NUMBER NETWORK, "X" NUMBER NETWORK, AND MISCELLANEOUS NUMBER NETWORK FRAMES AUTOMATIC NUMBER IDENTIFICATION—TYPE B EQUIPMENT DESIGN REQUIREMENTS NO. 1 CROSSBAR, PANEL, AND STEP-BY-STEP SYSTEMS

1. GENERAL

SCOPE

1.01 This specification together with the supplementary information listed herein, covers the equipment design requirements for the framework, equipment, and circuits to be used in the engineering, manufacture, and installation of the number network frame, "X" number network frame, and miscellaneous number network frame in decoder panel, No. 1 crossbar, and No. 1, 350A, and 355A step-by-step offices arranged for automatic number identification.

1.02 This specification is reissued:

(a) To add requirements for the 9-foot 0-inch high number network and miscellaneous number network frames for use in step-by-step offices.

CAPACITY

1.03 The capacity of the number network frame depends on the type of framework used in the office. The 11-foot 6-inch high frame which is used in Panel, No. 1 Crossbar, and Step-by-Step Systems has a capacity of 2000 customer numbers and is always fully equipped. The 9-foot 0-inch frame which is used only in Step-by-Step Systems has a capacity of 1400 customer numbers. Since customer number networks are always furnished in groups of 2000 this frame may be equipped for 600, 1200, or 1400 customers.

1.04 The "X" number network frame, which is used only in No. 1 crossbar offices, has a capacity of 1600 auxiliary numbers arranged in 16 separate groups of 100 numbers each and is equipped as required in groups of 200 customer numbers.

1.05 The capacity of the miscellaneous number network frame which is used with one-way lines depends on the framework used in the office. The 11-foot 6-inch high frame used in Panel, No. 1 Crossbar, and Step-by-Step Systems is similar to and has the same capacity as the "X" number network frame. The 9-foot 0-inch high frame used only in Step-by-Step Systems has a capacity of 1200 one-way lines arranged in the same manner as the 11-foot 6-inch high frame.

1.06 Each number network frame is arranged for 80 tie lines to all other number network frames in the same office for connecting PBX numbers to their associated directory or billing numbers on other frames. In offices arranged for "X" numbers or one-way outgoing lines from PBXs, and in offices using 9-foot 0-inch high number network frames, this tie line capacity is reduced to 60. In No. 1 crossbar offices arranged for "X" numbers (auxiliary or coded numbers) 80 tie lines are provided from each NN frame to an associated XNN frame. Due to this fixed tie cable arrangement, the "X" numbers associated with one NN frame must be located on one XNN frame. In panel, step-by-step , and No. 1 crossbar offices arranged for one-way outgoing lines from PBXs 20 tie lines are provided for each NN frame to an associated MNN frame.

DESCRIPTION

1.07 The ***Automatic Number Identification System,*** referred to as ANI, provides a high-speed, one-at-a-time identification of the calling customer directory number on CAMA calls from

single- and 2-party lines and PBX trunks. (See Fig. 1.) While ***coin numbers*** are denied CAMA access, they are usually connected in the same manner as noncoin lines to permit automatic tracing of permanent signals (panel and No. 1 crossbar only) and the conversion to noncoin service.

1.08 A system, referred to as an identifier group, serves a maximum of six panel, No. 1 crossbar, or step-by-step central offices in a building when 11-foot, 6-inch high frames are used. A maximum of one step-by-step central office is served when 9-foot 0-inch high frames are used. One, two, or three ID groups may be provided in a building. An ID group will include outgoing trunks (ANIT), number network (NN), "X" and miscellaneous number network (XNN) and (MNN), identifier (ID), and outpulser (OP) frames and associated line verification and test equipment.

1.09 On a CAMA call, a 5800-cycle signal is placed on the sleeve of an ANI trunk by an oscillator on the ANIT frame. This signal is sent back through the connecting switch train to the sleeve of the customer number at the local distributing frame, then to the directory number network on the NN frame, and through a concentrating or secondary network on the ID frame. Amplifier detectors on the ID frame locate and identify this signal and cause it to be registered in the outpulser, which then transmits the complete office code and digits of the calling number to the CAMA office on a multifrequency basis. If the call is from a multiparty line or if identification cannot be made, the call is automatically routed to an attendant for manual identification. In the case of a PBX customer, all numbers in the directory series and "X" numbers or one-way outgoing numbers not in the directory series will be identified as the associated directory billing number.

1.10 All frames are of the bulb-angle type, arranged for 23-inch mounting plates and are 11 feet 6 inches high having 10-inch guardrails or 9 feet 0 inch high having 10- or 12-inch guardrails.

1.11 A number network system consists of two major parts as shown in Fig. 2. The secondary number network is mounted on the identifier frame while the primary network is mounted on the number network frames.

1.12 The 11-foot 6-inch high number network frame shown in Fig. 3 is always completely equipped with ten 313A panels which provide for 2000 numbers arranged in two vertical groups of 1000 numbers each. Five of these number network frames provide the ANI facilities for a complete 10,000 number office. When 9-foot 0-inch high number network frames are used, ten 313A panels are always furnished on two frames as shown in Fig. 9. Eight frames are required to provide ANI facilities for a complete 10,000 number office as shown in Fig. 10.

1.13 The 313A panel shown in Fig. 5 consists of a steel framework with 30 vertical and 20 horizontal buses on each of two insulated panels. The vertical buses provide a tip, ring, an multiparty connection for each customer position, while the horizontal buses provide a tip and ring connection. These three vertical, two horizontal, and the associated two network terminals provide the seven terminals representing a customer number position. The center terminal (multiparty) is marked by a

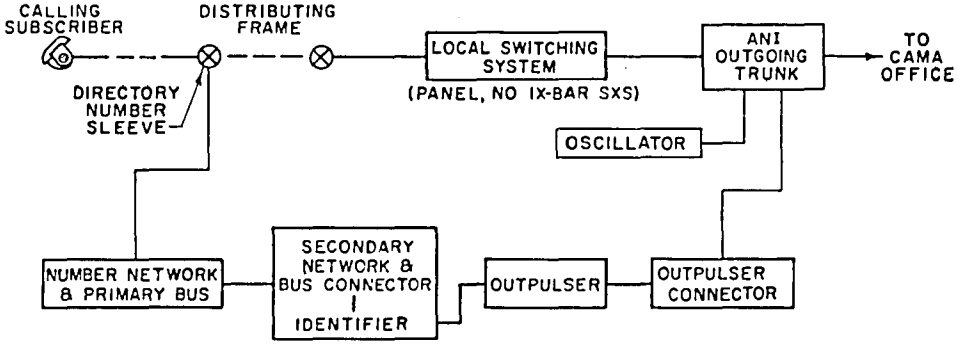


Fig. 1—Automatic Number Identification—Block Diagram

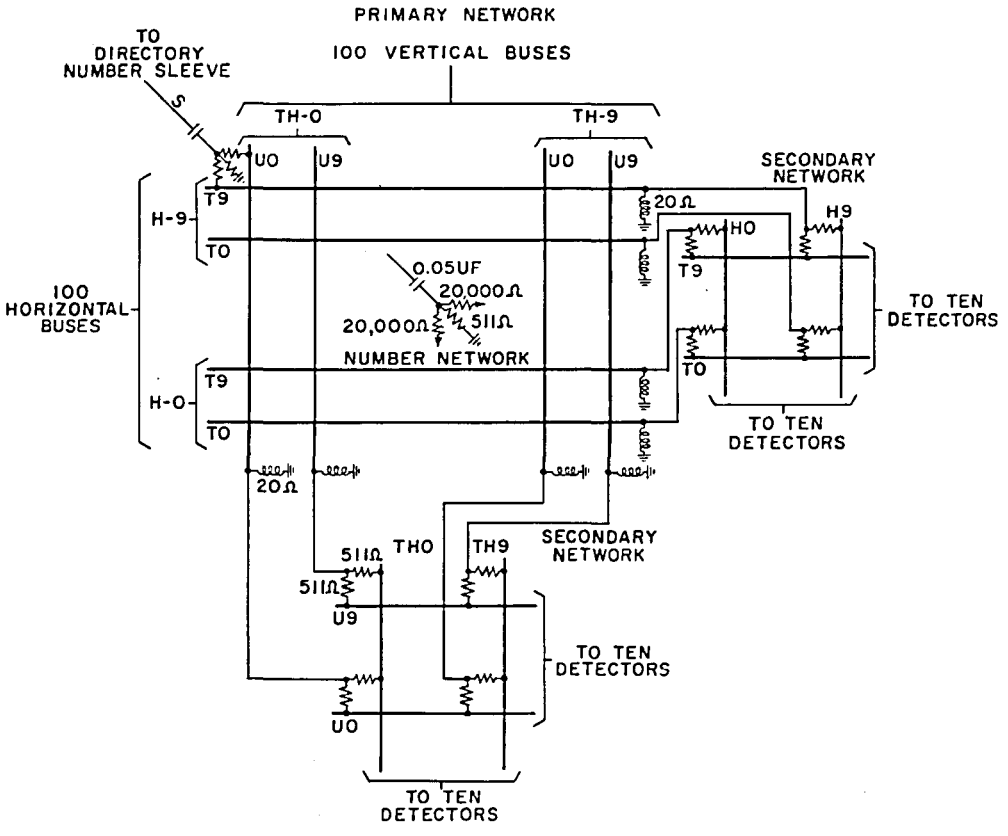


Fig. 2—Number Network System for 10,000 Numbers

black plus (+) sign to aid in identifying each number position.

