

3- OR 4-WIRE ROTARY OUT-TRUNK SWITCH UNITS NO. 1, 350A, 355A, AND 35E97 OFFICES EQUIPMENT DESIGN REQUIREMENTS 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 manufacture and installation of 3- or 4-wire rotary out-trunk switch (ROTS) equipment for No. 1, 350A, 355A, and 35E97 step-by-step offices.

1.02 This specification is reissued:

- (a) To change Fig. 1.
- (b) To revise Part 1 and change Fig. 2 to show the use of ROTS equipment when used with combined outgoing dial pulse trunks to a traffic service position system (TSPS) No. 1 office.
- (c) To revise J33001G, Lists 3, 4, 5, and 6 and Note A.
- (d) To add Notes H and I to J33001H and to revise Note B.
- (e) To add Notes E and F to J33001J and to revise Note B.

CAPACITY

1.03 The equipment units available have banks equipped for 206-type selectors as shown in Table A. The selectors are ordered equipped as required on each unit.

1.04 One 11-foot 6-inch bay, arranged for 23-inch mounting plates, will mount a total of six 10-circuit ROTS units, provided that at least four

of these units are supplementary units (a total of sixty 2-inch spaces). One 9-foot 0-inch frame, arranged for 23-inch mounting plates, will mount four shelves if two are supplementary units or five shelves if four are supplementary (a total of forty-two or forty-eight 2-inch spaces, respectively).

DESCRIPTION

1.05 ROTS equipment per SD-30868-02 is for Step-by-Step System multioffice areas. It uses 206-type selectors to preselect idle repeaters or outgoing trunks of a group of interoffice trunks through which to route calls from selector levels to a distant office. Another application of ROTS equipment is associating selector level trunks from two or more offices with a common group of outgoing trunks to a distant office, the trunks coming directly from selector levels. The ROTS equipment per SD-31990-01 is also available for use at a tandem office between trunks, from the office beyond tandem to the tandem office, and from the tandem office trunks to an operator office. The ROTS equipment per SD-32253-01 is available to connect a selector switch in a step-by-step office to trunk circuits toward an operator office.

1.06 ROTS circuits functioning together to give common access to trunks or repeater circuits are known as a ROTS group. A ROTS group is usually comprised of 20 to 30 ROTS circuits when used with regular interoffice trunks. However, where 10-circuit ROTS units are used, one initial ROTS unit and a maximum of nine supplementary ROTS units may be employed to make up a ROTS group in accordance with traffic requirements in each case, ie, digit 1 access to a centralized automatic message accounting (CAMA) office (see 1.13). The banks of all 206-type selectors of a ROTS group are multiplied together except when used with

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TABLE A

J33001 CODES	206-TYPE SELECTORS	APPLICATIONS	REMARKS
A	30	From selector levels	A&M Only
F	3 or 5	Between trunks from office beyond tandem and trunks to operator office	Not arranged for preselection of trunk
G	10	From selector bank multiple circuit to operator office	Not arranged for preselection of trunk
H	10	From selector levels or auxiliary trunks	Initial unit arranged for preselection
J	10	From selector levels or auxiliary trunks	Supplementary unit arranged for preselection

combined outgoing dial pulse trunks to a TSPS No. 1 office (see 1.15). The ROTS groups in each building are numbered from 1 up. Common equipment for each ROTS group is located in the initial ROTS unit.

Circuit

1.07 A preselecting ROTS circuit consists essentially of a 206-type selector and the two relays that control its operation. The brushes of this selector are arranged to be connected to a selector level trunk or auxiliary trunk. Of the 22 sets of terminals on the bank of the 206-type selector, 21 may be connected to trunks to outgoing repeaters or trunks. A control relay is required for each trunk thus connected. Post-selecting ROTS circuits, consisting of 206-type selectors and associated relays, are connected directly from the banks of the switches to 22 operator trunks maximum, without intervening outgoing trunk relays. These are used where no digit is to be supplied through the ROTS equipment, except in cases where an auxiliary trunk is provided to separate 0- (operator assist) and 0+ (special toll) traffic to a traffic service position (TSP) or TSPS No. 1 office, in which case, operator traffic is routed through a preselecting ROTS.

Operation

1.08 For preselecting ROTS groups, an idle trunk is preselected from those connected to its

bank. If a trunk to which the brushes of a switch are making contact is made busy from another source, the brushes automatically step ahead until they find another idle trunk. A ROTS circuit tests busy to local selectors while it is stepping. If all the trunks from a ROTS group become busy, a common group circuit operates to prevent the continuous stepping of the switches.

1.09 There are four standard arrangements provided to attach selector level trunks to repeaters (see Fig. 1) or outgoing trunks (see Fig. 2) through a preselecting ROTS.

Arrangement 1

1.10 When connection is made without intervening auxiliary trunks and a single selector level is assigned to the outgoing trunk (OGT), arrangement 1 provides enough groups of rotary out-trunk switches to give secondary access to every OGT or repeater serving the trunk group, to connect 40 percent of the selector level trunks (lower choice) directly to the OGTs or repeaters and the remaining 60 percent (higher choice trunk) to the rotary out-trunk switches that provide secondary access to the same group of OGTs or the same group of repeaters. ***This combined direct and secondary access trunking plan*** effects economies between local selectors and OGTs or repeaters due to the smaller number of rotary switches required as compared with the number that would be necessary

SEL. SUB. GROUP	TRK. NO. IN SUBGROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
1	POS. OF TRK. IN MULT.	1-1	1-2	2-1	2-2	3	4	5	6	7	8	9	10																					
	DTA TERM. NO.	631	641	632	642	633	634	635	636	637	638	639	640																					
	SEL. BAY	101											101																					
	REPEATER	R1	21	41	61	80																												
	R.O.T.S. GROUP	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1		
R.O.T. SWITCH						1	1	1	1	1	2	2																						
2	POS. OF TRK. IN MULT.	1	2	3	4	5	6	7	8	9																								
	DTA TERM. NO.	643	644	645	646	647	648	649	650	651																								
	SEL. BAY	101											101																					
	REPEATER	R1	22	42	62	81																												
	R.O.T.S. GROUP	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2		
R.O.T. SWITCH						3	3	2	2	2																								
3	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	671	682	687	693	697	681	688	692	672	694	683	688	695	684	673	689	696	674	690	685	691	675	676	677	678	679	680						
	SEL. BAY	103																																
	REPEATER	R1	43	63	82	2	23	44	64	83	3	24	45																					
	R.O.T.S. GROUP	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3		
R.O.T. SWITCH													3	3	4	4	3	4	4	5	5	4	5	5	6	6	5	6						
4	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	689	609	614	620	624	608	613	619	699	621	610	615	622	611	700	616	623	601	617	612	618	602	603	604	605	606	607						
	SEL. BAY	103																																
	REPEATER	R1	65	84	4	25	46	66	85	5	26	47	67																					
	R.O.T.S. GROUP	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4		
R.O.T. SWITCH													6	7	7	6	7	6	7	6	8	8	7	8	8	9	9	8	9					
5	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	ADDITIONAL O.G. CABLE CKTS. TO H.T.D.F. AS REQ.																																
	SEL. BAY	105																																
	REPEATER	R1	66	6	27	48	68	87	7	28	49	69	88																					
	R.O.T.S. GROUP	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
R.O.T. SWITCH													10	10	9	10	10	11	11	10	11	11	12	12	11	12	12	13						
6	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	ADDITIONAL O.G. CABLE CKTS. TO H.T.D.F. AS REQ.																																
	SEL. BAY	105																																
	REPEATER	R1	8	29	50	70	89	9	30	51	71	90	10																					
	R.O.T.S. GROUP	6	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
R.O.T. SWITCH													13	12	13	13	14	14	13	14	14	15	15	14	15	15	16	16						
7	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	ADDITIONAL O.G. CABLE CKTS. TO H.T.D.F. AS REQ.																																
	SEL. BAY	107																																
	REPEATER	R1	31	52	72	91	11	32	53	73	92	12	33																					
	R.O.T.S. GROUP	7	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	
R.O.T. SWITCH													15	16	16	17	17	16	17	17	18	18	17	18	18	19	19	18						
8	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	ADDITIONAL O.G. CABLE CKTS. TO H.T.D.F. AS REQ.																																
	SEL. BAY	107																																
	REPEATER	R1	54	74	93	13	34	55	75	94	14	35	56																					
	R.O.T.S. GROUP	8	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	
R.O.T. SWITCH													19	19	20	20	19	20	20	21	21	20	21	21	22	22	21	22						
9	POS. OF TRK. IN MULT.	1-1	1-3	1-5	1-7	1-8	1-2	1-4	1-6	2-1	2-4	2-2	2-3	3-4	3-2	3-1	3-3	4-4	4-1	4-3	4-2	5-2	5-1	6	7	8	9	10						
	DTA TERM. NO.	ADDITIONAL O.G. CABLE CKTS. TO H.T.D.F. AS REQ.																																
	SEL. BAY	109																																
	REPEATER	R1	76	95	15	36	57	77	98	18	37																							
	R.O.T.S. GROUP	9	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	
R.O.T. SWITCH													22	23	22	23	23	22	24	23	24	24	24	25	24									

ASSIGNMENT OF SELECTOR TRUNKS TO REPEATERS AND ROTARY OUT-TRUNK SWITCHES

NOTES:

