

SWITCHING SYSTEMS MANAGEMENT
DIAL FACILITIES
STEP-BY-STEP OFFICE
INTERCEPT ARRANGEMENTS

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1.02 When this section is reissued, this paragraph will contain the reason for reissue.

1.03 The intercept arrangements described in this section include those available for use in the No. 1, 350A, and the large 355A step-by-step offices. Descriptions of regular and trouble intercepting arrangements to operator facilities or machine announcements are included. Information on operation with the Automatic Intercept System (AIS) is also provided. Intercept arrangements for 355A offices with a capacity of less than 1500 lines are given in Dial Facilities Management Practices, Division H, Section 14.

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

1. GENERAL

1.01 This section describes the facilities required for traffic intercept arrangements in large metropolitan-area step-by-step offices.

2. EQUIPMENT ARRANGEMENTS

2.01 The equipment arrangements provide intercept service for the following conditions:

- (a) Calls to vacant or disconnected connector terminals
- (b) Calls to local and toll selector vacant levels
- (c) Calls to subscriber lines on which a trouble condition exists which requires assistance by an operator.

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2.02 The equipment units required to provide the intercept services in the large step-by-step offices include:

- (a) Intercept trunk finder units equipped with trunk finder switches and associated auxiliary relay circuits
- (b) Vacant code, trouble intercept, and auxiliary trunk circuits
- (c) Outgoing trunk circuits to an intercept bureau or automatic intercept center (AIC).

2.03 A trunk finder switch and auxiliary intercepting trunk capacity table is shown in Figure 1.

2.04 Auxiliary relay equipment for trouble intercept (plugging up lines) and vacant level intercept (unassigned selector levels) is usually located in a miscellaneous relay rack. These trunks are cross-connected on the distributing frame to the banks of the trunk finders. The auxiliary trunk circuits mounted on the trunk finder units are used for vacant or disconnected connector terminal intercept. A block diagram showing typical intercept arrangements is provided in Figure 2.

2.05 Automatic processing of intercept traffic is provided with the AIS. Offices equipped for automatic number identification (ANI) operation may be arranged for intercept service from an AIS. An intercept trunk finder unit with a capacity for twenty 200-point trunk finders and 160 auxiliary intercepting trunk relays concentrates intercepted traffic on the outgoing trunks to AIS.

2.06 Step-by-step offices that are not equipped for ANI may route intercept traffic to AIS without change in the local office equipment when operator number identification (ONI) facilities are available at the AIS location.

3. OPERATION AND USE

3.01 The intercept trunk finder is used as a concentrator to connect the maximum number of auxiliary intercepting relays to a limited number of trunk facilities to an intercept center. The auxiliary relays for unassigned connector terminals, vacant selector levels, and lines plugged up for trouble intercept are terminated on the banks of the trunk finder units. Each trunk finder switch may be connected directly to an outgoing intercept

trunk circuit, an intercept bureau, and/or an announcement machine.

3.02 The operation of the intercept trunk finder is similar to that of a line finder. When an auxiliary intercept trunk is seized, the trunk finder will operate to locate the trunk on the trunk finder bank and connect it to the associated outgoing intercept trunk.

3.03 Intercept trunk finders are equipped with normal post springs used to identify the class of call being intercepted. Each class of intercept service, regular or connector terminal, selector level, or trouble intercept is assigned specific levels on the trunk finder banks. The normal post springs are adjusted to the corresponding levels to cause a lamp to be lighted at the intercepting position indicating the class or type of the intercepted call.

3.04 Offices that are arranged for automatic intercept service with an AIC require a similar adjustment of the normal post springs. The operation of the normal post will cause a class-of-service relay to operate in the outgoing trunk. The operated relay will indicate to the ANI outputter the class identification to be outpulsed to the AIC.

3.05 In offices arranged for AIS, the calls are handled as follows.

- (a) Regular or unassigned connector terminals will receive computer-generated information at the AIS.
- (b) Vacant selector levels will be routed to a machine announcement, usually a 6A announcement system.
- (c) Lines plugged up for trouble intercept will be handled by an operator at the AIC.