1.14 Each 313A panel is equipped with 20 network cards, each having ten networks for ten numbers, or a total of 200 numbers. A separation in the middle of the panel divides the cards into two groups of ten each. The ten network cards on the left of a group of ten 313A panels are associated with one thousand number group and the ten network cards on the right are associated with another thousand number group. The thousands numbering on network frames for an office will usually be provided in consecutive order. In some step-by-step offices, the thousand numbers may be assigned in any order on a number network frame or between network frames. However, these numbers should be assigned in numerical sequence for more orderly growth, cabling, and maintenance. It should also be noted that the thousand number assigned to a physical or theoretical office will be the number connected to that thousand digit in the secondary network and the number outpulsed to the CAMA office. This will require stamping the correct thousands numbers on the frames and connecting the cables to the proper secondary networks on a job basis.

1.15 The ***"X" number network frame*** (XNN) shown in Fig. 4 is used only in No. 1 crossbar offices and includes only eight 313A panels and groups of PBX tie line terminal strips for the networks of these extra numbers which are multipled to the billing numbers on the regular NN frames. Provision for these extra numbers, when required, is made in groups of 100 for each number group in an office. A maximum of 2500 "X" numbers may be provided per office. The hundred designation is replaced by a letter corresponding to the number group to which it is assigned. The letters A to Z, (omitting I and O) are used for number groups 0 to 23, the letters AA being assigned to number group 24, if furnished. Extra numbers are identified, therefore by a letter corresponding to the associated number group and by a tens and units digit corresponding to the terminals on the 20 block

