TRUNK NETWORK DESIGN—
FIRST ROUTE AND ALTERNATE ROUTE SELECTION—
LOAD ACCUMULATION—CANDIDATE TRUNK GROUP IDENTIFICATION
TRUNK ENGINEERING
NETWORK OPERATIONS METHODS

1. GENERAL

1.01 This section face sheet is issued to assign its 9-digit number to Traffic Facilities Practices

Division G, Section 3-e(3), September 1976.

This is part of the conversion of all Traffic Facilities Practices (TFPs) to the 9-digit Bell System Practices (BSPs) series as described in GL-77-05-262 and GL-77-11-200.

1.02 When this section is reissued, all references to TFP numbers will be changed to the appropriate 9-digit BSP numbers.

1.03 Recommendations for changes, additions, or deletions to this section should be forwarded on Form E-3973 as specified in Section 000-010-015.

1.04 TFP to BSP cross-reference information can be found in GL-77-11-200 and in Section 780-400-005.

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TRUNK NETWORK DESIGN

FIRST ROUTE AND ALTERNATE ROUTE SELECTION

LOAD ACCUMULATION—CANDIDATE TRUNK GROUP IDENTIFICATION

1. GENERAL

1.01 This section describes the procedures to be followed in the alternate route network design process of accumulating point-to-point loads for the purpose of identifying potential trunk group candidates. These procedures identify the trunk groups that should be considered in the network sizing process and the first routed loads which are offered to these trunk groups. The specific justification of a trunk group is done as a part of the network sizing process covered in Traffic Facilities Practices (TFP) Division G, Section 8.

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

1.03 As discussed in TFP, Division G, Section 3-e(2), there are twelve basic rules which underlie the procedures discussed in the following paragraphs. An understanding of those rules is fundamental to an understanding of these procedures. It should be noted that the process discussed involves the application of the rules in such a way as to reduce the number of steps required to properly route all traffic. The basic rules, however, are observed for all items of traffic and each level of network concentration.

1.04 As described in 2.01, certain basic information is required before the load accumulation process can begin. The primary information consists of homing arrangements and end office to end office point-to-point loads. This section describes the process as that of first identifying candidate trunk groups involving the ***lowest*** switching function (ie, 5—5) and then moving up the hierarchy one level at a time, identifying other candidate trunk groups resulting from the concentrating of traffic at each higher switching function in the network. Describing the process in this manner is for ease of understanding. Once the basic process is understood, it can be used in the identification of candidate new trunk groups in an existing network or in other ways as discussed in TFP Division G, Section 3-e(1). The starting point can be at any level of switching function, provided valid assumptions can be made or conditions developed relative to the trunk groups and traffic routes provided at lower levels of switching functions.

1.05 The procedures described in the following paragraphs provide a specific route for all traffic items where 6-digit translation limitations are not encountered or where 6D translation is not required. TFP Division G, Section 3-e(5) provides guidelines for routing traffic where translation limitations are encountered.

1.06 The procedures discussed in this section are applicable to alternate route networks of one through five levels of switching functions. Where only two levels are involved, such as in most metropolitan networks, all traffic will have been routed at the completion of switching function 4 routing. In a similar manner, all intra class 3 area traffic will have been routed at the completion of switching function 3 routing, all intra class 2 area traffic will have been routed at the completion of switching function 2 routing, and all other traffic will have been routed at the completion of switching function 1 routing.

1.07 This section is essentially a ***procedural*** section; no attempt is made to develop the rationale behind each step of the procedure. The section lists the specific sequential actions necessary to the process of identifying candidate high-usage trunk groups and developing the first route loads offered to these trunk groups. It reflects the straightforward application of the rules discussed in TFP Division G, Section 3-e(2) and is based on the concepts and principles discussed in TFP Division G, Section 3-e(1). Fig. 1 provides a simplified flowchart of these procedures. Part 3 provides an illustrative application to a 2-level metropolitan network and 2-region portion of the 5-level North American network.

1.08 In the procedural discussion that follows, certain phrases are frequently used. For clarity, they are defined as follows:

(1) "Plan the trunk group"—This trunk group should be considered as a candidate trunk group.

(2) "Route the traffic accordingly"—Assume the point-to-point traffic on the indicated trunk group and remove this traffic from further consideration.

(3) "Planned trunk groups"—These are candidate trunk groups either specified as preestablished trunk groups or developed by application of a previous step of the load accumulation procedure.

2. LOAD ACCUMULATION PROCEDURES

INITIAL INFORMATION REQUIRED

2.01 Use of this process requires the following:

(1) Class 5 to class 5, or trunking entity to trunking entity, directional point-to-point load information for each class of service or traffic requiring separate trunking arrangements.

(2) Originating and terminating homing arrangements for each class of service or traffic requiring separate routing arrangements.

(3) An indication of the ***first route*** load threshold at which a potential trunk group becomes a candidate.

(4) Identification of "preestablished" trunk groups and "prerouted" traffic.

(5) Knowledge of the limitations of switching systems in handling 2-way trunking and routing, including 6-digit translation or other routing limitations. This is required to determine which trunk groups must be provided on a one-way basis and where exception routing is required.

(6) Identification of trunk groups already planned for service in the time frame covered by the application of these procedures. This enables the process to give priority to trunk groups which already exist or are a part of network design plans.

(7) The principal numbering plan area (NPA) tandem for each NPA and the NPA code for each switching system. This is required if the point-to-point loads include any inter-NPA traffic.

INITIALIZING STEPS

2.02 The following steps must be taken prior to the application of these procedures in the identification of candidate trunk groups and routes. Fig. 1, sheet 1, provides a simplified flowchart.

(1) Assume all final trunk groups in service. These are trunk groups required to satisfy homing arrangements for the specified traffic items and classes of service. They are required without regard to accumulated loads.

(2) Assume "preestablished" trunk groups in service.

(3) Place "prerouted" traffic on designated trunk groups. Only final or "preestablished" trunk groups are able to carry "prerouted" traffic.

(4) Insure that all the point-to-point traffic to be routed can be served within the network defined by the final trunk groups per item (1).

SWITCHING FUNCTION 5 ROUTING (First Level of Switching)

2.03 Following are the sequential steps to be followed in function 5 routing. This routing covers the function 5 even though a switching system may also perform a higher switching function. Fig. 1, sheet 2, provides a simplified flowchart. As discussed in 1.04, it is not necessary to start the routing process at this lowest level. It can, for example, be started at the 4 or higher switching function. A description of the process, beginning with switching function 5 and moving sequentially through each higher switching function, is provided to facilitate an understanding of the process.

(1) For those networks not involving tandem switching, trunk groups should be planned for all interoffice combinations and the traffic routed accordingly.

(2) For other situations, determine if there is sufficient load to support direct 5—5 function trunk groups. Plan the trunk groups with sufficient loads and route the traffic accordingly, consistent with switching system capabilites as reflected in the initial information (see 2.01).

These trunk groups may be two-way or they may be one-way. Naturally one-way loads should be examined for one-way trunk groups and loads in both directions for two-way trunk groups. TFP Division G, Section 3-f discusses one-way versus two-way considerations.

(3) When all 5—5 function combinations have been examined, the function 4 routing provides procedures for routing the remaining unrouted traffic.

SWITCHING FUNCTION 4 ROUTING (Second Level of Switching)

2.04 Following are the sequential steps to be followed in switching function 4 routing. These steps are designed to determine candidate trunk groups based on loads accumulated by utilizing switching function 4, and to determine routing for all traffic not requiring a higher level of concentration. Note that this routing covers function 4 even though a switching system may also perform a higher switching function. Switching systems performing a function 4 may also perform switching function 5, and candidate trunk groups utilizing that function will have been planned as outlined in 2.03. All unrouted traffic will require a higher function switch. Steps (1) through (12) describe the method for handling this traffic. Fig. 1, sheet 3, provides a simplified flowchart.

(1) For ***intra*** 4 function area traffic, where there is no 5—5 planned trunk group and the last choice route chain consists of two final trunk groups (5—4—5) in tandem, this traffic should route over those final trunk groups via the 4 function.

(2) For ***inter*** 4 function area traffic, if no candidate trunk groups are already planned between the two function 4 areas and the total load is not sufficient for any planned trunk groups, hold this traffic for function 3 routing. This quick test is designed to bypass a detailed analysis of all potential trunk groups between the areas.

(3) For other situations, plan a 2-way trunk group between the 4 functions if one has not already been planned. Route over it the 2-way function 5 traffic (if any) between the two switching systems. If the switching systems cannot accommodate 2-way trunks, plan one-way trunk groups in each direction and route the traffic accordingly. In a 2-level network, these would be final trunk groups already established.

(4) For any 5—4 function trunk groups already planned (either as a preestablished trunk group or from a previous step in this procedure), route all unrouted one-way traffic to the 4 function over them.

(5) Determine if there is enough unrouted traffic, in total, to support any additional trunking between the two function 4 areas. If so, proceed to step (6). If there is not enough load to support additional trunking, proceed to step (8).

(6) For switching systems able to handle routing and trunking, determine if there is sufficient load to support 5—4 function trunk groups on the basis of 2-way 5 function (one-way 5 function if trunk groups are one-way) and one-way 5—4 function traffic. Plan the trunk groups with sufficient load and route the traffic accordingly. These trunk groups may be two-way or one-way, but this is determined independently of this procedure. See TFP Division G, Section 3-f.

(7) After evaluating all 5—4 function possibilities per step 6, evaluate other 5—4 function trunk groups on the basis of 2-way 5←→4 function traffic if the switching systems can handle 2-way trunks. This requires a sequential test of potential trunk group candidates. The traffic grouping and 2-way interdependency rules discussed in TFP Division G, Section 3-e(2) must be observed. Plan the trunk groups with sufficient loads and route the traffic accordingly.

(8) Determine if there is a one-switch alternate route path for each class 5—class 5 planned trunk group. If not, plan one of the missing link trunk groups in accordance with the test sequence in the 2-way interdependency rule, and route traffic as outlined in step (6), or in step (10) if the added trunk group is one-way 4→5.

(9) After completing steps (1) through (8), if any traffic has been routed in one direction only, follow the same route in the opposite direction if the trunk groups involved are 2-way.

(10) Determine if there is enough unrouted traffic to support 4—5 function trunk groups,

based on the one-way 4→5 function traffic. Plan those trunk groups with sufficient load and route the traffic accordingly. Note that these 4—5 trunk groups should result only if limitations prevent establishing 5—4 function trunk groups on a 2-way basis as outlined in step (7).

(11) Any remaining unrouted traffic should route over the 4—4 function trunk group.

(12) The next 4—4 function combination is then examined per steps 2 through 11 and, when all combinations have been examined, the function 3 routing provides procedures for routing the remaining unrouted traffic.

Note that all 2-level network configurations should be complete when all 4—4 function combinations have been examined.

SWITCHING FUNCTION 3 ROUTING (Third Level of Switching)

2.05 Following are the sequential steps to be followed in switching function 3 routing. These steps are designed to determine candidate trunk groups based on loads accumulated by utilizing switching function 3, and to determine routing for all traffic not requiring a higher level of concentration. Note that this routing covers the 3 function even though a switching system may also perform a higher switching function. Switching systems performing a 3 function will often also perform 4 and, occasionally, 5 functions, and candidate trunk groups utilizing those functions will have been planned as outlined in 2.03 and 2.04. All unrouted traffic will require switching at a 3 or higher function. Steps (1) through (11) describe how to handle this traffic. Fig. 1, sheet 4, provides a simplified flowchart.

(1) For ***intra*** 3 function area traffic where there is no class 4—class 4 planned trunk group, traffic should route via the 3 function.

(2) For ***inter*** 3 function area traffic, if no candidate trunk groups are already planned between the two function 3 areas and the total load is not sufficient for any planned trunk groups, hold traffic for function 2 routing. This quick test is designed to bypass a detailed analysis of all potential trunk groups between the areas.

(3) For other situations, plan a 3—3 function trunk group if one has not already been planned and route over it the 2-way function 4 traffic.

(4) For any 5—3 and 4—3 function trunk groups already planned (either as preestablished trunk groups or from a previous step in this discipline), route all unrouted one-way traffic to the function 3 over them.

(5) Determine if there is enough unrouted traffic, in total, to support any additional trunking between the two function 3 areas. If so, proceed to step (6). If there is not enough load to support additional trunking, proceed to step (8).