3.06 Intercept traffic from local offices which are not equipped for identification and outpulsing of the called number may be routed to an AIC with no changes in existing local office equipment. The local offices may be arranged to indicate the type of intercept by tip and ring reversal for trouble intercept and a simple battery signal for blank number announcement (no reversal for operator handled calls). They may also be arranged to route any or all of these three classes of calls

over a common trunk group with no indication of the type of intercept. The constraint on this traffic is that the AIC must be arranged for ONI operation.

ANI-TYPE C and ANI-TYPE D OFFICES ONLY

A. Full ANI Intercept Operation

3.07 An auxiliary trunk is available for those offices equipped with ANI-Type C (ANI-C) or ANI-Type D (ANI-D) facilities that interface with AIS. The connector intercept class indication is forwarded via a fourth wire in the outgoing intercept trunk. Since the class of service is furnished by the fourth wire on the trunk finder banks, a dedicated trunk finder level is not required. As a result of this flexibility, the auxiliary trunks may be assigned to any trunk finder bank terminal other than the test terminal or those levels dedicated for trouble and vacant selector level intercept. Figure 3 is a block diagram which illustrates the full intercept operation.

B. Split Intercept Without Local Announcement

3.08 An auxiliary trunk, equipped with a class-of-service lead (fourth wire), may also be used for a split connector terminal intercept arrangement. When there are connector terminals which have never been assigned or have been on intercept for a long period of time, a savings of ANI capacity may be realized by treating these numbers the same as vacant selector levels. The auxiliary trunk will seize the trunk finder and place battery on the class-of-service lead (fourth wire) to the outgoing trunk. This seizure is treated the same as a vacant selector level seizure with respect to ANI functions. Figure 4 is a block diagram which illustrates the operation of split intercept without local announcement.

C. Split Intercept With Local Announcement

3.09 While the split intercept arrangement without local announcement has the advantage of saving ANI capacity, it requires trunking calls which require only an announcement to an intercept center. To remedy this, an announcement for vacant level and non-ANI connector terminal intercepts may be provided at the local central office. The auxiliary trunks for non-ANI connector intercept and vacant level intercept are arranged to monitor for one cycle of announcement and then cut through to the trunk finder if the calling

customer is still attached. When split intercept with local announcement is provided, the non-ANI connector terminal calls and vacant level calls may be routed directly to the AIC, as is done in offices without the local announcement capability. However, neither class of call may be treated both ways within the same office at the same time since the outgoing trunk can generate only one identification digit per class of call. Figure 5 is a block diagram which illustrates the operation of split intercept with local announcement.

3.10 Figure 6 compares the treatment of the intercept classes described in 3.07 through 3.09.

4. EQUIPMENT REQUIREMENTS

4.01 The following equipment requirements assume that the intercept traffic will terminate at an AIC arranged to either handle ANI or ONI calls.

4.02 Trunk finder quantities and associated outgoing intercept trunk circuit quantities are provided on the actual or estimated CCS loads as determined from the Poisson Capacity Table, Table 10 (P.01).

4.03 The following engineering criteria are used to establish a new intercept trunk finder group when load data are not available.

(a) The average holding time per intercept call is assumed to be 25 seconds. This includes the outpulsing of the called number for those offices arranged for ANI.

(b) Call estimates may be based on the Bell System average of 0.01 intercept call per originating call.

4.04 The difference in holding time of intercept calls to manual or semiautomatic systems and the estimated holding time per call to the AIC is not expected to affect the quantity of the auxiliary intercept relay circuits.

4.05 The quantity of connector intercept relays or auxiliary trunks (on the trunk finder banks) is dependent on the inward and outward movement of customer stations. In those offices where this activity is low, 200 connector terminals may be assigned on one intercept relay. Where the connect and disconnect activity is high, one

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intercept relay circuit is provided per 100 terminals or connector groups.