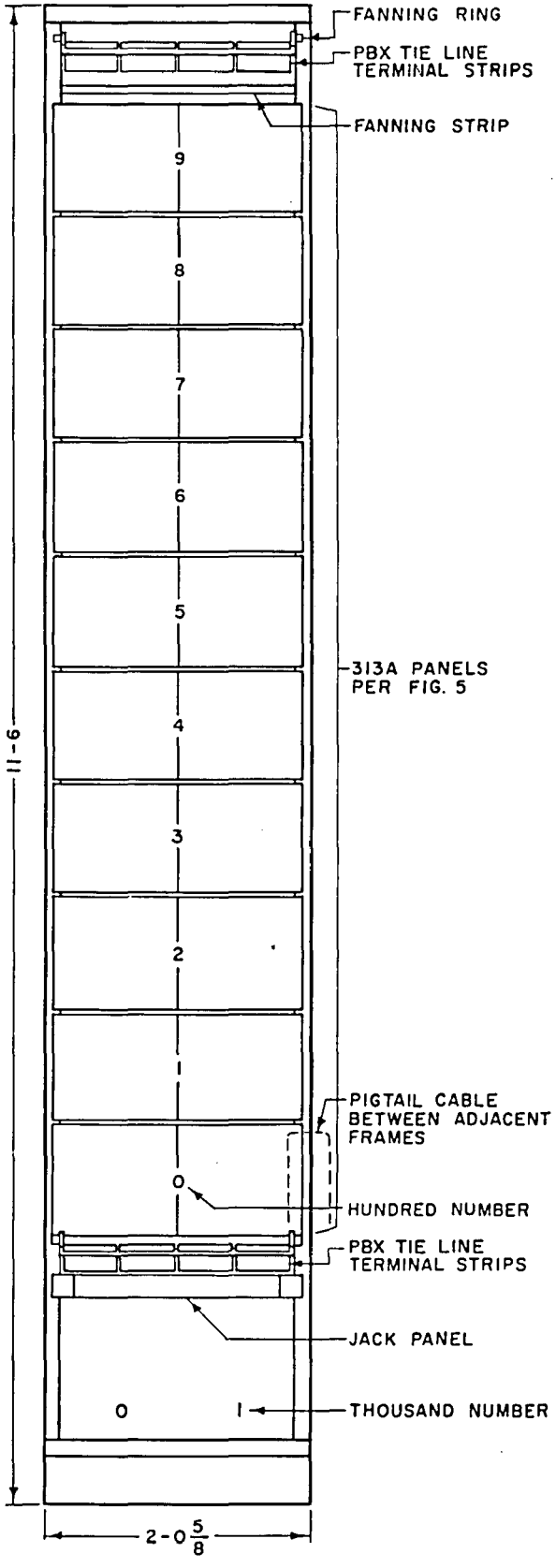


Fig. 3—Number Network Frame

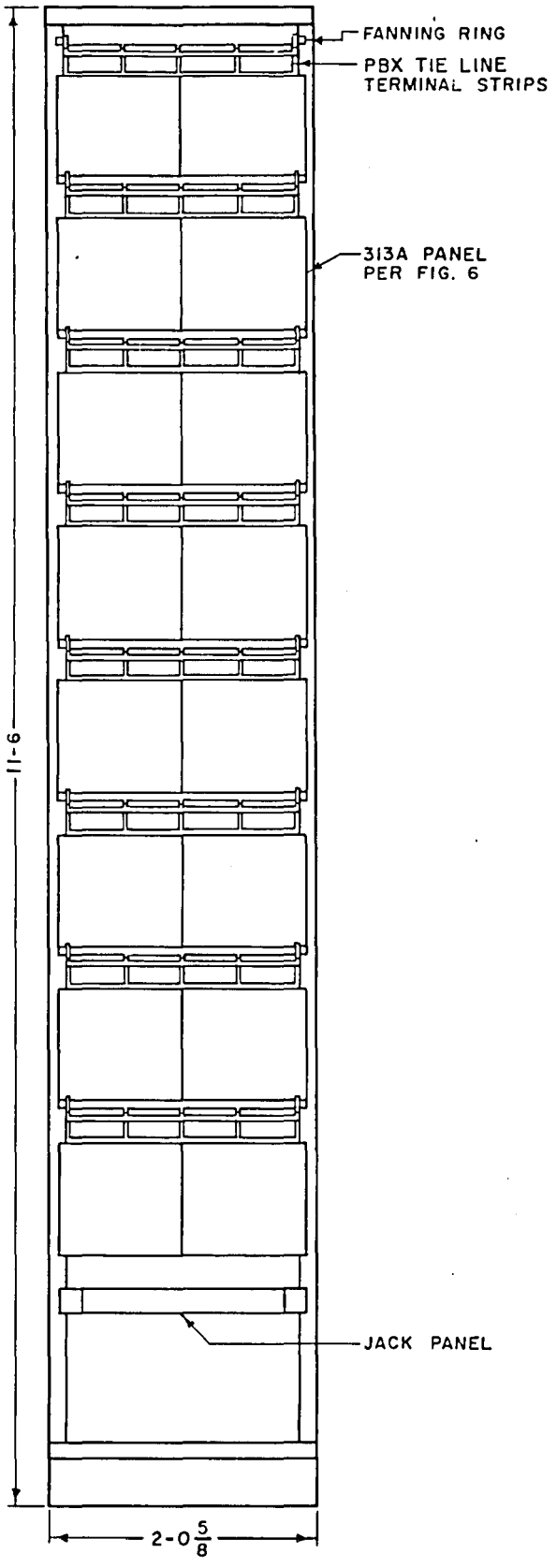


Fig. 4—"X" or Miscellaneous Number Network Frame

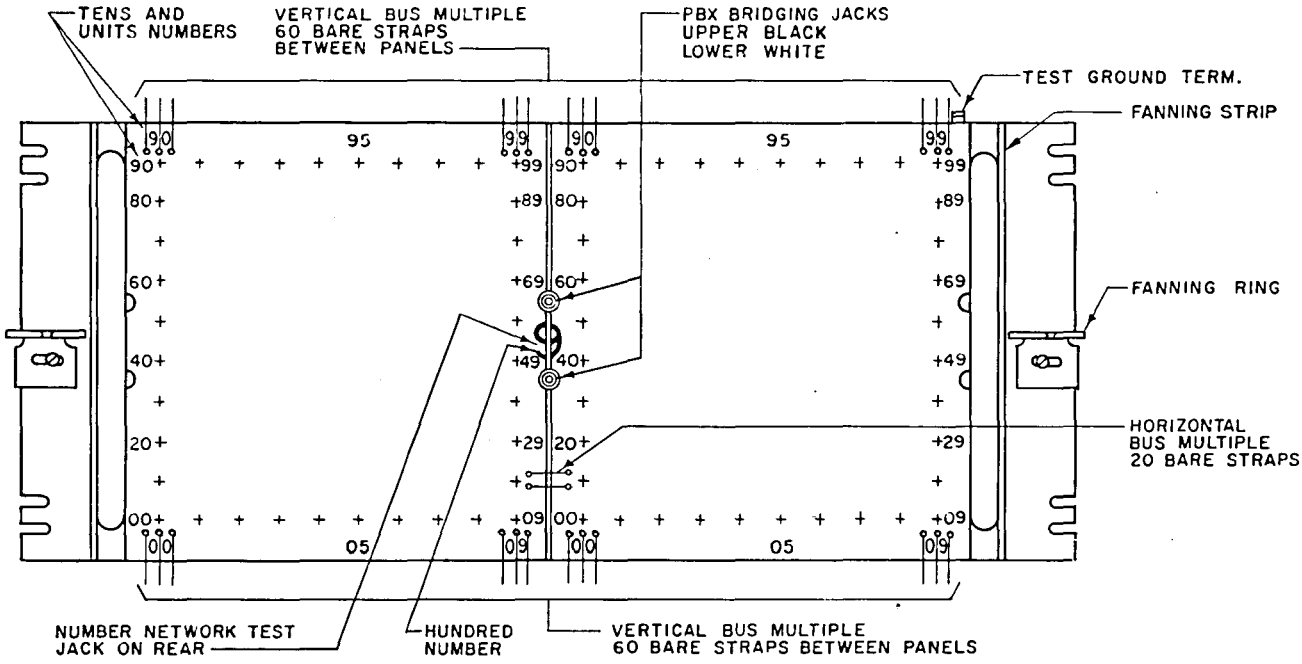


Fig. 5—Number Network Panel (313A)—200 Numbers

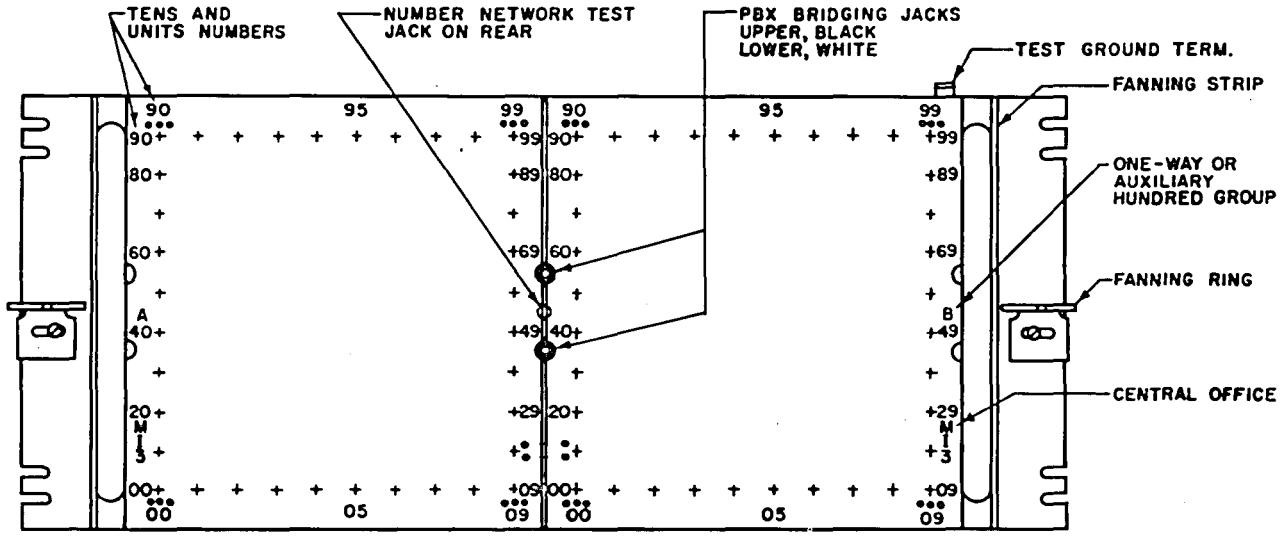


Fig. 6—"X" or Miscellaneous Number Network Panel (313A)—200 Numbers

relays. A typical "X" number network panel is shown in Fig. 6. While the standard 313A panel is used on the XNN frame, only the network terminals are used for connecting to the associated billing numbers through the PBX tie line terminal strips. The networks associated with only one office may be assigned to a network panel of 200 numbers. This limitation is necessary since a panel is equipped for only one number network test (NNT) jack associated with one office. This assignment should be in consecutive order to facilitate office identification. An XNN frame may

serve several offices and two XNN frames may serve one office.

1.16 The 11-foot 6-inch ***miscellaneous number network frame*** (MNN) is similar to the XNN frame and is similarly equipped. This frame is used for the networks associated with one-way lines providing outgoing service only in PBX groups, in panel and step-by-step offices, and in No. 1 crossbar offices not arranged for "X" numbers. In most offices only a few network panels and associated tie line terminal strips will be required on this frame, due to the small number of these outgoing lines required. For this reason, other relay rack equipment, preferably associated with ANI can be located on this frame. In step-by-step offices it is recommended that the line verification equipment be located on this frame as indicated on the frame equipment drawing. While the NN frames associated with MNN frames have a terminal strip capacity for 80 tie lines for use with one-way outgoing lines, only 20 tie lines are provided as this is the indicated maximum required. Any additional tie lines may be provided, if required, on a job basis. While a group of four terminal strips is usually provided above each network panel for uniformity and distribution purposes, any terminals on any terminal strip may be connected to a network frame in any office. Any one of the 100 networks on each side of a panel may be assigned to any one of six offices in an identifier group. This random distribution of networks is made possible by the addition of six number network test (NNT) jacks at the side of each 100 group on the panel for association with any one of six offices.

1.17 The 9-foot 0-inch high miscellaneous number network frame, as shown in Fig. 11, is similar to the 11-foot 6-inch high frame except that the six number network test jacks are omitted from the side of each 100 group on the 313A panel. This omission is possible since there is only one office in an identifier group when 9-foot 0-inch high frameworks are used.

