load.

1.8 Terminal-per-station systems employ one connector terminal for each individual and party-line station (excluding extension stations) and one linefinder terminal for each individual and party line.

1.9 This section is written for switch type dial offices, but the same principles are applicable to all offices.

2. MANUFACTURER'S EQUIPMENT DATA (EXHIBIT A)

2.1 Two copies of this assignment data are furnished the purchaser at least 90 days prior to shipment of the equipment. A study of this document shows that the office used in this example is to be an all "terminal-per-station" switchboard of 750 linefinder terminals and 1400 connector terminals with 100 percent lockout feature. It states the specific numbering for each 100's group of equipment, the test and other service numbers assigned, paystation and PBX trunk arrangements, the office codes, including satellite offices, and other pertinent data. The manufacturer also furnishes a Switching Plan upon which all switching and UC engineered information appears and to which the manufacturer is bound.

3. CABLE AND JUMPER SCHEMATIC (EXHIBIT B)

3.1 This is a typical cable and wire schematic to show the various jumper connections required to open any new line of equipment and the various jumper changes required for station changes and rearrangements. This schematic is not specifically related to the office used in the following example.

4. RECORD FORMS AND WORK SHEETS

4.1 Prepare the Connector-Linefinder-Bunch Block cards (one for each 50 connector terminals) as shown in Figures 5 and 6. Enter the appropriate hundreds (four digit) designation at top right and the exchange name or number at top left.

4.2 Prepare the Linefinder cards, one for each 100's group, or portion thereof, the same as for connector terminal cards, above. In this example the LF group numbers will be the bay and shelf number and the number of LF terminals equipped in that shelf (see Figure 7).

4.3 Prepare connector terminal, linefinder terminal, and bunch-block work sheets as shown in Figures 2, 3, and 4.

5. THE SUBSCRIBER DATA

5.1 Since this example is a conversion from a TPL to a new TPS office, we will assume that the grouping of subscribers to lines is complete and listed on assignment sheets (Figure 1) or similar and that the information on columns a through e, Figure 1, has been added.

5.2 For this example the total stations and lines to be served at cutover are as follows:

TABLE 1

Lines and Stations by Class-of-Service (At Cutover)

<u>Class-of-Service</u>	<u>Stations</u>	<u>Lines</u>
B1	68	68
R1	268	268
B2	35	18
R2	93	48
R4	560	143
PS	5	5
PBX	<u>12</u>	<u>12</u>
Totals	1041	562 *

* Actual count from assignment records

ANTICIPATED FILL AT CUTOVER

$$\frac{1041}{1400} = 75 \text{ percent connector terminals.}$$

$$\frac{562}{750} = 75 \text{ percent linefinder terminals.}$$

6. CONNECTOR TERMINAL DISTRIBUTION

6.01 Rotary Trunk Groups (PBX)

6.011 These trunk groups may be spread throughout the connector terminal groups or as shown in this example; one specific connector terminal group may be arranged by the manufacturer for trunk hunting (rotary service). See Exhibit A, par. 3.1, a.

6.012 Private branch exchanges and key systems having two or more trunk lines serving a single subscriber usually require that a single number be listed in the directory under the user's name. To give this service, it is necessary to provide equipment that will select the next idle trunk in the group when the directory number is dialed. Generally accepted methods of handling this class of service are dependent upon the number of trunks in the groups.

6.013 For groups of ten trunks or less, the equipment (the trunk hunting connectors) is capable of hunting over a group of ten contacts in a given level and seizing the first set of terminals in the group. This feature establishes ten trunks as a maximum. Groups of trunks to be assigned in this category should be arranged as follows:

TABLE II

Groups of Ten Trunks or Less

<u>Name</u>	<u>Trunks</u>	<u>Call No.</u>	<u>Other Trunks</u>	<u>Reserved For Future</u>
State Bank	2	2111	2112	2113
Green's Dept. Store	3	2151	2152, 53	2154
Boc Chemical Co.	4	2131	2132, 33, 34	2135, 36
Bush Realty Co.	3	2141	2142, 43	2144

6.014 Individual lines and paystations may be assigned to these trunk levels to balance the traffic load. Paystations may be assigned to reserved trunk numbers. They are easily moved if required. The following table gives trunk groups of various sizes and the number of trunks usually reserved for future growth.

TABLE III

		Number of Trunks Per Group								
Proposed	2	3	4	5	6	7	8	9	10	
Reserved	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	
Total	3	4	6	7	8	10	10	10	10	

6.015 No group of ten trunks (requirement at cutover) should be included in this category if an increase in the group total of trunks is expected.

6.02 Groups of Ten to Twenty Trunks

6.021 When the ultimate trunk group is more than ten but less than twenty, service thereto may still be rendered by the ordinary trunk hunting connectors if there is more than one shelf of connectors in the group, in which case, the trunks can be graded over the shelves. Where trunk groups of ten to twenty trunks are required, the practice is generally to reserve the remainder of the twenty connector terminals.