4.06 Additional connector intercept trunks may be provided when there are high calling rate lines (usually PBX trunks) in the same connector groups which require simultaneous intercepting. Two intercept trunks per group are provided when this condition exists.

4.07 One trouble intercept trunk is provided per 1000 terminals with a minimum of five per office.

4.08 Two local selector vacant level trunks and, where required, two toll selector vacant level trunks should be provided for a 10,000-terminal office.

4.09 When more than one intercept trunk finder group is required, the various types of intercept services should be apportioned between the trunk finder groups. This is necessary to avoid overloading which may develop during traffic peaks.

4.10 An example of intercepting trunk finder group assignments is shown in Figure 7.

TRUNK FINDER UNIT	UNITS PER UNIVERSAL SWITCH FRAME		AUXILIARY TRUNKS PER UNIT (NOTE 2)	SWITCHES PER UNIT
	11'6"	9'0"		
200 Point Trunk Finders -3 Wire Bank Multiple	3	2 (See Note 1)	198	20
200 Point Trunk Finders -3 Wire Bank Multiple for ANI-B Offices to Automatic Intercept System (AIS)	3	2	160	20
200 Point Trunk Finders -3 Wire Bank Multiple for No. 1 SXS with AMA to AIS	3	2	160	20
100 Point Trunk Finders -3 Wire - 10 Bank Multiple	5	4	99	10
100 Point Trunk Finders -3 Wire - 6 Bank Multiple	5	4	99	6
100 Point Trunk Finders -3 Wire - 4 Bank Multiple	5	4	49	4
22 Point Trunk Finders Rotary Line Switch Unit	—	—	22	3

Notes:

1. Trunk finder units per J32008-A are arranged for mounting on universal switch frames. A similar unit per J32003-BR requires installation on standard 20-switch capacity *line finder frames only*. As this unit cannot be mounted on universal frames, it is not applicable for installation in 355A offices.
2. Auxiliary trunks per unit indicate the intercepting trunk relays which are located on the trunk finder unit. These circuits may also be relay rack mounted as required.

Fig. 1—Trunk Finder Switch and Auxiliary Intercepting Trunk Capacity Table (2.03)