(6) For switching systems able to handle routing and trunking, determine if there is sufficient load to support 4—3 function trunk groups on the basis of the two-way 4 function traffic and one-way 4→3 function traffic. Plan the trunk groups with sufficient load and route the traffic accordingly.

(7) After evaluating all 4—3 function possibilities per step (6), evaluate other 4—3 function trunk groups on the basis of the 2-way function 4 traffic and 2-way 4←→3 function traffic. This requires a sequential test of potential trunk group candidates. The traffic grouping and 2-way interdependency rules discussed in TFP Division G, Section 3-e(2) must be observed. Plan the trunk groups with sufficient load and route the traffic accordingly.

(8) Determine if there is a one-switch alternate route path for each class 4—class 4 and class 4—class 3 planned trunk group. If not, provide one of the missing link trunk groups in accordance with the test sequence in the 2-way interdependency rule and route traffic as outlined in step (6).

(9) After completing steps (1) through (8), if any traffic has been routed in one direction only, follow the same route in the opposite direction.

(10) Any remaining unrouted traffic should route over the 3—3 function trunk group.

(11) The next 3—3 function combination is then examined per steps (2) through (10) and,

when all combinations have been examined, the function 2 routing provides the procedures for routing remaining unrouted traffic.

SWITCHING FUNCTION 2 ROUTING (Fourth Level of Switching)

2.06 Following are the sequential steps to be followed in switching function 2 routing. These steps are designed to determine candidate trunk groups, based on loads accumulated by utilizing switching function 2, and to determine routing for all traffic not requiring a higher level of concentration. Note that this routing covers the 2 function even though a switching system may also perform a higher switching function. Switching systems performing a 2 function will often also perform 4 and 3 functions, and candidate trunk groups utilizing those functions will have been planned as outlined in 2.04 and 2.05. All unrouted traffic will require switching at a 2 or higher function. Steps 1 through 11 below describe how to handle this traffic. Fig. 1, sheet 5, provides a simplified flowchart.

(1) For ***intra*** 2 function area traffic where there is no class 3—class 3 planned trunk group, traffic should route via the 2 function.

(2) For ***inter*** 2 function area traffic, if no candidate trunk groups are already planned between the two function 2 areas and the total load is not sufficient for any trunk groups, hold this traffic for function 1 routing. This quick test is designed to bypass a detailed analysis of all potential trunk groups between the areas.

(3) For other situations, plan a 2—2 function trunk group, if one has not already been planned, and route over it the 2-way 4 and 3 function traffic.

(4) For any 5—2, 4—2, and 3—2 function trunk groups already planned (either as preestablished trunk groups or from a previous step in this discipline), route all unrouted one-way traffic to the 2 function over them.

(5) Determine if there is enough unrouted traffic, in total, to support any additional trunking between the two function 2 areas. If so, proceed to step (6). If there is not enough load to support additional trunking, proceed to step (8).

(6) For switching systems able to handle routing and trunking, determine if there is sufficient load to support 3—2 function trunk groups on the basis of the 2-way function 4 and 3 traffic and the one-way 3→2 function traffic. Plan the trunk groups with sufficient load and route the traffic accordingly.

(7) After evaluating all 3—2 function trunk group possibilities per step (6), test for additional 3—2 function trunk groups on the basis of 2-way function 4 and 3 traffic and 2-way 3←→2 function traffic. This requires a sequential test of potential trunk group candidates. The traffic grouping and 2-way interdependency rules must be observed. Plan the trunk groups with sufficient load and route the traffic accordingly.

(8) Determine if there is a one-switch alternate route path for each class 3—class 3 and class 3—class 2 planned trunk group. If not, provide one of the missing link trunk groups in accordance with the test sequence in the 2-way interdependency rule and route traffic as outlined in step (6).

(9) After completing steps (1) through (8), if any traffic has been routed in one direction only, follow the same route in the opposite direction.

(10) Any remaining unrouted traffic should route over the 2—2 function trunk group.

(11) The next 2—2 function combination is then examined per steps (2) through (10) and, when all combinations have been examined, the function 1 routing provides procedures for routing the remaining unrouted traffic.

SWITCHING FUNCTION 1 ROUTING (Fifth Level of Switching)

2.07 Following are the sequential steps to be followed in switching function 1 routing. These steps are designed to determine candidate trunk groups, based on loads accumulated by utilizing switching function 1, and to determine routing for all traffic requiring this level of concentration. This section is written on the basis that this is the highest level of concentration needed to route any traffic item and that all class 1 switching systems are interconnected by final trunk

groups. Class 1 switching systems will often also perform 4, 3, and 2 functions, and candidate trunk groups using those functions will have been planned as outlined in 2.04, 2.05, and 2.06. All unrouted traffic will require a switch at a class 1 switching system. Steps (1) through (9) describe how to handle this traffic. Fig. 1, sheet 6, provides a simplified flowchart.

(1) For ***intra*** 1 function area traffic, where there is no class 2—class 2 planned trunk group, traffic should route via the 1 function.

(2) For ***inter*** 1 function area traffic, for any 5—1, 4—1, 3—1 and 2—1 function trunk groups already planned (either as preestablished trunk groups or from a previous step in this discipline), route all unrouted one-way traffic to the 1 function over them.

(3) Determine if there is enough unrouted traffic, in total, to support any additional trunking between the two function 1 areas. If so, proceed to step (4). If there is not enough load to support additional trunking, proceed to step (6).

(4) For switching systems able to handle routing and trunking, determine if there is sufficient load to support 2—1 function trunk groups on the basis of the 2-way 4, 3, and 2 function traffic and the one-way 2→1 function traffic. Plan the trunk groups with sufficient load and route the traffic accordingly.

(5) After evaluating all 2—1 function trunk group possibilities per step (4), test for additional 2—1 function trunk groups on the basis of the 2-way 4, 3, and 2 function traffic and the 2-way 2←→1 function traffic. This requires a sequential test of potential trunk group candidates. The traffic grouping and 2-way interdependency rules must be observed. Plan the trunk groups with sufficient load and route the traffic accordingly.

(6) Determine if there is a one-switch alternate route path for each class 2—class 2 planned trunk group. If not, provide one of the missing link trunk groups in accordance with the test sequence in the 2-way interdependency rule and route traffic as outlined in step (4).

(7) After completing steps (1) through (6), if any traffic has been routed in one direction only, follow the same route in the opposite direction.

(8) Any remaining unrouted traffic should route over the 1—1 function trunk group.

(9) The next 1—1 function combination is then examined per steps (2) through (8) and, when all combinations have been examined, all traffic should have been routed.

3. LOAD ACCUMULATION—ILLUSTRATIVE EXAMPLES

CANDIDATE TRUNK GROUP IDENTIFICATION—TWO LEVEL NETWORK

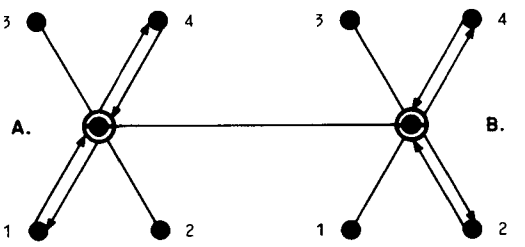
3.01 Determine candidate trunk groups between the two Class 4 areas given the following information:

(1) Point-to-Point Loads:

	TO				
From	B	B1	B2	B3	B4
A	160	140	50	20	100
A1	100	150	20	100	50
A2	150	300	20	50	50
A3	50	10	20	20	10
A4	20	20	20	50	200

	TO				
From	A	A1	A2	A3	A4
B	200	120	100	50	50
B1	100	50	50	20	50
B2	10	10	10	10	60
B3	20	10	30	20	30
B4	20	20	20	20	100

(2) Homing Arrangement:



(3) Candidate trunk group justification load = 200.

(4) No preestablished trunk groups or prerouted traffic.

(5) Switching systems A1, A4, B2, and B4 can only handle one-way trunks. There are no other trunking or routing limitations.

(6) No trunk groups are already planned for service in this time frame.

(7) All traffic is within a single NPA, so NPA codes are not relevant.

3.02 Initial Action—

Plan final trunk group A—B load = 360.

PROBLEM SOLUTION

Step 1—Switching Function 5 Routing

3.03 Following are candidate trunk groups based on function 5 loads:

TRUNK GROUP	ITEMS	LOAD
A ↔ B1	A → B1, B1 → A	240
A2 ↔ B	A2 → B, B → A2	250
A2 ↔ B1	A2 → B1, B1 → A2	350
A4 → B4	A4 → B4	200

Step 2—Switching Function 4 Routing

3.04 For any 5—4 function trunk groups already planned, route remaining traffic one-way to 4 function over them.

	LOAD
A ↔ B1 add B1 → A1, A3, A4	+120
A2 ↔ B add A2 → B2, B3, B4	+120

(a) Test for additional 5—4 function trunk groups on the basis of 2-way function 5 traffic plus one-way 5→4 function traffic.

TRUNK GROUP	ITEMS	LOAD
A1 → B	A1 → B, B1, B2, B3, B4	420

(b) Test for ***potential*** candidate 5—4 function trunk groups on the basis of two-way 5←→4 function traffic for switching systems able to handle two-way trunking and routing.

POTENTIAL TRUNK GROUP	ITEMS	LOAD
A3 → B, B1, B2, B3, B4 + B, B2, B3, B4 → A3		210
B3 → A, A1, A2, A3, A4 + A, A3, A4 → B3		200

(c) There is interdependent duplicate routing of A3←→B3. Removal of this duplicate routing, following the traffic grouping rule, would cause each trunk group to drop out; therefore, only one is justified. To determine which, sequence-test against the following criteria.

TEST	RESULT
Trunk Group in previous planning	Neither
Class of tandem	Both are 4
Amount of load	A3 ↔ B 210

Therefore, eliminate B3←→A and retain A3←→B.

(d) Is there a one-switch alternate route for each 5—5 trunk group? There is not one for A4→B4, so plan A→B4 and route the following over it.

TRUNK GROUP	ITEMS	LOAD
A → B4	A → B4	100

(e) If any traffic has been routed in one direction only, follow the same route in the opposite direction if trunk groups are 2-way.

TRUNK GROUP	ITEMS ADDED	LOAD
A2 ↔ B	B2, B3, B4 → A2	+60

(f) Determine if any 4→5 function trunk group candidates are justified by 4→5 function load.

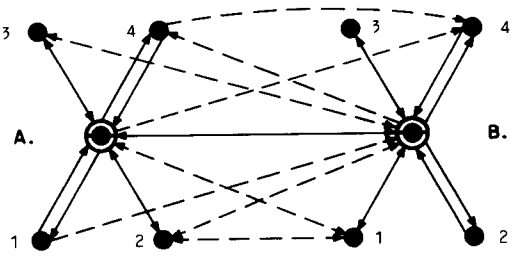
TRUNK GROUP	ITEMS	LOAD
B → A4	B, B2, B3, B4 → A4	240

(g) Route any remaining traffic over the 4—4 trunk group.

TRUNK GROUP	ITEMS ADDED	LOAD
A ↔ B	A → B2, B3	+70
	A4 → B, B1, B2, B3	+110
	B → A1	+120
	B2 → A, A1	+20
	B3 → A, A1	+30
	B4 → A, A1	+40
	Total	+390

SUMMARY—CANDIDATE TRUNK GROUPS AND LOADS:

A ↔ B	360 + 390	= 750
A ↔ B1	240 + 120	= 360
A2 ↔ B	250 + 120 + 60	= 430
A2 ↔ B1	350	= 350
A4 → B4	200	= 200
A1 → B	420	= 420
A3 ↔ B	210	= 210
A → B4	100	= 100
B → A4	240	= 240
	Total	3060



CANDIDATE TRUNK GROUP IDENTIFICATION—FIVE-LEVEL NETWORK

3.05 Determine candidate trunk groups between the two regions, given the following information:

(a) Point-to-point loads as shown in Fig. 2.

(b) Homing arrangement as shown in Fig. 3.

(c) Candidate trunk group justification load = 200.

(d) No preestablished trunk groups or prerouted traffic.

(e) No trunking or routing limitations.

(f) No trunk groups in previous planning.

(g) All traffic to be served within the hierarchy.

(h) No EOT trunking is warranted.