6.022 In those instances where more than ten but less than twenty trunks are required and where only one shelf of connectors is provided, consideration should be given to assigning the trunks above ten to other terminals in the rotary hundreds group but not listing them in the directory. These trunks would be used as first choice on traffic originating at the PBX, and the numbers might be given to executives for use if they encounter a busy on the listed number.

6.023 One principal objective in the number assignments is to assign high calling rate stations to low-numbered connector terminals in each group. This practice is designed to reduce switch wear and to avoid slow dial tone. For this example, the preferred low numbers for PBX would be 11, 21, 31, 41, and 51.

6.024 Enter the total PBX trunk figure (12) on line 1, Column b, Figure 2.

6.03 Paystation Allocations

6.031 There are different ways the manufacturer of C.O. equipment may elect to arrange the paystation numbering as presented in TE & CM Section 208, paragraph 5.8. This example, due to its size, has second selectors and numerous switch level requirements causing the manufacturer to elect to strap the "2" and "9" levels of the first selectors to obtain the digit "9" as the fourth from last digit for paystation identification purposes. (See Exhibit A, par. 3.2.) Consequently, any number assigned to paystations in the 745-9100 to 745-9099 groups will eliminate the corresponding connector terminal in the 745-2100 to 745-2099 groups.

6.032 Since there are only five paystations to be cut into service, they may appropriately be assigned to the PBX (2100 group) and to terminals marked for future PBX rotary trunks. Paystation tone capacitors must be added to each PS line circuit. Enter the total number of paystations (5) on line 2, column b, Figure 2. The connector terminal numbers to be used for paystations in this example appear in Table II. They are 2113, 2154, 2135, 2136, and 2143.

6.04 Special Service Terminals

6.041 Determine from the manufacturer's data, Exhibit A, the exact connector and linefinder terminals that have been assigned for special services. Post the indicated function opposite each such number on the connector and linefinder record cards as shown on Figures 6 and 7. Note that connector terminals 2107, 2108, 2109, and 2100 are for special use in the 2100 group. Terminal "09" is assigned in each connector group for routine testing. This means a total of 17 connector terminals are used for special services. Linefinder terminals "21" and "39" are used in each linefinder group for linefinder test for a total of 16 LF terminals for special services. When precise traffic calculations are to be made, these special terminals should be subtracted from the totals for each terminal group. Therefore, while each group may be equipped with 100 terminals, or 100% equipped, the "available terminal" figure will be in the order of 97 to 99 terminals, possibly less.

6.05 Special Directory Number Requests

6.051 On most central office conversions, management is confronted with customer requests for specific directory number combinations. There are not too many such numbers in the 1400 line example in this section. Some are 2200, 2300, 2222, 2345, 2468, etc. Management should

provide the person responsible for number assignments with data on such commitments as they are made. From this special list go through the assignment sheets and post the appropriate numbers in column g of Figure 1. Then enter the group totals of such numbers on line 3, under the appropriate connector 100's group as shown on line 3, Figure 2. Caution should be used for any such number requests in the 2100 group in order not to break up a desirable PBX rotary group of terminals.

6.06 Residence Two-Party Allocations

6.061 The only restriction related to this class-of-service group is contained in Exhibit A, par. 3.1, a, which states "only individual and PBX lines may be assigned on levels marked for PBX groups." This excludes the 2100 group and leaves 13 groups for allocation. There are 93 residence two-party stations. Assign 7 or 8 to each of the 13 groups (93 \rightarrow 13) as shown on line 4, Figure 2.

6.07 Business Two-Party Allocations

6.071 The same conditions prevail as those in paragraph 6.061 above. There are 35 B2 stations; assign 2 or 3 to each of the 13 groups (35 \rightarrow 13) as shown on line 5, Figure 2.

6.08 Residence Four-Party Allocations

6.081 Conditions are the same as in paragraphs 6.061 and 6.071, above. There are 560 residence four-party stations. Assign 43 or 44 to each of 13 connector terminal groups (560 \rightarrow 13) as shown on line 6, Figure 2.

6.09 High Calling-Rate Station Allocations

6.091 Since the conversion in this example is from TPL to TPS equipment, it may be assumed that certain traffic information was obtained from traffic registers on the TPL equipment not too long before the new TPS office was placed on order. Certain business one-party lines were connected to traffic registers that count originating calls to determine the actual calling rates of lines expected to have above average usage. Of the group measured 16 were found to have calling rates with an average of 2.5 UC/S. Assign 1 or 2 to each of the 13 groups (16 \rightarrow 13) as on line 7, Figure 2.

6.10 Business One-Party Allocations

6.101 Subtract the preferred numbers (17) and the high UC stations (assumed to all be B1 stations) (16) from the total 68 B1 users (68-33) leaving a total of 35 B1 stations to be allocated. Assign 2 or 3 to each of 13 groups (35 \rightarrow 13) as on line 8, Figure 2. This leaves only the R1 stations for allocation.

6.11 Assigned Load Balance

6.111 At this stage of the connector terminal allocations a check should be made to ascertain if the balance among groups has been adequately maintained. Whether PBX rotary groups are assigned to different groups or to a specific group, the fact such trunks have a much higher UC than other classes-of-service points up the need to check closely to determine that certain groups are not over or underloaded excessively.

