

APPLICATION GUIDE FOR THE PREPARATION OF
DETAILED EQUIPMENT REQUIREMENTS FOR
AUTOMATIC NUMBER IDENTIFICATION EQUIPMENT

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1. GENERAL

- 1.1 Purpose

- 1.11 This section provides REA borrowers, consulting engineers, and other interested parties with technical information for use in the design and construction of REA borrowers' telephone systems. It covers, in particular, the preparation of Part III, REA Form 537c, "REA Specification for Equipment for Automatic Number Identification - CAMA, Detailed Equipment Requirements." Refer to paragraph 1.4 of REA Form 537a to determine the field of use of this specification.

- 1.12 The General Specification, REA Form 537a, establishes minimum performance requirements and capabilities for automatic number identification (ANI) equipment to be supplied for use in the telephone systems of REA borrowers. However, the many variables involved make it impractical to devise a single overall specification for ANI equipment which will insure the provision of adequate and appropriate facilities to fit every situation. Accordingly, Part III, "Detailed Equipment Requirements," REA Form 537c, was prepared to permit the particular arrangements and requirements for individual offices to be specified to prospective suppliers of the equipment. The "Detailed Requirements" are based upon the premise that the ANI equipment is in compliance with the General Specification. Therefore, prior to preparation of the "Detailed Requirements," the General Specification should be consulted.

1.13 Most of the items covered by REA Form 537c are those that have purposely been left flexible in the General Specification in order to meet the requirements of individual situations. In some instances it may become necessary to deviate from the basic requirements established in the General Specification. Such deviations should be strictly limited to obtaining all the features required for each situation. They should be shown in detail in Part III and will supersede the requirements established in Part I, General Specification.

1.14 In preparing a specification for ANI equipment, it will be helpful for the engineer to review the following sections of the REA Telephone Engineering and Construction Manual even though most of them do not relate directly to automatic number identification:

- REA TE&CM 157, "Customer Toll Dialing"
- REA TE&CM 205, "Preparation of an Area Coverage Design"
- REA TE&CM 319, "Interoffice Trunking and Signaling"
- REA TE&CM 325, "Application Guide for the Preparation of Detailed Step-by-Step Central Office Equipment Requirements"
- REA TE&CM 326, "Application Guide for the Preparation of Part III Specifications - Detailed Toll Office Equipment Requirements"
- REA TE&CM 327, "Application Guide for the Preparation of Part III - Specification of Detailed Requirements for Direct Distance Dialing Equipment"
- REA TE&CM 335, "Application Guide for the Preparation of Detailed Common Control Central Office Equipment Requirements"
- REA TE&CM 500, "Telephone Traffic"
- REA TE&CM 511, "Telephone Traffic - Dial Equipment for Toll Centers"
- REA TE&CM 707, "Station Equipment Aspects of Automatic Number Identification"

1.15 The Area Coverage Design (ACD) (or Supplemental Loan Proposal (SLP) - see REA Bulletin 320-14) for the project should be studied carefully and used as a reference. However, because of the possibility that some of the information therein may require updating to include recent changes, current information should be used in preparing Part III. If this information differs from that in the ACD or Supplemental Loan Proposal, it should be submitted to REA with the plans and specifications for approval.

1.16 The engineer should be familiar with the latest issue of the American Telephone and Telegraph Company's "Notes on Distance Dialing" (the "Blue Book").

1.17 The ANI equipment and associated interoffice trunk groups are to be engineered on the same 5-year period that is customary for local dial and for toll offices. A 25-year estimate is desirable as a guide in layout of the floor plan and planning growth capacities.

1.18 Throughout this Guide, wherever some action is specified to be taken by the "Owner," the words "or its engineer" shall be considered to be implied.

1.19 Wherever paragraph numbers are shown in parentheses in the following text, these numbers refer to the paragraphs in Part III of the ANI Specification, REA Form 537c.

1.2 Reasons for Reissue

1.21 This Application Guide is reissued for the following reasons:

1.211 To rearrange the subject matter to conform with the new issue of REA Form 537.

1.212 To recognize the situation where ANI equipment for a new common control central office will be specified in REA Form 537c, rather than in Parts III and IV of REA Form 524, "General Specification for Common Control Central Office Switching Equipment."

2. NATURE OF EQUIPMENT ORDER (PARAGRAPH 2)

2.1 (Paragraphs 2.1, 2.2, 2.3 and 2.4) The proper blank should be checked to indicate the nature of the equipment order.