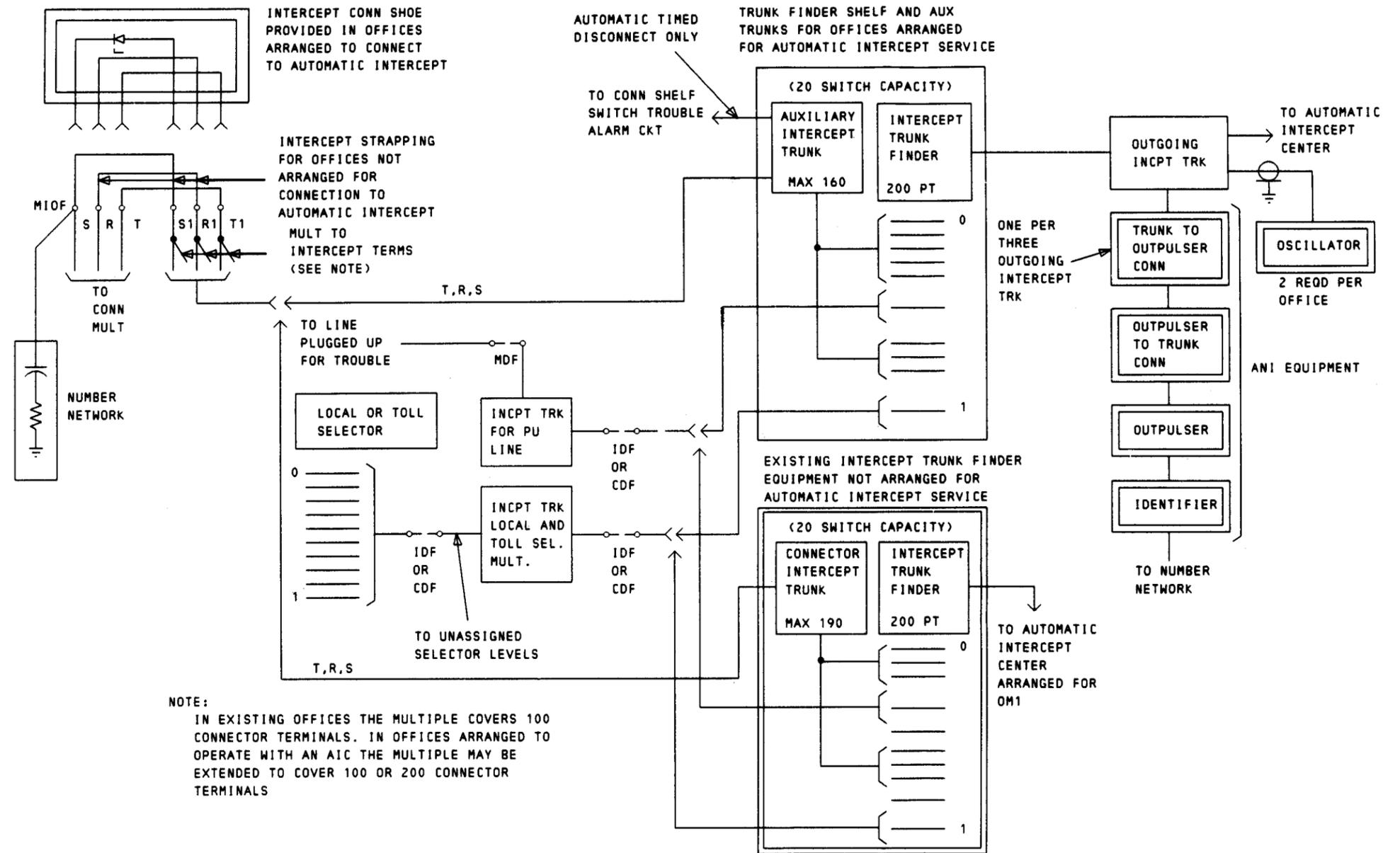


Fig. 2—Typical Intercept Arrangements for No. 1, 350A, and Large 355A Step-by-Step Offices (2.04)