1. THE INFORMATION CONTAINED IN THE TABLE SHOWING LOCAL SELECTOR GROUPING AND TRAFFIC INFORMATION IS FOR A SPECIFIC INTEROFFICE TRUNK GROUP USED HERE AS A TYPICAL EXAMPLE BY WHICH TO DEMONSTRATE THE METHOD TO BE FOLLOWED IN CROSS-CONNECTING SELECTOR LEVEL TRUNKS TO REPEATERS AND ROTARY OUT-TRUNK SWITCHES.
2. THE LINE POS. OF TRK. IN MULT. IN THE TABLE FOR THE ARRANGEMENT OF SELECTOR TRUNKS TO REPEATERS AND ROTARY OUT-TRUNK SWITCHES REFERS TO THE POSITION OF THE VARIOUS TRUNKS IN GRADED MULTIPLE PATTERN. 1-1 INDICATES THE TOP 1ST. CHOICE TRUNK IN THE PATTERN, 1-2 THE SECOND FROM THE TOP 1ST. CHOICE TRUNK, 2-3 THE THIRD FROM THE TOP 2ND CHOICE TRUNK ETC.
3. FOR SELECTOR LEVEL TRUNKS DIRECTLY CONNECTED TO REPEATERS, GROUP REFERS TO REPEATERS SERVED BY THAT PARTICULAR R.O.T.S. GROUP.
4. THE NUMBERS IN THE R.O.T.S. COLUMN REPRESENT ROTARY OUT-TRUNK SWITCH CIRCUITS IN EACH R.O.T.S. GROUP.
5. EACH TRUNK IN A R.O.T.S. GROUP NOT REQUIRED TO PROVIDE SECONDARY ACCESS TO A REPEATER SHALL BE MULTIPLIED TO A TRUNK WHICH HAS ACCESS TO A REPEATER FROM THE SUCCEEDING R.O.T.S. GROUP AS SHOWN IN THIS TABLE. THE NUMBERS ARE THOSE OF THE R.O.T.S. GROUP AND OUT-TRUNK TO WHICH THE PARTICULAR TRUNK IS MULTIPLIED.

TOTAL C. C.S. IN O.G.T. GROUP-2592 O.G.T. TO REPEATERS-98

NO. OF SUB GRPS	SEL. PER SUBGROUP			SEL. TRUNKS		SEL. TRKS DIRECT TO REP.		SEL. TRKS TO R.O.T.S.	
	FR	CB	A	PER SUBGROUP	TOTAL	PER SUBGROUP	TOTAL	PER SUBGROUP	TOTAL
6	160			27	162	11	66	18	96
1	110			22	22	9	9	13	13
1		80		9	9	4	4	5	5
1			45	12	12	5	5	7	7
				205		64		121	

LOCAL SELECTOR GROUPING AND TRAFFIC INFORMATION

TRK	R.O.T.S. GROUP NO.
1	1 21 41 61 80
2	2 22 42 62 81
3	3 23 43 63 82
4	4 24 44 64 83
5	5 25 45 65 84
6	6 26 46 66 85
7	7 27 47 67 86
8	8 28 48 68 87
9	9 29 49 69 88
10	10 30 50 70 89
11	11 31 51 71 90
12	12 32 52 72 91
13	13 33 53 73 92
14	14 34 54 74 93
15	15 35 55 75 94
16	16 36 56 76 95
17	17 37 57 77 96
18	18 38 58 78 97
19	19 39 59 79 98
20	20 40 60
21	21 41 61 81 19
22	22 42 62 82 19
23	23 43 63 83 19
24	24 44 64 84 19
25	25 45 65 85 19
26	26 46 66 86 19
27	27 47 67 87 19
28	28 48 68 88 19
29	29 49 69 89 19
30	30 50 70 90 1

ASSIGNMENT OF SELECTOR LEVEL 0 AND 1 TRUNKS TO COMBINED COIN OUTGOING DIAL PULSE TRUNKS TO TSPS NO. 1 DIRECT AND VIA ROTARY OUT-TRUNK SW

TYPE OF TRAF	SEL SUB GROUP	TRK NO. IN SUB GROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
0	1	POS OF TRK IN MULT	1-1	1-4	1-7	1-2	1-5	1-8	1-3	1-6	2-1	2-3	2-4	2-2	3-2	3-1	3-3	3-4	4-2	4-1	4-3	4-4	5-2	5-1	6	7	8	9	10		
		DTA TERM NO.	(OG CABLE TO HTDF AS REQD)																												
		SEL BAY																													
		COMBINED TRK NO.	1	17	32	2	18	33	3	19	34	4	20																		
		TRUNK BAY																													
	ROTS GROUP	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	ROTS SUBGROUP	(A)																													
	ROTS SWITCH																														
	2	POS OF TRK IN MULT	1-1	1-4	1-7	1-2	1-5	1-8	1-3	1-6	2-1	2-3	2-4	2-2	3-2	3-1	3-3	3-4	4-2	4-1	4-3	4-4	5-2	5-1	6	7	8	9	10		
		DTA TERM NO.																													
SEL BAY																															
COMBINED TRK NO.		21	35	5	22	36	6	23	37	7	24	38																			
TRUNK BAY																															
ROTS GROUP	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
ROTS SUBGROUP	(A)																														
ROTS SWITCH																															
1	3	POS OF TRK IN MULT	1-1	1-4	1-7	1-2	1-5	1-8	1-3	1-6	2-1	2-3	2-4	2-2	3-2	3-1	3-3	3-4	4-2	4-1	4-3	4-4	5-2	5-1	6	7	8	9	10		
		DTA TERM NO.																													
		SEL BAY																													
		COMBINED TRK NO.	39	8	25	40	9	26	41	10	27	42	11																		
		TRUNK BAY																													
	ROTS GROUP	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
	ROTS SUBGROUP	(B)																													
	ROTS SWITCH																														

NOTES

- THE INFORMATION CONTAINED IN THE TABLE SHOWING LOCAL SELECTOR GROUPING AND TRAFFIC INFORMATION IS FOR A SPECIFIC INTEROFFICE TRUNK GROUP USED HERE AS A TYPICAL EXAMPLE BY WHICH TO DEMONSTRATE THE METHOD TO BE FOLLOWED IN CROSS-CONNECTING SELECTOR LEVEL 0 AND 1 TRUNKS TO COMBINED COIN OUTGOING DIAL PULSE TRUNKS AND ROTARY OUT-TRUNK SWITCHES.
- THE NUMBERING 1-1, 1-2, 1-3 ETC UNDER THE HEADING "POS OF TRK IN MULTIPLE" INDICATE THE CHOICE AND CHOICE POSITION OF EACH TRUNK IN A GRADED MULTIPLE SUBGROUP. FOR EXAMPLE THE ABOVE NUMBERS INDICATE THE 1ST, 2ND AND 3RD FIRST CHOICE TRUNKS NUMBERED TOP DOWN IN THE GRADED MULTIPLE PATTERN, 3-2 INDICATES THE 2ND THIRD CHOICE TRUNK.
- FOR TRUNKS DIRECTLY CONNECTED TO COMBINED OGTS THE NUMBERS UNDER THE HEADING "ROTS GROUP" REPRESENT THE ROTARY OUT-TRK SWITCH GROUPS, TO THE BANKS OF WHICH, THE COMBINED COIN OUTGOING DIAL PULSE TRUNK IS CONNECTED.

TOTAL CCS IN COMBINED COIN OGT GRP-1080, COMB COIN OGTS-46

TYPE OF TRAF	NO OF SUB GRPS	SEL PER SUB GRP	SEL TRUNKS		SEL TRUNKS DIRECT TO OGTS		SEL TRUNKS TO ROTTS	
			PER SUB GRP	TOTAL	PER SUB GRP	TOTAL	PER SUB GRP	TOTAL
0	2	160	27	54	11	22	16	32
1	1	320	27	27	11	11	16	16

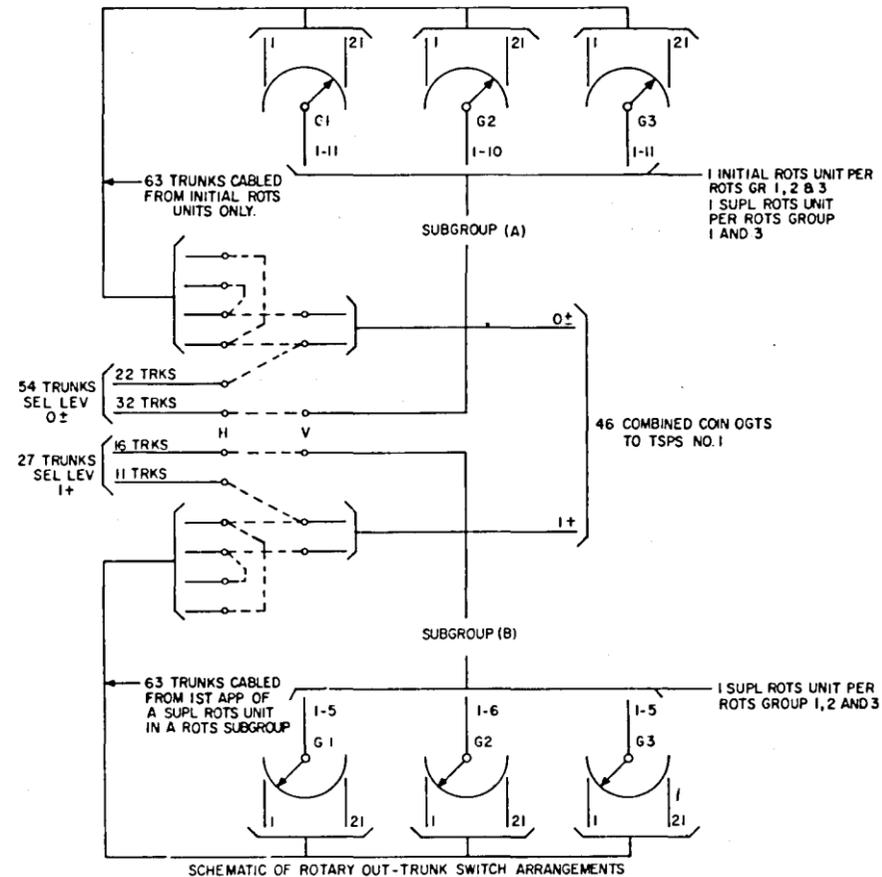
LOCAL SELECTOR GROUPING AND TRAFFIC INFORMATION FOR INTEROFFICE TRUNK GROUP (SEE NOTE 1)