PROBLEM SOLUTION

Step 1—Switching Function 4 Routing

3.06 Following are candidate trunk groups based on the function 4 loads:

AA—ZA	200
ABB2—ZOA1	200
A1—Z	200
AOA—ZOA	200

Note: No end-office trunking is warranted per the initial assumptions, so most of the steps within the switching function 4 procedures are not required. The equivalent steps are generally illustrated in the switching function 3 procedures.

Step 2—Switching Function 3 Routing

3.07 All loads should be accumulated by switching function 3 areas and all 3—3 combinations examined, one at a time, to see which candidate trunk groups are justified and how the traffic shall be routed.

3.08 Examining combinations one at a time produces the following results:

(a) AAA Function 3 Area

(1) AAA—ZAA

- There are no trunk groups already planned, so plan the AAA—ZAA trunk group and route the function 4 traffic over it.
- No additional trunk groups are justified on the basis of two-way 4 ***plus*** one-way 4→3 function traffic.
- A trunk group is justified AAA1—ZAA on the basis of a two-way 4←→3 function load of 240.
- The AAA1—ZAA trunk group has a one-switch alternate route path, and no traffic has been routed in one direction only.
- All remaining traffic should route AAA—ZAA.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZAA	300
AAA1 — ZAA	240

(2) AAA—ZAB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(3) AAA—ZA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(4) AAA—ZBA

- There are no trunk groups already planned, so plan the AAA—ZBA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AAA—ZBA.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZBA	340

(5) AAA—ZBB

- There are no trunk groups already planned, so plan the AAA—ZBB trunk group and route the function 4 traffic over it.

- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AAA—ZBB.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZBB	240

(6) AAA—ZB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(7) AAA—ZOA

- There are no trunk groups already planned, so plan the AAA—ZOA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AAA—ZOA.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZOA	360

(8) AAA—Z

- There are no trunk groups already planned, so plan the AAA—Z trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AAA—Z.

CANDIDATE TRUNK GROUP	LOAD
AAA — Z	300

(b) AAB Function 3 Area—(There are no candidate trunk groups.)

(c) AA Function 3 Area

(1) AA—ZAA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(2) AA—ZAB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(3) AA—ZA

- A trunk group is already planned AA—ZA based on function 4 traffic.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AA—ZA.

CANDIDATE TRUNK GROUP	LOAD
AA — ZA	200 (function 4 routing) +200 (function 3 routing) 420

(4) AA—ZBA

- There are no trunk groups already planned, so plan the AA—ZBA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route AA—ZBA.

CANDIDATE TRUNK GROUP	LOAD
AA — ZBA	300

(5) AA—ZBB

• No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(6) AA—ZB

• No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(7) AA—ZOA

• No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(8) AA—Z

• There are no trunk groups already planned, so plan the AA—Z trunk group and route the function 4 traffic over it.

• No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route AA—Z.

CANDIDATE TRUNK GROUP	LOAD
AA — Z	320

(d) ABA Function 3 Area

(1) ABA—ZAA

• There are no trunk groups already planned, so plan the ABA—ZAA trunk group and route the function 4 traffic over it.

• No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route ABA—ZAA.

CANDIDATE TRUNK GROUP	LOAD
ABA — ZAA	240

(2) ABA—ZAB

• There are no trunk groups already planned, so plan the ABA—ZAB trunk group and route the function 4 traffic over it.

• No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route ABA—ZAB.

CANDIDATE TRUNK GROUP	LOAD
ABA — ZAB	240

(3) ABA—ZA

• There are no trunk groups already planned, so plan the ABA—ZA trunk group and route the function 4 traffic over it.

• No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route ABA—ZA.

CANDIDATE TRUNK GROUP	LOAD
ABA — ZA	240

(4) ABA—ZBA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(5) ABA—ZBB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(6) ABA—ZB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(7) ABA—ZOA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(8) ABA—Z

- There are no trunk groups already planned, so plan the ABA—Z trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route ABA—Z.

CANDIDATE TRUNK GROUP	LOAD
ABA — Z	200

(e) ABB Function 3 Area

(1) ABB—ZAA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(2) ABB—ZAB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(3) ABB—ZA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(4) ABB—ZBA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(5) ABB—ZBB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(6) ABB—ZB

- There are no trunk groups already planned, so plan the ABB—ZB trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route ABB—ZB.

CANDIDATE TRUNK GROUP	LOAD
ABB — ZB	320

(7) ABB—ZOA

- A trunk group is planned ABB2—ZOA1, but no trunk group is planned between the function 3 switching systems, so plan the ABB—ZOA trunk group and route the function 4 traffic over it.

- Evaluate 4—3 trunk groups on the basis of two-way function 4 plus one-way 4→3 function traffic. The ABB1—ZOA trunk group is justified on the basis of ABB1←→ZOA 120, ABB1→ZOA1 40, and ABB1→ZOA2 50 for a total load of 210.

- Evaluate additional 4—3 trunk groups on the basis of remaining two-way traffic. The following are potential candidates:

ABB — ZOA2	250
ABB2 — ZOA	220

Note: The ABB2→ZOA2 item is included in both loads and, in removing the duplication, only the ABB—ZOA2 trunk group remains justified.

- Determine if there is one switch alternate route. The ABB2—ZOA1 trunk group does not have one. This requirement can be met by providing either ABB2—ZOA or ABB—ZOA1. The remaining load for ABB2—ZOA is 100 and ABB—ZOA1 is 160, so the ABB—ZOA1 is selected.

- No traffic has been routed in one direction only, but the ABB2—ZOA item has not been routed, so it should route over the ABB—ZOA trunk group.

CANDIDATE TRUNK GROUP	LOAD
ABB2 — ZOA1	200 (Function 4 routing)
ABB1 — ZOA	210
ABB — ZOA2	250
ABB —ZOA1	160 (for AR requirements)
ABB — ZOA	220

(8) ABB—Z

- There are no trunk groups already planned, so plan the ABB—Z trunk group and route the function 4 traffic over it.

- No other trunk groups are justified by either one-way or two-way loads.

- All remaining traffic should route ABB—Z.

CANDIDATE TRUNK GROUP	LOAD
ABB — Z	200

f) AB Function 3 Area

(1) AB—ZAA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(2) AB—ZAB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(3) AB—ZA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(4) AB—ZBA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(5) AB—ZBB

- There are no trunk groups already planned, so plan the AB—ZBB trunk group and route the function 4 traffic over it.

- No other trunk groups are justified by either one-way or two-way loads.

- All remaining traffic should route AB—ZBB.

CANDIDATE TRUNK GROUP	LOAD
AB — ZBB	280

(6) AB—ZB

- There are no trunk groups already planned, so plan the AB—ZB trunk group and route the function 4 traffic over it.

- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AB—ZB.

CANDIDATE TRUNK GROUP	LOAD
AB — ZB	260

(7) AB—ZOA

- There are no trunk groups already planned, so plan the AB—ZOA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AB—ZOA.

CANDIDATE TRUNK GROUP	LOAD
AB — ZOA	300

(8) AB—Z

- There are no trunk groups already planned, so plan the AB—Z trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AB—Z.

CANDIDATE TRUNK GROUP	LOAD
AB — Z	280

(g) AOA Function 3 Area

(1) AOA—ZAA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(2) AOA—ZAB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(3) AOA—ZA

- There are no trunk groups already planned, so plan the AOA—ZA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AOA—ZA.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZA	200

(4) AOA—ZBA

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(5) AOA—ZBB

- No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(6) AOA—ZB

- There are no trunk groups already planned, so plan the AOA—ZB trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route AOA—ZB.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZB	280

(7) AOA—ZOA

- A trunk group is already planned AOA—ZOA based on function 4 traffic.

- No other trunk groups are justified by either one-way or two-way traffic.
- All remaining traffic should route AOA—ZOA.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZOA	200 (Function 4 routing) +300 (Function 3 routing) 500 Total

(8) AOA—Z

- There are no trunk groups already planned, so plan the AOA—Z trunk group and route the function 4 traffic over it.
- There is not enough load based on two-way function 4 plus one-way function 3 traffic to justify additional trunk groups.
- There is enough load two-way between AOA←→Z1 for a trunk group, so plan it and route the traffic accordingly.
- There is a one-switch alternate route for AOA—Z1 and no traffic has been routed in one direction only.
- All remaining traffic should route AOA—Z.

CANDIDATE TRUNK GROUP	LOAD
AOA — Z1	220
AOA — Z	220

(h) A Function 3 Area

(1) A—ZAA

- There are no trunk groups already planned, so plan the A—ZAA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route A—ZAA.

CANDIDATE TRUNK GROUP	LOAD
A — ZAA	300

(2) A—ZAB

- There are no trunk groups already planned, so plan the A—ZAB trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route A—ZAB.

CANDIDATE TRUNK GROUP	LOAD
A — ZAB	300

(3) A—ZA

- There are no trunk groups already planned, so plan the A—ZA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route A—ZA.

CANDIDATE TRUNK GROUP	LOAD
A — ZA	240

(4) A—ZBA

- There are no trunk groups already planned, so plan the A—ZBA trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.
- All remaining traffic should route A—ZBA.

CANDIDATE TRUNK GROUP	LOAD
A — ZBA	420

(5) A—ZBB

- There are no trunk groups already planned, so plan the A—ZBB trunk group and route the function 4 traffic over it.
- No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route A—ZBB.

CANDIDATE TRUNK GROUP	LOAD
A — ZBB	320

(6) A—ZB

• No trunk groups are planned and none are justified by the total 3—3 function load. Hold this traffic for the function 2 routing module.

(7) A—ZOA

• There are no trunk groups already planned, so establish the A—ZOA trunk group and route the function 4 traffic over it.

• No other trunk groups are justified by either one-way or two-way loads.

• All remaining traffic should route A—ZOA.

CANDIDATE TRUNK GROUP	LOAD
A — ZOA	360

(8) A—Z

• There is a planned trunk group A1—Z based on function 4 routing, so the A1→Z1 item should route over it. The A—Z trunk group is a final trunk group, planned as a part of the initial action carrying the A—Z function 4 traffic.

• No other trunk groups are justified by either one-way or two-way loads.

• The A1—Z1 item has been routed in one direction only, so follow the same route in the opposite direction.

• All remaining traffic should route A—Z.

CANDIDATE TRUNK GROUP	LOAD
A1 — Z	200 (function 4 routing) +100 (function 3 routing) 300 Total
A — Z	100 (Final group routing) +100 (function 3 routing) 200 Total

Step 3—Switching Function 2 Routing

3.09 The first action in switching function 2 routing is to examine each function 2 area combination to see which trunk groups have already been planned as a part of 4 and 3 function routing. The next action is to see if the unrouted load may justify additional candidate trunk groups. They should be examined one at a time as follows:

(a) AA Function 2 Area

(1) AA—ZA

• A trunk group is already planned AA—ZA, but there are no other trunk groups to the function 2 switching systems.

• Evaluate additional 3—2 trunk groups on the basis of two-way 4 and 3 function traffic plus one-way 3→2 function traffic. The following are candidates:

AAA — ZA	190 + 60 = 250
AAB — ZA	120 + 150 = 270
AA — ZAA	180 + 90 = 270
AA — ZAB	90 + 120 = 210

• All possible 3—2 trunk groups have been planned and all traffic has been routed.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZAA	300 (function 3 routing)
AAA1 — ZAA	240 (function 3 routing)
AA — ZA	200 (function 4 routing) +220 (function 3 routing) + 0 (function 2 routing) 420 Total
AAA — ZA	250
AAB — ZA	270
AA — ZAA	270
AA — ZAB	210

(2) AA—ZB

• There is no trunk group AA—ZB, so plan one and route the two-way function 3 traffic over it.

• There is a planned trunk group AA—ZBA, based on function 3 routing, so route the remaining one-way 3→2 function traffic over it.

- Evaluate additional 3—2 trunk groups on the basis of two-way function 3 traffic plus one-way 3→2 function traffic. None are justified.

- Evaluate additional 3—2 trunk groups on the basis of two-way 3←→2 traffic. None are justified.

- Determine if there is a one-switch alternate route for all 3—3 trunk groups. None exists for AAA—ZBB. This requirement can be met by AAA—ZB 140 or AA—ZBB 150, so plan AA—ZBB.

- The AAB←ZBA function 3 traffic has been routed in one direction only, so follow the same route AAB → ZBA.

