

**NO. 4A AND 4M CROSSBAR
ASSIGNMENT PRACTICES
INCOMING TRUNK LINK FRAME
OUTRIGGER SWITCHES**

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1. GENERAL

1.01 Growth forecasts indicate that many No. 4A Electronics Translator System (ETS) offices presently in service will be limited in the future by the number of terminations available on the incoming link frames. This is particularly true in offices that serve a significant number of trunk groups from a Traffic Service Position System (TSPS) which tend to be small and therefore inefficient.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 The need for increasing incoming trunk link frame terminations has brought about an equipment arrangement called outrigger switches. Outrigger crossbar switches may be added to No. 4A ETS incoming link frames to provide additional trunk terminations in those offices where trunk growth will be termination limited. The equipment arrangement utilizes the small crossbar switch.

1.05 Certain physical and electrical restrictions will determine the number of outrigger switches that can be installed in any particular office. The addition of these switches will also impact on dial administration procedures.

2. LIMITATIONS

2.01 The limitations for providing this additional incoming link frame arrangement are:

- (a) The arrangement is only available for ETS offices equipped with incoming third primary extension frames.
- (b) Outrigger switches can only be located on extension frames that are adjacent to basic frames.
- (c) If nonadjacent primary extension frames have been provided, the maximum "S" lead

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resistance from the adjacent frame to the nonadjacent frame(s) is limited to one ohm.

3. EQUIPMENT DESCRIPTION

3.01 Different configurations are provided for standard and A&M frames. Up to ten outrigger switches may be added to the standard frames (J67437L-1), five each on the first and second primary extension frame. (See Fig. 1.) Up to eight outrigger switches may be added to the A&M frame, one switch on the J67437C-2 first extension, four on the J67437D-2 second extension, and three on the J67437G-3 third extension frame. (See Fig. 2.) Switches may be added in any quantity, up to the above maximum number, as long as the adjacent requirement is met. For example, in the A&M case where the third primary extension frame is nonadjacent to the basic frame and the first and second extensions, only one to five outrigger switches can be added. In addition to the outrigger switch, an outrigger trouble recorder unit (J67437T or U) is required on the first primary extension frame. The office trouble recorder must be modified to accept incoming trunk identification from trunks assigned to outrigger switches.

3.02 The switch unit used in the outrigger application is the CF-2 small crossbar switch. While this is a 12 level switch, only the first ten levels will be used for terminating trunks. The 20 verticals of each switch will be multiplied to the 20 "A" links of one of the switch levels of the same frame. Thus these "A" links will be accessed by up to 50 incoming trunk terminations whereas the other levels, without outrigger multiples, will have "A" links accessed by only 40 incoming trunk terminations. The impact of this mixture on traffic engineering and dial administration is discussed in Part 4.

4. ASSIGNMENT CONSIDERATIONS

4.01 Since the application of the outrigger switch does not change the basic network configuration of "A", and "B", and "C" links, the hundred call seconds (CCS) capacity per frame has not been changed. This figure, normally 2800 CCS per frame for a full sized office, may be applied whether utilizing 400 termination frames, or the latter in combination with outrigger switches. Thus in calculating the number of frames required to accommodate the CCS load, no variation should be applied for the addition of outrigger switches.

Where constrained to 2800 CCS, a 40 by 40 office still has a capacity limit of 224,000 CCS.

4.02 This technique is applicable *provided the load generated per switch level is balanced*, for instance, those switch levels terminating 50 trunks with an outrigger should generate no more load than those switch levels terminating 40 trunks. For a completely equipped standard frame (J67437L-1) terminating 500 trunks instead of 400, the load generated must not exceed 2800 CCS or the established office capacity per frame.

4.03 The purpose of applying the outrigger switch is to increase the termination capacity in a termination limited system. It is not intended to be used for purposes of increasing the CCS per frame capacity in the system. Many systems today are unable to generate 2800 CCS per frame because of the number of lightly loaded trunks.