- UNDER THE HEADING "ROTS SUBGROUP" THE ALPHA CHARACTERS LOCATED WITHIN THE PARENTHESIS INDICATE THAT PORTION OF EACH ROTTS GROUP ASSIGNED TO EACH TYPE OF TRAFFIC AS FOLLOWS:
 - (A) COMBINED OUTGOING COIN OR NON-COIN DIAL PULSE TRUNKS TO TSPS NO. 1

ROTS SUBGROUPS	TYPE OF TRAFFIC
A	0±
B	1±
 - (B) COMBINED OUTGOING COIN AND NON-COIN DIAL PULSE TRUNKS TO TSPS NO. 1

ROTS SUBGROUP	TYPE OF TRAFFIC
(A)	0± COIN
(B)	0± NON-COIN
(C)	1± COIN
(D)	1± NON-COIN

- EACH TRUNK IN A ROTTS GROUP NOT REQUIRED TO PROVIDE SECONDARY ACCESS TO A COMBINED TRUNK SHALL BE MULTIPLIED TO A ROTTS TRUNK WHICH HAS ACCESS TO A COMBINED TRUNK FROM A SUCCEEDING ROTTS GROUP AS SHOWN, THE NUMBERS ARE THOSE OF THE ROTTS GROUP AND OUT-TRUNK TO WHICH THE PARTICULAR TRUNK IS MULTIPLIED.



TRUNK	ROTS GROUP			TRUNK	ROTS GROUP		
	1	2	3		1	2	3
	SUBGROUP (A)				SUBGROUP (B)		
1	1	17	32	1	1	17	32
2	2	18	33	2	2	18	33
3	3	19	34	3	3	19	34
4	4	20	35	4	4	20	35
5	5	21	36	5	5	21	36
6	6	22	37	6	6	22	37
7	7	23	38	7	7	23	38
8	8	24	39	8	8	24	39
9	9	25	40	9	9	25	40
10	10	26	41	10	10	26	41
11	11	27	42	11	11	27	42
12	3-16	1-17	2-17	12	3-16	1-17	2-17
13	12	28	43	13	12	28	43
14	3-17	1-18	2-18	14	3-17	1-18	2-18
15	13	29	44	15	13	29	44
16	3-18	1-19	2-19	16	3-18	1-19	2-19
17	14	30	45	17	14	30	45
18	3-19	1-20	2-20	18	3-19	1-20	2-20
19	15	31	46	19	15	31	46
20	3-20	1-21	2-21	20	3-20	1-21	2-21
21	16	32	47	21	16	32	47
	3-21	3-10	1-11		3-21	3-10	1-11
	2-11	3-11	1-12		2-11	3-11	1-12
	2-12	3-12	1-13		2-12	3-12	1-13
	2-13	3-13	1-14		2-13	3-13	1-14
	2-14	3-14	1-15		2-14	3-14	1-15
	2-15	3-15	1-16		2-15	3-15	1-16

ASSIGNMENT OF COMBINED COIN OUTGOING DIAL PULSE TRUNKS TO TRUNKS FROM ROTTS GROUPS.

1	9	14	18	22	23	24	25	26	27
4	1	1	1	1	1	1	1	1	1
7	12	13	17						
2	1	1	1	1	1	1	1	1	1
5	10	15	19	21					
8	1	1	1	1	1	1	1	1	1
3	11	16	20						
6	1	1	1	1	1	1	1	1	1

160 SEL-27 TRUNKS MULTIPLE ARRANGEMENT FOR SEL SUB GROUPS 1 TO 3

Fig. 2—Method of Cross-Connecting ROTTS Equipment From Local Selectors to Combined Outgoing Dial Pulse Trunks to TSPS No. 1

if all selector level trunks were assigned through switches to OGTs or repeaters.

1.11 *An originating call to a distant office*

establishes a connection to the selector level in the usual manner. At the end of the pulse train for that level, the selector rotates to find an idle trunk. The call will be routed *directly* to an OGT or to a repeater unless all trunks of this level that have direct connection are busy. In this case, the selector will reach the first contact to which a ROTS is connected. If that trunk is idle, the ROTS already will have selected an idle trunk to an OGT or to a repeater; if the trunk is busy, however, the selector will hunt through the remaining contacts on this level until it finds an idle ROTS circuit. If all the trunks on this level are busy or if all of the interoffice trunks in the group are busy, the customer is informed in the usual way.

1.12 When there is an auxiliary trunk between the selector level and the outgoing trunk, the ROTS in each group of the auxiliary trunks will equal the number of auxiliary trunks. None of the selector level trunks will have direct access to outgoing trunks.

Arrangement 2

1.13 In the case of digit 1 access to a CAMA office where service codes in the form of 11x are to be completed locally, the ROTS group will be preceded by an auxiliary trunk connected to both the selector multiple banks and the code selectors. If the second digit dialed after digit 1 on the first selector is other than 1, the ROTS will remain connected to the outgoing trunk and the call will be completed to a CAMA office. If the second digit is 1, the ROTS equipment will be released and the call will be completed through the service code selectors.

Arrangement 3

1.14 When the traffic from level 0 of the first selector must be divided to give a separate routing for 0- (operator assist) and 0+ (special toll) traffic, an auxiliary trunk follows the selector level trunk. If a second digit follows the 0, routing is made to a TSP or TSPS No. 1 office. If an elapsed time of 3.5 ± 0.5 seconds follows without further dialing, routing is made to a cordboard or to a separate TSPS office designated to provide

operator assistance. Two separate groups of ROTSS are provided, each with the same number of switches as the quantity of auxiliary trunks.

Arrangement 4

1.15 In cases where 1+, 0-, and 0+ coin and/or noncoin type traffic is to be routed via combined outgoing dial pulse trunks to a TSPS No. 1 office, each ROTS group will carry all traffic items; that is, each ROTS group will be arranged to provide a separate input and output for each type of traffic. Each ROTS group therefore will be divided into as many portions (subsequently referred to as ROTS subgroups) as are needed to support each type of traffic to be routed, ie, a combined outgoing coin *or* a combined outgoing noncoin trunk group will require two ROTS subgroups per ROTS group, one for $0\pm$ traffic and one for 1+ traffic. In the case of a combined outgoing coin *and* noncoin trunk group, four ROTS subgroups per ROTS group will be required, one for each of the following types of traffic: $0\pm$ coin, $0\pm$ noncoin, 1+ coin, and 1+ noncoin. A ROTS subgroup shall be defined as the ROTS circuits functioning together within a ROTS group to give common access to the same port of a combined outgoing dial pulse trunk group. Each ROTS subgroup will consist of standard ROTS units, the number of which is dependent on the particular job condition. The initial ROTS unit (and, therefore, all TK- relays) of a ROTS group, plus as many supplementary ROTS units as are needed, shall constitute that ROTS subgroup of the ROTS group assigned to carry the highest priority traffic as determined from the input preference of the combined outgoing dial pulse trunk group. The remaining ROTS subgroup(s) of the ROTS group will consist of supplementary ROTS units only. The banks of all 206-type selectors in a ROTS subgroup are multiplied together, and the S1 leads, plus the 20-second sleeve bank terminal of all 206-type selectors of all ROTS subgroups in the same ROTS group, are multiplied together. To identify each ROTS subgroup in a ROTS group as to the type of traffic routed via that particular ROTS subgroup, alpha characters will be assigned to each ROTS subgroup, as follows, and will appear on the forward and backward tracing designation cards furnished with each ROTS unit.

- (a) Combined outgoing coin *or* noncoin dial pulse trunks to a TSPS No. 1 office:

ROTS SUBGROUP	TRAFFIC
A	0±
B	1+

- (b) Combined outgoing coin *and* noncoin dial pulse trunks to a TSPS No. 1 office:

ROTS SUBGROUP	TRAFFIC
A	0± coin
B	0± noncoin
C	1+ coin
D	1+ noncoin

The conventional arrangement of 40 percent direct trunking and 60 percent trunking via ROTS may be used for each type of traffic to be routed, limited in that the sum of the direct trunks does not exceed the total number of combined outgoing dial pulse trunks in the trunk group. Auxiliary trunks may be provided on level 1, if required. Fig. 2 illustrates a typical example of the method followed in assigning and cross-connecting rotary out-trunk switch equipment from local selectors to a combined outgoing coin dial pulse trunk group to a TSPS No. 1 office.