- The remaining traffic should route over the AA—ZB trunk group.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZBA	340 (function 3 routing)
AAA — ZBB	240 (function 3 routing)
AA — ZBA	300 (function 3 routing) +50 (function 2 routing) 350 Total
AA — ZBB	150
AA — ZB	340

(3) AA—Z

- A trunk group is already planned AA—Z based on function 3 routing. There are also trunk groups AAA—ZOA and AAA—Z based on function 3 routing.

- No additional trunk groups are justified by either one-way or two-way loads.

- There is one-switch alternate route for all 3—3 trunk groups and no traffic has been routed one-way only.

- All remaining traffic should route over the AA—Z trunk group.

CANDIDATE TRUNK GROUP	LOAD
AAA — ZOA	360 (function 3 routing)
AAA — Z	300 (function 3 routing)
AA — Z	320 (function 3 routing) +300 (function 2 routing) 620 Total

(b) AB Function 2 Area

(1) AB—ZA

- There is no trunk group already planned AB—ZA, so plan one and route the two-way function 3 traffic over it.

- Evaluate additional 3—2 trunk groups on the basis of two-way 4 and 3 function traffic plus one-way function 2 traffic. ABB—ZA is justified for a load of 210.

- No other trunk groups are justified on the basis of either one-way or two-way loads.

- There is a one-switch alternate route for all 3—3 trunk groups.

- The ABB—ZAA and ABB—ZAB function 3 traffic has been routed one-way over the ABB—ZA trunk group, so follow the same route in the opposite direction.

- The remaining traffic AB←→ZAA and AB←→ZAB should route over the AB—ZA trunk group.

CANDIDATE TRUNK GROUP	LOAD
ABA — ZAA	240 (function 3 routing)
ABA — ZAB	240 (function 3 routing)
ABA — ZA	240 (function 3 routing)
ABB — ZA	300
AB — ZA	300

(2) AB—ZB

- A trunk group is already planned AB—ZB, based on function 3 routing.

- There is a planned trunk group ABB—ZB, so route the remaining 3→2 function traffic over it. There is also a planned trunk group AB—ZBB, so route the remaining 3→2 function traffic over it.

- Evaluate additional 3—2 trunk groups on the basis of two-way 4 and 3 function traffic plus one-way function 2 traffic.

ABA — ZB	160 + 180 = 340
AB — ZBA	120 + 135 = 255

- All possible trunk groups have been planned.

CANDIDATE TRUNK GROUP	LOAD
ABA — ZB	340
ABB — ZB	320 (function 3 routing) +120 (function 2 routing) 440 Total
AB — ZBA	255
AB — ZBB	280 (function 3 routing) +165 (function 2 routing) 445 Total
AB — ZB	260 (function 3 routing)

(3) AB—Z

- In this situation, trunk groups are already planned between the two function 2 areas and there is not enough unrouted traffic to justify any additional trunk groups.

- There is a trunk group planned ABA—Z, so route ABA→ZOA function 3 traffic one-way over it.

- There is a trunk group planned AB-ZOA, so route ABA←ZOA function 3 traffic one-way over it.

- No additional traffic remains unrouted and all 3—3 trunk groups have a one-switch alternate route.

CANDIDATE TRUNK GROUP	LOAD
ABA — Z	200 (function 3 routing) + 45 (function 2 routing) 245 Total
ABB2 — ZOA1	200 (function 4 routing)
ABB1 — ZOA	210 (function 3 routing)
ABB — ZOA2	250 (function 3 routing)
ABB — ZOA1	160 (function 3 routing)
ABB — ZOA	220 (function 3 routing)
ABB — Z	200 (function 3 routing)
AB — ZOA	300 (function 3 routing) + 45 (function 2 routing) 345 Total
AB — Z	280 (function 3 routing)

(c) A Function 2 Area

(1) A—ZA

- All possible 3—2 and 2—2 trunk groups are planned as outlined in function 3 routing.

- Route AOA→ZAA and AOA→ZAB one-way function 3 traffic over the AOA—ZA trunk group. Route AOA←ZAA one-way function 3 traffic over the A—ZAA trunk group. Route AOA←ZAB one-way function 3 traffic over the A—ZAB trunk group.

- All other traffic has been routed and all 3—3 trunk groups have a one-switch alternate route.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZA	200 (function 3 routing) +150 (function 2 routing) 350 Total
A — ZAA	300 (function 3 routing) + 90 (function 2 routing) 390 Total
A — ZAB	300 (function 3 routing) + 60 (function 2 routing) 360 Total
A — ZA	240 (function 3 routing)

(2) A—ZB

- No trunk group is already planned A—ZB, so plan one and route the two-way 4 and 3 function traffic over it.
- A trunk group is planned AOA—ZB, so route AOA→ZBA and AOA→ZBB function 3 traffic one-way over it. A trunk group is planned A—ZBA, so route the ZBA → AOA function 3 traffic one-way over it. A trunk group is planned A—ZBB, so route the ZBB→AOA function 3 traffic one-way over it.
- All traffic has been routed and a one-switch alternate route exists for all 3—3 trunk groups.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZB	280 (function 3 routing) +150 (function 2 routing) 430 Total
A — ZBA	420 (function 3 routing) + 60 (function 2 routing) 480 Total
A — ZBB	320 (function 3 routing) + 90 (function 2 routing) 410 Total
A — ZB	160

(3) A—Z

- All possible trunk groups are planned, and no traffic remains unrouted.

CANDIDATE TRUNK GROUP	LOAD
AOA — ZOA	200 (function 4 routing) +300 (function 3 routing) 500 Total
AOA — Z1	220 (function 3 routing)
AOA — Z	220 (function 3 routing)
A — ZOA	360 (function 3 routing)
A1 — Z	200 (function 4 routing) +100 (function 3 routing) 300 Total
A—Z	100 (Final group routing) +100 (function 3 routing) 200 Total

3.10 The following pages provide a summary of the solution to the routing problem. The summary consists of a listing of candidate trunk groups with total first route loads offered to each one (Fig. 4), a homing arrangement diagram showing all these trunk groups (Fig. 5), and a listing of the individual point-to-point traffic items and loads routed over each trunk group (Fig. 6).

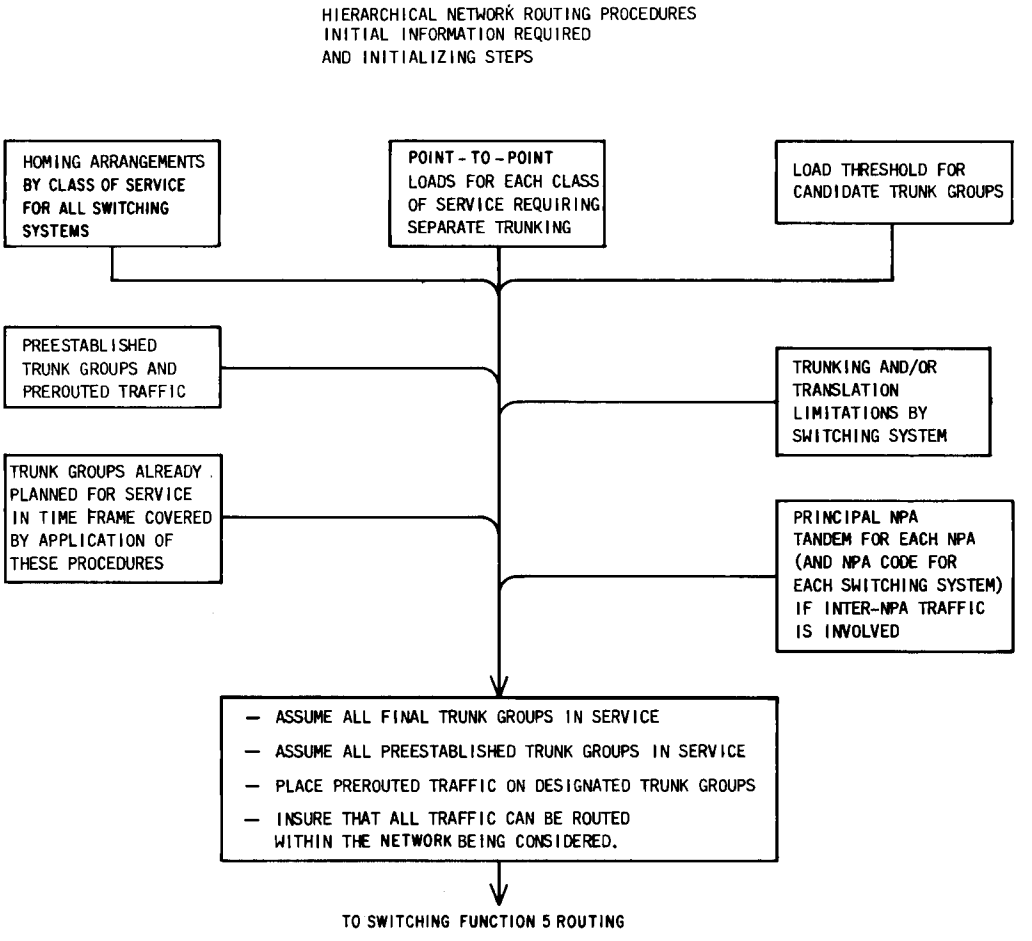


Fig. 1—Hierarchical Network Routing Procedures (Sheet 1 of 6) (2.02)

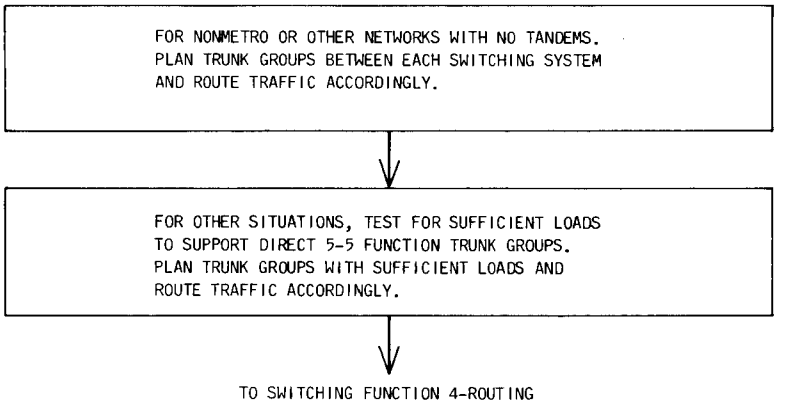


Fig. 1—Hierarchical Network Routing Procedures—Switching Function 5 Routing (Sheet 2 of 6) (2.03)

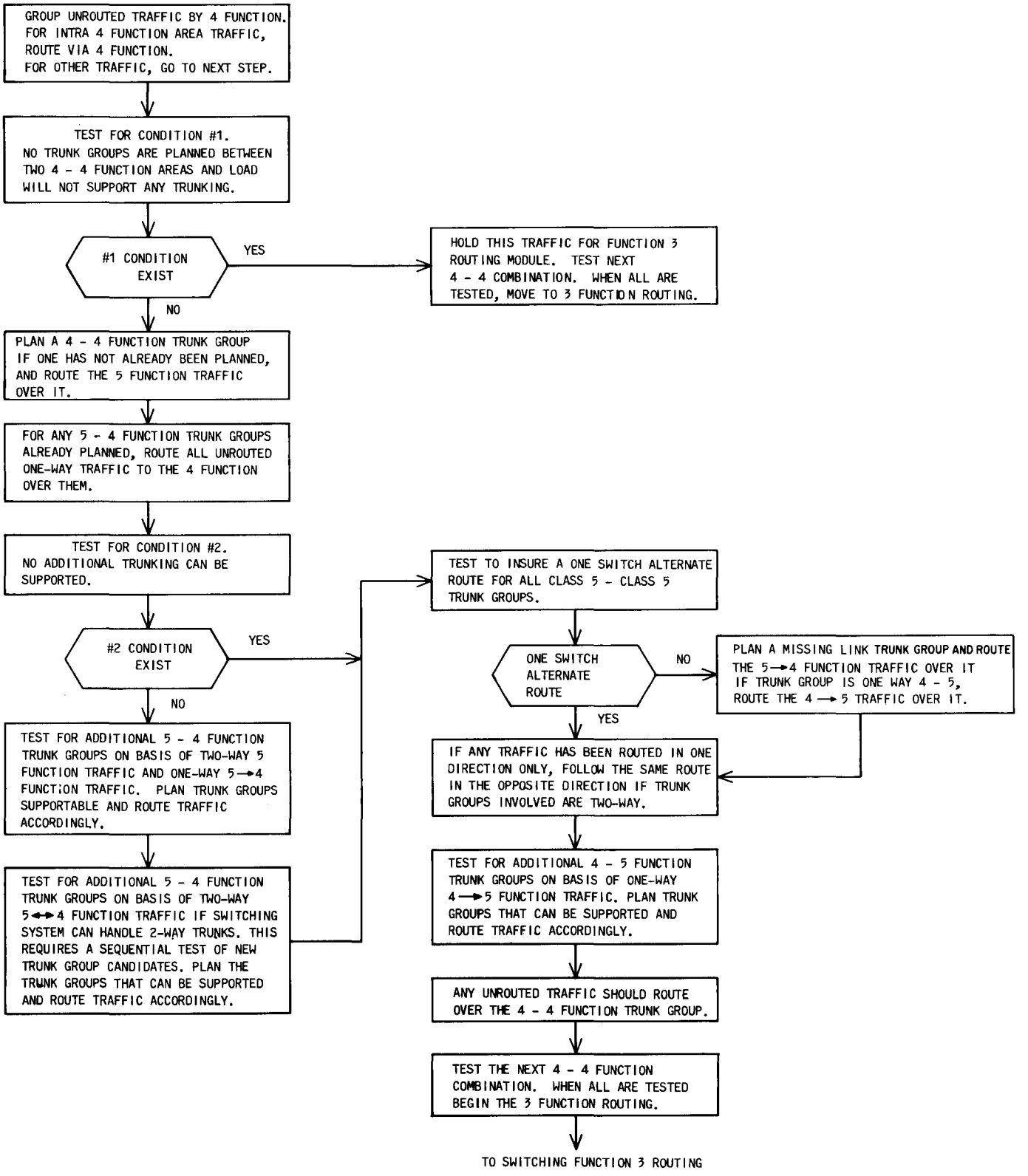


Fig. 1—Hierarchical Network Routing Procedures—Switching Function 4 Routing (Sheet 3 of 6) (2.04)

