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COMMON SYSTEMS
NUMBER NETWORK AND
PRIMARY BUS CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION - TYPE B
CROSSBAR NO. 1, PANEL OR STEP-BY-STEP OFFICE

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is designed for use in panel, crossbar No. 1, and step-by-step offices arranged for automatic number identification. Fundamentally, it consists of a resistor-capacitor network arranged in a 10,000-crosspoint array, the crosspoints being located at the intersections of 100 vertical and 100 horizontal buses.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This circuit translates a 5800-cycle identification signal appearing on one of 10,000 input leads to a signal on one of 100 vertical and on one of 100 horizontal output buses in either a tip or a ring bus field, or to a signal on one of 100 vertical output buses in a multiparty bus field.

SECTION II - DETAILED DESCRIPTION

1. PHYSICAL DESCRIPTION

1.01 The basic equipment unit of the primary bus circuit is the number network panel, half of which is represented in FS1. Each panel contains 20 groups of three buses which are located vertically on the panel, and 10 groups of two buses which are located horizontally on the panel. In each of the vertical bus groups, one bus is associated with a ring field, one with a tip field, and one with a multiparty field. In each of the horizontal bus groups, one bus is associated with a ring field and one with a tip field. The three buses in each vertical bus group are given like thousands and units number assignments. The two buses in each horizontal bus group are given like hundreds and tens number assignments. If the intersection of one vertical bus group and one horizontal bus group is considered to form a crosspoint, each number network panel provides 200 such crosspoints. The panels are mounted ten on a frame, so that five frames of panels are required to provide 10,000 crosspoints for a 10,000-line office. Similarly designated vertical buses on adjacent panels on a frame are wired together and similarly designated horizontal buses on adjacent frames are wired together. Each bus in the tip and ring bus field is wired to the secondary network and bus connector circuit, and buses in the same thousands group of the multiparty bus field are multipled and wired to the secondary network circuit. The buses are designated either RTH(0-9) U(0-9), TTH(0-9) U(0-9), RH(0-9) T(0-9), TH(0-9) T(0-9), or PYTH(0-9) U(0-9) according to the field with which they are associated and their number assignments. Information Note 301 shows a typical arrangement of bus number assignments.

1.02 Twenty cards, each containing ten number networks, are mounted vertically on each number network panel. As shown in

FS1, one number network is associated with each crosspoint on the panel. Each number network consists of an A, B, and G resistor and a C capacitor. The G resistors are grounded through the mounting screws for the cards. The A and B resistors are wired to either the ring, tip, or multiparty buses at the associated crosspoints. Information Note 302 shows the relative position of the buses at each crosspoint and the wiring of the number networks to the buses for various options. Option Z is used for ring subscribers, or for tip subscribers on 2-party message rate step-by-step lines. Option Y is used for tip subscribers except those on 2-party message rate step-by-step lines. Option X is used for multiparty subscribers. Options W and Z are used for PBX lines not arranged for AIOD service. For any PBX group not arranged for AIOD service the number network which is associated with the buses having number assignments corresponding to the PBX billing number is wired to the ring field (option Z). The number networks associated with other lines in the PBX group are multipled to the above network (option W). Thus all lines in a PBX group have an electrical connection to the buses corresponding to the PBX billing number. The PBX lines may make their appearance at consecutive or nonconsecutive crosspoints of the primary bus circuit, or may be X numbers in crossbar No. 1 office or PBX lines arranged for originating service only in panel or step-by-step office as described in 3. PBX EXTRA NUMBERS. Not more than 600 number networks, including those associated with PBX numbers, shall be connected to a primary bus. PBX lines arranged for AIOD service are treated as described.

2. FUNCTIONAL OPERATION

2.01 An input lead is connected from each C capacitor to the sleeve (or message register lead for tip party subscribers on step-by-step 2-party message rate lines) of the subscriber line that has the same directory number as the number assigned to the buses at the associated crosspoints. Output leads from all buses are connected to the Secondary Network and Bus Connector Circuit. For all except multiparty subscribers, a 5800-cycle identification signal appearing on one input lead is transmitted through the associated C capacitor and A and B resistors to the secondary network over one vertical bus and one horizontal bus in either the tip or ring bus field. In the secondary network these signals are translated to a signal on one in each of four groups of ten outputs, so that the identifier, in scanning the secondary network output leads, detects the signal on buses corresponding to the subscriber directory number. For multiparty subscribers, the signal appears on one vertical bus which is multipled to nine other vertical buses in the multiparty bus field and connected to a lead to the secondary network. Ten such leads are provided in the secondary network and concentrated to one multiparty output, so that the identifier, in scanning the secondary network output leads, detects a multiparty signal and an operator is called in to make the identification.

2.02 The C capacitor is furnished with each number network to provide dc blocking between the primary bus circuit and the subscriber sleeve or message register leads. The A and B resistors are furnished to provide a translation from the input lead to the associated buses, and their size is such that feedback of the 5800-cycle signal from one bus to another is greatly minimized. The G resistors are furnished to terminate the input leads with a relatively low impedance to ground, thus keeping capacitive crossfire of the 5800-cycle signal between input leads to a minimum.

3. PBX EXTRA NUMBERS

X-NUMBER NETWORKS

3.01 For PBX groups in No. 1 crossbar offices, X numbers may be provided which are outside of the regular 10,000-number series and which are used to facilitate growth. The sleeve leads from such X-number lines terminate at number networks that are located on an X-number network frame or on a miscellaneous-number network frame. These frames might be termed dummy frames in that the vertical and horizontal buses on individual panels on the frames are not interconnected, nor are they wired to either the regular 100 by 100 primary bus circuit or the secondary network circuit. The A and B resistors of the X-number networks are wired to the PBX-billing-number network in the same manner as PBX lines that make their appearance in the regular subscriber number series.