1.16 In offices equipped with common control equipment arranged for multifrequency (MF) outpulsing where noncoin 1+, 0-, and 0+ traffic is combined on a single trunk group using MF outpulsing, the conventional arrangements may be used, as all traffic is directed to a single arbitrary selector level by the common control equipment.

1.17 Common control offices using MF coin trunks should arrange the coin selector level access as described in 1.16.

1.18 For post-selecting ROTS groups, the step-by-step selectors function as described previously, except that in this case they are searching for an idle rotary out-trunk switch and, upon seizure, the switch rotates to find an idle trunk. All trunks in a post-selecting ROTS group are routed through ROTS equipment.

Cabling

1.19 The ROTS group equipments are connected with switchboard cabling to the distributing

frame for cross-connection to trunks from selector levels to repeaters or trunks and combined outgoing trunks to a TSPS No. 1 office. In the case of repeaters or trunks, these switchboard cables run from terminal strips located on only the initial ROTS units in each ROTS group. In the case of combined outgoing dial pulse trunks to a TSPS No. 1 office, these cables run from terminal strips located on the initial ROTS unit of a ROTS subgroup and the first appearance of a supplementary ROTS unit in subsequent ROTS subgroups in the same ROTS group.

Method of Cross-Connecting

Preselecting ROTS Groups

1.20 *As many preselecting ROTS groups are furnished* as are required to provide rotary switch circuits for 60 percent of the local selector trunks from each selector subgroup going into the office group and one out-trunk circuit for each OGT or repeater of the office group, except as indicated in groups to CAMA offices.

1.21 *At the distributing frame*, the trunks from ROTS groups are cross-connected to repeaters or to OGT circuits (subsequently referred to as trunk circuits). Approximately the same number of trunk circuits should be available to each ROTS group of an outgoing trunk group, and the initial assignments should be in consecutive order, beginning with the first trunk circuit in the group being connected to the first trunk of the first ROTS group and ending with the last trunk circuit being connected to the final assigned trunk in the last ROTS group. This is illustrated in Fig. 1 and 2 and is covered in greater detail on ED-30839-01. If, however, the number of trunk circuits changes, existing trunk assignments need not be changed, except to the minimum extent necessary to maintain the balance of trunk circuits throughout the different ROTS groups.

1.22 Except for occasional cases, the number of trunks in a preselecting outgoing trunk group will not be an even multiple of 21, so that usually there will be a number of trunks from each ROTS group that are not directly assigned to trunk circuits (subsequently referred to as unassigned trunks). These unassigned trunks shall be multiplied at the distributing frame to trunks that are directly assigned to trunk circuits (subsequently referred to as assigned trunks), either in the succeeding

ROTS group if available, as illustrated in Fig. 1 and 2, or in the same ROTS group, as follows.

(a) Where there is more than one ROTS group in an OGT group, unassigned trunk 21 from ROTS GR1 is multiplied to the last assigned trunk from ROTS GR2; unassigned trunk 21 from ROTS GR2 is multiplied to the last assigned trunk from ROTS GR3, etc; unassigned trunk 21 from the last ROTS group is multiplied to the last assigned trunk from ROTS GR1; unassigned trunk 20 from ROTS GR1 is multiplied with the next-lower assigned trunk from ROTS GR2, etc; unassigned trunk 20 from the last ROTS group is multiplied to the next-lower assigned trunk from ROTS GR1, etc. This multiplying is continued as far as necessary to provide secondary access to trunk circuits from *all* unassigned trunks from rotary out-trunk switches.

(b) If there is only one ROTS group in an outgoing trunk group, unassigned trunks from the ROTS group shall be multiplied with assigned trunks in the same group in accordance with the multiplying plan covered on ED-30325-01.

(c) Rotary out-trunk switch units per SD-30868-01 [J33001B-() and J33001C-()] are Mfr Disc. However, units of this vintage may be used as part of groups manufactured per SD-30868-02 [J33001H-() and J33001J-()]. If the initial unit in a group is manufactured per J33001B-(), the removal of excess TK- relays should follow the procedure of 1.22 (d), (e), (f), and (g). If the initial unit in a ROTS group is manufactured per J33001H-(), the same provisions will apply with three exceptions:

- (1) All unassigned relays in a ROTS group must be electrically removed per ED-30325-01.
- (2) A maximum of two ROTS groups can share the same trunk circuit with one TK-relay connected to each ROTS group. All other TK- relays must be removed per ED-30839-01.
- (3) The removal or addition of a TK- relay is accomplished by adding or removing straps on a terminal strip provided for that purpose and does not require access to the rear wiring of the unit.

(d) When multiplying unassigned trunks to assigned trunks, it is not permissible from the circuit standpoint to multiple more than two TK- trunk relays of the ROTS circuit to the same trunk circuit sleeve lead. Therefore, to meet this requirement when it is necessary under the above multiplying procedures to multiple more than one unassigned trunk to the same assigned trunk (resulting in more than two trunks being in multiple), wiring facilities have been added in the ROTS circuit (SD-30868-01) whereby any TK-relay may effectively be disconnected from the circuit to eliminate its connection to the trunk sleeve lead. This is accomplished by the installer removing two strap wires between separate pairs of terminals at each TK- relay. The TK- relays to be disconnected shall be relays for the higher-numbered unassigned trunks in excess of the first unassigned trunk multiplied to any assigned trunk.

(e) The usual case requiring TK- relays to be disconnected would fall in the category of fewer than 11 assigned trunks in a single ROTS group. For example, assume a group of 7 outgoing trunks to CAMA with the 14 unassigned trunks from a single ROTS group multiplied in accordance with ED-30325-01. TK- relays for unassigned trunks 14, 15, 16, 17, 19, 20, and 21 would have to be disconnected. For a 5-trunk group, TK- relays for trunks 11 through 21 would have to be disconnected. ED-30325-01 has been revised to indicate the specific TK- relays to be disconnected for various numbers of assigned trunks.

(f) There may be exceptional cases, however, where TK- relays may have to be disconnected in outgoing trunk groups using more than one ROTS group. For example, assume a trunk group of 18 trunks in which 2 ROTS groups are provided to care for growth. There would be 9 assigned and 12 unassigned trunks in each ROTS group. Here the multiplying procedure occurs [see 1.22(a)] until nine unassigned trunks in each group are multiplied with nine assigned trunks in the *other* group. The remaining unassigned trunks in each ROTS group (in this case 12, 11, and 10) shall be multiplied as third appearance unassigned trunks in the *same* ROTS group (in this case 21, 20, and 19). Multiplying shall progress in reverse numerical order, as 12 multiplied to 21, 11 to 20, and 10 to 19 in each and the same ROTS group. TK- relays shall

then be disconnected from the highest-numbered unassigned trunks involved in a triple multiple (in this case 21, 20, and 19). Fig. 11 on ED-30839-01 shows this multiplying arrangement.

(g) At the unit terminal strip on the initial unit of each ROTS group, the S1 lead punchings for the S1 leads from arc 4 of the S selector for trunks having the TK- relays disconnected per 1.22 (c), (d), and (e), must be multiplied to an S1 lead punching connected to a TK- relay not so disconnected and associated with the same outgoing trunk circuit as the unassigned S1 lead punching or punchings. This may be accomplished by multiplying such S1 lead punchings at the unit terminal strip in accordance with the same pattern as the T, R, S, and A leads are multiplied at the distributing frame, to the point where the multiple becomes connected to an S1 punching associated with a TK- relay that is not disconnected.

(h) The above practice of disconnecting TK-relays replaces a previous practice of making unassigned trunks busy by grounding the sleeves, as necessary, to prevent more than two TK-relays having to be multiplied to the same sleeve. This change in practice is desirable because of the increased number of small trunk groups anticipated, due to the use of this ROTS equipment on small trunk groups to CAMA, TSP, and TSPS No. 1 offices.

1.23 *Where both direct and secondary access trunks are provided, some of the trunks from each selector subgroup are cross-connected directly to OGTs or repeaters at the distributing frame and the remaining trunks to the ROTS circuits.* The direct-access trunks are those from the lower-choice contacts on the levels in each selector division of the subgroup, in the order in which the selectors hunt through them. For the smaller selector subgroups associated with out-trunk switch equipment, the standard method of multiplying the selector divisions at the selector frame is modified, where necessary, so that the direct-access trunks are not included in the multiple reversal form. In no case shall the total number of direct-access trunks exceed the number of interoffice trunks in the office group.

1.24 *In order to assure an even distribution of traffic to the OGTs, the repeaters, and the several ROTS groups, a systematic method of cross-connecting selector level trunks is necessary.*

Whether directly connected or given secondary access to an interoffice trunk, the trunks from each selector subgroup are assigned in a certain order to the several ROTS groups in rotation, and correspondingly numbered trunks in consecutive subgroups are also assigned to the ROTS groups in rotation. The direct-access trunks from selector subgroups are assigned to the interoffice trunks from each ROTS group in the order that they appear on the banks of each group, and the ROTS switches in each group are similarly assigned from 1 up. (The order of assigning the selector trunks to the ROTS groups in rotation is described in 1.31.)