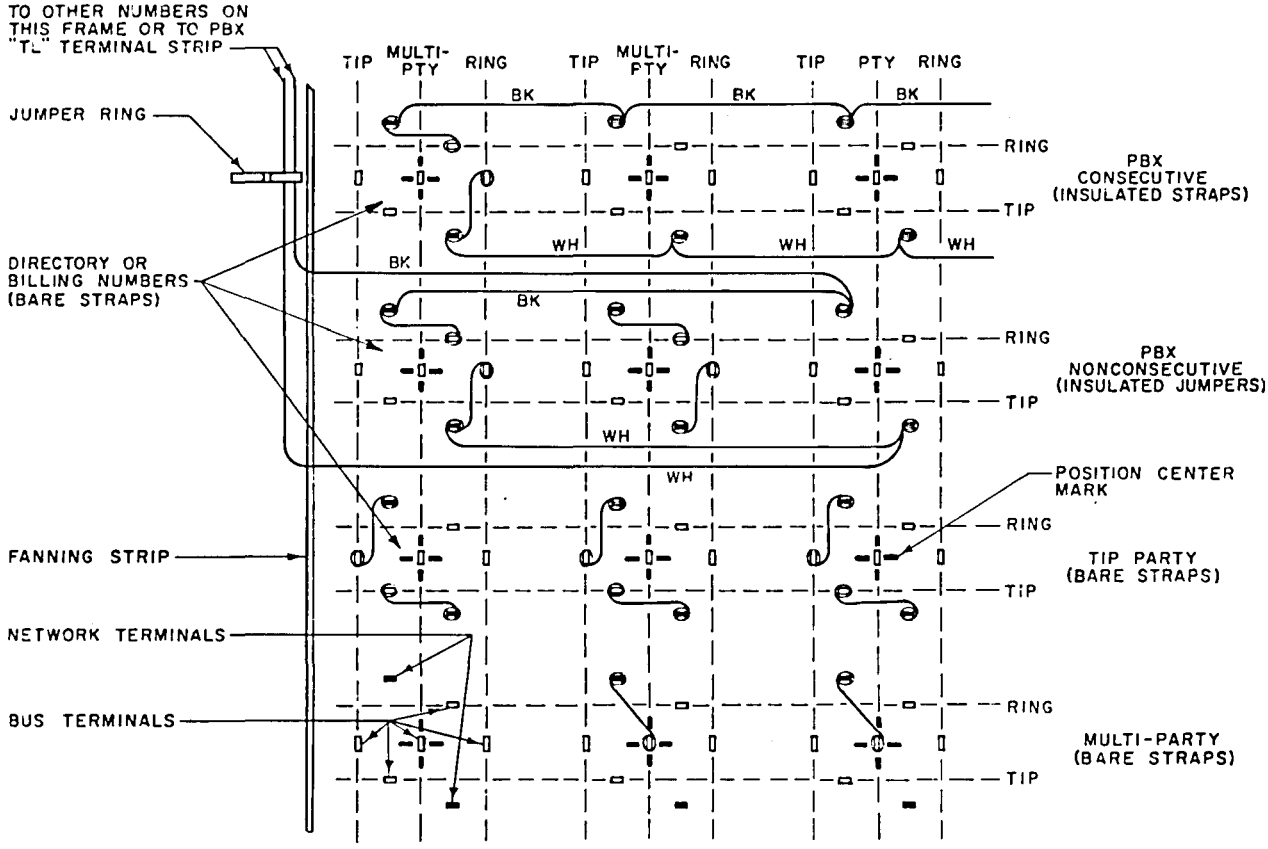


Fig. 7—Number Network—Cross-Connections

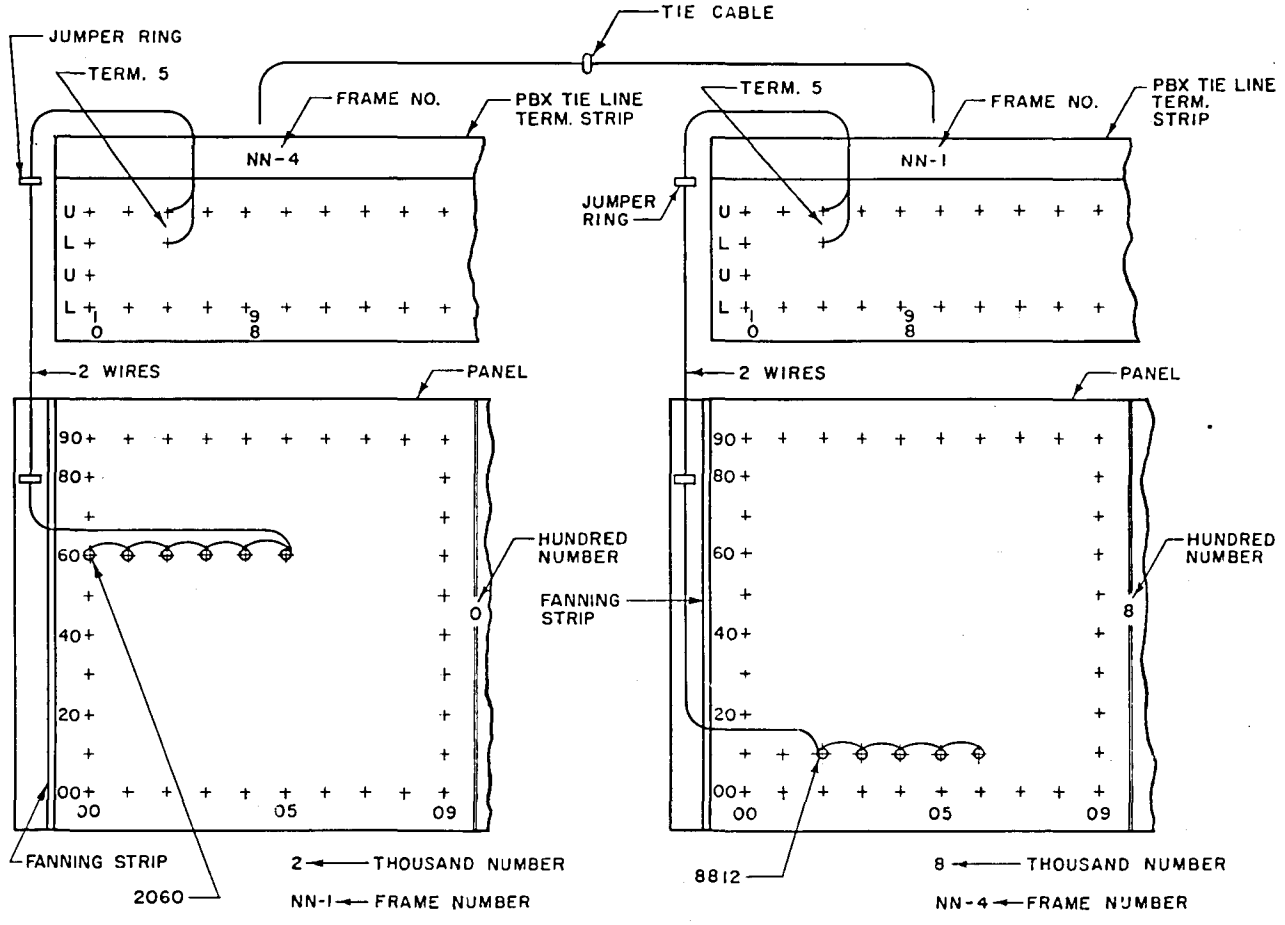
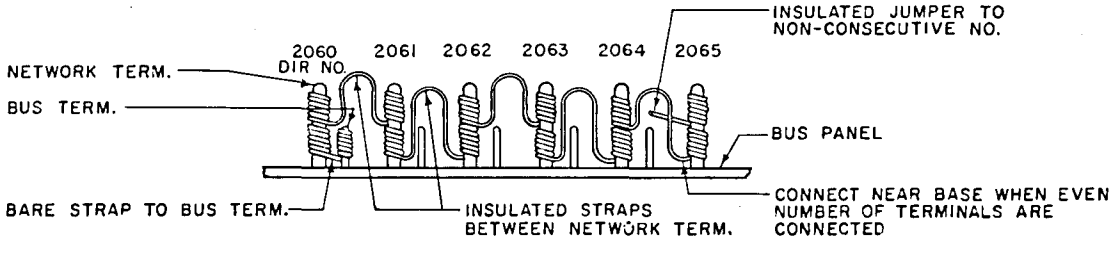


DIAGRAM OF TYPICAL PBX CONNECTION
BILLING NO. 2060
CONSECUTIVE NO. 2060 TO 2065
NON-CONSECUTIVE NO. 8812 TO 8816



METHOD OF CONNECTING
PBX NUMBERS
(TWO SETS OF CONNECTIONS REQUIRED)

Fig. 8—PBX Cross-Connections

1.18 ***Solderless-wrapped connections*** (SWC) are used on all wiring terminals on the NN, XNN, and MNN frames. The various types of connections made on the network panels are shown in Fig. 7. These include the two directory number bare wire straps for individual, 2-party, or PBX customers and the single bare wire strap for multiparty numbers. Insulated straps are used for consecutive PBX numbers of a group which are adjacent in the same tens level, and insulated jumper wires are used for nonadjacent PBX numbers on the same frame or to PBX TL or one-way TL terminal strips at the top or bottom of the NN frame or above a network panel on the XNN or

MNN frame. The upper (U) insulated strap or jumper connection to the network terminal is a black wire and the lower (L) network connection is a white wire.

1.19 All ***bus connections*** on the 313A panels appear on the front of the frame where they are accessible for cross-connections to the network terminals and for maintenance and testing. The terminals at the ends of the buses are used for strapping the buses together both vertically and horizontally. "Pigtail" local cables or switchboard cables are used to tie the horizontal buses together between frames. The vertical bus terminals on the tenth 313A panel (hundreds number 9) in a thousand number group and the horizontal bus terminals at the side of the 313A panels of the first thousand number group are used to connect the switchboard cabling to the secondary networks on the identifier frames. When 9-foot 0-inch high number network frames are used, switchboard cable is used to extend the vertical buses of the same thousand number group between 313A panels that are not mounted on the same frame.

Note: Bus connections are not used on the XNN and MNN frames.