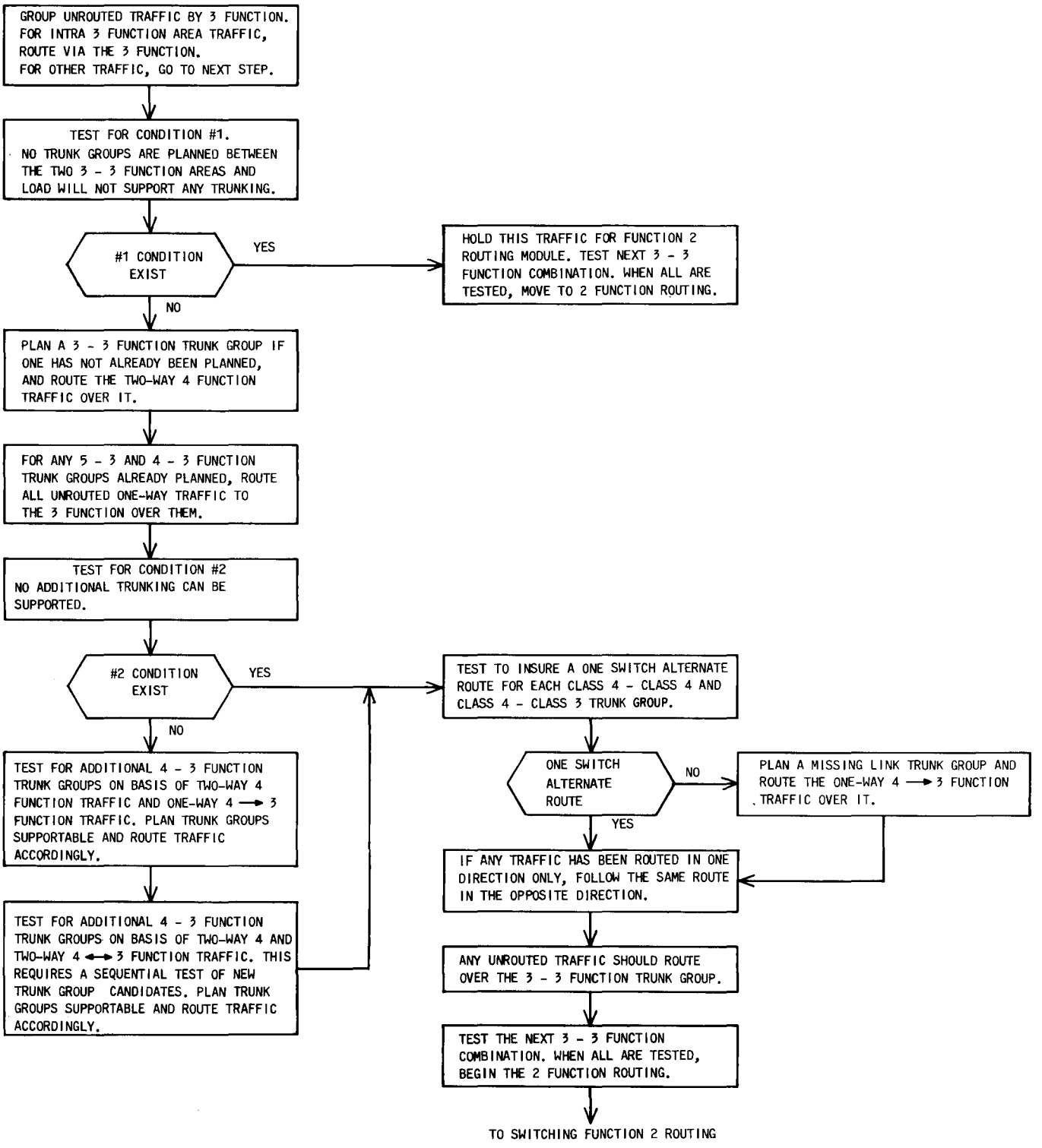


Fig. 1—Hierarchical Network Routing Procedures—Switching Function 3 Routing (Sheet 4 of 6) (2.05)

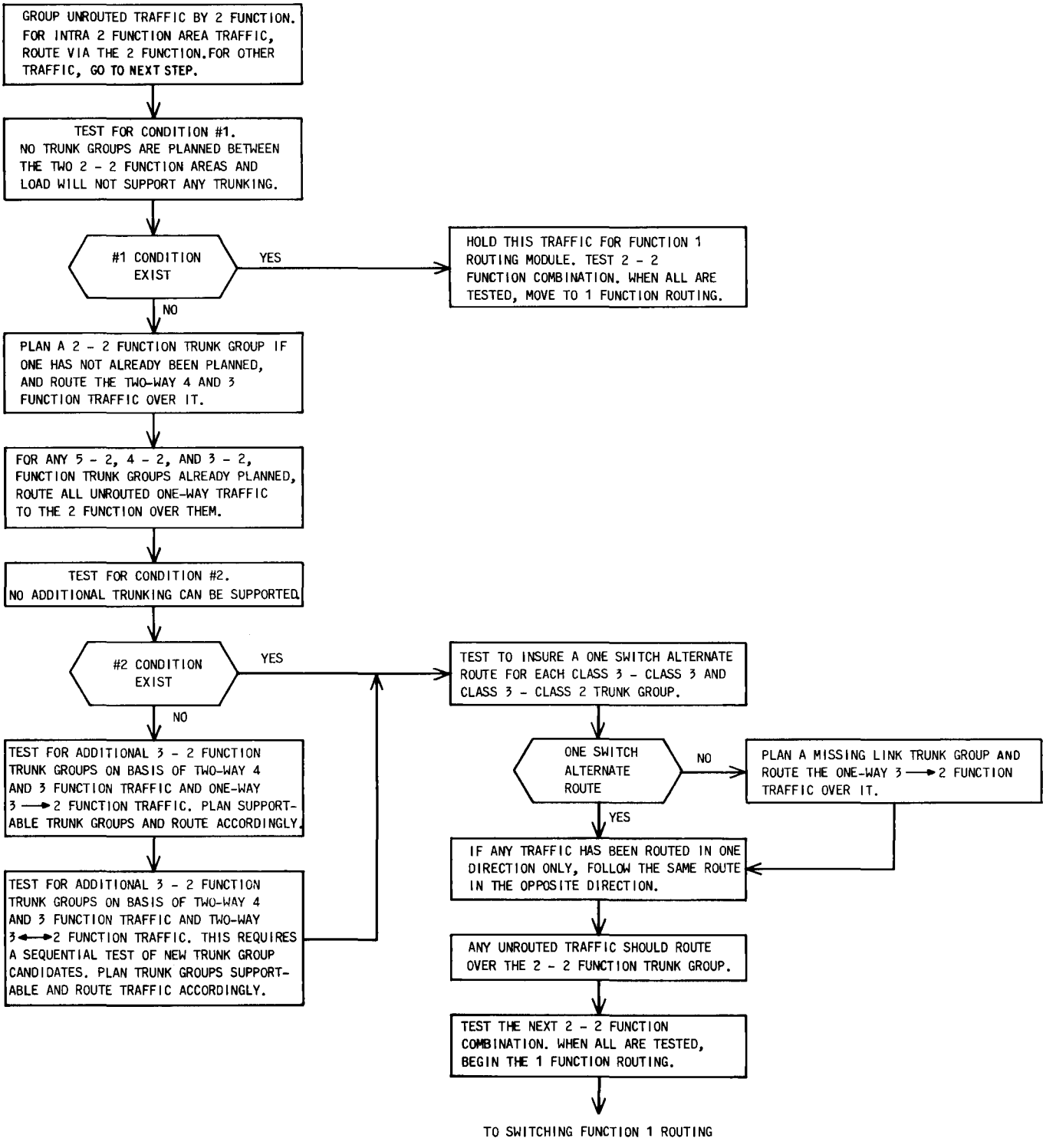


Fig. 1—Hierarchical Network Routing Procedures—Switching Function 2 Routing (Sheet 5 of 6) (2.06)

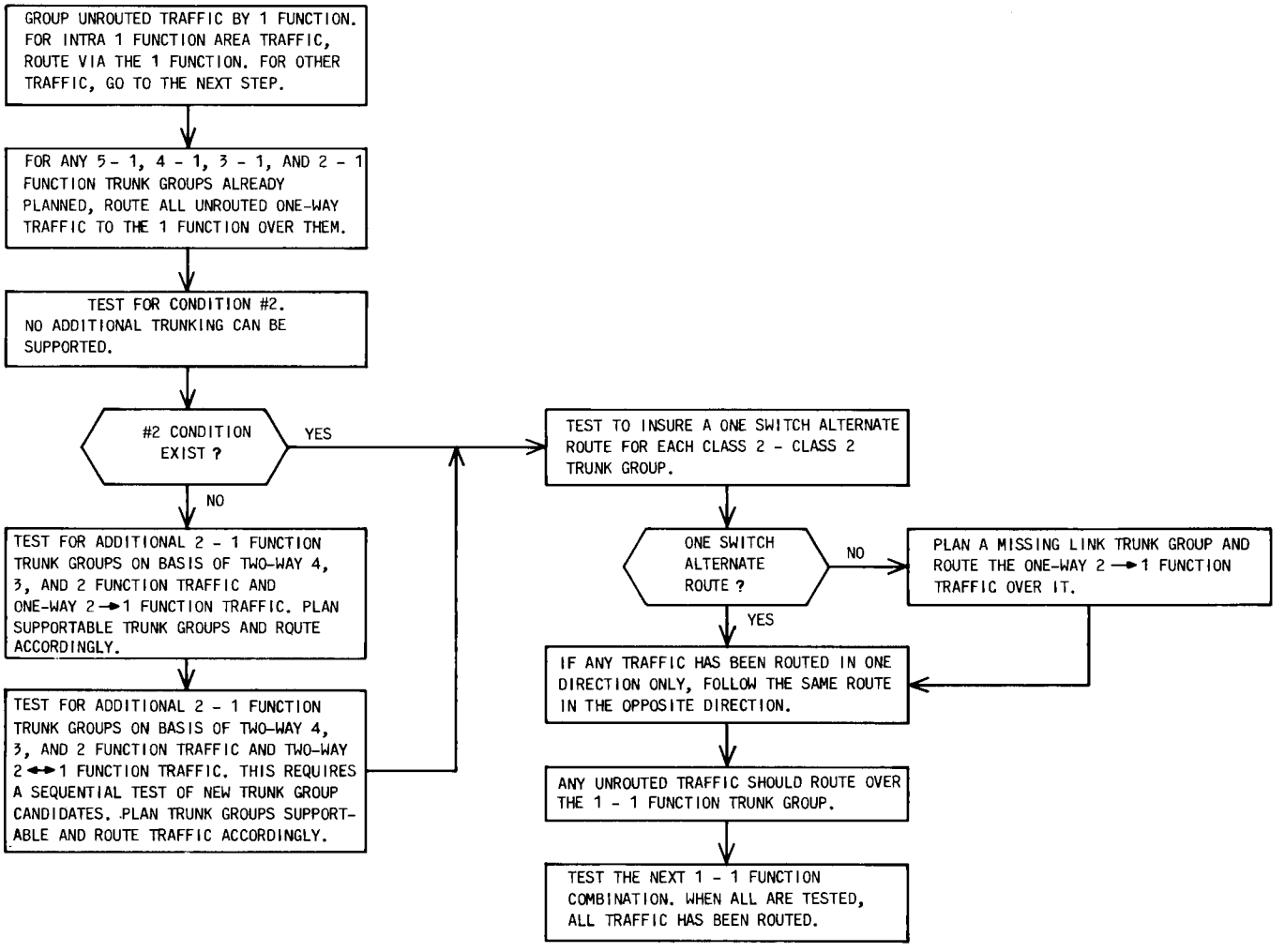


Fig. 1—Hierarchical Network Routing Procedures—Switching Function 1 Routing (Sheet 6 of 6) (2.07)