1.25 *ROTS circuits in each group are equipped, as required, by the even distribution cross-connecting plan (see 1.24).* In the majority of cases, the variation in the number of ROTS in each group will be small (for example, a difference of not more than three switches between the minimum and maximum numbers). However, in cases where the variation, if tolerated, would exceed the capacity of the ROTS group or where serious imbalance of traffic may result, the cross-connecting plan should be modified to obtain a more even distribution of circuits in each group.

1.26 *Within larger interoffice trunk groups,* each division of selectors in a graded multiple subgroup will not have secondary access to switches in all of the ROTS groups. The order of assigning the trunks of each subgroup to the various ROTS groups [see 1.28(a)] is required so that maximum uniform access to the various groups is achieved. The traffic tables for the engineering of this equipment take account of this limited access in the larger trunk groups. However, taking these factors into consideration, it is desirable to limit to ten the number of ROTS groups that are cross-connected into one interoffice trunk group. Where more than ten ROTS groups are required, two interoffice trunk groups, each with independent ROTS groups, should be specified.

1.27 *The number of interoffice trunks available to ROTS equipment at cutover may be less than the number for which the equipment is engineered.* In this case, due to the primary and secondary access trunking plan, the cross-connections determined as described are modified in order that the call-carrying capacity of the selector subgroup be affected as little as possible.

1.28 *Usually, it is not possible to determine the number of interoffice trunks* that will be available far in advance of cutover. The manufacturer will prepare cross-connecting information in all cases for the number of interoffice trunks being engineered. When the number of interoffice trunks that will be available is determined, the telephone company will modify the cross-connecting information for the job in accordance with a general plan, as follows:

(a) In general, OGTs or repeaters that are available through rotary out-trunk switches only are left out of service as the first set in the modification plan. To further reduce the interoffice trunk group, the graded multiple subgroups are paired, an OGT or a repeater is removed from the last direct-access trunk of one of the subgroups (usually the odd-numbered subgroup of the pair), and the trunks from selectors and rotary out-trunk switches thus vacated are multipled with the last direct-access trunk of the other subgroup of the pair, giving both sets of trunks access to the OGT or the repeater previously serving only one subgroup. Additional direct-access trunks in these pairs of subgroups, selected in a right-to-left order on the cross-connecting drawing, are similarly paired until the necessary number of interoffice trunks have been removed from service. As described in detail on the ROTS cross-connecting drawing, subgroups of like types are paired for cutback purposes to as great an extent as possible, but in order to maintain traffic balance with subgroups of other sizes, these subgroups are also included in the cutback procedure, approximately in proportion to their size. In the case of extensive cutbacks, the terminations of OGTs or repeaters on the incoming selectors in the distant office should be examined by the telephone company to determine if the cross-connections there should be rearranged to obtain satisfactory distribution of traffic to the selector shelves.

(b) When additional interoffice trunks become available, the direct-access trunks are restored to their status under the original cross-connecting plan in the reverse order from which they were chosen in the modification plan [see 1.28 (a)]. When all direct-access trunks have been restored, the secondary access trunks are put into service.

1.29 *Traffic requirements for trunk groups change periodically* and may necessitate

an increase or decrease in the number of selector subgroups and interoffice trunks and possible changes in the size of the selector subgroups. For minor additions, the change in switch quantities required may be within the capacity of the ROTS units already installed. In such cases, the additional circuits should be added with the least possible revision of the existing cross-connections. Trunks added in existing selector subgroups to rotary out-trunk switches may be added at the end of the existing trunks on the cross-connecting drawing and connected to additional out-trunk switches in the indicated ROTS groups, except that in cases where a partial, or smaller, leftover subgroup is expanded to a full subgroup, it usually will be desirable to recross-connect the subgroup. Similarly, one or more subgroups may be added below the existing subgroups and cross-connected to additional out-trunk switches without disturbing existing cross-connections. In both cases, additional direct-access selector trunks will be cross-connected to successive additional direct-access OGTs or repeaters in the ROTS groups indicated. It should be noted, however, that any additional OGTs or repeaters in the interoffice trunk groups usually will be accessible through rotary out-trunk switches only, and consideration should be given by the telephone company to revising the cross-connection in the distant office to distribute such added OGTs or repeaters over several incoming selector shelves. If the traffic should fall off and it is not considered desirable to reduce the number of ROTS groups, interoffice trunks may be cut back (see 1.28) or the out-trunk switches and the OGTs or repeaters connected with selector trunks that are eliminated may be omitted, depending on conditions. In either case, if the reduction is extensive, the terminations of OGTs or repeaters on the distant office incoming selectors should be examined by the telephone company and changed, if necessary, for proper traffic balance to the selector shelves.

1.30 *One additional ROTS group may be added without major cross-connecting changes* by substituting the added group number at regular intervals in the cross-connecting plan in such a way that it replaces successively different group numbers in each selector subgroup and in successive subgroups and is associated with different numbered selector trunks in the various subgroups. For example, in growing from five to six ROTS groups, GR6 would replace every sixth group number in the first subgroup which would be GR1, 2, 3, 4, 5, 1, etc; the first, seventh, thirteenth,

etc, group numbers; or GR2, 3, 4, etc, in the second subgroup; the second, eighth, fourteenth, etc, group numbers, or GR4, 5, 1, etc, in the third subgroup, and so on. As another example, in growing from four to five ROTS groups, GR5 would similarly replace every fifth group number in the first subgroup, but in order to replace successively different groups and also be associated with different numbered selector trunks in the following subgroups, the second, seventh, twelfth, etc, group numbers or GR3, 4, 1, etc, would be replaced in the second subgroup; the fourth, ninth, and fourteenth, etc, group numbers, or GR2, 3, 4, etc, in the third subgroup, and so on. The same principle applies for other numbers of groups, a varying change in the substitution of the new group in successive subgroups being necessary in different cases to accomplish the desired distribution of the new group. Rotary out-trunk switches in the new group will be assigned in succession to the secondary access selector trunks corresponding to the appearances of the added group number until all such appearances are assigned. Replaced switches of other groups previously connected to these selector trunks will be connected to new selector trunks associated with the same groups until all such appearances are filled, any remaining switches being left out of service. Direct-access trunks to OGTs or repeaters associated with the added ROTS groups will be similarly reassigned per (a) or (b):

- (a) The trunks are assigned to the OGTs or repeaters of the added ROTS group which is made up entirely of added OGTs or repeaters.
- (b) The trunks are assigned to the OGTs or repeaters that were removed from other ROTS groups in order to equalize traffic and are then followed by the added OGTs or repeaters.

Vacant terminals in the rotary out-trunk groups, after additions, will be multiplied with working terminals of following groups, similar to the practice for new installation, although existing multiplying that still connects nonworking terminals with working terminals need not be disturbed. Occasionally, a few of the added OGTs or repeaters will have to be assigned as OGTs or repeaters in the other groups reached only through out-trunks switches. If more than one ROTS group is added, it will usually be desirable to recross-connect the equipment to conform with the standard arrangement.

1.31 *The order of assigning the selector level trunks of each graded multiple subgroup over the rotary out-trunk switch groups in rotation* should be such that (a) the best proportionate balance, on the average, of direct and secondary access trunks to each ROTS group is obtained, (b) a good distribution of the different choice trunks over the ROTS group is obtained, and (c) all selectors in a graded multiple subgroup have uniform access to the various ROTS groups as practicable and to as many such groups as practicable. The assignment of the trunks in straight top-down, left-to-right order in each subgroup meets requirements (a) and (b) much more satisfactorily than a left-to-right, top-down order of assignment. The first choice direct-access trunks and the second choice secondary-access trunks being assembled together in their respective groups on the cross-connecting plan greatly reduces the engineering effort of assigning the cross-connections to the OGTs or the repeaters and out-trunk switches. The trunk assignment does not, however, meet requirement (c) as satisfactorily, particularly where the number of first choice trunks in the graded multiple is an exact multiple of the number of rotary out-trunk groups, or vice versa. In such cases, the same ROTS groups may appear before trunks from the same selectors, giving the various selectors uneven access to the various ROTS groups. Requirement (c) can be met satisfactorily, however, by the use of a modified top-down, left-to-right order of assignment in the following manner:

- (a) A modified top-down, left-to-right order of assigning the trunks of each graded multiple subgroup to the banks of switches of the various ROTS groups in rotation shall be used. With a straight top-down, left-to-right order of assignment, all of the first choice trunks are assigned in top-down order in the graded multiple to OGTs or to repeaters associated with successive ROTS groups; the second choice trunks are similarly assigned, and so on, to and through the common trunks. Regarding the association of the trunks with ROTS groups, this arrangement is equivalent to numbering the trunks of a graded multiple subgroup in this order, with the ROTS group numbers in rotation, repeating these numbers as often as necessary until the last (tenth choice) trunk in the subgroup is reached. *The modified top-down, left-to-right arrangement* consists of rearranging the trunks of each choice before the *same* ROTS groups in such a way as to improve the uniformity of access to each ROTS

group from the several divisions of selectors in the subgroup.