6.112 If there is reason to make further load balance verification, use may be made of average or known unit call per main station data. Section 325, par. 2.242 suggests the following average UC/S.

TABLE IV

Average Main Station Unit Calls

<u>Class-of-Service</u>	<u>Unit Calls Per Main Station</u>
Business-one-party	1.5
Residence-one-party	1.0
Business-two-party	1.2
Residence-two-party	.8
Residence-four-party	.6
Rural-eight-party	.05-.06
Pay stations	1.5
PBX lines	4.0
Official lines	2.0
Wire chief	1.0

6.113 Using the above average UC/S except where there are measured differences, such as the high CR users with 2.5 UC discussed in par. 6.9, proceed to develop the total allocated UC load for each group. See line 10, Figure 2. Where the total UC figures end in fractions, use the next higher whole number.

6.114 The fact that the allocations in this example were juggled several times accounts for the near balance of both stations and UC. This is generally not the case on the first attempt, meaning the unit call check has merit even though traffic measurements are planned within six months after cutover.

6.115 The 2100 group of connector terminals was given separate consideration in the initial engineering as follows, and as taken from TE & CM, Section 325, par. 2.246 with figures from this example filled in:

11.0322 Where the PBX groups are confined to a separate connector group (or groups):

$$\frac{(h) - (\text{total PBX UC})}{(k) - (\text{total PBX trunks})} = \frac{1109-64}{1400-16} = .76 \text{ UC}$$

Regular
Connector
Terminal

This office has been engineered to handle an initial average terminating busy hour traffic of .76 unit calls per connector terminal, except 2100 (PBX) group.

The 2100 (PBX) group shall be equipped to handle 125 unit calls and shall be arranged to provide, in addition to PBX trunk hunting, the services indicated on the Switching Diagram.

2.2461 The 125 unit calls were determined as follows:

<u>Type of Service</u>	<u>UC</u>
16 PBX terminals @ 4 UC	64
80 Regular terminals @ .76 UC	<u>61</u>
Total	125

The maximum number of usable terminals in the PBX trunk group of connectors is 96 since four terminals will be used for test purposes.

6.116 Similar computations such as those shown above should be available from the Engineer since it is a part of the engineering data worked up in the initial Plans and Specifications for every borrower's central office.

6.117 With the engineered UC for every group determined at this stage, it is practical to list them as shown in Figure 2, line 11.

6.12 Residence One-Party Allocations

6.121 There are 268 R1 stations to be distributed in the final step. Every effort should be made to attain the best possible balance among groups. Since R1 stations have an estimated average UC/S of 1.0, the balancing division among groups should be approximately 18 to 20

(268 ~~→~~ 14) for each of 14 groups. See division on line 13, Figure 2. The totals on line 15, Figure 2, are developed largely from average UC figures so an average balance has been attained. However, how realistic the UC load balance really is can be determined only from traffic measurements after the new office has settled down.

6.13 At this point the total number of stations, by class-of-service, for each connector terminal group should be posted in pencil in the space provided along lower portion of the connector-linefinder-bunch-block records. See Figure 5.

7. LINEFINDER TERMINAL ASSIGNMENTS

7.1 The example in Exhibit A calls for 750 linefinder terminals. Paragraphs 1.3 and 1.4 of Exhibit A state that there is lockout on all lines, that Bay L1, Shelf A is equipped for only 50 line terminals and that paystations are to be assigned in this Bay L1, Shelf A. With the prepared linefinder terminal work sheet begin the assignments, as follows:

7.11 PBX Allocations

7.111 PBX lines may be assigned to any line group except bay L1, shelf A. There are 12 PBX lines. With 7 fully equipped groups assign 1 or 2 (12 ~~→~~ 7) to each group. See line 1, Figure 3.

7.12 Paystation Allocations

7.121 Assign all 5 paystation lines to bay L1, Shelf A as shown on line 2, Figure 3.

7.13 Party Line Allocations

7.131 There are 18 B2 lines to be spread over 7 groups. Allot 2 or 3 to each of 7 groups (18 ~~→~~ 7), Figure 3.

7.132 There are 48 R2 lines to be spread over 7 groups. Allot 6 or 7 to each of 7 groups (48 ~~→~~ 7), as on line 4, Figure 3.

7.133 There are 143 R4 lines to be spread over 7 groups. Allot 20 or 21 to each of 7 groups (143 ~~→~~ 7), as on line 5, Figure 3.

7.134 There are 16 high calling rate users to be spread over 7 groups. Allot 2 or 3 (16 ~~→~~ 7) to each group. See line 6, Figure 3.

7.135 There are 52 remaining B1 lines to be spread over $7\frac{1}{2}$ groups. Allot so as to equalize the individual total group assignments as much as possible. See line 7, Figure 3.

7.136 Compute the group total allocations up to this stage as shown on line 8, Figure 3.

7.137 There are 268 R1 lines to be spread over $7\frac{1}{2}$ groups. Since the 7 fully equipped groups each represent approximately 13% of the total LF terminals and the partially equipped group approximately 9%, the division was made accordingly as shown on line 9, Figure 3.