To → / From ↓	ZAA1	ZAA2	ZAA	ZAB1	ZAB2	ZAB	ZA1	ZA	ZBA1	ZBA2	ZBA	ZBB1	ZBB2	ZBB	ZB1	ZB	ZOA1	ZOA2	ZOA	Z1	Z
AAA1	30	40	50	10	5	10	5	5	10	20	30	10	10	10	10	10	10	20	30	40	50
AAA2	10	20	30	5	5	10	5	10	30	20	10	10	10	20	5	5	10	20	30	20	10
AAA	20	30	40	5	5	5	40	30	20	10	20	20	20	10	20	20	20	20	20	10	20
AAB1	10	10	10	10	5	5	10	10	5	0	5	5	5	5	5	0	5	0	5	10	10
AAB2	10	10	10	10	5	5	10	10	0	0	0	5	5	5	0	5	0	5	5	10	10
AAB	10	10	10	10	5	5	10	10	5	5	5	5	5	5	5	5	5	5	0	10	10
AA1	10	10	10	5	5	5	50	40	20	30	40	5	5	5	20	20	10	10	10	40	40
AA	20	20	20	10	10	10	20	100	20	20	20	5	5	5	20	20	10	10	10	40	40
ABA1	10	10	10	10	10	10	20	20	10	10	10	10	10	10	20	20	5	5	5	20	20
ABA2	10	10	10	10	10	10	20	20	10	10	10	10	10	10	10	10	5	5	5	10	10
ABA	20	20	20	20	20	20	20	20	10	10	10	10	10	10	10	10	5	5	5	20	20
ABB1	5	5	5	5	5	5	10	10	5	5	5	10	10	10	20	30	40	50	60	20	10
ABB2	5	5	5	5	5	5	10	10	5	5	5	5	5	5	30	20	100	60	50	10	20
ABB	5	5	5	5	5	5	10	10	5	5	5	10	10	10	30	30	60	40	60	20	20
AB1	5	5	5	10	10	10	10	10	10	10	10	20	30	30	40	40	20	20	20	40	30
AB	5	5	5	10	10	10	20	20	10	10	10	20	20	20	20	30	30	30	30	30	40
AOA1	10	10	10	5	5	5	20	20	5	5	5	10	10	10	20	20	10	10	10	40	30
AOA2	10	10	10	5	5	5	10	10	5	5	5	10	10	10	20	20	10	10	10	30	40
AOA	10	10	10	10	10	10	20	20	10	10	10	10	10	10	30	30	50	40	100	40	40
A1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	50	100
A	30	30	30	30	30	30	40	40	50	50	50	40	20	40	10	30	30	40	50	50	50

Fig. 2—Function 4 Point-to-Point Loads (Sheet 1 of 2) (3.05)

To → / From ↓	AAA1	AAA2	AAA	AAB1	AAB2	AAB	AA1	AA	ABA1	ABA2	ABA	ABB1	ABB2	ABB	AB1	AB	AOA1	AOA2	AOA	A1	A
ZAA1	30	10	20	10	10	10	10	20	10	10	20	5	5	5	5	5	10	10	10	20	30
ZAA2	40	20	30	10	10	10	10	20	10	10	20	5	5	5	5	5	10	10	10	20	30
ZAA	50	30	40	10	10	10	10	20	10	10	20	5	5	5	5	5	10	10	10	20	30
ZAB1	10	5	5	10	10	10	5	10	10	10	20	5	5	5	10	10	5	5	10	20	30
ZAB2	5	5	5	5	5	5	5	10	10	10	20	5	5	5	10	10	5	5	10	20	30
ZAB	10	10	5	5	5	5	5	10	10	10	20	5	5	5	10	10	5	5	10	20	30
ZA1	5	5	40	10	10	10	50	20	20	20	20	10	10	10	10	20	20	10	20	20	40
ZA	5	10	30	10	10	10	40	100	20	20	20	10	10	10	10	20	20	10	20	20	40
ZBA1	10	30	20	5	0	5	20	20	10	10	10	5	5	5	10	10	5	5	10	20	50
ZBA2	20	20	10	0	0	5	30	20	10	10	10	5	5	5	10	10	5	5	10	20	50
ZBA	30	10	20	5	0	5	40	20	10	10	10	5	5	5	10	10	5	5	10	20	50
ZBB1	10	10	20	5	5	5	5	5	10	10	10	10	5	10	20	20	10	10	10	20	40
ZBB2	10	10	20	5	5	5	5	5	10	10	10	10	5	10	30	20	10	10	10	20	20
ZBB	10	20	10	5	5	5	5	5	10	10	10	10	5	10	30	20	10	10	10	20	40
ZB1	10	5	20	5	0	5	20	20	20	10	10	20	30	30	40	20	20	20	30	20	10
ZB	10	5	20	0	5	5	20	20	20	10	10	30	20	30	40	30	20	20	30	20	30
ZOA1	10	10	20	5	0	5	10	10	5	5	5	40	100	60	20	30	10	10	50	20	30
ZOA2	20	20	20	0	5	5	10	10	5	5	5	50	60	40	20	30	10	10	40	20	40
ZOA	30	30	20	5	5	0	10	10	5	5	5	60	50	60	20	30	10	10	100	20	50
Z1	40	20	10	10	10	10	40	40	20	10	20	20	10	20	40	30	40	30	40	50	50
Z	50	10	20	10	10	10	40	40	20	10	20	10	20	20	30	40	30	40	40	100	50

Fig. 2—Function 4 Point-to-Point Loads (Sheet 2 of 2) (3.05)

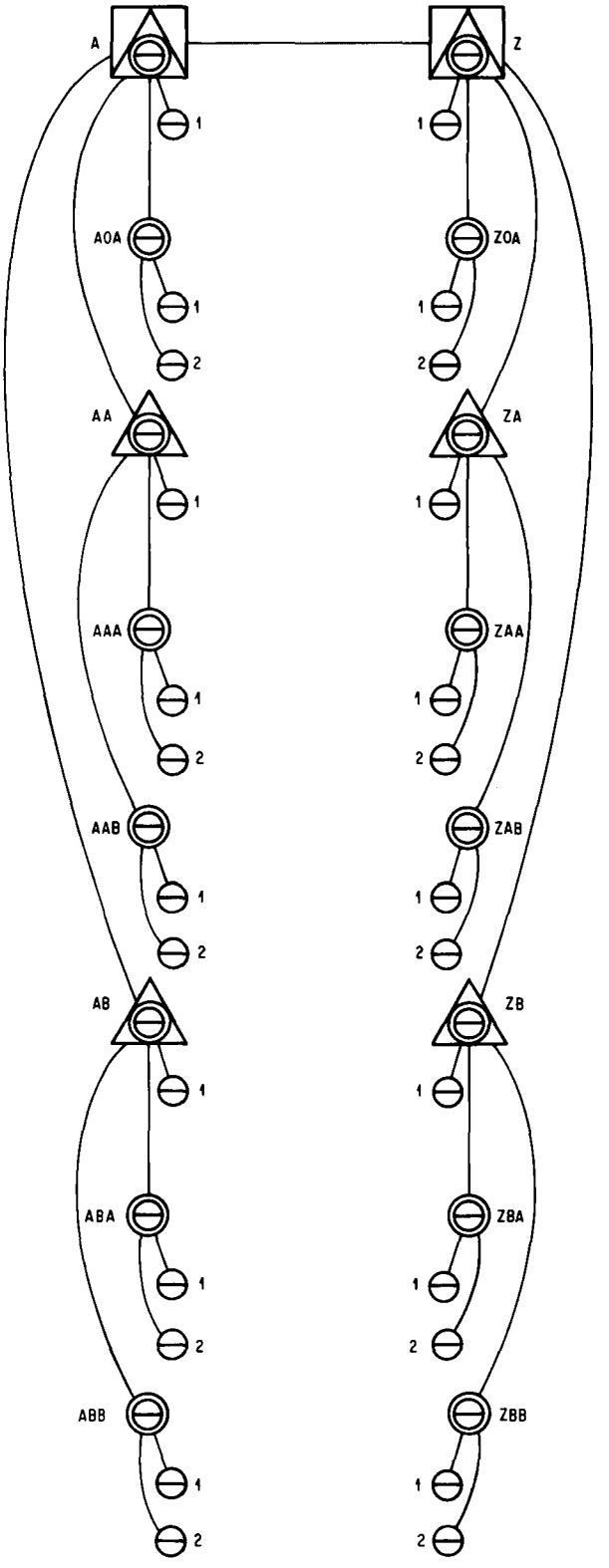


Fig. 3—Homing Arrangements (3.05)

AA — ZA	420	AA — ZB	340	AA — Z	620
AA — ZAA	270	AA — ZBA	350		
AA — ZAB	210	AA — ZBB	150	AAA — Z	300
				AAA — ZOA	360
AAA — ZA	250	AAA — ZBA	340		
AAA — ZAA	300	AAA — ZBB	240		
AAA1 — ZAA	240				
AAB — ZA	270				
AB — ZA	300	AB — ZB	260	AB — Z	280
		AB — ZBA	255	AB — ZOA	345
ABA — ZA	240	AB — ZBB	445		
ABA — ZAA	240			ABA — Z	245
ABA — ZAB	240	ABA — ZB	340		
				ABB — Z	200
ABB — ZA	300	ABB — ZB	440	ABB — ZOA	220
				ABB — ZOA1	160
				ABB — ZOA2	250
				ABB1 — ZOA	210
				ABB2 — ZOA1	200
A — ZA	240	A — ZB	160	A — Z	200
A — ZAA	390	A — ZBA	480	A — ZOA	360
A — ZAB	360	A — ZBB	410		
				A1 — Z	300
AOA — ZA	350	AOA — ZB	430	AOA — Z	220
				AOA — Z1	220
				AOA — ZOA	500

Fig. 4—Problem Solution Summary—Candidate Trunk Groups and First Route Loads (3.10)