(b) ED-30839-01, Fig. 10 illustrates these modified assignments. An 8-3/8 by 10-7/8 inch form per ES-557716 is used, and the trunks of the particular graded multiple arrangement in question are first numbered in a straight top-down, left-to-right order with the ROTS group numbers in rotation. These numbers are put in the squares in the first columns (1 through 10) of the form in positions to represent the graded multiple pattern. The modified arrangement is indicated in the next ten columns and consists of rearranging the assignment to the ROTS groups in each choice so that, in general, there is a change in the successive appearances of each group, causing the group in each such appearance to be associated with selectors following those with which it was associated in the previous appearance. In each case, when the last selectors in the pattern have been reached, the succession of assignment proceeds back to the first selectors in the pattern. Starting with the first choice trunks, place all of the GR1 appearances first, followed by all of the GR2 appearances, then by GR3, etc. Place the next GR1 appearance in a following choice on selectors following those of the preceding GR1 appearance, and continue in this manner for the remaining GR1 appearances. Do the same for ROTS GR2, 3, etc. ROTS groups not appearing on first choice trunks (or left over after the first choice trunks are assigned as described) will be assigned in a top-down order in the first choice in which they appear to trunks remaining after the assignment of the lower-numbered groups.

(c) The next step consists of determining how uniformly the trunks from each set of selectors associated with a first choice trunk in the subgroup are distributed over the ROTS groups after this modification assignment has been made. This information is set up in the third set of ten columns on the form, for a maximum of ten ROTS groups, as indicated in Fig. 10 of ED-30839-01. Where necessary, minor rearrangements should be made in the ROTS group assignments in one or more choices, starting with the higher choices for optimum distribution, which, in the majority of cases, should not vary more than one trunk in the number of trunks to the various ROTS groups from sets of selectors associated with first choice trunks. The variation in the number of trunks from each set of selectors

to the several ROTS groups may be somewhat greater than this, being influenced by the relative coverage of individual, partial-common, and common trunks. It should be noted that throughout these rearrangements, the groups associated with each choice are not changed, but merely rearranged within the choice. After the best arrangement is obtained, the resultant final assignment, together with the ROTS group numbers in rotation, is written on the next two horizontal lines in the squares on the form as the assignment is to appear on the equipment drawing per Fig. 1 of ED-30839-01 (Mfr Disc.). In all cases, the direct-access trunks to OGTs or repeaters shall be consecutive trunks from left to right followed by the secondary access trunks to rotary out-trunk switches. These final assignments are then to be used for all subgroups in all offices in combination with the particular number of ROTS groups, and the sheets should be numbered and indexed for possible use on future jobs.

1.32 ROTS groups initially equipped with switches on the basis of 40 percent direct access and 60 percent access through the ROTS equipment may be converted to 100 percent access through the ROTS group for use with digit 1 or digit 0 to CAMA, TSP, and TSPS No. 1 offices. When this condition exists, additional ROTS equipment may be required (that is, a present 30-switch group with 40- to 60-percent access may require 50 switches on the revised plan). Any new equipment added should be installed per the same schematic drawings as used in existing installations. When additional units per J33001C-() are added, the supplementary cable available with the unit should be specified to provide interconnection. When an additional unit per J33001A-() is required, the banks of the old and the new unit should be multiplied at their terminating intermediate distributing frame (IDF) or trunk distributing frame (TDF).

1.33 ROTS units per J33001F-() (SD-31990-01) will involve a small number of trunks from selector levels given 100-percent access to ROTS and normally a small enough group of 2-way trunks to a master office to permit grouping in a single ROTS group. If fewer than 22 trunks are involved in the trunk group, unequipped terminals should be multiplied in accordance with ED-30325-01.

Post-Selecting ROTS Groups

1.34 Post-selecting ROTS per J33001G-() (SD-32253-01) may be employed in a single

ROTS group (see 1.33), or the number of out-trunks may require two or more ROTS groups. In the event that more than one ROTS group is involved, it is necessary to provide a multiplying arrangement whereby all unassigned ROTS trunk terminals are multiplied to assigned terminals and, at the same time, to provide for suitable all-trunks-busy registration and for busying of post-selecting rotary out-trunk switches where all outgoing trunks on a ROTS group are busy. To accomplish this, the out-trunks are divided into common trunks (trunks appearing on the same contact of every rotary out-trunk switch in every group) and individual trunks (trunks that have their multiple appearance in only one rotary out-trunk group). SD-30896-01, Fig. 18, A, and B provide for all-trunks-busy registration on this basis and for busying of the rotary out-trunk switches.

1.35 Fig. 3 illustrates the assignment of 51 trunks to 3 rotary out-trunk groups. To achieve this arrangement, the first 22 trunk circuits are assigned to ROTS GR1. The total number of trunk circuits to be assigned is subtracted from the number of outlets originally available ($66 - 51 = 15$). This difference is divided by the number of groups that are still to be filled ($15/2 = 7 + 1$). In the example given, seven trunks (16 through 22) are strapped in common to those in the first group. Trunks 23 through 51 are assigned as individual trunks in GR2 and 3. This assignment leaves the fifteenth terminal in GR3 unassigned. To meet the requirement that all terminals be occupied, terminal 15 is strapped back to terminal 14, or, in this case, trunk 36.

2. SUPPLEMENTARY INFORMATION

814-000-000—Numerical Index—Step-by-Step Systems
 800-600-000—Checking List—General Equipment Requirements
 J33010—814-427-150—5-Wire Rotary Equipment for AMA — No. 1 Office
 J38805—814-005-151—No. 355A Dial Office
 J39206—814-005-150—No. 1 and 350A Offices — General
 J97025—801-006-155—Angle-Type Relay Rack
 Current Drain Data—
 SD-31359-02—No. 1 Offices
 SD-31364-02—No. 350A Offices
 SD-31780-02—No. 355A Offices
 SD-35325-02—No. 35E97 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-31359-01—No. 1 Offices
 SD-31364-01—No. 350A Offices
 SD-31780-01—No. 355A Offices

Circuits

SD-30868-01—Step-by-Step Systems No. 1, 350A, 355A, or 35E97, Rotary Out-Trunk Switch Circuit—3- or 4-Wire Arranged for Preselection
 SD-30868-02—Step-by-Step Systems No. 1, 350A, 355A, or 35E97 Rotary Out-Trunk Switch Circuit—3- or 4-Wire Arranged for Preselection
 SD-30896-01—Step-by-Step Systems—No. 1 or 350A Traffic Register Circuit
 SD-31122-01—Step-by-Step Rotary Out-Trunk Switch Circuit Arranged for Preselection
 SD-31518-01—Step-by-Step No. 1 Switch Trouble Alarm Circuits
 SD-31990-01—Step-by-Step Systems No. 355A Rotary Out-Trunk Switch Circuit
 SD-32253-01—Step-by-Step No. 1, 350A, 355A, or 35E97 Rotary Out-Trunk Switch Circuit — 3- or 4-Wire Arranged for Post-Selection

Equipment

ED-30325-01—Method of Multiplying Unassigned Trunks From 26-Type Banks
 ED-30839-01—Method of Cross-Connecting Rotary Out-Trunk Switch Equipment With Revised Selector Graded Multiple Arrangements of 45 Trunks Maximum
 ED-30892-01—Typical Frame Equipment and Switchboard Cabling
 ED-30892-10—Switchman Talk Jack and 48V Test Jack Equipment
 J33001A-()—Rotary Out-Trunk Switch Unit
 J33001F-()—Rotary Out-Trunk Switch Unit—For Tandem Operation—Not Arranged for Preselection
 J33001G-()—Rotary Out-Trunk Switch Unit— 3- or 4-Wire—No. 1, 350A, 355A, or 35E97 Offices Arranged for Post-Selecting

TRK	ROTS GROUP NO.			SEL SUB GRP	TRK IN SUB GRP																																														
	1	2	3			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31															
1	1	23	37	1	POS OF TRK IN MULT	1-1	1-3	1-5	1-2	1-4	1-6	2-2	2-3	2-1	3-3	3-1	3-2	4-1	4-2	5-1	5-2	6	7	8	9	10																									
					DTA TERM. NO.	(O.G. CABLE CIRCUITS TO HTDF AS REQD)																																													
2	2	24	38			SEL BAY																																													
					1 REPEATER																																														
3	3	25	39	2	REP BAY																																														
					ROTS GRP	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1															
4	4	26	40			ROT SWITCH	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7																								
					2 REPEATER																																														
5	5	27	41	3	POS OF TRK IN MULT	1-1	1-3	1-5	1-2	1-4	1-6	2-2	2-3	2-1	3-3	3-1	3-2	4-1	4-2	5-1	5-2	6	7	8	9	10																									
					DTA TERM. NO.	(O.G. CABLE CIRCUITS TO HTDF AS REQD)																																													
6	6	28	42			SEL BAY																																													
					3 REPEATER																																														
7	7	29	43	3	REP BAY																																														
					ROTS GRP	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2															
8	8	30	44			ROT SWITCH	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14																								
					3 REPEATER																																														
9	9	31	45	3	REP BAY																																														
					ROTS GRP																																														
10	10	32	46			ROT SWITCH																																													
					3 REPEATER																																														
11	11	33	47	3	REP BAY																																														
					ROTS GRP																																														
12	12	34	48			ROT SWITCH																																													
					3 REPEATER																																														
13	13	35	49	3	REP BAY																																														
					ROTS GRP																																														
14	14	36	50			ROT SWITCH																																													
					3 REPEATER																																														
15	15	36	51	3	REP BAY																																														
					ROTS GRP																																														
16	16	16	16			ROT SWITCH																																													
					3 REPEATER																																														
17	17	17	17	3	REP BAY																																														
					ROTS GRP																																														
18	18	18	18			ROT SWITCH																																													
					3 REPEATER																																														
19	19	19	19	3	REP BAY																																														
					ROTS GRP																																														
20	20	20	20			ROT SWITCH																																													
					3 REPEATER																																														
21	21	21	21	3	REP BAY																																														
					ROTS GRP																																														
22	22	22	22			ROT SWITCH																																													
					3 REPEATER																																														
22	22	22	22	3	REP BAY																																														
					ROTS GRP																																														
					ROT SWITCH																																														
					3 REPEATER																																														