7.138 Strike totals for each of the eight groups as shown on line 10, Figure 3.

7.139 If it is deemed necessary to double check the load balance among groups, the unit call approach as outlined for connector terminals may be used. With a traffic load balanced as evenly as shown on Figure 3, there should be no need for further check until actual traffic measurements can be made after cutover. Post the group totals to be assigned to each separate group along the bottom lines of the Linefinder Terminal Record as shown on Figures 6 and 7.

8. FINAL ASSIGNMENT OF LINE & STATION NUMBERS

8.1 In addition to the traffic balancing exercises covered in previous paragraphs, an additional objective is to assign high calling rate connector and linefinder terminals to the low numbers in the switch banks to reduce dialing time and switch wear. The high calling rate users for this example, in order, for connector terminals are, (a) PBX, (b) official lines, (c) B1, as shown in TABLE IV, "Average Main Station Unit Calls."

8.2 The order of high UC users for linefinder terminals is quite different than for connector terminals since they are on a per line basis. Using an 80% fill factor for party lines, the UC per line would appear as below in TABLE V.

TABLE V

Average Unit Call Per Line

<u>Class-of-Service</u>	<u>UC Per Station</u>	<u>Line Fill</u>	<u>Per Line UC</u>
B1	1.5	1	1.5
R1	1.0	1	1.0
B2	1.2	1.6	1.92
R2	0.8	1.6	1.28
R4	0.6	3.2	1.92
PBX	4.0	1	4.0
PS	1.5	1	1.5

8.3 Here we have the high UC users as PBX, R4, B2, in that order. This does not apply, of course, in offices where the banks have been split and terminals reversed to equalize dial tone delay.

8.4 The preferred numbers should be assigned first since they will be widely scattered throughout the connector groups. This group, line 3, figure 2, is to be associated with some of the 52 B1 lines on line 7, figure 3. Start with the two preferred numbers in the 2200 group and locate the subscribers on the assignment sheets since the new connector numbers should have previously been posted to the sheet. For this example, use 2200 and 2222. Assign to the two B1 lines shown on line 7, Figure 3. Since these are B1 users with a UC of 1.5 or above, they should be assigned somewhere near the middle of the 100's count. Let us, for example, use L1A-48 and L1A-49. Post the class-of-service opposite the LF number on the linefinder card as shown on Figure 7. Post the Connector-Linefinder-Bunch Block 2200's card. After terminals 2200 and 2222 post the LF Numbers L1A-48 and L1A-49, show the class-of-service as B1, and mark the party position and frequency column with a dash -. Write the linefinder number on the subscriber card. Move on to the next preferred numbers until completed.

8.5 The other assignments are similar except that for four-party lines a bunch block must be added. Where bunch blocks are placed in more than one frame position, always try to select the next idle bunch block of the nearest bunch-block strip. Be sure to show the bunch-block number on the subscriber card and on the connector-linefinder bunch-block card. After the bunch-block number used post the linefinder terminal number as shown on Figure 4.

8.6 The two work sheets, Figures 2 and 3, reflect exactly how many stations or lines by class-of-service should be assigned in each 100's group. The only controlling factor is the high UC stations and lines to low numbers. Otherwise it makes little difference which station is connected to which linefinder terminal. Consecutive numbers in a group should not be assigned on party lines because of the possibility of dialing errors.

9. FULL USE OF EQUIPPED CONNECTOR TERMINALS

9.1 The assignment plan for offices with non-uniform connectors per group will result in more vacant terminals in a lower number of connectors. To make full use of the connector terminals in these groups, it will be necessary to assign stations with below average incoming calls per station. It is expected that this will be done as normal growth uses up the vacant terminals.

10. ADDITIONS TO EXISTING OFFICES

10.1 When an office addition requires new linefinder and connector groups, it is important to assign lines and stations so that each of the new groups will carry its full share of the load. Simply assigning new subscribers in the new groups generally results in the assignment of too many residence subscribers resulting in the groups being underloaded.

10.2 Linefinder groups can readily be balanced by transferring lines from existing groups to the new groups and, in effect, rebalancing the office.

10.3 To place a full load on connector groups is more difficult as it is normally not feasible to change numbers. The best thing that can be done probably is to make sure that new connects are assigned with a view toward load balance and not merely assigned automatically to the new groups.

MANUFACTURER'S EQUIPMENT DATA

SHEET 1

S. O. No. 092631

DATE 2-10-66

The following information covers subscribers' numbering and trunk assignment for a Dial Office for the main office at Mainville, Georgia.

1. CAPACITY

1.1 This installation is 750 lines, 1400 terminals, terminal-per-station.

1.2 Connector terminal quantities are as follows:

<u>Class of Service</u>	<u>Quantity</u>
a. PBX (Trunk Hunting), Party, Individual	100
b. Party, Individual	1300

1.3 Line terminal quantities are as follows:

<u>Class of Service</u>	<u>Line Group</u>	<u>Line Terminations</u>
a. Lockout Lines	Bay L1, Shelf A	11-50
	Bay L1, Shelf B-D	11-00
	Bay L2, Shelf A-D	11-00

1.4 Postpay paystations may be assigned to any line in Shelf A, Bay L1.

2. CLASSES OF SERVICE

2.1 The following classes of service may be furnished to subscribers with ringer connections at the subscribers' stations, as indicated.

a. PBX (Trunk Hunting) or consecutively numbered line groups in groups of 10 or less.