3. VINTAGE OF EXISTING LOCAL DIAL OFFICE EQUIPMENT (PARAGRAPH 3)

3.1 (Paragraphs 3.1, 3.2, 3.3 and 3.4) If either paragraph 2.1 or 2.2 of REA Form 537c has been checked by the Owner, the information requested in paragraph 3 shall be provided by the Owner. This information is necessary so that the Bidder may properly engineer the ANI equipment to be compatible with the existing equipment.

4. LOCAL DIAL OFFICE INFORMATION (PARAGRAPH 4)

4.1 Access Code(s) to be Used (Paragraph 4.1)

4.11 While normally "1" will be used for SSSP and "0" for PPCS, cases may arise where some other code is required by the Owner. In any case, the access code(s) desired by the Owner shall be entered in paragraph 4.1.

4.2 Line and Terminal Information (Paragraph 4.2)

4.21 (Paragraphs 4.21, 4.22 and 4.23) The information called for in these paragraphs is needed so that the Bidder may determine the amount and type of ANI equipment which will be required for the office in question. The required information should be obtained from current studies and records wherever possible, although the Area Coverage Design (ACD) or the Direct Distance Dialing (DDD) study may be used as a guide. (See paragraph 1.15 of this Application Guide.) It is emphasized that the ANI equipment is being installed for the 5-year period, so the number of lines, terminals and directory numbers to be shown will not necessarily be the same as the number presently equipped.

4.3 PEX Groups (Paragraph 4.3)

4.31 List here the number of PEX groups expected in the 5-year engineering period which will require identification of the listed directory number.

4.4 Blocking DDD Service from Pay Stations (Paragraph 4.4)

4.41 (Paragraphs 4.41, 4.42 and 4.43) If the DDD system is not arranged to accept DDD calls from pay stations, it will be necessary to prevent calls from pay stations from reaching the DDD system. If the associated central office equipment is not, or cannot be, arranged to block access to the DDD network, it will be necessary to provide this feature in the ANI equipment. The appropriate blocks in paragraph 4.4 should be checked. If paragraph 4.42 is checked, a check mark should be placed in paragraph 4.421 or paragraph 4.422, depending on whether the Owner wishes to have busy tone returned to the pay station on the blocked call, or to have the connection released (forced disconnect) and the pay station reconnected to dial tone. Also, the number of pay stations involved shall be entered in paragraph 4.43.

5. TYPE OF IDENTIFICATION (PARAGRAPH 5)

5.1 (Paragraphs 5.1 and 5.2) See paragraph 1.6 of Part I, REA Form 537a, for discussion of the types of identification available and an explanation of the engineering factors involved. A study of this information will supply the Owner with the necessary technical information for filling in the appropriate blanks of paragraph 5 of Part III, REA Form 537c.

6. TRUNKING INFORMATION (PARAGRAPH 6)

6.1 A considerable portion of the information necessary to complete the trunking information can be obtained from a completely and properly executed REA Form 810, "Central Office Equipment Engineering Information," for the borrower's exchange. A completed REA Form 810 must be prepared for each exchange before attempting to complete the trunking requirements in paragraph 6. If the ANI equipment is to be an addition to an existing office, the existing REA Form 810 should be brought up-to-date on Sheet 2 (Trunking Plan). An up-to-date REA Form 810 should be included, for information purposes, with the specification sent to suppliers for bids.

6.2 There are two columns of blanks for paragraphs 6.1 and 6.2 headed "SSSP" (Station-to-Station Sent Paid) and "PPCS" (Person-to-Person, Collect, Special). Separate trunk groups may be provided for each type of service, either to the same or separate offices or a common group of trunks may be provided to an office handling both types of service. Where the distant office is in a connecting company area, the types of trunks to be provided must be determined by negotiations with the connecting company.

6.3 (Paragraph 6.1) As indicated, the geographical name of the distant office shall be entered in the appropriate column. If the SSSP and PPCS services are handled in the same office, the same office name shall be entered in both columns. If PPCS service is not provided, the word "None" shall be entered under "PPCS" in paragraph 6.1. In this case, no entries shall be made in the other blanks under "PPCS" in paragraphs 6.1 and 6.2.