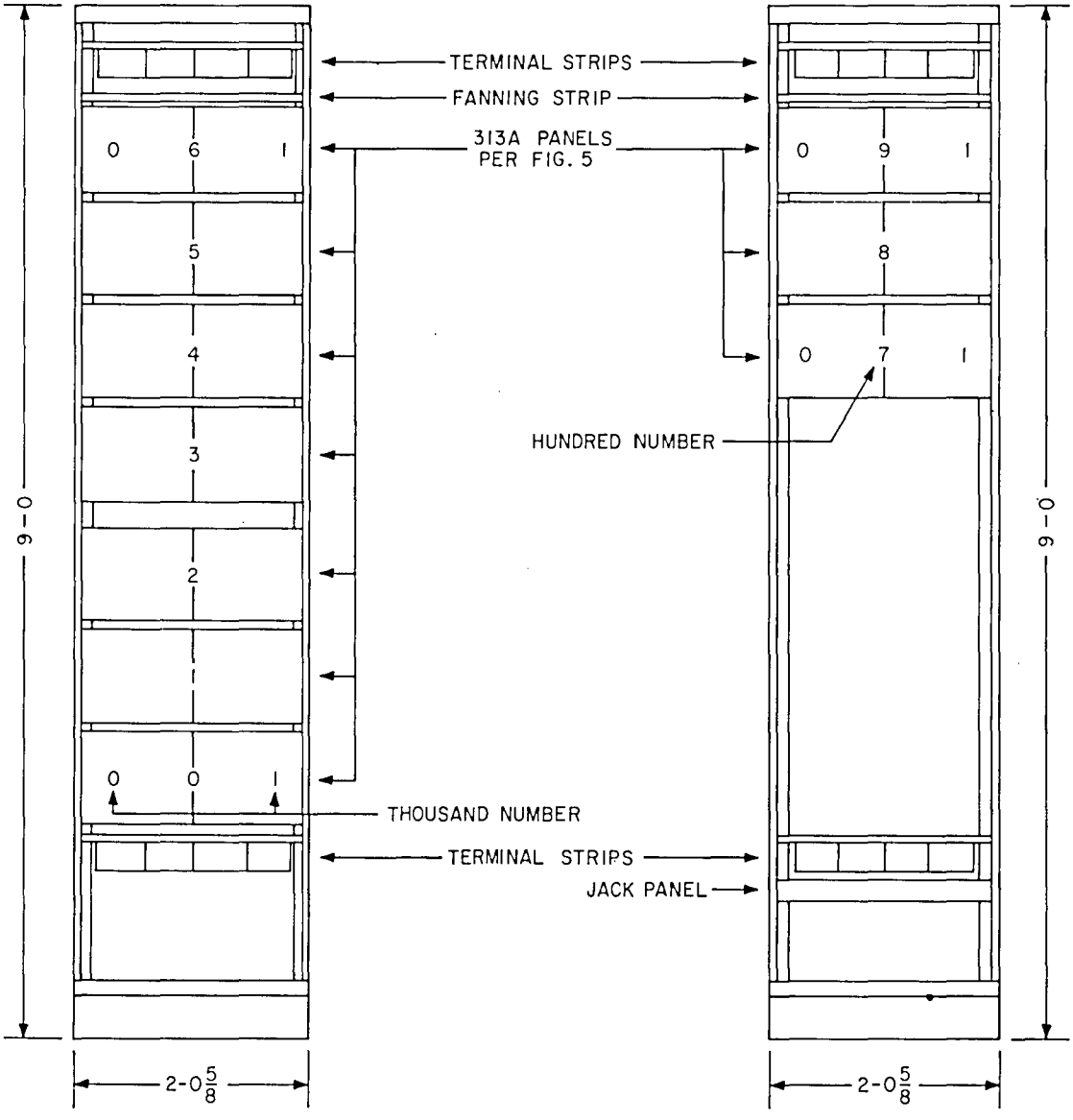


Fig. 9—Number Network Frames

1.20 ***PBX connections*** are shown for a typical customer in Fig. 8. All types of connections are illustrated and include the bare straps from the directory number network to the vertical and horizontal ring bus terminals; the insulated straps for adjacent consecutive number network connections and jumper wires connecting nonadjacent numbers on another NN frame. While single line connections are shown for illustration, it should be noted that two wire connections are required, as shown in Fig. 7. Thus, any PBX number may be connected to any other PBX number in the same office for billing purposes. ***Bridging jacks*** (black and white) are provided on all 313A panels, as shown in Fig. 5 and 6, for "bridging" around a PBX number to be removed from the middle of a group.

1.21 ***Line verification equipment*** per J99250 will be located on the lower part of the NN, XNN, or MNN frames in panel and No. 1 crossbar offices when specified by the telephone company. In these offices this equipment is a multiple of the lamp display and associated control equipment located at the line message register rack. In step-by-step offices complete line verification equipment is included and the unit is to be mounted at a convenient height on the MNN frame or on any other frame in the NN aisle, as specified by the telephone company. The lamp display indicates the particular office and the four digits of the calling customer number for verification of the cross-connections at the NN, XNN, or MNN frames. One appearance of this equipment at each location of NN frames will be required.

FLOOR PLAN ARRANGEMENT

1.22 The preferred arrangement for the NN, XNN, and MNN frames is in one common location with the associated identifier frames due to the circuit operation reasons outlined under ***ANI Limitations*** (5.14) and the daily cross-connecting activities involved. The NN frames of an office (plus XNN frames for No. 1 crossbar and MNN frames for panel, No. 1 crossbar, and step-by-step offices) should preferably be in one continuous line. Several offices may be in a line and two such lines, when furnished, should face the same front or maintenance aisle. It is also preferable that the identifier frames be located at the end of a lineup of NN frames. The front aisle should be 3 feet 0 inches minimum, although 3 feet 6

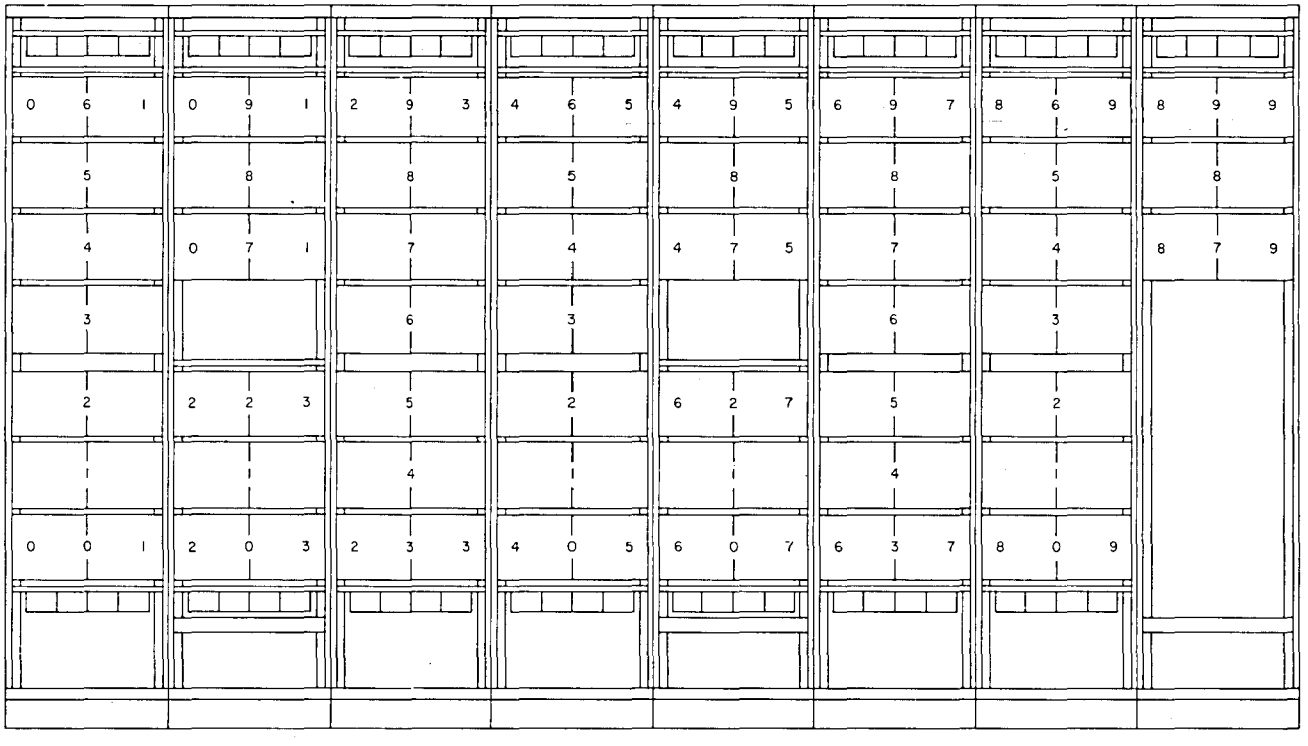


Fig. 10—Number Network Frames Arranged for 10,000 Numbers

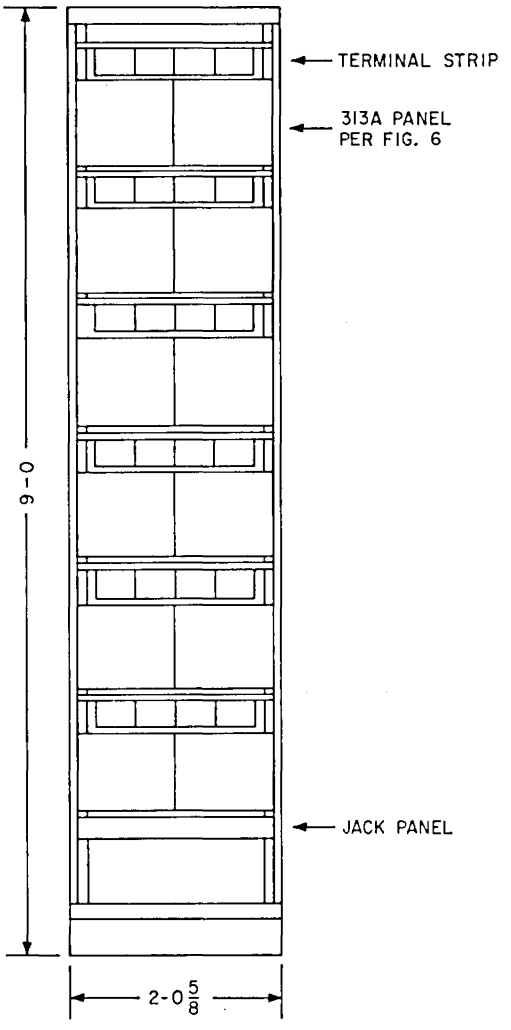


Fig. 11—Miscellaneous Number Network Frame

inches is desirable where this will not involve equipment or maintenance penalties.