Ringer: Straight Line

Connection: Bridged

b. Individual Lines

Ringer: Straight Line

Connection: Bridged

2. CLASSES OF SERVICE (Cont'd)

- c. Two-party Selective Four-party Selective
Ringer: Tuned
Connection: Bridged
- d. Post pay paystations same as individual lines. Paystation tone capacitor must be added to line circuit.
- e. All lines are arranged for flat rate (non-metered) service only.

3. NUMBERING & RINGING

3.1 Each subscriber's directory number shall consist of seven (7) digits. The numbers available on the initial installation are as follows:

- a. Individual, PBX & Party Lines, Frequency Marking (100 Connector Terminals)

745-2100 to 745-2199

Only individual & PBX lines may be assigned on levels marked for PBX groups.

PBX lines to be consecutively numbered.

- b. Individual & Party Lines, Frequency Marking (1300 Connector Terminals).

745-2200 to 745-2099
745-6100 to 745-6499

- c. The local calling party may take advantage of this office's reduced dialing options by dialing only the last five digits of the directory number.

- d. Paystation Lines.

745-9100 to 745-9099

3. NUMBERING & RINGING (Cont'd)

- 3.2 It should be noted that no separate group of equipment is furnished for paystation lines. The separate number group for paystations is effected by strapping the "2" and "9" levels of the first selectors together. Consequently any number assigned to paystations in the 745-9100 to 745-9099 group will eliminate the corresponding connector terminal in the 745-2100 to 745-2099 group.
- 3.3 For multiparty lines, the dialed telephone number selects the ringing frequency as indicated below:

<u>Frequency Marking Lead</u>	<u>Frequency</u>
M-1	30 c.p.s. (Hz)
M-2	40 c.p.s. (Hz)
M-3	50 c.p.s. (Hz)
M-4	60 c.p.s. (Hz)
M-5	20 c.p.s. (Hz)

3.4 Special Services

- 3.4.1 Subscribers shall be instructed to dial the following codes for the purposes indicated:

<u>Service Code</u>	<u>Function</u>
0	Toll Operator

- 3.4.2 Subscribers in Mainville shall be instructed to dial the following for extended area service. Trunking to the connecting office is accomplished on the digit in ().

<u>Office Code</u>	<u>Area Service</u>
3(7)9	Youngtown
(8)96	Oldtown

- 3.4.3 Subscribers calling Mainville from each of the following communities shall be instructed to dial the digit sequence shown below for extended area service. Digits utilized by Mainville equipment are shown in ().

<u>Town</u>	<u>Digit Sequence</u>
Youngtown	745 + (XXXX)
Oldtown	745 + (XXXX)

3. NUMBERING & RINGING (Cont'd)

- 3.4.4 Operators calling Mainville from Switchville exchange shall be instructed to dial the last four digits of the directory number.
- 3.4.5 For maintenance service, the following codes should be dialed for the purposes indicated:

<u>Service Code</u>	<u>Function</u>
21	Inspectors Trunk

3.5 Reverting Call by Special Number

Calls are made by a subscriber to another party on the same telephone line by dialing a special four digit number assigned by the telephone company.

- 3.5.1 The subscriber should dial "33" plus the party digit of his number followed by the party digit of the desired party. The subscriber should then replace his handset. Both the calling and called telephones will ring.
- 3.5.2 If the called party does not answer in two to four minutes, the ringing will automatically stop.
- 3.5.3 The telephone company shall furnish a list for each subscriber on a party line listing the names and party digits of other parties on their line.

Party digits shall be assigned to party line subscribers to correspond with the assignment of their ringing frequency to the banks of the reverting call switch.

3.6 Test Numbers

- 3.6.1 Connector bank terminal "09" is assigned for routing testing in each connector group, except the trunk hunting group, in which "09" and "00" are assigned. These numbers are not available for subscriber assignment. No line relays need be associated with the connector routine test terminals.
- 3.6.2 Linefinder terminals "21" and "39" in each finder group have been assigned for linefinder test. These terminals may also be used for subscribers' lines, if desired by the customer.
- 3.6.3 Connector terminal "2107" has been assigned for alarm checking. This terminal cannot be used for subscriber assignment. No line relays need be associated with the alarm checking terminal.

3.6.4 Connector terminal "2108" has been assigned for tone generator transfer. This terminal cannot be used for subscriber assignment. No line relays need be associated with the terminal.

