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ELECTRONIC SWITCHING SYSTEMS

NO. 3

15B REMREED GRID
CIRCUIT

CHANGES

B. Changes in Apparatus

B.1	<u>Superseded</u>	<u>Superseded by</u>
	App Fig. 1	App Fig. 1 (Option Z) and App Fig. 2 (Option Y)

D. Description of Changes

- D.1 The 296C-1B code switches in the 15B remreed grid have been redesignated 296D-1B. They have been redesigned to eliminate external straps for the PNP connections.
- D.2 Activated terminals R217 and R317. Used with a strap and in conjunction with R230 and R330, these terminals permit the diode of each switch in the common horizontal coil path to be bypassed. The redesign eliminates all front terminals associated with the control circuitry on each output switch.
- D.3 Switch 296C-5B has been redesignated 296D-5B and redesigned to incorporate the function of the now eliminated front terminals.
- D.4 A test point (TP1) has been added and brought out to the terminal strip for access during grid testing.

F. Changes in Description of Operation

- F.1 In Section I, 2.01 and 2.03, and in Section II, 1.04, change all references to "296C-1B" and "296C-5B" type remreed switches to "296D-1B" and "296D-5B" respectively.

F.2 Add the following to Section III, 2:

<u>Designation</u>	<u>Meaning</u>
TPl	Test point 1

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NO. 3

15B REMREED GRID
CIRCUITSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 The 15B remreed grid is the basic apparatus unit used to form the second stage of the No. 3 ESS switching network. Two 15B grids are mounted on the No. 3 ESS network frame (SD-3H901-01) and provide the means of establishing 2-wire metallic paths between A-links and B-links. The 15B grids also provide 2-wire metallic paths between the B-links and test verticals.

2. GENERAL DESCRIPTION OF OPERATION

2.01 A 15B grid contains four 296C-1B type and one 296-5B type remreed switch packs. Each 1B switch pack contains two 8-by-8 switches (ie, 8-by-8 means eight inputs and eight outputs per switch). There are eight 8-by-8 switches per grid. Four of the switches are assigned to concentrator 0 and four to concentrator 1. The tip-ring output terminals of the switches in concentrator 0 are multiplexed to corresponding switches and levels in concentrator 1 to form 32 B-links. The B-links are, in turn, wired to two 1-by-16 test-vertical switches in the 296-5B switch package. One switch provides test-vertical access to even-numbered (circuit) B-links, and the other switch provides test-vertical access to odd-numbered (wire) B-links.

2.02 When mounted on the network frame, the 15B grid is wired so that one-half of the A-links come from first-stage switches in concentrator 0 and the other half from first-stage switches in concentrator 1.

2.03 Control connections to the individual switches within a grid are made via a terminal field on the rear of the grid. B-link and test-vertical tip-ring terminals are accessed via the same rear terminal field, while A-link tip-ring terminals are accessed from front terminal fields on each 296C-1B switch.

2.04 A-links are the inputs to the 15B grid while wire and circuit B-links are the outputs.

2.05 To set up a 2-wire path through a 15B grid, an output switch and input and output levels must be selected. The input level is determined by the A-link wiring pattern and the particular first-stage switch that is selected. The output-level selection is made via selector circuitry located external to the grid. A high-current pulse is applied to the control path in order to close the remreed crosspoints in the talking path. Diodes, PNP's, and node resistors are used to make the selection. The 1B-type switch packages contain the switch-selection PNP's, node resistors, and level- and gate-selection diodes. The remaining control circuitry is located on pluggable circuit packs separate from the grids.

2.06 The test vertical provides a means for switching test circuitry across the tip and ring leads at the output of the stage II switches. The test vertical also provides operator access to the B-links.

SECTION II - DETAILED DESCRIPTION1. PULSE PATH (FS 3, FS 4, AND FS 5)

1.01 The selection of a particular path through the 15B grid is the function of the selection of different PNP's, both within the 15B grid and in the pulse-path selectors located in other parts of the network.