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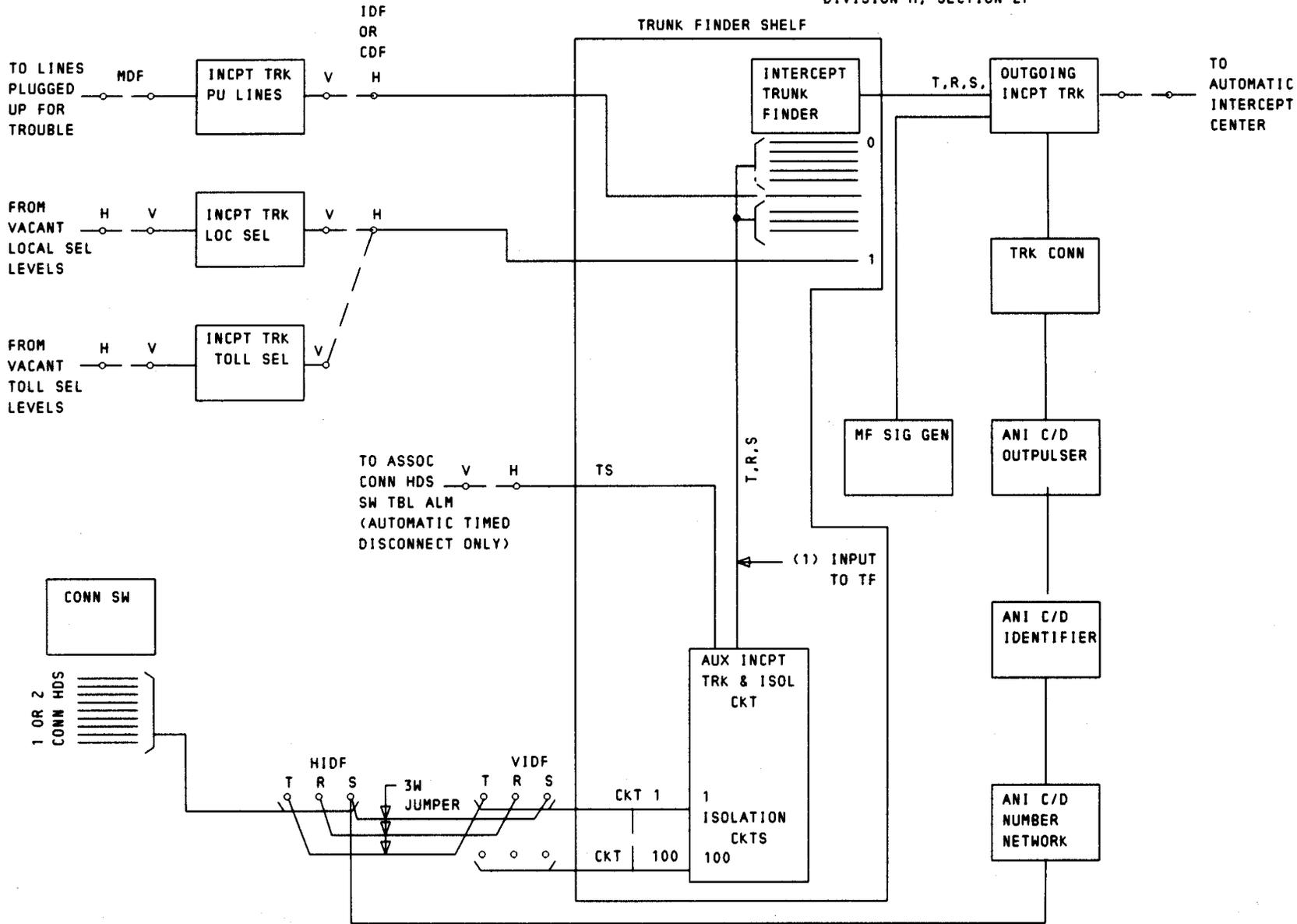


Fig. 3—Full ANI Intercept Operation (ANI-C/ANI-D Equipped Offices Only) (3.07)