4. PAYSTATION (Postpay)

- 4.1 Persons calling local numbers from pay phones should wait for dial tone and then dial the desired party's number. When the called party answers, he will not hear the calling party until the required coins are deposited in the paystation, after which, conversation may begin.
- 4.2 Persons calling "long distance" or other "special numbers" from pay phones should dial the numbers assigned for these services. Coins will not be required to reach the operator. The operator will identify the call by the paystation tone. The operator will request the calling party to deposit the required coins.
- 4.3 Operators should have their "listen" key operated before answering incoming calls to hear the short paystation tone. If she wishes to recheck the tone, it is necessary to remove and reinsert the answering plug.

5. MISCELLANEOUS

- 5.1 Long Line Adapters are provided, arranged for loop dialing pulse correction bypass ringing on lines up to 3000 ohm resistance.

6. VERIFICATION

- 6.1 A separate train of switches is provided for busy verification, consisting of a test selector and test connector.
- 6.2 To verify a busy line in Mainville, the Switchville operator should seize a Mainville trunk and dial "00". The incoming selector will seize the test selector. The operator should then dial the last four (4) digits of the subscriber's number and listen to determine whether anyone is on the line. No ringing current is sent out by the test connector.

7. TONES

- 7.1 Dial tone is provided to indicate that the equipment is ready to receive dial impulses.
- 7.2 60 IPM busy tone is provided to indicate that the dialed connector terminal is busy.

- 7.3 120 IPM busy tone is provided to indicate that all paths from the dialed selector level are busy.
- 7.4 Revertive ringing tone is provided to indicate that the called line is being rung.

8. INTERCEPT

- 8.1 Intercept service is provided to connect the intercepted call to the Switchville operator who will notify the calling party that the called party's number has been changed, disconnected, is unequipped, or the dialed selector level is vacant.

9. ALARMS

- 9.1 When a non-standard condition exists in the office, the alarm sending circuit, which is part of the common supervisory circuit, will seize an idle trunk to Switchville and show as an incoming call to the operator. The operator, on answering, will receive no special indication of a non-standard condition, neither will the trunk release if the operator assumes the call to be abandoned. Via an idle trunk to Mainville, the operator should dial the alarm checking number "2107" to determine the nature of the alarm. The trunk circuit seized by the alarm sender will release only when the alarm checking number has been dialed. Table "A" or "B" on the common supervisory circuit shows the various classes of alarms, time delay before alarm condition is sent to control office, and tone signal assigned to different classes of alarms.

ROUTE: 1

ASSIGNMENT SHEET

SHEET NO. 1

PROJECT: STATE XX

EXCHANGE: MAINVILLE (745)

DATE: 3-10-66

MAP REF. NO.	CLASS SERVICE	OLD TEL. NO.	NAME	ADDRESS	PTY. POS.	CONN. TERM. NO.	BUNCH BLOCK NO.	LINE F'NDR NO.	CABLE & TERM.	CABLE PAIR NO.	WIRED ROUTE NO.	DROP POLE NO.	PIN OR PAIR NO.	L.L. ADPT NO.
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
15-23-1	R4	2839	GRANGER, P.O.	RFD 4	1	2266	B1-1	LIB-23	1-27	28	17	139	3-4	1
15-23-2	R4	2838	INGRAM, G.O.	"	2	2257	"	"	"	"	"	124	"	1
15-23-4	R4	2837	JOHNSON, T.M.	"	3	2346	"	"	"	"	"	116	"	1
15-23-6	R4	2836	GREEN, GEO. P.	"	4	2339	"	"	"	"	"	110	"	1
15-15-5	R4	2833	KONIG, TOM S.	RFD 4	1	2530	B1-2	LIB-27	1-28	31	15	136	5-6	2
15-15-3	R4	2832	KONIG, TOM JR.	"	2	2532	"	"	"	"	"	121	"	2
15-15-2	R4	2831	SMITHSON, P.T.	"	3	2235	"	"	"	"	"	144	"	2
12-23-7	R4	2378	MASON, H.C.	1329 N. CENTRAL	1	2237	B1-3	LIB-35	1-9	52	-	-	-	-
12-23-10	R4	2377	BROWN, MRS. BESS	1320 N. "	2	2356	"	"	"	"	-	-	-	-
12-23-22	R4	2376	AKINS, JOHN L.	1315 N. "	3	2523	"	"	1-18	"	-	-	-	-
10-6-7	R2	2721	JONES, TOM	317 N. CENTRAL	1	2276	-	LIC-27	1-10	78	-	-	-	-
10-6-12	R2	2722	WHITE, B.W.	318 N. "	2	2352	-	"	"	"	-	-	-	-
10-2-12	TRK	2241	STATE BANK	107 N. CENTRAL	1	2111	-	LID-21	1-7	98	-	-	-	-
10-2-14	TRK	2242	" "	107 N. "	1	2112	-	LID-22	"	99	-	-	-	-
10-1-3	PS	9176	COMM. TEL. CO.	104 N. CENTRAL	0	9143	-	LIA-11	1-2	201	-	-	-	-
10-1-2	B1	2136	BROWN, DR. C.L.	102 N. CENTRAL	1	2222	-	LID-25	1-5	100	-	-	-	-