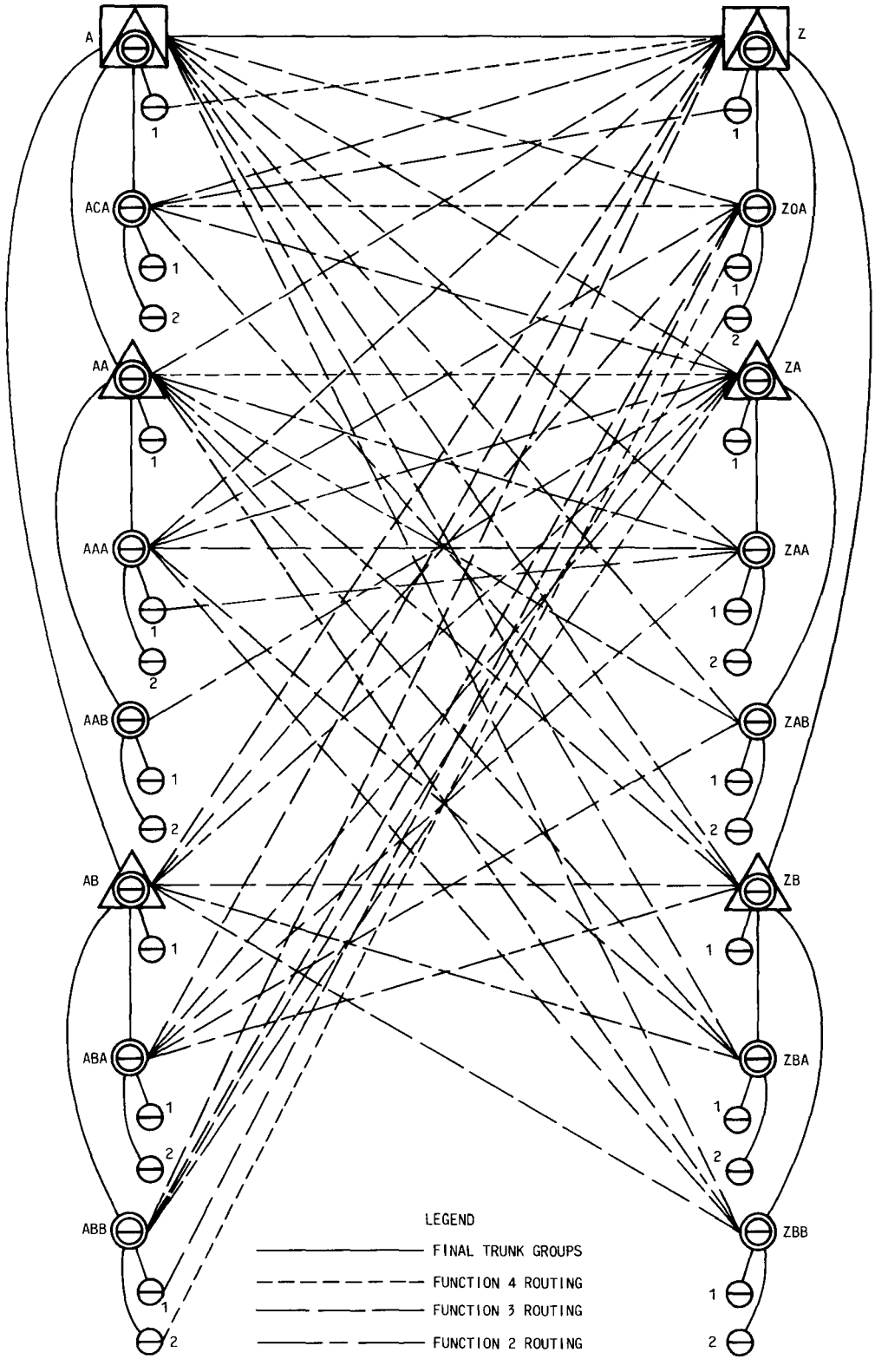


Fig. 5—Homing Arrangement Diagram with Candidate High Usage Trunk Groups (3.10)

TRUNK GROUP	ITEMS	LOAD				
A — Z	A ←→ Z	100				
(200)	A ←→ Z1	100				
A — ZOA	A ←→ ZOA	100	A1 ←→ ZOA	40		
(360)	A ←→ ZOA1	60	A1 ←→ ZOA1	40		
	A ←→ ZOA2	80	A1 ←→ ZOA2	40		
A — ZA	A ←→ ZA	80	A1 ←→ ZA	40		
(240)	A ←→ ZA1	80	A1 ←→ ZA1	40		
A — ZAA	A ←→ ZAA	60	A1 ←→ ZAA	40		
(390)	A ←→ ZAA1	60	A1 ←→ ZAA1	40		
	A ←→ ZAA2	60	A1 ←→ ZAA2	40		
	AOA ← ZAA	10	AOA1 ← ZAA	10	AOA2 ← ZAA	10
	AOA ← ZAA1	10	AOA1 ← ZAA1	10	AOA2 ← ZAA1	10
	AOA ← ZAA2	10	AOA1 ← ZAA2	10	AOA2 ← ZAA2	10
A — ZAB	A ←→ ZAB	60	A1 ←→ ZAB	40		
(360)	A ←→ ZAB1	60	A1 ←→ ZAB1	40		
	A ←→ ZAB2	60	A1 ←→ ZAB2	40		
	AOA ← ZAB	10	AOA1 ← ZAB	5	AOA2 ← ZAB	5
	AOA ← ZAB1	10	AOA1 ← ZAB1	5	AOA2 ← ZAB1	5
	AOA ← ZAB2	10	AOA1 ← ZAB2	5	AOA2 ← ZAB2	5
A — ZB	A ←→ ZB	60	A1 ←→ ZB	40		
(160)	A ←→ ZB1	20	A1 ←→ ZB1	40		

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 1 of 9) (3.10)

TRUNK GROUP	ITEMS					
A — ZBA (480)	A ↔ ZBA	100	A1 ↔ ZBA	40		
	A ↔ ZBA1	100	A1 ↔ ZBA1	40		
	A ↔ ZBA2	100	A1 ↔ ZBA2	40		
	AOA ← ZBA	10	AOA1 ← ZBA	5	AOA2 ← ZBA	5
	AOA ← ZBA1	10	AOA1 ← ZBA1	5	AOA2 ← ZBA1	5
	AOA ← ZBA2	10	AOA1 ← ZBA2	5	AOA2 ← ZBA2	5
A — ZBB (410)	A ↔ ZBB	80	A1 ↔ ZBB	40		
	A ↔ ZBB1	80	A1 ↔ ZBB1	40		
	A ↔ ZBB2	40	A1 ↔ ZBB2	40		
	AOA ← ZBB	10	AOA1 ← ZBB	10	AOA2 ← ZBB	10
	AOA ← ZBB1	10	AOA1 ← ZBB1	10	AOA2 ← ZBB1	10
	AOA ← ZBB2	10	AOA1 ← ZBB2	10	AOA2 ← ZBB2	10
A1 — Z (300)	A1 ↔ Z	200	A1 ↔ Z1	100		
AOA — Z (220)	AOA ↔ Z	80	AOA1 ↔ Z	60	AOA2 ↔ Z	80
AOA — Z1 (220)	AOA ↔ Z1	80	AOA1 ↔ Z1	80	AOA2 ↔ Z1	60
AOA — ZOA (500)	AOA ↔ ZOA	200	AOA1 ↔ ZOA	20	AOA2 ↔ ZOA	20
	AOA ↔ ZOA1	100	AOA1 ↔ ZOA1	20	AOA2 ↔ ZOA1	20
	AOA ↔ ZOA2	80	AOA1 ↔ ZOA2	20	AOA2 ↔ ZOA2	20

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 2 of 9) (3.10)

TRUNK GROUP	ITEMS					
AOA — ZA	AOA ↔ ZA	40	AOA1 ↔ ZA	40	AOA2 ↔ ZA	20
(350)	AOA ↔ ZA1	40	AOA1 ↔ ZA1	40	AOA2 ↔ ZA1	20
	AOA → ZAA	10	AOA1 → ZAA	10	AOA2 → ZAA	10
	AOA → ZAA1	10	AOA1 → ZAA1	10	AOA2 → ZAA1	10
	AOA → ZAA2	10	AOA1 → ZAA2	10	AOA2 → ZAA2	10
	AOA → ZAB	10	AOA1 → ZAB	5	AOA2 → ZAB	5
	AOA → ZAB1	10	AOA1 → ZAB1	5	AOA2 → ZAB1	5
	AOA → ZAB2	10	AOA1 → ZAB2	5	AOA2 → ZAB2	5
AOA — ZB	AOA ↔ ZB	60	AOA1 ↔ ZB	40	AOA2 ↔ ZB	40
(430)	AOA ↔ ZB1	60	AOA1 ↔ ZB1	40	AOA2 ↔ ZB1	40
	AOA → ZBA	10	AOA1 → ZBA	5	AOA2 → ZBA	5
	AOA → ZBA1	10	AOA1 → ZBA1	5	AOA2 → ZBA1	5
	AOA → ZBA2	10	AOA1 → ZBA2	5	AOA2 → ZBA2	5
	AOA → ZBB	10	AOA1 → ZBB	10	AOA2 → ZBB	10
	AOA → ZBB1	10	AOA1 → ZBB1	10	AOA2 → ZBB1	10
	AOA → ZBB2	10	AOA1 → ZBB2	10	AOA2 → ZBB2	10
AA — Z	AA ↔ Z	80	AA1 ↔ Z	80		
(620)	AA ↔ Z1	80	AA1 ↔ Z1	80		
	AAB ↔ Z	20	AAB1 ↔ Z	20	AAB2 ↔ Z	20
	AAB ↔ Z1	20	AAB1 ↔ Z1	20	AAB2 ↔ Z1	20
	AAB ↔ ZOA	0	AAB1 ↔ ZOA	10	AAB2 ↔ ZOA	10
	AAB ↔ ZOA1	10	AAB1 ↔ ZOA1	10	AAB2 ↔ ZOA1	0
	AAB ↔ ZOA2	10	AAB1 ↔ ZOA2	0	AAB2 ↔ ZOA2	10
	AA ↔ ZOA	20	AA1 ↔ ZOA	20		
	AA ↔ ZOA1	20	AA1 ↔ ZOA1	20		
	AA ↔ ZOA2	20	AA1 ↔ ZOA2	20		
AA — ZA	AA ↔ ZA	200	AA1 ↔ ZA	80		
(420)	AA ↔ ZA1	40	AA1 ↔ ZA1	100		

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 3 of 9) (3.10)

TRUNK GROUP	ITEMS					
AA — ZAA (270)	AA ↔ ZAA	40	AA1 ↔ ZAA	20		
	AA ↔ ZAA1	40	AA1 ↔ ZAA1	20		
	AA ↔ ZAA2	40	AA1 ↔ ZAA2	20		
	AAB ← ZAA	10	AAB1 ← ZAA	10	AAB2 ← ZAA	10
	AAB ← ZAA1	10	AAB1 ← ZAA1	10	AAB2 ← ZAA1	10
	AAB ← ZAA2	10	AAB1 ← ZAA2	10	AAB2 ← ZAA2	10
AA — ZAB (210)	AA ↔ ZAB	20	AA1 ↔ ZAB	10		
	AA ↔ ZAB1	20	AA1 ↔ ZAB1	10		
	AA ↔ ZAB2	20	AA1 ↔ ZAB2	10		
	AAA ← ZAB	5	AAA1 ← ZAB	10	AAA2 ← ZAB	10
	AAA ← ZAB1	5	AAA1 ← ZAB1	10	AAA2 ← ZAB1	5
	AAA ← ZAB2	5	AAA1 ← ZAB2	5	AAA2 ← ZAB2	5
	AAB ← ZAB	5	AAB1 ← ZAB	5	AAB2 ← ZAB	5
	AAB ← ZAB1	10	AAB1 ← ZAB1	10	AAB2 ← ZAB1	10
	AAB ← ZAB2	5	AAB1 ← ZAB2	5	AAB2 ← ZAB2	5
AA — ZB (340)	AA ↔ ZB	40	AA1 ↔ ZB	40		
	AA ↔ ZB1	40	AA1 ↔ ZB1	40		
	AAA ↔ ZB	40	AAA1 ↔ ZB	20	AAA2 ↔ ZB	10
	AAA ↔ ZB1	40	AAA1 ↔ ZB1	20	AAA2 ↔ ZB1	10
	AAB ↔ ZB	10	AAB1 ↔ ZB	0	AAB2 ↔ ZB	10
	AAB ↔ ZB1	10	AAB1 ↔ ZB1	10	AAB2 ↔ ZB1	0
AA — ZBA (350)	AA ↔ ZBA	40	AA1 ↔ ZBA	80		
	AA ↔ ZBA1	40	AA1 ↔ ZBA1	40		
	AA ↔ ZBA2	40	AA1 ↔ ZBA2	60		
	AAB ↔ ZBA	10	AAB1 ↔ ZBA	10	AAB2 ↔ ZBA	0
	AAB ↔ ZBA1	10	AAB1 ↔ ZBA1	10	AAB2 ↔ ZBA1	0
	AAB ↔ ZBA2	10	AAB1 ↔ ZBA2	0	AAB2 ↔ ZBA2	0

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 4 of 9) (3.10)