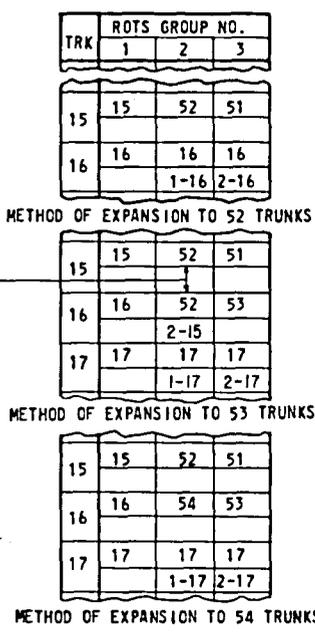
TRK	ROTS GROUP NO.		
13	13	35	49
14	14	36	50
15	15	36	51
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22

TRK CKT NO. INDIVIDUAL TRUNKS

THE LIKE NUMBERED TERMINALS OF TWO OR MORE ROTTS GROUPS SHALL CONSIST ONLY OF INDIVIDUAL TRUNKS OR COMMON TRUNKS, IF A PARTIAL COMMON GROUP RESULTS, TRUNKS SHOULD BE TIED BACK TO ADJACENT INDIVIDUAL TRUNKS IN THE SAME GROUP, AS REQUIRED, TO ELIMINATE THE PARTIAL COMMON TRUNKS

TRK	ROTS GROUP NO.		
15	15	52	51
16	16	16	16
17	17	17	17

TRK	ROTS GROUP NO.		
15	15	52	51
16	16	54	53
17	17	17	17



ASSIGNMENT OF SELECTOR TRUNKS TO ROTARY OUT TRUNK SWITCHES (100% ACCESS THROUGH ROTTS)

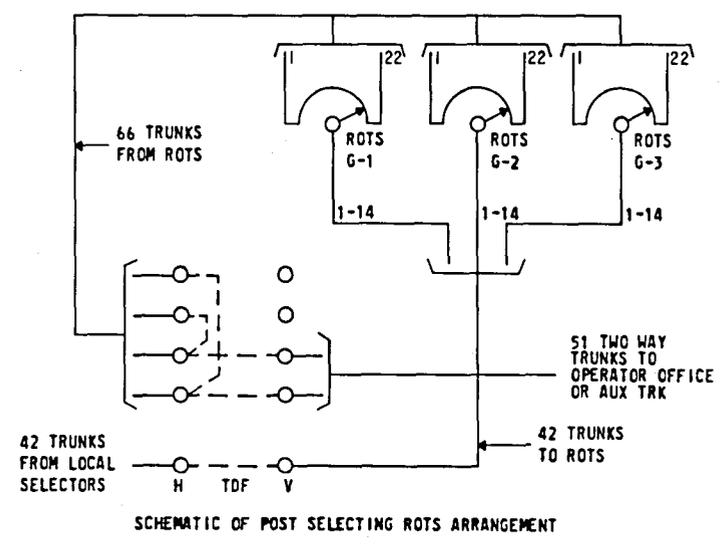


Fig. 3—Method of Cross-Connecting Post-Selecting ROTTS Equipment

	WIRE	EQUIP	NOTES
J33001H-()—Rotary Out-Trunk Switch Unit—3- or 4-Wire—Arranged for Preselection—For Use With Local Selector Level Trunks With or Without Auxiliary Trunk Circuits From Selector Levels in Distant Office, or Auxiliary Trunks for Completing Service Code and CAMA or TSP(S) Calls, or Combined Outgoing Dial Pulse Trunks to a TSPS No. 1 (Ten Circuits—Initial Unit)	0	1	
	0	1	
	0	1	5.01
	ROTS Ckt, SD-31122-01:		
Fig. 1, Opt T	30	0	
Trk Ckt, Fig. 2	21	21	
Trk Gr Ckt, Fig. 3, SP Rel Only	6	6	5.03
Trk Gr Ckt, Fig. 3B, C Rel Only	1	1	5.03
	ROTS Alm Ckt, SD-31518-01:		
Fig. 3	1	1	
J33001J-()—Rotary Out-Trunk Switch Unit—3- or 4-Wire—Arranged for Preselection—For Use With Local Selector Level Trunks With or Without Auxiliary Trunk Circuits From Selector Level Trunks in Distant Office, or Auxiliary Trunks for Completing Service Code and CAMA or TSP(S) Calls, or Combined Outgoing Dial Pulse Trunks to a TSPS No. 1 (Ten Circuits—Supplementary Unit)			

Wiring and Cabling

ED-31122-06—Cabling Schematic for Rotary Out-Trunk Switch Equipment

Miscellaneous

ES-557716—Step-by-Step Systems, Order of Cross-Connecting Trunks of Graded Multiple Subgroups From Selectors to Rotary Out-Trunk Switch Groups

4. EQUIPMENT***J33001A—A&M Only—Rotary Out-Trunk Switch Unit***

List 1—Framework, assembly, wiring, and common equipment for one rotary out-trunk unit switch.

List 5—Equipment per SD-31122-01, Fig. 1 and 5 (less 26G banks, capacitor A, and resistor A) required in addition to list 1 for one ROTS circuit.

List 9—Framework, wiring, and equipment required in addition to list 1 for use in offices desiring front mounting of MC relays to reduce impulse noise on ROTS circuits per SD-31122-01, Fig. 7 and option S. (Omit option T.)

List 10—Framework, wiring, and equipment required in addition to list 1 for use in offices desiring rear mounting of MC relays to reduce impulse noise on ROTS circuits per SD-31122-01, Fig. 7 and option S. (Omit option T.) (See Note A.)

Note

A. List 10 shall always be shipped loose and mounted by the installer.

J33001F—AT&T Co Std—Rotary Out-Trunk Switch Unit—For Tandem Operation—Not Arranged for Preselection

List 1—Framework, assembly, wiring, and equipment for one ROTS unit of five circuits per SD-31990-01, Fig. 1.

List 2—Framework, assembly, wiring, and equipment for one ROTS unit of three circuits per SD-31990-01, Fig. 1.

List 3—Wiring and equipment per SD-31990-01, Fig. 2, with Z wiring required in addition to list 1 or 2 for one stop circuit (one

required per group of trunks to operate office).

J33001G—AT&TCo Std—Rotary Out-Trunk Switch Unit—3- or 4-Wire—No. 1, 350A, 355A, or 35E97 Offices Arranged for Post-Selecting

List 3—Assembly, wiring, and equipment required in addition to list 1, 2, 5, or 6 for one 3-circuit ROTS relay unit per SD-32253-01, three Fig. 1, option M relays only. (See Note A.)

List 4—Equipment per SD-32253-01, three Fig. 1, 206BY selectors only, required in addition to list 1, 2, 5, or 6 for three rotary out-trunk circuits. (See Note A.)

List 5—Framework, assembly, wiring, and common equipment for one basic initial ROTS unit arranged for post-selecting.

	WIRE	EQUIP	NOTES
ROTS Ckt, SD-32253-01:			
Sw Ckt, Fig. 1, Opt M			
Bk and Net.	10	10	
Sw and Rel	10	7	
Com Rel, Fig. 2 and 5	1	1	

List 6—Framework, assembly, wiring, and common equipment for one basic supplementary ROTS unit arranged for post-selecting.

	WIRE	EQUIP	NOTES
ROTS Ckt, SD-32253-01:			
Sw Ckt, Fig. 1, Opt M			
Bk and Net.	10	10	
Sw and Rel	10	4	
Com Rel, Fig. 5	1	1	

List 7—A&M Only—Equipment required in addition to list 1 when one SP1 lead for each two equipped switch positions is desired. Remove N apparatus from SD-32253-01, Fig. 2 and add SD-32253-01, Fig. 3, in No. 1, 350A, or 355A offices.

List 8—A&M Only—Equipment required in addition to list 2 when one SP1 lead for each two equipped switch positions is desired. Add SD-32253-01, Fig. 3 in No. 1, 350A, or 355A offices.

List 9—A&M Only—Equipment per SD-32253-01,

Fig. 4. Provide one per equipped Fig. 1 in addition to list 5 or 6 and associated list 3 in 35E97 office only. (See Note D.)

List 10—Wiring and equipment required in addition to list 3, 5, or 6 when accessed from intercepting trunk circuit with controlled transfer to operator or auxiliary line circuit for hotel/motel service per SD-32253-01, option K. (Omit option M.)

Notes

A. ROTS circuits in multiples of three may be furnished in addition to list 5 or 6 in accordance with lists 3 and 4 to provide ten circuits maximum per unit.

B. All units to be associated in the same rotary out-trunk group shall be located, as far as possible, adjacent to each other on the same relay rack bay. Where practicable, spare space on the relay rack shall be left for anticipated growth within any rotary out-trunk group. If, in any case, units in the rotary out-trunk group should be on different bays, the interunit wiring would be switchboard cable.