OFFICE: 745

CONNECTOR TERMINAL WORK SHEET

DATE: 3-15-66

LINE NO.	CLASS	GROUP →															TOTALS	
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o		p
1	PBX	12																12
2	PS	5																5
3	PREFERRED NUMBERS		2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	17
4	R2		7	7	7	7	8	8	7	7	7	7	7	7	7	7	7	93
5	B2		2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	35
6	R4		43	43	43	43	43	43	43	43	43	44	43	43	43	43	43	560
7	HIGH CR* USERS		1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	16
8	B1		3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	35
9	STATION SUB-TOTALS	17	58	58	58	58	59	59	58	58	58	58	58	58	58	58	58	773
10	UC SUB-TOTALS	56	44	44	44	44	45	45	44	44	44	43	45	45	45	45	45	632
11	ENGINEERED UC**	125	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	1113
12	BALANCE UC	69	32	32	32	32	31	31	32	32	32	33	31	31	31	31	31	481
13	R1	25	19	19	19	19	18	18	19	19	19	20	18	18	18	18	18	268
14	TOTAL STATIONS	42	77	77	77	77	77	77	77	77	77	78	76	76	76	76	76	1041
15	ASSIGNED UC	81	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	900
16	AVAILABLE UC	44	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	213

* CR = CALLING RATE
 ** UC = UNIT CALL

REA TE & CM-221, FIG. 2

LINEFINDER WORK SHEET OFFICE: 745											
SHEET LINE NO.	CLASS	GROUP	L1A-50	L1B-100	L1C-100	L1D-100	L2A-100	L2B-100	L2C-100	L2D-100	TOTALS
1	PBX			1	1	2	2	2	2	2	12
2	PS		5								5
3	B2			3	3	3	3	2	2	2	18
4	R2			7	7	6	7	7	7	7	48
5	R4			21	21	21	20	20	20	20	143
6	HIGH CR* USERS			2	2	2	2	2	3	3	16
7	B1		2	7	7	7	7	8	7	7	52
8	SUB-TOTAL		7	41	41	41	41	41	41	41	294
9	R1		23	35	35	35	35	35	35	35	268
10	TERMINALS ASSIGNED		30	76	76	76	76	76	76	76	562
11											

*CR= CALLING RATE

FIGURE 3

BUNCH BLOCK WORK SHEET OFFICE: 745					
B1-	B1-	B2-	B2-	B3-	B3-
1 LIB-23	31	1	31	1	31
2 LIB-27	32	2	32	2	32
3 LIB-35	33	3	33	3	33
4	34	etc.	etc.	etc.	etc.
5	35				
6	36				
7	37				
8	38				
9	39				
10	40				
11	41				
12	42				
13	43				
14	44				
15	45				
16	46				
	47				

FIGURE -4

REA TE & CM-221, FIG. 3 & 4

CONNECTOR - LINEFINDER - BUNCH BLOCK RECORD										
EXCHANGE MAINVILLE-745										
GROUP NO. 2100										
CONN. TERM.	LINE FINDER	BUNCH BLOCK	CLASS SERV.	PARTY POS. AND FREQ.	CONN. TERM.	LINE FINDER	BUNCH BLOCK	CLASS SERV.	PARTY POS. AND FREQ.	
35					50					
34					59					
33					58					
32					57					
31					56					
20					55					
29					54					
28					53					
27					52					
26					51					
25					40					
24					49					
23					48					
22					47					
21					46					
10					45					
19					44					
18					43					
17					42					
16					41					
15					30					
14					39					
13	HOLD				38					
12	LID22				37					
11	LID21				36					
CLASS	B-1	B-2	B-4	BR	R-1	R-2	R-4	RR	PS	PBX
ALLOTTED THIS GROUP	-	-	-	-	25	-	-	-	5	12
ASSIGNED THIS GROUP										