1.23 Where building conditions dictate separation of the NN frames from the associated ID frames, care must be exercised in planning the cable runs to meet the ANI limitations. The secondary cables connecting the buses on the NN frames to the secondary networks on the ID frames should not be subjected to parallel runs with central office switch train sleeve leads or with the sleeve leads from the ANI trunk frames to the distributing frame, except as noted under ANI Limitations (5.14).

1.24 In No. 1 crossbar offices, all number network frames served by one message register rack miscellaneous circuit shall be at one location to facilitate line verification work.

1.25 In panel offices, all number network frames served by one line verification trunk circuit shall be at one location to facilitate line verificaton work.

2. SUPPLEMENTARY INFORMATION

814-000-000—Step-by-Step System Index
815-000-000—Panel System Index
816-000-000—No. 1 Crossbar System Index
J93402—814-607-150, 815-409-150, 816-205-150—Outpulser-Identifier-Trunk Test Frame-ANI
J93403—814-600-150, 815-408-150,816-206-150—Trouble Ticketer Frame—ANI
J95105—814-201-150, 815-300-150, 816-201-150—Identifier Frame—ANI
J95107—814-204-150, 815-301-150, 816-204-150—Outpulser Frame—ANI
J95108—814-507-151, 815-302-150, 816-207-150—Outgoing Trunk Frames—ANI
J99250—814-205-150, 815-304-150, 816-202-150—Line Verification and Miscellaneus Equipment—ANI
951-330-100—ANI System—General Descriptive Information
Floor Plan Data—Section 7.1, Sheet 49
Current Drain Data—
SD-21300-01—Panel Office—Battery Cutoff (Not available for Panel Office—Ground Cutoff)
SD-25000-02—No. 1 Crossbar Offices
SD-31359-02—No. 1 Step-by-Step offices

3. DRAWINGS

WE J drawings should be ordered by referring to the prefix and base number and requesting the current dash (—) number.

Keysheets

SD-21300-01—Panel Systems—Battery Cutoff Relay Office
SD-21680-01—Panel Systems—Ground Cutoff Relay Office
SD-25000-01—No. 1 Crossbar System
SD-31359-01—Step-by-Step Systems No. 1
SD-31364-01—Step-by-Step Systems—350A
SD-31780-01—Step-by-Step Systems—355A

Framework

ED-25278-30—Assembly—Jack, Key, and Lamp Panel

ED-25529-70—Guard Rail Junctions

ED-90595-01—Table Type Wagon and Spool Rack Assembly

ED-91710-73, ED-94848-73, ED-91837-71 } Bulb-Angle Frame Assembly

Equipment and Cabling

ED-20622-01—Method of Running Battery and Ground Leads—Single-sided Frames—Panel System

ED-20623-01—Method of Running Battery and Ground Leads—Double-sided Frames—Panel System

ED-20838-01, ED-20838-02 } IDF Switchboard Cabling Plan—Panel and Step-by-Step Systems

ED-25341-10, ED-25341-11 } LDF Switchboard Cabling Plan—Crossbar System No. 1

ED-25346-14, ED-25346-15 } Method of Running Power Feeders—No. 1 Crossbar

ED-27114-01—Wire Gauges and Type of Insulation—No. 1 Crossbar

ED-31351-10—Method of Running Power Feeders—Step-by-Step Systems

ED-95091-10—Number Network, "X" Number Network and Miscellaneous Number Network Frames—Switchboard Cabling Details

J95109A-( )—Number Network Frame—Assembly, Equipment, and Cabling

J95109B-( )—"X" Number Network Frame Assembly, Equipment, and Cabling

J95109C-( )—Miscellaneous Number Network Frame Assembly, Equipment, and Cabling—11 feet 6 inches High

J95109D-( )—Number Network Frame—Assembly, Equipment, and Cabling—9 feet 0 inches High

J95109E-( )—Miscellaneous Number Network Frame—Assembly, Equipment, and Cabling—9 feet 0 inches High

SD-80728-01—Battery Distributing Circuit Step-by-Step Systems

4. EQUIPMENT

J95109A—AT&TCo Std—Number Network Frame—11 feet 6 inches High—No. 1 Crossbar, Panel, and Step-by-Step Offices

Equipment—J95109A-( )

List 1—Framework, assembly, wiring, and equipment for one number network frame equipped for 2000 customer numbers and arranged for 60 or 80 PBX tie lines.

	WIRE	EQUIP	NOTES
Number Network and Primary Bus Ckt, SD-95813-01:			
Fig. 1	10	10	A
Fig. 2		0	B

List 2—Framework, assembly, and wiring for one miscellaneous jack panel.

	WIRE	EQUIP	NOTES
Jack, Key, and Lamp Panel ED-25278-30, G5		1	C
Number Network and Primary Bus Misc Ckt, SD-95825-01:			
Fig. 1	1	1	D,E
Fig. 2 & 3		0	D

List 3—Apparatus required in addition to list 2 to equip the TEL jacks in panel and No. 1 crossbar offices per SD-95825-01, Fig. 2.

List 4—Apparatus required in addition to list 2 to equip the SWMN jack in step-by-step offices per SD-95825-01, Fig. 3.

Notes

A. The number network frame is completely equipped for 2000 customer numbers included on ten 313A panels (200 numbers each), a vertical bus fanning strip, cable brackets, fanning rings, and terminal strips for PBX tie lines. A full complement of PBX TL terminal strips is provided at the top and bottom of

all frames. In panel and step-by-step offices not arranged for one-way outgoing lines, these terminal strips provide for 80 tie lines between all NN frames in each office and are designated accordingly. In No. 1 crossbar offices, arranged for "X" numbers, these terminal strips provide for 60 tie lines between all NN frames in each office and 80 tie lines to the XNN frame from each NN frame in the office. These terminal strips are, accordingly, designated for the 60 regular and 80 "X" number tie lines.

B. In panel and step-by-step offices and in No. 1 crossbar offices not arranged for "X" numbers, one-way lines providing outgoing service only in PBX groups, and not in the regular directory series will require tie lines from each number network frame to a miscellaneous number network frame. Twenty tie lines from each number network frame for each office are provided for this purpose. Where more than 20 tie lines are required, the additional cabling and terminal strip arrangements shall be provided on a job basis.

C. The number of W1AT cords furnished per SD-95813-01, Fig. 2, will be specified by the telephone company. Four of these cords are required for bridging around a PBX number being removed within a group. One of these cords is required to patch the NNT jack to the sleeve of a number network on the rear of the frame. Ten cords per identifier group should be sufficient for the average building.

D. One jack, key, and lamp panel per list 2 is furnished on each third NN, XNN, and MNN frame in a line of two or more frames, beginning with the second frame. One panel is furnished on each isolated frame.

E. The jack, key, and lamp panel per list 2 is drilled for equipment for all systems and equipped with the B jack and test posts per SD-95825-01, Fig. 1. The TEL jacks per SD-95825-01, Fig. 2, for use in panel and No. 1 crossbar offices are furnished per list 3. These TEL jacks in panel and crossbar offices may be cross-connected to the frame line circuit in either system, as specified by the telephone company. The SWMN jack per SD-95825-01, Fig. 3, for use in step-by-step offices is furnished per list 4. The B, TEL, and SWMN jacks are multipled on an identifier group basis, from the associated jacks on the ID frames which are located with the NN frames. These jacks and the associated multiples are provided separately for all the ANI equipment in a building, and are connected together at distributing frames as required.

F. The −48 volt battery and ground connections to the 1-A test posts shall be run direct to a fuse panel on a nearby fuse bay or fuseboard.

J95109B—AT&TCo Std—"X" Number Network Frame—No. 1 Crossbar Offices

Equipment—J95109B-( )

List 1—Framework, assembly, wiring, and equipment for one "X" number network frame arranged for, but not equipped with, 16 hundred groups of auxiliary numbers and PBX tie line terminal strips. (See Note A.)

List 2—Framework, assembly, and equipment for two groups of 100 auxiliary or "X" numbers. (See Note B.)

List 3—Framework, assembly, and equipment for one group of PBX TL terminal strips. (See Note C.)

Notes

A. List 1 includes the frame assembly and 18 cable brackets and 16 fanning rings mounted on the rear of the frame. Typical layouts of the "X" number network frames are shown on the equipment J drawing listed herein.