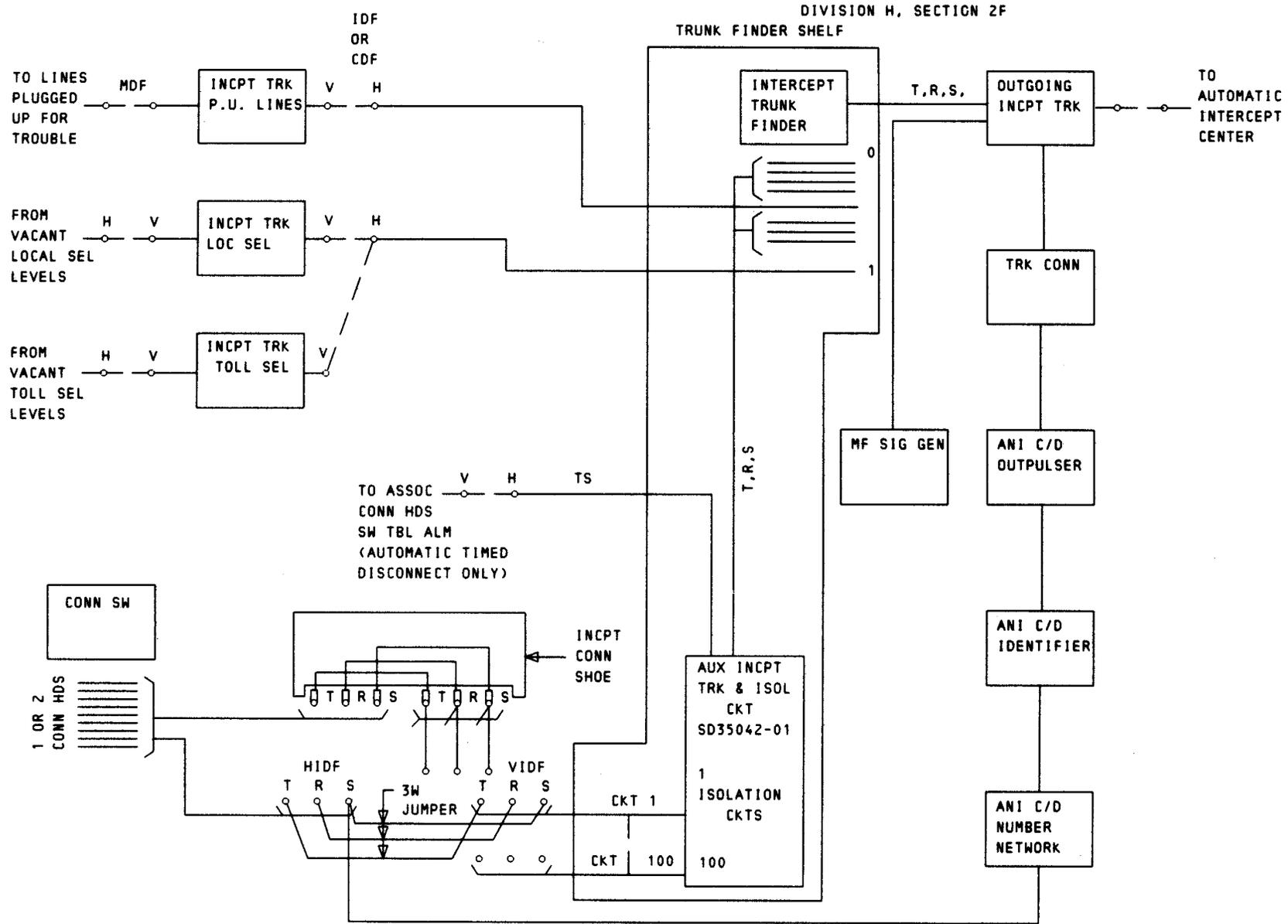


Fig. 4—Split Intercept Without Local Announcement (ANI-C/ANI-D Equipped Offices Only) (3.08)

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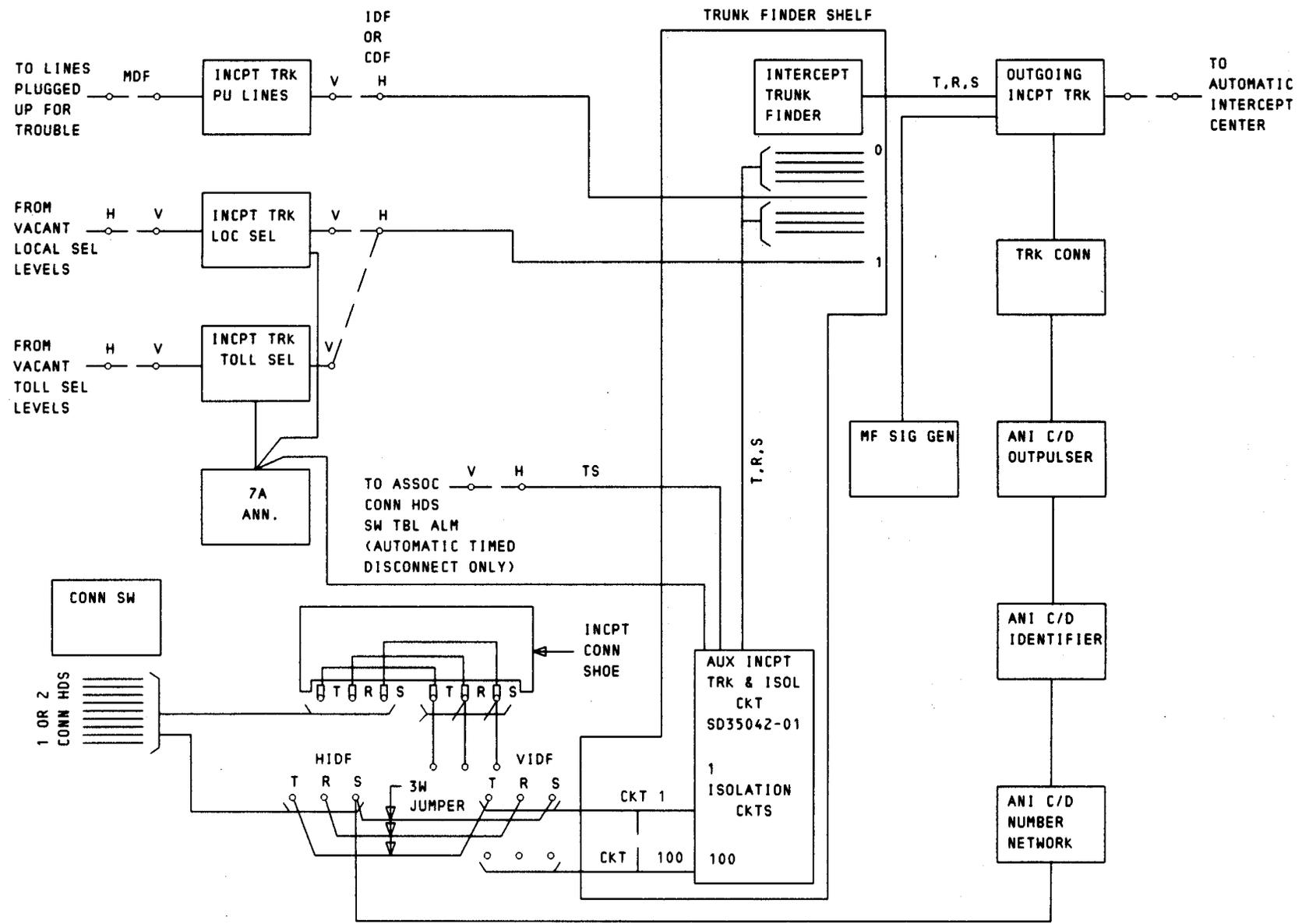