TRUNK GROUP	ITEMS					
AA — ZBB	AA ↔ ZBB	10	AA1 ↔ ZBB	10		
(150)	AA ↔ ZBB1	10	AA1 ↔ ZBB1	10		
	AA ↔ ZBB2	10	AA1 ↔ ZBB2	10		
	AAB ↔ ZBB	10	AAB1 ↔ ZBB	10	AAB2 ↔ ZBB	10
	AAB ↔ ZBB1	10	AAB1 ↔ ZBB1	10	AAB2 ↔ ZBB1	10
	AAB ↔ ZBB2	10	AAB1 ↔ ZBB2	10	AAB2 ↔ ZBB2	10
AAA — Z	AAA ↔ Z	40	AAA1 ↔ Z	100	AAA2 ↔ Z	20
(300)	AAA ↔ Z1	20	AAA1 ↔ Z1	80	AAA2 ↔ Z1	40
AAA — ZOA	AAA ↔ ZOA	40	AAA1 ↔ ZOA	60	AAA2 ↔ ZOA	60
(360)	AAA ↔ ZOA1	40	AAA1 ↔ ZOA1	20	AAA2 ↔ ZOA1	20
	AAA ↔ ZOA2	40	AAA1 ↔ ZOA2	40	AAA2 ↔ ZOA2	40
AAA — ZA	AAA ↔ ZA	60	AAA1 ↔ ZA	10	AAA2 ↔ ZA	20
(250)	AAA ↔ ZA1	80	AAA1 ↔ ZA1	10	AAA2 ↔ ZA1	10
	AAA → ZAB	5	AAA1 → ZAB	10	AAA2 → ZAB	10
	AAA → ZAB1	5	AAA1 → ZAB1	10	AAA2 → ZAB1	5
	AAA → ZAB2	5	AAA1 → ZAB2	5	AAA2 → ZAB2	5
AAA — ZAA	AAA ↔ ZAA	80	AAA2 ↔ ZAA	60		
(300)	AAA ↔ ZAA1	40	AAA2 ↔ ZAA1	20		
	AAA ↔ ZAA2	60	AAA2 ↔ ZAA2	40		
AAA — ZBA	AAA ↔ ZBA	40	AAA1 ↔ ZBA	60	AAA2 ↔ ZBA	20
(340)	AAA ↔ ZBA1	40	AAA1 ↔ ZBA1	20	AAA2 ↔ ZBA1	60
	AAA ↔ ZBA2	20	AAA1 ↔ ZBA2	40	AAA2 ↔ ZBA2	40

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 5 of 9) (3.10)

TRUNK GROUP	ITEMS					
AAA — ZBB	AAA ↔ ZBB	20	AAA1 ↔ ZBB	20	AAA2 ↔ ZBB	40
(240)	AAA ↔ ZBB1	40	AAA1 ↔ ZBB1	20	AAA2 ↔ ZBB1	20
	AAA ↔ ZBB2	40	AAA1 ↔ ZBB2	20	AAA2 ↔ ZBB2	20
AAA1 — ZAA	AAA1 ↔ ZAA	100				
(240)	AAA1 ↔ ZAA1	60				
	AAA1 ↔ ZAA2	80				
AAB — ZA	AAB ↔ ZA	20	AAB1 ↔ ZA	20	AAB2 ↔ ZA	20
(270)	AAB ↔ ZA1	20	AAB1 ↔ ZA1	20	AAB2 ↔ ZA1	20
	AAB → ZAA	10	AAB1 → ZAA	10	AAB2 → ZAA	10
	AAB → ZAA1	10	AAB1 → ZAA1	10	AAB2 → ZAA1	10
	AAB → ZAA2	10	AAB1 → ZAA2	10	AAB2 → ZAA2	10
	AAB → ZAB	5	AAB1 → ZAB	5	AAB2 → ZAB	5
	AAB → ZAB1	10	AAB1 → ZAB1	10	AAB2 → ZAB1	10
	AAB → ZAB2	5	AAB1 → ZAB2	5	AAB2 → ZAB2	5
AB — Z	AB ↔ Z	80	AB1 ↔ Z	60		
(280)	AB ↔ Z1	60	AB1 ↔ Z1	80		
AB — ZOA	AB ↔ ZOA	60	AB1 ↔ ZOA	40		
(345)	AB ↔ ZOA1	60	AB1 ↔ ZOA1	40		
	AB ↔ ZOA2	60	AB1 ↔ ZOA2	40		
	ABA ← ZOA	5	ABA1 ← ZOA	5	ABA2 ← ZOA	5
	ABA ← ZOA1	5	ABA1 ← ZOA1	5	ABA2 ← ZOA1	5
	ABA ← ZOA2	5	ABA1 ← ZOA2	5	ABA2 ← ZOA2	5

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 6 of 9) (3.10)

TRUNK GROUP	ITEMS					
AB — ZA (300)	AB ↔ ZA	40	AB1 ↔ ZA	20		
	AB ↔ ZA1	40	AB1 ↔ ZA1	20		
	AB ↔ ZAA	10	AB ↔ ZAB	20		
	AB ↔ ZAA1	10	AB ↔ ZAB1	20		
	AB ↔ ZAA2	10	AB ↔ ZAB2	20		
	AB1 ↔ ZAA	10	AB1 ↔ ZAB	20		
	AB1 ↔ ZAA1	10	AB1 ↔ ZAB1	20		
	AB1 ↔ ZAA2	10	AB1 ↔ ZAB2	20		
AB — ZB (260)	AB ↔ ZB	60	AB1 ↔ ZB	80		
	AB ↔ ZB1	40	AB1 ↔ ZB1	80		
AB — ZBA (255)	AB ↔ ZBA	20	AB1 ↔ ZBA	20		
	AB ↔ ZBA1	20	AB1 ↔ ZBA1	20		
	AB ↔ ZBA2	20	AB1 ↔ ZBA2	20		
	ABA ← ZBA	10	ABA1 ← ZBA	10	ABA2 ← ZBA	10
	ABA ← ZBA1	10	ABA1 ← ZBA1	10	ABA2 ← ZBA1	10
	ABA ← ZBA2	10	ABA1 ← ZBA2	10	ABA2 ← ZBA2	10
	ABB ← ZBA	5	ABB1 ← ZBA	5	ABB2 ← ZBA	5
	ABB ← ZBA1	5	ABB1 ← ZBA1	5	ABB2 ← ZBA1	5
	ABB ← ZBA2	5	ABB1 ← ZBA2	5	ABB2 ← ZBA2	5
AB — ZBB (445)	AB ↔ ZBB	40	AB1 ↔ ZBB	60		
	AB ↔ ZBB1	40	AB1 ↔ ZBB1	40		
	AB ↔ ZBB2	40	AB1 ↔ ZBB2	60		
	ABA ← ZBB	10	ABA1 ← ZBB	10	ABA2 ← ZBB	10
	ABA ← ZBB1	10	ABA1 ← ZBB1	10	ABA2 ← ZBB1	10
	ABA ← ZBB2	10	ABA1 ← ZBB2	10	ABA2 ← ZBB2	10
	ABB ← ZBB	10	ABB1 ← ZBB	10	ABB2 ← ZBB	5
	ABB ← ZBB1	10	ABB1 ← ZBB1	10	ABB2 ← ZBB1	5
	ABB ← ZBB2	10	ABB1 ← ZBB2	10	ABB2 ← ZBB2	5

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 7 of 9) (3.10)

TRUNK GROUP	ITEMS					
ABA — Z	ABA ↔ Z	40	ABA1 ↔ Z	40	ABA2 ↔ Z	20
(245)	ABA ↔ Z1	40	ABA1 ↔ Z1	40	ABA2 ↔ Z1	20
	ABA → ZOA	5	ABA1 → ZOA	5	ABA2 → ZOA	5
	ABA → ZOA1	5	ABA1 → ZOA1	5	ABA2 → ZOA1	5
	ABA → ZOA2	5	ABA1 → ZOA2	5	ABA2 → ZOA2	5
ABA — ZA	ABA ↔ ZA	40	ABA1 ↔ ZA	40	ABA2 ↔ ZA	40
(240)	ABA ↔ ZA1	40	ABA1 ↔ ZA1	40	ABA2 ↔ ZA1	40
ABA — ZAA	ABA ↔ ZAA	40	ABA1 ↔ ZAA	20	ABA2 ↔ ZAA	20
(240)	ABA ↔ ZAA1	40	ABA1 ↔ ZAA1	20	ABA2 ↔ ZAA1	20
	ABA ↔ ZAA2	40	ABA1 ↔ ZAA2	20	ABA2 ↔ ZAA2	20
ABA — ZAB	ABA ↔ ZAB	40	ABA1 ↔ ZAB	20	ABA2 ↔ ZAB	20
(240)	ABA ↔ ZAB1	40	ABA1 ↔ ZAB1	20	ABA2 ↔ ZAB1	20
	ABA ↔ ZAB2	40	ABA1 ↔ ZAB2	20	ABA2 ↔ ZAB2	20
ABA — ZB	ABA ↔ ZB	20	ABA1 ↔ ZB	40	ABA2 ↔ ZB	20
(340)	ABA ↔ ZB1	20	ABA1 ↔ ZB1	40	ABA2 ↔ ZB1	20
	ABA → ZBA	10	ABA1 → ZBA	10	ABA2 → ZBA	10
	ABA → ZBA1	10	ABA1 → ZBA1	10	ABA2 → ZBA1	10
	ABA → ZBA2	10	ABA1 → ZBA2	10	ABA2 → ZBA2	10
	ABA → ZBB	10	ABA1 → ZBB	10	ABA2 → ZBB	10
	ABA → ZBB1	10	ABA1 → ZBB1	10	ABA2 → ZBB1	10
	ABA → ZBB2	10	ABA1 → ZBB2	10	ABA2 → ZBB2	10
ABB — Z	ABB ↔ Z	40	ABB1 ↔ Z	20	ABB2 ↔ Z	40
(200)	ABB ↔ Z1	40	ABB1 ↔ Z1	40	ABB2 ↔ Z1	20

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 8 of 9) (3.10)

TRUNK GROUP	ITEMS					
ABB — ZOA (220)	ABB ↔ ZOA	120	ABB2 ↔ ZOA	100		
ABB — ZOA1 (160)	ABB ↔ ZOA1	120				
	ABB1 ← ZOA1	40				
ABB — ZOA2 (250)	ABB ↔ ZOA2	80	ABB1 ← ZOA2	50	ABB2 ↔ ZOA2	120
ABB — ZA (300)	ABB ↔ ZA	20	ABB1 ↔ ZA	20	ABB2 ↔ ZA	20
	ABB ↔ ZA1	20	ABB1 ↔ ZA1	20	ABB2 ↔ ZA1	20
	ABB ↔ ZAA	10	ABB1 ↔ ZAA	10	ABB2 ↔ ZAA	10
	ABB ↔ ZAA1	10	ABB1 ↔ ZAA1	10	ABB2 ↔ ZAA1	10
	ABB ↔ ZAA2	10	ABB1 ↔ ZAA2	10	ABB2 ↔ ZAA2	10
	ABB ↔ ZAB	10	ABB1 ↔ ZAB	10	ABB2 ↔ ZAB	10
	ABB ↔ ZAB1	10	ABB1 ↔ ZAB1	10	ABB2 ↔ ZAB1	10
	ABB ↔ ZAB2	10	ABB1 ↔ ZAB2	10	ABB2 ↔ ZAB2	10
ABB — ZB (440)	ABB ↔ ZB	60	ABB1 ↔ ZB	60	ABB2 ↔ ZB	40
	ABB ↔ ZB1	60	ABB1 ↔ ZB1	40	ABB2 ↔ ZB1	60
	ABB → ZBA	5	ABB1 → ZBA	5	ABB2 → ZBA	5
	ABB → ZBA1	5	ABB1 → ZBA1	5	ABB2 → ZBA1	5
	ABB → ZBA2	5	ABB1 → ZBA2	5	ABB2 → ZBA2	5
	ABB → ZBB	10	ABB1 → ZBB	10	ABB2 → ZBB	5
	ABB → ZBB1	10	ABB1 → ZBB1	10	ABB2 → ZBB1	5
	ABB → ZBB2	10	ABB1 → ZBB2	10	ABB2 → ZBB2	5
ABB1 — ZOA (210)	ABB1 ↔ ZOA	120				
	ABB1 → ZOA1	40				
	ABB1 → ZOA2	50				
ABB2 — ZOA1 (200)	ABB2 ↔ ZOA1	200				

Fig. 6—Problem Solution—Trunk Groups and Traffic Items Routed Thereon (Sheet 9 of 9) (3.10)