B. List 2 includes one 313A panel having 200 networks in two groups of 100 each and two P-40D884 fanning rings. Each panel shall be stamped with the hundred group (A, B, C, etc) and the associated central office designation. The bus terminals are not used on these panels, since all networks are multipled back to associated directory or billing numbers on the regular NN frames. No vertical strapping is required between the panels and no bus connections are required to the secondary networks. The number of 313A panels furnished will be determined by job requirements.

C. List 3 includes the P-34A614 mounting bar, four terminal strips arranged for 80 tie lines

to each of two associated NN frames, and two P-40D884 fanning rings for containing the jumpers to these terminal strips. The number of these terminal strip groups furnished will be determined by job requirements. While these terminal strips are mounted alternately with the 313A panels, the terminal strip associated with a particular office provides the tie lines for all the panels of that office.

J95109C—AT&TCo Std—Miscellaneous Number Network Frame—11 feet 6 inches High—Common Systems

Equipment—J95109C-( )

List 1—Framework, assembly, and equipment for one miscellaneous number network frame arranged for, but not equipped with, a maximum of 16 hundred groups of number networks for one-way lines for outgoing service only, with tie line terminal strips, line verification, and relay equipment as required. (See Note A.)

List 2—Framework, assembly, and equipment for one 313A network panel having two groups of 100 networks each. (See Notes B, D, E, and F.)

List 3—Framework, assembly, and equipment, for one group of tie line terminal strips. (See Notes C, D, and F.)

List 4—Framework, assembly, and equipment for one 313B network panel per SD-95813-01, Fig. 1, to provide 200 number networks for use with AIOD. (See Note G.)

Notes

A. List 1 includes the frame assembly and 18 cable brackets mounted on the rear of the frame. Where the line verification equipment in step-by-step offices is located on this frame, the capacity of the frame is reduced to 14 hundred groups with associated tie line terminal strips. Additional tie line terminal strips may be required for special job conditions, in which case the network capacity of the frame will be further reduced.

B. List 2 includes one 313A panel having 200 networks in two groups of 100 each, four P-40D884 fanning rings (two on the front and two on the rear) and two NNT jack panels, each arranged for association with six central offices. Thus, any network in a hundred group may be associated with any one of six offices. The single NNT jack provided with the 313A panel is not used on this frame. Each panel shall be stamped with the hundred group (A, B, C, etc) and the associated central office designation when associated with a single office. The bus terminals and the vertical and horizontal strapping are not used on these panels, since all networks are multipled back to associated directory or billing numbers on the regular NN frames. Also, wiring from these panels to the secondary network units on the ID frames is not required. The number of 313A panels furnished will be determined by job requirements.

C. List 3 includes the P-34A614 mounting bar, four terminal strips arranged for 20 one-way tie lines to each associated NN frame, and two P-40D884 fanning rings for containing the jumpers to the terminal strips. The number of these sets of terminal strips and fanning rings will be determined by job requirements. While these terminals are usually mounted alternately with the 313A panels, the terminal strips associated with a particular office provide the tie lines for all the networks of that office and should be provided initially for the ultimate of the office. Where the networks on one 313A panel are associated with two or more offices, the additional tie line terminal strips per list 3 shall be mounted directly above the terminal strips for the first office.

D. An assignment record will be provided by the telephone company, showing the one-way line number as a hundred group (A, B, C, etc) and a 2-digit number (00-99) corresponding to the network position on the panel, with the associated office (0-5), 4-digit billing number, and the connecting terminal strip tie line numbers (0-up).

E. The NNT jack panels are located on the rear of each upright at each panel so that the W1AT cord can be used to patch any number network sleeve terminal to any one of six offices in one ID group. The two groups of 100 networks on a panel may be in two separate ID groups, if desired.

F. Refer to NN frame, J95109A, or XNN frame, J95109B, for cross-connection and grounding information.

G. Same as 313A panel except horizontal bus straps and PBX bridging jacks have been omitted. Networks are strapped to ring buses. Terminal strips, fanning strips, a P-34A614 mounting bar, and two P-40D884 fanning rings are included with list 4.

J95109D—A T&TCo Std—Number Network Frame—9-foot 0-inch High Frame For Use in Step-by-Step Offices.

Equipment—J95109D-( )

List 1—Framework, assembly, and common equipment for one number network frame without 5-inch cable rack arranged for, but not equipped with, a maximum of 1400 customer numbers and 60 PBX tie lines. (See Note A.)

List 2—Framework, assembly, and common equipment for one number network frame with 5-inch cable rack arranged for, but not equipped with a maximum of 1400 customer numbers and 60 PBX tie lines. (See Note A.)

List 3—Framewok, assembly, wiring, and equipment required in addition to list 1 or 2 for 1400 customer numbers.

	WIRE	EQUIP	NOTES
Number Network and Primary Bus Ckt, SD-95813-01:			
Fig. 1	7	7	B
Fig. 2	0	0	C

List 4—Framework, assembly, wiring, and equipment required in addition to list 1 or 2 for 600 customer number.

	WIRE	EQUIP	NOTES
Number Network and Primary Bus Ckt, SD-95813-01:			
Fig. 1	3	3	B
Fig. 2	0	0	C

List 5—Framework, assembly, wiring, and equipment for one miscellaneous jack panel.

	WIRE	EQUIP	NOTES
Jack, Key, and Lamp Panel, ED-25278-30, G5		1	D
Number Net. and Primary Bus Miscellaneous Ckt, SD-95825-01:			
Fig. 1	1	1	E
Fig. 3	1	1	E

Notes

A. List 1 or list 2 includes the frame assembly, a vertical bus fanning strip, cable brackets, fanning rings, and terminal strips for PBX tie lines. A full complement of PBX tie line terminal strips is provided at the top and bottom of all frames. These terminal strips provide for 60 tie lines between all NN frames in the office, and 20 one-way lines from each number network frame to a miscellaneous number network frame. Where more than 20 tie lines are required, the additional cabling shall be provided on a job basis.

B. List 3 includes seven 313A panels (200 numbers each) for 1400 customers, list 4 includes three 313A panels for 600 customers. Thus, to completely equip for 2000 customers, in two vertical groups of 1000 numbers each, one list 4 must be provided in addition to list 3 as follows:

For first 2000 customers provide one list 1 or 2 equipped with one list 3 NN-FR 0, and one list 1 or 2 equipped with one list 4 top half of NN-FR 1.

For the second 2000 customers provide one list 4 in bottom half of NN-FR 1, and one list 1 or 2 equipped with one list 3 NN-FR 2, repeat for third to fifth groups of 2,000 customers. One P-43D009 fanning strip shall be provided with the second list 4 on NN frames 1 and 4 in order to facilitate the cabling of the vertical bus between panels in the same vertical groups mounted in adjacent NN frames.

C. The number of W1AT cords furnished per SD-95813-01, Fig. 2, will be specified by the telephone company. Four of these cords are required for bridging around a PBX number being removed within a group. One of these cords is required to patch the NTT jack to the sleeve of a number network on the rear of the frame. Ten cords should be sufficient for the building.

D. One jack, key, and lamp panel per list 5 is furnished per three number network and miscellaneous number network frames in a lineup of three or more frames beginning with the second frame. One panel is furnished on each isolated frame.

E. The B and SWMN jacks are multipled on an identifier group basis from the associated jacks on the ID frames which are located with the NN frames. These jacks and the associated multiples are provided separately for all the ANI equipment in a building, and are connected together at distributing frames as required. The −48 volt battery and ground connection to the 1-A test posts shall be run direct to a fuse panel on a nearby fuse bay.

J95109E—AT&TCo Std—Miscellaneous Number Network Frame—9-foot 0-inch High Frame for Use in Step-by-Step Offices

Equipment—J95109E-( )

List 1—Framework, assembly, and equipment for one miscellaneous number network frame without 5-inch cable rack arranged for, but not equipped with, a maximum of 12 hundred groups of number networks for one-way lines for outgoing service only, with tie line terminal strips as required. (See Note A.)

List 2—Framework, assembly, and equipment for one miscellaneous number network frame with 5-inch cable rack arranged for, but not equipped with, a maximum of 12 hundred groups of number networks for one-way lines for outgoing service only, with tie line terminal strips as required. (See Note A.)

List 3—Framework, assembly, and equipment for one 313A network panel having two groups of 100 networks each. (See Notes B, D, E, and F.)

List 4—Framework, assembly, and equipment for one group of tie line terminal strips. (See Notes C, D, and F.)

List 5—Framework, assembly, and equipment for one 313B network panel per SD-95813-01, Fig. 1, to provide 200 number networks for use with AIOD. (See Note G.)

Notes

A. List 1 includes the frame assembly and 14 cable brackets mounted on the rear of the frame. Where the line verification equipment is located on this frame, the capacity of the frame is reduced to eight hundred groups with associated tie line terminal strips. Additional tie line terminal strips may be required for special job conditions, in which case the network capacity of the frame will be further reduced.