4.04 Based on CCS per incoming trunk estimates, calculate the CCS generated by 48 trunks (allowing 2 terminations for administration). If this does not exceed 560 CCS, then trunk assignments can be made in accordance with Division H, Section 13c(4) without exceeding "A" link loading objectives. This equates to 11.6 CCS per 2-way trunk termination. If CCS per trunk estimates are in excess of this figure, two alternatives are available.

- (a) Reduce the number of usable terminations assignable in the outrigger switch. At 13 CCS per 2-way trunk only 50% of the outrigger is assignable.
- (b) Establish dial administration procedures to rebalance the switch levels to decrease the load per trunk.

4.05 Where applied, it is recommended that the full complement of outrigger switches be spread over existing link frames in a uniform fashion. For example, 1200 terminations would be added, 30 to a frame (3 switches), over a 40 by 40 office. In a 40 by 40 office outrigger terminations should be added in increments of 400, one per frame. In offices equipped with both large and small switch link frames, where stated limitations are met, the outrigger switch can be used on the large switch link frames to achieve a uniform 480 terminations. In these offices, mixtures of frames with more than two frame termination sizes

are not recommended and the frame size difference should not exceed 20 percent.

4.06 To accommodate the additional trunks terminated through the use of outrigger switches, the sender link frames using the simplified sender grouping can be increased from 16 to 18. This increase in sender link frames assumes that

sender and controller capacity is available to handle the increased attempts generated by the additional trunks.

4.07 The Trunk Link Frame Assignment Records, Form E-3700C that may be used are shown in Fig. 3 and 4.

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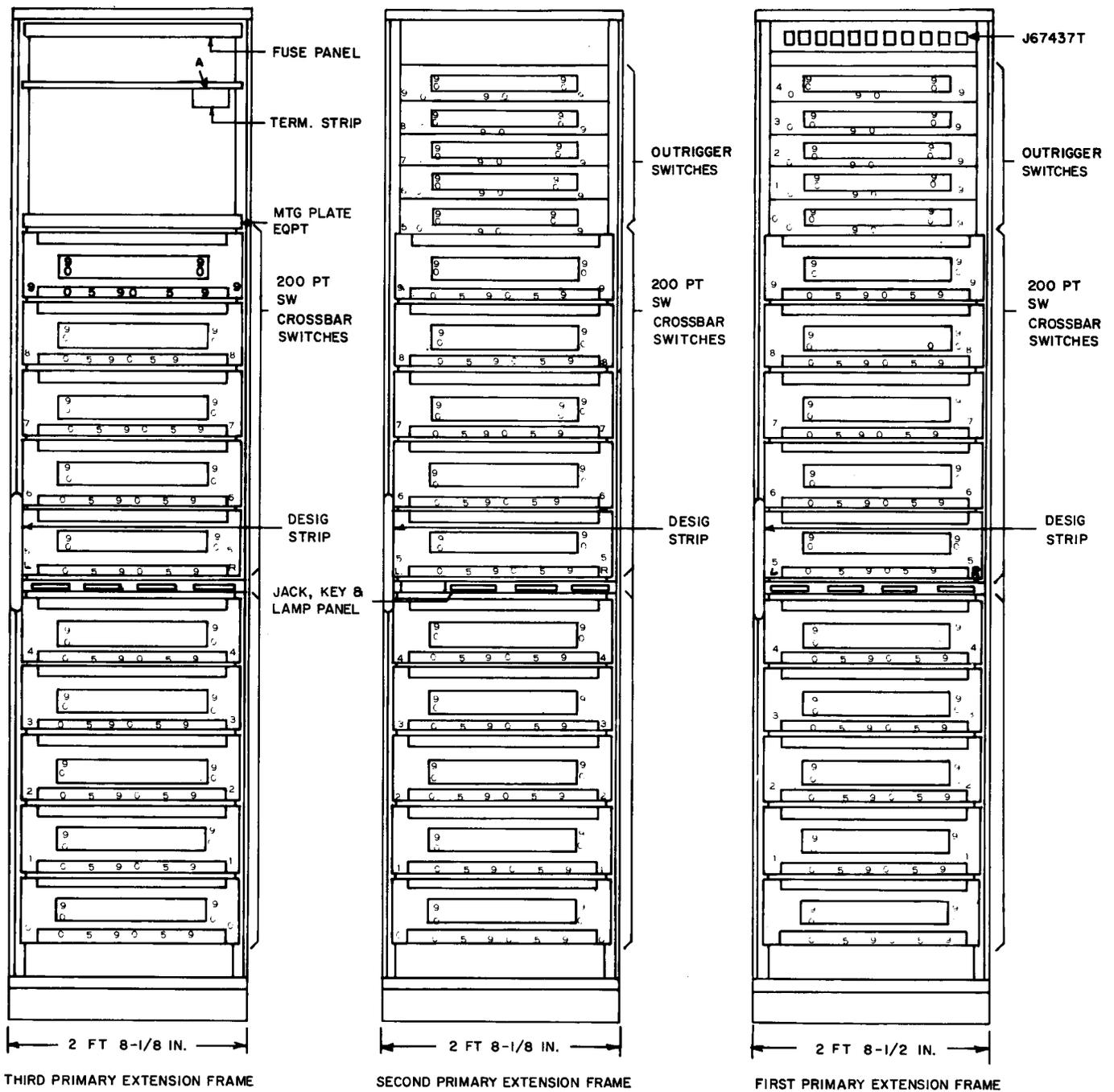