PBX LINES ARRANGED FOR ORIGINATING SERVICE ONLY

3.02 In panel or step-by-step offices, some PBX lines are arranged for originating service only and have no appearance at the final multiple or connector terminal. This arrangement is used to conserve directory numbers. To provide a means of charging the PBX billing number for extra charge calls on these lines, they are connected to number networks which are multipled to the network associated with the PBX billing number. The number networks for these lines may be provided on a miscellaneous-number network frame, or, for panel office, on an X-number network frame of a No. 1 crossbar office at the same location. These networks are wired in the same manner as the

X number networks described in 3.01 of this section.

4. MISCELLANEOUS EQUIPMENT

4.01 The U and L PBX bridging jacks, shown in FS2, used in conjunction with the patching cords of FS4, provide a means for temporarily "strapping around" a number network position in a PBX group while the composition of the group is being changed. This maintains continuity in the PBX strapping path until permanent wiring is accomplished.

4.02 The NNT test jack shown in FS3, used in conjunction with the patching cords of FS4, provides a means for making an input connection to any number network from the Outpulser Identifier Test Circuit for test purposes. The ground terminals, also shown in FS3, provide a test ground for use in measuring the impedance from the primary buses to ground.

5. PBX LINES ARRANGED FOR AUTOMATIC IDENTIFIED OUTWARD DIALING (AIOD) SERVICE

5.01 The primary bus system and number network for 100 PBX lines arranged for AIOD service is represented in FS5. This unit is part of an AIOD number network panel that contains two separate blocks of 100 individual number networks. Additional panels may be furnished as required. A line arranged for AIOD service requires a connection to an individual number network in the AIOD primary bus system. The use of the AIOD number network supersedes the use of a regular, X, or miscellaneous number network so that if a line is to be provided with AIOD service and is already connected to a regular, X, or miscellaneous number network the associated cross-connections per options W and Z must be removed. The connection to the AIOD bus system provides a distinct 4-digit number referred to as an arbitrary PBX trunk number. The arrangement of each AIOD number network panel is such that each block of 100 individual number networks can be cross-connected to provide any thousands digit (0-5) and any hundreds digit (0-9). The outputs of all the AIOD number networks are connected to a distinct secondary network and are thus identified by a distinct office number. This office number registration is cross-connected in the outpulser to provide an AIOD class mark and causes the outpulser to connect to the AIOD equipment, prior to outpulsing, where the arbitrary PBX trunk number is translated to the directory number of the calling PBX station. This directory number is passed to the outpulser and then transmitted to the CAMA office for recording.

6. INTERCEPTED LINES ARRANGED FOR AUTOMATIC INTERCEPT SERVICE

6.01 In panel or step-by-step offices arranged for automatic intercept service, the intercepted line is identified through the ANI equipment. Those lines connected for intercept service shall be connected to the ring party bus, option Z.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

None

2. FUNCTIONAL DESIGNATIONS

2.01 Jacks

Designation	Meaning
U	Upper PBX bridging jack
L	Lower PBX bridging jack
NNT	Number network test jack

3. FUNCTIONS

3.01 To translate a 5800-cycle identification signal appearing on one of the 10,000 input leads to a signal on one of 100 horizontal and on one of 100 vertical output buses in either a tip or a ring bus field, or to a signal on one of 100 vertical output buses in a multiparty bus field.

3.02 To provide for the expansion of PBX groups through the use of X-number network frames and miscellaneous-number network frames.

3.03 To provide PBX bridging jacks.

3.04 To provide test jacks with connections to the Outpulser Identifier Test Circuit.

3.05 To provide grounded test terminals for use in measuring the impedance from the primary buses to ground.

3.06 To provide patching cords for use with PBX bridging jacks or test jacks.

3.07 To provide number networks for PBX lines arranged for originating service only in panel and step-by-step offices.

3.08 To provide a means to permit PBX lines arranged for AIOD service to be identified by a distinct office number and an arbitrary 4-digit trunk number.

3.09 To provide a means to identify intercepted lines in offices arranged for automatic intercept service.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a key-sheet the connecting information thereon is to be followed.

(a) Number Group Connector (Crossbar No. 1) - SD-25276-01.

(b) Subscriber Line Circuit (Panel-BCO) - SD-21712-01 (typical).

(c) Subscriber Line Circuit (Panel-GCO) - SD-21715-01 (typical).

(d) Subscriber Line Circuit (Panel-Line Switch) - SD-21525-01.

(e) Subscriber Line, Line Link and Controller Circuit (Crossbar No. 1) - SD-25553-01.

(f) Subscriber Line Circuit (Step-by-Step) - SD-32133-01 (typical).

(g) Secondary Network and Bus Connector Circuit - SD-95814-01.

(h) Outpulser Identifier Test Circuit - SD-95815-01.

(i) Trunk Make-Busy Circuit (Step-by-Step) - SD-32337-01.

SECTION IV - REASONS FOR REISSUE

A. Changed and Added Functions

A.1 To provide a means to identify intercepted lines in offices arranged for automatic intercept service.

D. Description of Changes

D.1 Circuit Note 111 and Information Note 305 are added to carry information concerning intercepted lines.

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