6.4 Trunk Quantities and Type of Operation (Paragraph 6.2)

6.4.1 Paragraph 6.2 specifies the type of operation (signaling) which will be required on trunks handling ANI service, and the quantities of trunks of each types. When the distant office is in a connecting company area, the types and quantities of trunks required must be determined by consultation and negotiation with the connecting company. Otherwise, the Owner shall determine for itself the types and quantities of trunks to be provided. In either case, the Owner shall assure itself that the trunk quantities are sufficient to handle the busy hour CCS load provided by the anticipated calling rates and holding times, including any additional holding time per call which may be introduced by the ANI equipment. The information as to added holding times introduced by ANI operation must be obtained from the prospective bidders. The probability of loss to which ANI trunk groups shall be engineered is $P=.01$ for direct acting offices and $B.005$ for common control offices, unless otherwise specified by a connecting company. The engineering information referred to in the following paragraph 6.4.2 shall be taken

into consideration by the Owner in determining the type of operation (signaling) required either for trunks to its own connecting office or, in consultation with the connecting company, for trunks to a connecting company office.

6.42 Paragraph 6.23 or 6.24 should be checked to indicate the type of trunk facilities desired. The type of signaling desired for each trunk group shall be entered in paragraph 6.25. If one trunk group is to handle both SSSP and PPCS service, the trunk quantity figure shall be entered in the SSSP column, and the words "Joint Use" shall be entered in the PPCS column. If separate trunk groups of the same signaling type are required, the required quantity for each type of service shall be entered in the appropriate column. It should be noted that paragraph 6.25 does not specify the type of equipment to be provided, but only the type of signaling. The actual equipment to be provided is specified in paragraph 6.5.

6.43 The engineering factors affecting the choice of a signaling method are outlined in considerable detail in paragraph 3.112, lines 15 and 16 of REA TE&CM 335, "Application Guide for the Preparation of Detailed Common Control Central Office Equipment Requirements." These engineering factors shall be taken into consideration in selecting the type of signaling to be specified for ANI equipment covered by REA Form 537c, Part III, whenever a choice of signaling type is available. No matter what type of signaling method is specified, it is important that all prospective bidders be provided with the drawing numbers of the connecting trunk circuits proposed for use in the distant office, whether this office is the Owner's office or a connecting company office.

6.5 Trunk Circuits

6.51 It should be pointed out that the term "trunk terminating circuits," as used in REA Form 810, refers to all equipment between the trunk circuit itself and the trunk conductors or carrier or radio multiplex derived transmission facilities, whereas the term "trunk circuit" refers to the relay equipment used between the switching network and any trunk terminating circuits which may be provided.

6.52 The total number of trunk circuits to be listed in each column will usually be equal to the total number of trunks listed in paragraph 6.21. The exception would be those carrier or radio multiplex derived trunks where loop signaling is included as a part of the carrier or multiplex equipment and a separate trunk circuit is not required to function with the ANI equipment. Trunks, if this type, should be deducted from the total number of trunk circuits. Where new trunk circuits are required for the provision of the ANI feature, they shall always be provided by the Bidder on

the ANI equipment. If a connecting company into which a trunk group operates states that it will furnish the local trunk terminating equipment, it does not mean to imply that it will furnish the trunk circuits which are required in paragraph 6.21. The connecting company means that it will furnish line balancing equipment, repeating coils and signaling circuits.

6.6 Repeating Coils (Paragraph 6.4)

6.61 All trunk circuits for ANI service will require repeating coils, except radio multiplex or carrier derived trunks. Where the repeating coils are not included as part of the trunk terminating equipment or the trunk circuit itself, and are not to be furnished by a connecting company, the quantities of repeating coils to be provided by the Bidder shall be specified in the appropriate columns of paragraph 6.4.

6.7 Duplex Signaling Circuits (E & M) (Paragraph 6.5)

6.71 (Paragraph 6.51) For DX trunks, a DX signaling circuit is required, which should be specified by entering the required quantity in the appropriate columns of paragraph 6.51 unless the connecting company is providing the trunk terminating equipment. In this case, the DX signaling circuit will be provided by the connecting company, and nothing need be entered in paragraph 6.51.

6.72 For carrier or radio derived trunks employing E & M signaling including separate inband signaling units, no separate signaling units are required to be specified in paragraph 6.5 since the necessary signaling circuitry is contained in the carrier or radio multiplex unit or the inband signaling unit. The same holds true where a "loop type" carrier or radio multiplex trunk circuit is involved.

6.73 (Paragraph 6.52) Where inband signaling sets are required, the quantity required should be shown in the appropriate columns of paragraph 6.52 unless the connecting company is providing the trunk.

6.74 (Paragraph 6.53) If a type of signaling circuit other than DX or inband is required, the required quantity of circuits shall be entered in the proper column of paragraph 6.53 and a note covering the type of signaling to be provided shall be included in paragraph 10, Part III.

6.75 (Paragraph 6.6) Where M lead pulse correction is not provided by the inband signaling circuits, the trunk circuits shall be equipped with this feature.