B. List 3 includes one 313A panel having 200 networks in two groups of 100 each, four P-40D884 fanning rings (two on the front and two on the rear) and a single NNT jack associated with one office only. Each panel shall be stamped with the hundred group (A, B, C, etc) and the associated central office designation. The bus terminals and the vertical and horizontal strapping are not used on these panels since all networks are multipled back to associated directory or billing numbers on the regular NN frames. Also, wiring from these panels to the secondary network units on the ID frames is not required. The number of 313A panels furnished will be determined by job requirements.

C. List 4 includes the P-34A614 mounting bar, four terminal strips arranged for 20 one-way tie lines to each associated NN frame, and two P-40D884 fanning rings for containing the jumpers to the terminal strips. The number of these sets of terminal strips and fanning rings will be determined by job requirements, depending on the number of tie lines required.

D. An assignment record will be provided by the telephone company showing the one-way line number as a hundred group (A, B, C, etc)

and a 2-digit number (00-99) corresponding to the network position on the panel, with the associated office (0) 4-digit billing number, and the connecting terminal strip tie line numbers (0-UP).

E. A NNT jack associated with one office only is located at the rear of each 313A panel so that a W1AT cord can be used to patch the sleeves of the number networks on the rear of the frame to its associated office.

F. Refer to NN frame J95109A for cross-connection and grounding information.

G. Same as 313A panel except horizontal bus straps and PBX bridging jacks have been omitted. Networks are strapped to ring buses. Terminal strips, fanning strips, a P-34A614 mounting bar, and two P-40D884 fanning rings are included with list 4.

5. GENERAL NOTES

Equipment

5.01 The NN, XNN, and MNN frames serve the same general purpose as distributing frames and consist mainly of panels of networks and PBX tie line terminal strips. No local cables are required on these frames. Where these frames must be lined up with frames of different widths, guardrail junction details will be required as shown on ED-25529-70.

Wiring and Cabling

5.02 The code numbers of the switchboard cables to be used in cabling the NN, XNN, and MNN frames are shown on ED-95091-10, -11, -12, and 13.

5.03 All connecting terminals on the NN, XNN, and MNN frames are arranged for solderless-wrapped connections, except the pin jacks on the network panels and the miscellaneous apparatus on the jack panel. The gauge and insulation of all wire and cable used on these frames is shown on ED-27114-01.

5.04 The sleeve S leads from the distributing frame shall be run through the fanning ring at the side of each network panel, then up to the fanning strip at the top of the panel, down through the fanning hole, and around the skinning hook opposite each network to the associated sleeve terminal. Thus, the network panel and fanning rings are arranged as a wiring jig for the installation force and provide slack in the sleeve leads for three future SWC changes if required for test or maintenance purposes.

5.05 A battery feeder is not required at these frames. The ground feeder connected to the frame ground bar shall be provided in accordance with the battery and ground feeder drawing listed herein for the system to which this ground is to be associated. For uniformity, the same size of ground feeder used for the relay racks for the particular system to which these frames are connected shall be used. This ground feeder shall be connected to the frame ground bar at the end of each lineup with a suitable terminal lug bolted to the ground bar.

5.06 To insure a continuous and reliable ground for the number networks, two separate connections are made from ground punchings on the frame ground bar. One connection is made to the 313A panel ground terminal on the top of the top panel and multipled to the top ground terminal on all other panels on the frame. Another connection is made to the ground terminal on the bottom of the top 313A panel and multipled to the bottom terminal on all other panels on the frame. This method of grounding is applied to the panels on the NN, XNN, and MNN frames.

5.07 Bare horizontal bus straps are provided between the two hundreds groups on the 313A panel. The continuation of these horizontal bus connections between 313A panels in the same hundred group mounted on adjacent frames is made with shop-formed pigtail cables, one end of which is connected in the shop. Bare vertical bus straps provided between panels on the network frames are connected in the shop. The vertical and horizontal strapping and pigtail cables are not required on the XNN and MNN frames.

5.08 In ***panel offices,*** final numbers 97 (GRD-CO only), 98, and 99 in each group of 500 lines are arranged for the final selector test and these cable leads shall not be connected at the HIDF or at the NN frame. These leads shall be disposed of as spare cable leads in the standard manner. In step-by-step offices, the 90 and 99 connector multiple test terminals shall be connected to the

associated networks as working numbers in the usual manner to obtain a uniform treatment for all directory number terminals.

Cross-Connections

5.09 Precut straps are provided in marked plastic tube containers for directory number-to-network connections and for multiple network connections for adjacent numbers of a PBX group. These containers are also dispensers, since a slotted hole in the metal cap permits one or two straps to be removed by a "salt-shaker" action. Two bare straps are used for the directory number connections and a black and a white insulated strap are used for adjacent PBX number connections. A black and a white wire, from reels, are used for connecting nonadjacent PBX numbers and for connecting from networks to tie line terminal strips. These jumper wire reels are mounted on table-type wagons with spool racks per ED-90595-01, Group 8, as specified by the telephone company. Usually one of these wagons will be sufficient for one to three offices at a number network location and two wagons will be needed for number network lineups for four to six offices. The wiring tools, line assignment lists, and other associated material used at the network frames may be placed, as needed, in the top tray of these wagons.

5.10 Plastic tubes, similar to the strap containers, are used for dispensing the yellow disconnect and the red multiparty plastic tubing markers. Where an individual or 2-party number is disconnected at the associated distributing frame, the two bare wire straps on the directory number network are not removed, but a yellow marker is slipped over the associated center (multiparty) vertical bus terminal. This marker indicates that the number has been disconnected and must be checked before the number is reassigned and the marker removed. Usually, if the disconnected number is a tip or a ring customer the new assignment will be a tip or a ring customer and the strapping need not be changed. The straps for a PBX number, either the bare wire directory number or the insulated network multiple, are always removed on disconnects. A storage container assembly (P-48D581) is furnished to hold new and used straps and markers. This container will house six plastic dispensers and has a removable box for storing used bare and sleeved wire straps and markers. The container is arranged to clamp onto a ladder step or be placed on the top tray of the wagon. This container is required on the basis of one per rolling ladder and one per table-type wagon.

5.11 A red plastic tubing marker is used to indicate all except one of a group of multiparty numbers associated with a particular line and indicates a working number. This red marker is slipped over the associated multiparty bus terminal. The one number not marked is connected by a single bare strap from the multiparty bus terminal to the number network terminal of the number specified by the telephone company. The red-marker multiparty numbers are not strapped and the marker is removed on a disconnect.

5.12 All cross-connections required on the NN, XNN, and MNN frames prior to cutover are usually made by the installation force from assignment records provided by the telephone company, similar to the practice followed for distributing frames.

5.13 In step-by-step offices, the tip party of 2PMR lines is wired to the ring field.

ANI Limitations

5.14 Due to circuit and equipment design requirements, the following limitations in the ANI system shall be observed.

(a) Customer numbers served by one identifier group shall not have access to ANI trunks in another identifier group.

(b) A maximum of 600 number networks may be connected to one primary bus on a network frame. This includes all multipled PBX numbers connected to the bus.

(c) The primary cables for the sleeve leads from the LDF and IDF to the number network frames shall not exceed 400 feet, and shall not be located on the same cable rack with other switch train or ANI trunk sleeve leads for more than a total of 100 feet.

(d) When secondary cables are run above or below any cable racks, the top cable rack shall be equipped with sheet metal screens (shields) per ED-91689-30, or equivalent. Each section of these shields shall be connected by a continuous single No. 22 gauge type BH wire which shall

be terminated on a ground bar on a nearby fuse panel or fuseboard.

(e) Cables containing switching, ANI trunk, or step-by-step or crossbar line verification sleeves shall not be run on the cable racks above the number network frames. Other cables not involving these sleeve leads may be run on these cable racks.

(f) Over the NN, XNN, and MNN frames the primary cables from the distributing frames shall be separated by a 2-inch horizontal space from the secondary network cables to the identifier frames and PBX tie line cables between frames.

(g) Except as noted in (e) and (f), secondary cables shall be placed on separate racks. These racks may run side by side with other cable racks but shall not be subjected to continuous runs in parallel with the same cable for more than 60 feet. However, for panel district office and trunk sleeve cables the secondary cable racks must be separated by 5 feet for any parallel run.

(h) The tip and ring field secondary leads shall be run in separate cables and shall not exceed 300 feet in length.

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(i) All primary and secondary cable runs shall be marked with designation plates, as follows, to insure that the other interfering cables will not be placed on these runs.

ANI SEC CA ONLY (P-43D111)
ANI PRI CA ONLY (P-43D112)

These number plates shall be attached to the underside of the cable racks approximately every 5 feet. Where these plates are in such a position as to constitute an accident hazard, they shall be bent up to the cable rack with the stamping information retainable in a readable position.

(j) Secondary cables of two identifier groups may be run on the same secondary cable rack.

Frame Lighting

5.15 High-intensity lighting is required in front of the NN, XNN, and MNN frames. To insure this adequate lighting the auxiliary framing bars used for supporting these frames should be spaced on approximately 5-foot centers.