Fig. 1—Incoming Trunk Link Frame—Standard Version (3.01)

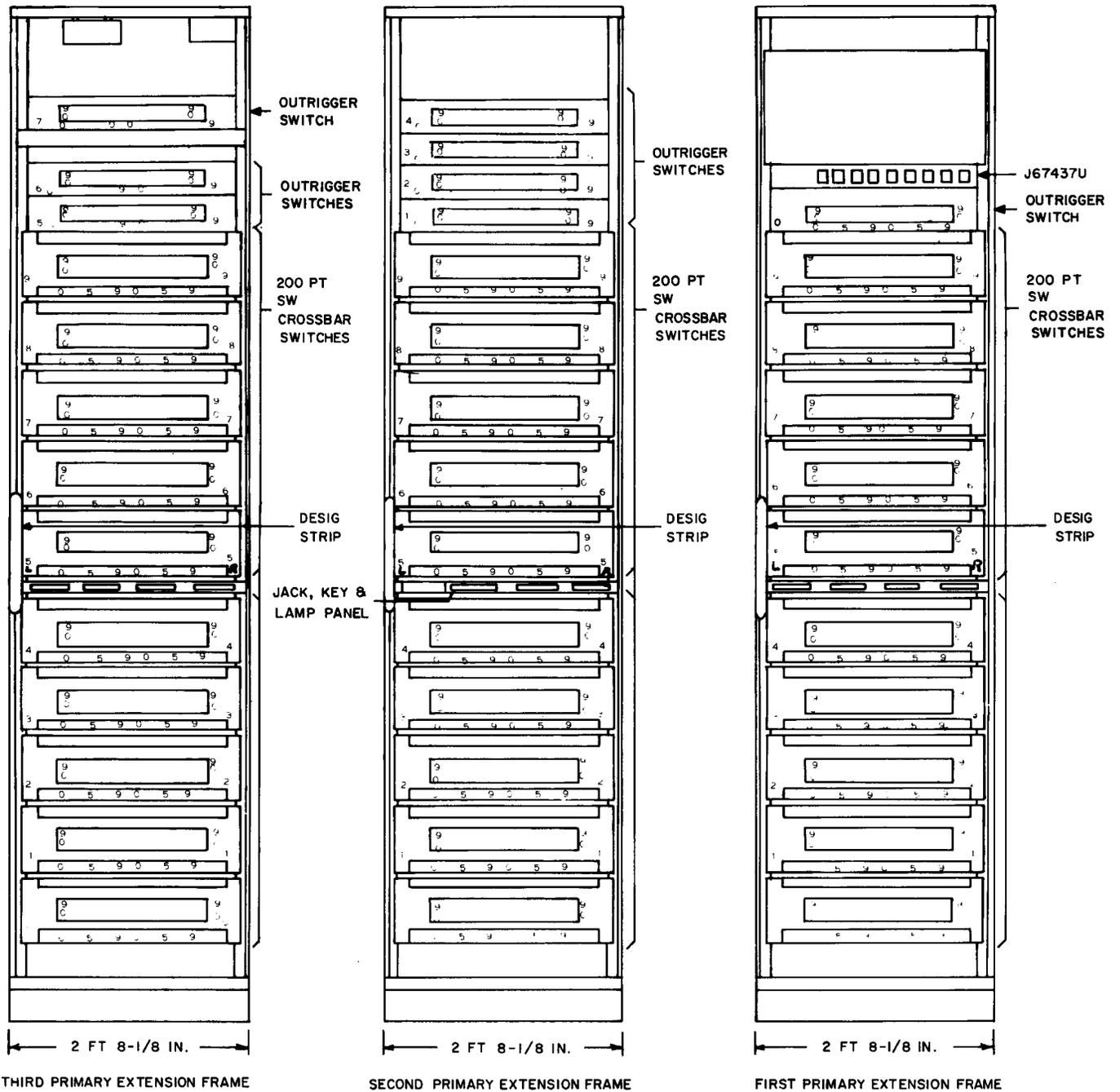


Fig. 2—Incoming Trunk Link Frame—A&M Version (3.01)

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INCOMING TRUNK LINK FRAME ASSIGNMENT
RECORD

FRAME NO. _____

SH	BAY #0		BAY #1		BAY #2	
	TRUNK GROUP	NO.	TRUNK GROUP	NO.	TRUNK GROUP	NO.
49						
48						
47						
46						
45						
44						
43						
42						
41						
40						
39						
38						
37						
36						
35						
34						
33						
32						
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4						
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1						
0						

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INCOMING TRUNK LINK FRAME ASSIGNMENT
RECORD

FRAME NO. _____

SH	BAY #3		BAY #4-OUTRIGGER		TOTAL SWITCH	
	TRUNK GROUP	NO.	TRUNK GROUP	NO.	WEIGHT	NO.
49						
48						
47					HEAVY	
46						
45					MEDIUM	
44						
43					LIGHT	
42						
41					CCS	
40						
39						
38						
37					HEAVY	
36						
35					MEDIUM	
34						
33					LIGHT	
32						
31					CCS	
30						
29						
28						
27					HEAVY	
26						
25					MEDIUM	
24						
23					LIGHT	
22						
21					CCS	
20						
19						
18						
17					HEAVY	
16						
15					MEDIUM	
14						
13					LIGHT	
12						
11					CCS	
10						
9						
8						
7					HEAVY	
6						