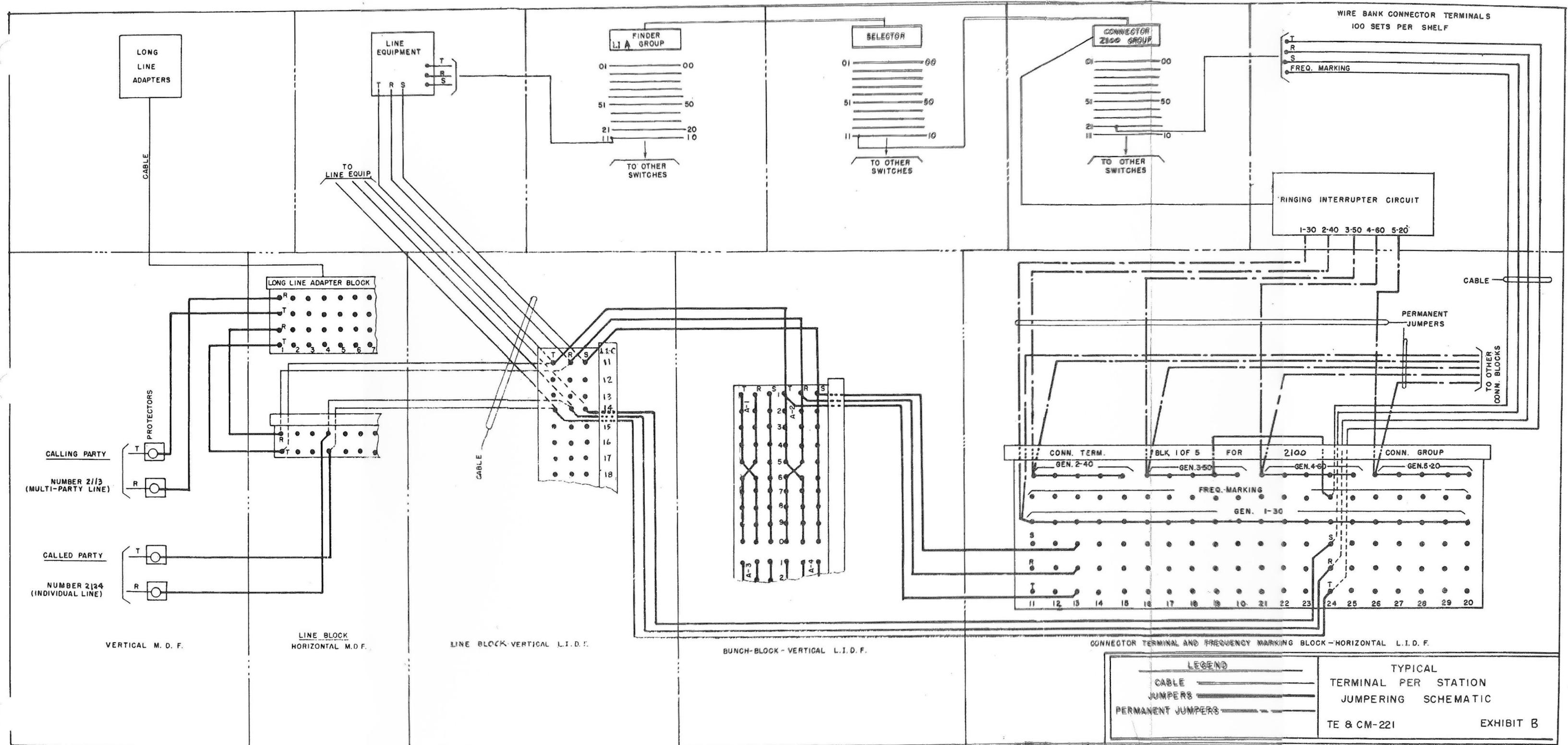
2100 CONNECTOR GROUP
FIRST 50 TERMINALS

CONNECTOR - LINEFINDER - BUNCH BLOCK RECORD											
										GROUP NO. 2100	
EXCHANGE MAINVILLE - 745											
CONN. TERM.	LINE FINDER	BUNCH BLOCK	CLASS SERV.	PARTY POS. AND FREQ.	CONN. TERM.	LINE FINDER	BUNCH BLOCK	CLASS SERV.	PARTY POS. AND FREQ.		
85					00	TEST					
84					09	TEST					
83					08	TONE GENERATOR					
82					07	ALARM CH'CKING					
81					06						
70					05						
79					04						
78					03						
77					02						
76					01						
75					90						
74					99						
73					98						
72					97						
71					96						
60					95						
69					94						
68					93						
67					92						
66					91						
65					80						
64					89						
63					88						
62					87						
61					86						
CLASS		B-1	B-2	B-4	BR	R-1	R-2	R-4	RR	PS	PBX
ALLOTTED THIS GROUP		—	—	—	—	25	—	—	—	5	12
ASSIGNED THIS GROUP											

2100 CONNECTOR GROUP
 LAST 50 TERMINALS

GROUP NO. LIA-11-50										
LINE FINDER TERMINAL RECORD										
EXCHANGE MAINVILLE - 745					TYPE PS & REG.					
LF TERM.	CLASS SERV.	LF TERM.	CLASS SERV.	LF TERM.	CLASS SERV.	LF TERM.	CLASS SERV.	LF TERM.	CLASS SERV.	LF TERM.
35		50		85		00				
34		59		84		09				
33		58		83		08				
32		57		82		07				
31		56		81		06				
20		55		70		05				
29		54		79		04				
28		53		78		03				
27		52		77		02				
26		51		76		01				
25		40		75		90				
24		49	B1	74		99				
23		48	B1	73		98				
22		47		72		97				
21	TEST	46		71		96				
10		45		60		95				
19		44		69		94				
18		43		68		93				
17		42		67		92				
16		41		66		91				
15		30		65		80				
14		39	TEST	64		89				
13		38		63		88				
12		37		62		87				
11		36		61		86				
CLASS	B-1	B-2	B-4	BR	R-1	R-2	R-4	RR	PS	PCK
ALLOTTED THIS GROUP	2		-	-	23	-	-	-	5	-
ASSIGNED THIS GROUP										

LINEFINDER TERMINAL RECORD
 BAY L1, SHELF A. 11-50



LEGEND
 CABLE —————
 JUMPERS —————
 PERMANENT JUMPERS —————

TYPICAL TERMINAL PER STATION JUMPING SCHEMATIC
 TE & CM-221 EXHIBIT B