1.02 For example, if in concentrator 0 the lowest output switch and lowest output level has been selected as an output and the A-link path selected uses the lowest input level on the selected switch, the corresponding pulse from the positive side of the pulser, via group and level selectors, would enter the 5B switch on leads OLPN0 or OLPO0, depending on whether

the no-test crosspoints are to be opened or closed. The pulse would then proceed on path PT00 into the 1B switch. It would pass through the vertical coils of eight crosspoints, then through a diode- and switch-select PNP, through the horizontal coils of eight crosspoints, and exit to the 15A grid on path PA000.

1.03 The selection of a particular switch within a concentrator group is made by selection of the PNP within that switch. The selection of a particular PNP is determined by the coincidence of a positive current source applied to a gate-select lead of the PNP by decoder/drivers and a near-ground potential applied to the 430-ohm node resistor from the node selector. Two diodes are provided with each gate-select lead of a PNP to provide access from either controller 0 or 1. These diodes also protect the controllers from the high-voltage pulses applied to the control paths.

1.04 It is possible for a special release current pulse to enter the grid on path PPLS, pass through a diode, the switch select PNP, through the horizontal coils of eight crosspoints, and out one of eight A-links to the 15A grid. This RLS2 order is used when it is desired to release a stage II crosspoint without operating another stage II crosspoint and without affecting the no-test crosspoints. When the order is used, the node resistors in the 296-5P switch are grounded in order to check for shorted level-selection diodes in the 296C-1B switches.

1.05 Diodes CR/C2-0 and CR/C2-1 in each 1B-type switch pack have been strapped out in order to enable testing for shorts in level-selection diodes in the first-stage switches.

2. TALKING PATH (FS 1 AND FS 2)

2.01 The talking-path schematics show symbolically the internal tip-ring wiring of the remreed switches. This symbolic representation indicates between which terminals a connection may be established.

2.02 Tip-ring outputs from concentrators 0 and 1 are multiplied on the B-link side of a 15B grid. This provides a 64:32 (2:1) concentration ratio in stage II. When mounted on the network frame, the outputs from two 15B grids provide 64 B-link paths. Test-vertical access to each B-link is also made at this junction. The second-stage odd-level outputs connect to wire B-links while the even-level outputs connect to circuit (juncor) B-links.

2.03 Tip and ring terminals on the A-link side of the grid are accessed at the front terminals of each 1B-type switch,

while B-link and test-vertical tip and ring terminals are accessed via a terminal field on the rear of the grid.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

<u>Designation</u>	<u>Meaning</u>
aNOSbc	Output-Switch Gate-Select Lead For Controller a, Concentrator b, Switch c
OLPNa	Pulse-path Output Level Select For Level a With No-Test Crosspoints Not Operated
OLPOa	Pulse-Path Output Level Select For Level a With No-Test Crosspoints Operated
ON	Output Node Resistor Ground Lead
OSNYab	Jumper To Strap-Out Diode In Concentrator a, Output Switch b
PAabc	Pulse-Path A-Link Concentrator a, Output Switch b, Level c
PRLS	RLS2 Order Pulse Path
PTab	Pulse Path From Output Switch a, Level b To No-Test Switch a, Level b
RAabc	Talking-Path Ring Lead A-Link Concentrator a, Output Switch b, Level c
RBab	Talking-Path Ring Lead B-Link Output Switch a, Level b
TAabc	Talking-Path Tip Lead A-Link Concentrator a, Switch b, Level c
TBab	Talking-Path Tip Lead B-Link Output Switch a, Level b
TCR	Test-Vertical Access Circuit B-Link Path Ring Lead
TCT	Test-Vertical Access Circuit B-Link Path Tip Lead
TWR	Test-Vertical Access Wire B-Link Path Ring Lead
TWT	Test-Vertical Access Wire B-Link Path Tip Lead

<u>Designation</u>	<u>Meaning</u>
5N	Level-Selection Diodes Short Test Access Lead

END REQUIREMENTS

5.02 This circuit should be tested to verify that it is wired in accordance with the schematic and wiring drawings and that the circuit is capable of performing all functions stated in this circuit description.

5.03 Additional manufacturing testing requirements are specified in the X-18272 specification.

3. FUNCTIONS

3.01 This circuit is capable of performing all functions described in Sections I and II of this circuit description.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed.

(a) Network frame circuit - SD-3H901-01.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Provided complete CD information.

5. MANUFACTURING TESTING REQUIREMENTS

Intermediate Requirements

5.01 None.

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