7. SPECIAL REQUIREMENTS (PARAGRAPH 7)

7.1 Special Service Selectors (Paragraph 7.1)

7.11 Where ANI equipment is to be provided in a direct acting office, and some code other than the standard digit "1" or "0" is to be used to access the ANI interoffice trunks, special service selectors may be required. Details of the required selector arrangement shall be provided in paragraph 7.1, Part III.

7.12 If a shelf with special service selectors is already installed in the local office, it may be desirable for the Owner to order the required additional selectors from the manufacturer of the local dial equipment and omit these selectors from the ANI equipment specification. If this is done, an explanation shall be provided in paragraph 7.1, Part III.

7.2 Level Hunting Selectors (Paragraph 7.2)

7.21 When access to ANI interoffice trunks is to be provided from step-by-step selector levels and it is necessary to provide for more than the 10 trunks which can be reached from one selector level, it may be desirable to consider the use of level hunting selectors. Most manufacturers can provide this type of selector, which will search over a second (or third) group of 10 trunks in case the preceding trunks are all busy. The purpose of this arrangement is to increase the efficiency of large trunk groups over that obtainable with a graded multiple for 10 outlet switches. In this case, the busy hour CCS capacity of the trunk group shall be calculated from the full access trunk table appropriate to the specified probability of loss. ($P=.01$, unless otherwise specified.)

7.22 Where level-hunting selectors (or the equivalent) are to be provided, an explanation of the details shall be given in paragraph 7.2, Part III.

7.3 Distributing Frame Requirements (Paragraph 7.3)

7.31 As covered in paragraph 4.01 of Part I, REA Form 537a, the Owner may specify that all ANI equipment cabling (except for the sleeve leads or equivalent used for identification purposes) shall be brought out to an intermediate distributing frame (IDF) or to a combined distributing frame (CDF).

7.32 If the Owner wishes to have additional IDF or CDF capacity provided as part of this specification, he shall so indicate in paragraph 7.31 and explain the details in paragraph 7.32.

7.33 If the Owner desires ANI equipment cabling to be terminated on an IDF or CDF, but has spare terminals available, he shall leave paragraph 7.31 blank and explain the details in paragraph 7.32.

7.4 Test Equipment (Paragraph 7.4)

7.41 As indicated in paragraph 3.53 of Part I, REA Form 537a, any portable test sets required for maintaining the ANI equipment, which are usable only for a specific type of system, shall be included in the basic bid unless the Owner indicates by a note in paragraph 10, Part III, that he does not require them. This could be the case if the Owner already has sets of the required type, possibly acquired for use with another ANI office in his area.

7.42 If, however, portable test sets of a general nature can be used for maintaining the ANI equipment, the Bidder shall recommend such equipment and bid it as a separate alternate, as covered in paragraph 7.4 of Part III.

8. POWER REQUIREMENTS (PARAGRAPH 8)

8.1 Standby Inverters (Paragraph 8.1)

8.11 As stated in paragraph 3.63 of Part I, REA Form 537a, standby inverters and automatic transfer circuits may be required for ANI systems which depend on commercial power for normal operation. If the local central office is equipped with a standby generator and the generator voltage is suitable for use with the ANI system and can be connected to the ANI system in case of commercial power failure, paragraph 8.1 need not be checked.

8.2 Voltage Limits (Paragraph 8.2)

8.21 The voltage limits of the power plant can usually be obtained from either circuit descriptions or schematics. A range of 45 to 54 volts is reasonable.

8.3 Additions to Power Equipment (Paragraph 8.3)

8.31 This paragraph should be filled in only if it is necessary to supplement or replace the existing power system.

9. FLOOR PLAN INFORMATION (PARAGRAPH 9)

9.1 (Paragraph 9.1) This paragraph shall be checked when the ANI equipment is part of a new local dial office installation and the floor plan shows both systems.

9.2 (Paragraph 9.2) This paragraph shall be checked when the ANI equipment is to be installed in an existing office. It is important to furnish accurate floor plan drawings which indicate clearly the floor space available for the ANI equipment. Drawings should show ceiling heights.

10. EXPLANATORY NOTES (PARAGRAPH 10)

10.1 Any items which require further clarification should be covered in this paragraph.

10.2 Special arrangements of wiring or equipment not covered in Parts I or III of this specification, but desired in some special situations, should be specifically described under paragraph 10, Part III.

10.3 Any carrier equipment, voice frequency repeaters, standby power plants or other equipment not to be included by the Bidder in his basic bid should be purchased under a separate special equipment contract. This equipment should not be included in the "REA Specification for Equipment for Automatic Number Identification - CAMA."