Fig. 5—Split Intercept With Local Announcement (ANI-C/ANI-D Equipped Offices Only) (3.09)

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	CONNECTOR TERMINAL RECENTLY CHANGED	CONNECTOR TERMINAL NONASSIGNED	VACANT LEVEL	PLUG- UP
Full ANI Intercept	ANI message at AIC (The number you have dialed, 234-5311, has been changed. The new number. . .)	Does not apply	Announcement at AIC	Operator at AIC
Split Intercept Without Local Announcement	ANI message at AIC	Announcement at AIC - same as vacant level announcement	Announcement at AIC	Operator at AIC
Split Intercept With Local Announcement	ANI message at AIC	One cycle local announcement, then transfer to operator at AIC Or Announcement at AIC (same as for split intercept without local announcement)	One cycle local announcement, then transfer to operator at AIC Or Announcement at AIC (same as for split intercept without local announcement)	Operator at AIC

Fig. 6—Call Treatment (ANI-C/ANI-D Equipped Offices Only) (3.10)

CITY: _____
 OFFICE: _____
 ORDER: _____
 DATE: _____

INTERCEPTING TRUNK FINDER ARRANGEMENT <u>ENGINEERING</u> PERIOD						
TYPE OF TRUNKS	NO. OF GROUPS	TRUNKS PER GRP		TF PER GRP		TOTAL TF
		WORK'G	EQUIP	CAP	EQUIP	
<u>TF GROUP 1 (ONI)</u>						
Conn Term — Regular		157				
— Special		15				
Plant Test		1				
TG Test		1				
VL Intc — Loc		2				
— Toll		2				
Trouble Intc		15				
Subtotal	1	193	198	20	7	7
<u>TF GROUP 2 (ANI)</u>						
Conn Term — Regular		113				
— Special		15				
Plant Test		1				
TG Test		1				
Trouble Intcpt		12				
VL Intc — Loc/Toll		3				
Subtotal		145	160	20	6	6
Grand Total	2	338	358		13	13

Fig. 7—Typical Intercepting Trunk Finder Group Assignments (4.10)