5					MEDIUM	
4						
3					LIGHT	
2						
1					CCS	
0						

Fig. 3—Incoming Trunk Link Frame Assignment Records
(Lines 0 through 49) (4.07)

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INCOMING TRUNK LINK FRAME ASSIGNMENT
RECORD

FRAME NO. _____

SH	BAY #0		BAY #1		BAY #2	
	TRUNK GROUP	NO.	TRUNK GROUP	NO.	TRUNK GROUP	NO.
99						
98						
97						
96						
95						
94						
93						
92						
91						
90						
89						
88						
87						
86						
85						
84						
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INCOMING TRUNK LINK FRAME ASSIGNMENT
RECORD

FRAME NO. _____

SH	BAY #3		BAY #4-OUTRIGGER		TOTAL SWITCHES	
	TRUNK GROUP	NO.	TRUNK GROUP	NO.	WEIGHT	NO.
99						
98						
97					HEAVY	
96						
95					MEDIUM	
94						
93					LIGHT	
92						
91					CCS	
90						
89						
88						
87					HEAVY	
86						
85					MEDIUM	
84						
83					LIGHT	
82						
81					CCS	
80						
79						
78						
77					HEAVY	
76						
75					MEDIUM	
74						
73					LIGHT	
72						
71					CCS	
70						
69						
68						
67					HEAVY	
66						
65					MEDIUM	
64						
63					LIGHT	
62						
61					CCS	
60						
59						
58						
57					HEAVY	
56						
55					MEDIUM	
54						
53					LIGHT	
52						
51					CCS	
50						

Fig. 4—Incoming Trunk Link Frame Assignment Records
(Lines 50 through 99) (4.07)