C. A supplementary cable is available for connection between the basic unit and the basic supplementary unit or the basic supplementary unit and the next basic supplementary unit when these units are adjacent and mounted on a top-down pattern.

D. List 9 for 35E97 offices may be furnished only in conjunction with list 5 or 6, since this type office will require an individual (SP1) lead per equipped Fig. 1 as provided by the SP1 relay specified per Fig. 5.

J33001H—AT&TCo Std—Rotary Out-Trunk Switch Unit—3- or 4-Wire—Arranged for Preselection—For Use With Local Selector Level Trunks With or Without Auxiliary Trunks Circuits From Selector Levels in Distant Office, or Auxiliary Trunks for Completing Service Code and CAMA or TSP(S) Calls, or Combined Outgoing Dial Pulse Trunks to a TSPS No. 1 (Ten Circuits—Initial Unit)

List 2—Wiring and equipment per SD-30868-02, Fig. 10, option X required in addition to list 1 or 11 for one 206-type selector

(maximum ten list 2 per each list 1 or 11).

List 4—Wiring and equipment per SD-30868-02, Fig. 10, option W required in addition to list 3 or 12 for one 206-type selector (maximum ten list 4 per each list 3 or 12).

List 5—Wiring and equipment per SD-30868-02, one Fig. 4 and two Fig. 8 required in addition to list 1 or 11 when a ROTS circuit connects to an auxiliary trunk circuit for trunks from selectors in distant office and connection to a make-busy circuit is required. (See Note B.)

List 6—Wiring and equipment per SD-30868-02, Fig. 4, option S required in addition to list 1, 3, 11, or 12 for all-trunks-busy relays when a ROTS circuit is preceded by an auxiliary trunk circuit arranged to complete service code and CAMA or TSP(S) calls.

List 7—Wiring and equipment per SD-30868-02, ten Fig. 6, option U required in addition to list 1, 3, 11, or 12 when a ROTS circuit connects to selectors or auxiliary trunks from selectors in a distant office or auxiliary trunks arranged to complete service code and CAMA or TSP(S) calls. (See Note A.)

List 8—Wiring and equipment per SD-30868-02, ten Fig. 6, option V required in addition to list 1, 3, 11, or 12 when a ROTS circuit connects to auxiliary trunks arranged for special toll and operator assistance traffic to outgoing trunks via ROTS. (See Note A.)

List 11—Framework, assembly, wiring, and equipment for one 3-wire ROTS unit, arranged for ten circuits per SD-30868-02, ten Fig. 1, options F and X, and Fig. 3, 5, 12, and 13. (See Notes A and C through F.)

List 12—Framework, assembly, wiring, and equipment for one 4-wire rotary out-trunk switch unit, arranged for ten circuits per SD-30868-02, ten Fig. 1, options F, H, and W, and Fig. 3, 5, 9, 12, and 13. (See Notes A and C through F.)

Notes

A. Lists 11 and 12 shall include all Fig. 1. The 206-type selectors required to complete the units will be ordered separately per list 2 or 4, respectively, and test jacks per Fig. 6, option U or V per list 7 or 8, respectively.

B. Provide list 5 if two or more ROTS groups serve the same originating and terminating office and the OGTs or repeaters in the originating office are arranged with winkoff feature.

C. ROTS units per J33001H-() and J33001J-() are electrically and mechanically compatible with units per J33001B-() and J33001C-(), respectively, and can be used interchangeably within ROTS groups.

D. When a trunk circuit has more than one appearance on the banks of a unit or if the same trunk has an appearance on the banks of more than one initial unit, TK- relays associated with all but the first appearance of the trunk on a per-ROTS-group basis shall be removed from the circuit by eliminating the associated option Q strap at the TKA or TKB unit terminal strips.

E. The provisions of Note D apply in cases where all of the ROTS units in a group are in accordance with SD-30868-02. In groups where there is a mixture of SD-30868-01 and SD-30868-02 units, the requirements specified on SD-30868-01 (permitting the association of two TK- relays with a trunk) shall be followed only on initial units per J33001B-().

F. When TK- relays are disconnected per Notes D and E, each associated S1 lead from arc 4 of the selectors must be multiplied to an S1 lead associated with a TK- relay that is connected and which is also associated with the same outgoing circuit. To accomplish this, the installer shall provide the required straps on a nonrecord basis at the unit terminal strip.

J33001J—AT&T Co Std—Rotary Out-Trunk Switch Unit—3- or 4-Wire—Arranged for Preselection—For Use With Local Selector Level Trunks With or Without Auxiliary Trunk Circuits From Selector Level Trunks in Distant Office, or Auxiliary Trunks for Completing Service Code and CAMA or TSP(S) Calls, or Combined Outgoing Dial Pulse Trunks to a TSPS No. 1 (Ten Circuits—Supplementary Unit)

List 2—Wiring and equipment per SD-30868-02, Fig. 10, option X required in addition to

list 1 or 12 for one 206-type selector (maximum ten list 2 per list 1 or 12). (See Note A.)

List 4—Wiring and equipment per SD-30868-02, Fig. 10, option W required in addition to list 3 or 13 for one 206-type selector (maximum ten list 4 per list 3 or 13). (See Note A.)

List 5—Wiring and equipment per SD-30868-02, two Fig. 8 required in addition to list 1 or 12 when ROTS circuits connect to auxiliary trunk circuits for trunks from selectors in distant office and connection to a make-busy circuit is required. (See Note B.)

List 6—Wiring and equipment per SD-30868-02, Fig. 4, option S required in addition to list 1, 3, 12, or 13 for an all-trunks-busy relay when a ROTS circuit is preceded by an auxiliary trunk arranged to complete service code and CAMA or TSP(S) calls.

List 7—Wiring and equipment per SD-30868-02, ten Fig. 6, option U required in addition to list 1, 3, 12, or 13 when ROTS circuits connect to selectors or auxiliary trunks from selectors in a distant office or auxiliary trunks arranged to complete service code and CAMA or TSP(S) calls. (See Note A.)

List 8—Wiring and equipment per SD-30868-02, ten Fig. 6, option V, required in addition to list 1, 3, 12, or 13 when ROTS circuits connect to auxiliary trunks arranged for special toll and operator assistance traffic to outgoing trunks via ROTS. (See Note A.)

List 11—A&M Only—Wiring and equipment per SD-30868-02, Fig. 11 required in addition to list 1, 3, 12, or 13 when adding this unit to a group having an initial unit per J33001B-() wired per SD-30868-01, Fig. 2. (Omit SD-30868-02, Fig. 5.)

List 12—Framework, assembly, wiring, and equipment for one 3-wire ROTS unit arranged for ten circuits per SD-30868-02, ten Fig. 1, options F and X and Fig. 5. (See Notes A, C, and D.)

List 13—Framework, assembly, wiring, and equipment for one 4-wire ROTS unit arranged for

ten circuits per SD-30868-02, ten Fig. 1, options F, H, and W and Fig. 5. (See Notes A, C, and D.)

Notes

- A. Lists 12 and 13 shall include all Fig. 1. The 206-type selectors required to complete the unit will be ordered separately per list 2 or 4, respectively, and test jacks per Fig. 6, option U or V per list 7 or 8, respectively.
- B. Provide list 5 when list 5 of J33001H-() initial unit is furnished and more than two distant offices are associated with auxiliary trunks.
- C. ROTS units per J33001H-() and J33001J-() are electrically and mechanically compatible with units per J33001B-() and J33001C-(), respectively, and can be used interchangeably within ROTS groups.
- D. A preformed supplementary cable shall be furnished with this unit to connect to an associated initial ROTS unit or to another associated supplementary ROTS unit, provided the ROTS units are mounted adjacent to one another in the same bay and the associated ROTS unit (initial or supplementary) is uppermost in the bay.

5. GENERAL NOTES AND INDEXES

- 5.01 The ROTS circuits should be equipped on each unit as required, the lower-numbered circuits being equipped first.
- 5.02 The trunk group circuit equipment is common to all units of a ROTS group and shall be fully wired and equipped in all cases.
- 5.03 Two designation cards shall be provided for each ROTS unit, one for backward tracing and one for forward tracing information, as shown on the unit equipment drawings.

List of A&M Only and Mfr Disc. Equipment

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
J33001A	A&M Only	7	—
L2 & L3	Mfr Disc.	3	J33001A,L1
L4	Mfr Disc.	7	—
L6 & L7	Mfr Disc.	10	—
L8	Mfr Disc.	11	J33001A,L9
J33001B	Mfr Disc.	10	J33001H
J33001C	Mfr Disc.	10	J33001J
J33001D	Mfr Disc.	9	—
J33001E	Mfr Disc.	9	J33001C
J33001G,L1	Mfr Disc.	8	J33001G,L5
L2	Mfr Disc.	8	L6
L7			
thru L9	A&M Only	8	
J33001H,L1	Mfr Disc.	11	J33001H, L11
L3	Mfr Disc.	11	L12
L9 & L10	Mfr Disc.	11	—
J33001J,L1	Mfr Disc.	11	J33001J, L12
L3	Mfr Disc.	11	L13
L9 & L10	Mfr Disc.	11	—
L11	A&M Only	11	

The above equipment has been replaced as indicated. Where A&M Only items appear, the issue numbers shown are those of the issue in which the rating was first applied.

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