FEATURE DOCUMENT

DIRECTED CALL PICKUP WITH BARGE-IN

2-WIRE NO. 1 AND NO. 1A ELECTRONIC SWITCHING SYSTEMS

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FEATURE DEFINITION AND DESCRIPTION

1. DEFINITION/INTRODUCTION

DEFINITION

1.01 The ***directed call pickup with barge-in (DPU)*** feature provides the ability for a call directed to a station line to be answered by any other station user within the same Centrex group or Centrex complex by dialing a unique answer code and the extension number of the line to be answered. If the call has already been answered, a burst of tone is applied to alert the answering party of the impending presence of a third party. The third party is then bridged onto the existing talking connection.

INTRODUCTION

1.02 DPU is a terminating feature; i.e., only the station being picked up needs to have the feature. When picking up an unanswered (ringing) call, the operation of DPU differs from the regular call pickup (CPU) only in that a specific extension is picked up rather than the one that has been ringing longest. When picking up a call that has been answered, DPU operates essentially the same as ***call waiting*** except that after the alerting tone the connection is bridged.

1.03 DPU was primarily designed to be used in conjunction with a paging system. It may also be used where the station being picked up is within audible range of the user's station or a visual signaling system may be used to indicate a ringing extension.

1.04 The primary market for DPU is probably the administrative staff of medium-to-large size hospitals. DPU may also have application to certain business users since it becomes unnecessary to know the exact whereabouts of key personnel within the plant as is necessary, for example, with call forwarding.

1.05 In such applications, DPU has three distinct advantages over CPU in that (1) it allows a selected incoming line to be picked up, (2) the station from which the pickup request is made does not have to have the feature, and (3) the barge-in capability of the feature allows a call to be bridged even when the called extension has been answered.

1.06 The barge-in capability of DPU is applicable to originating, as well as terminating, calls allowing the user to be reached in an emergency situation.

2. USER PERSPECTIVE

CUSTOMER

2.01 In simple applications the DPU originator may be within audible range of a ringing DPU extension. In applications where the called party is likely to be in one of a limited number of places, a visual signaling arrangement may be used to announce the incoming call. In more complex applications, the line may be answered by an attendant and paging used to announce the call.

2.02 For a DPU request to be successful, the following conditions must be satisfied.

(a) The station being picked up must have the DPU feature.

(b) Both the DPU extension and the DPU request originator's extension must be within the same Centrex group or Centrex complex, and

(c) The DPU extension must be busy (i.e., ringing, talking connection, or on key-hold) and on a stable connection.

2.03 Assuming the above conditions are met, the user originates a DPU request from any idle station by receiving dial tone and dialing the DPU access code (typically 1 to 3 digits). A second dial tone is returned; the user then dials the number of the DPU extension.

2.04 A user on an existing talking connection at a station with the ***call hold (CHD)*** feature may place that call on hold while answering the other call using DPU. To do so, the user flashes for dial tone, dials the DPU access code, waits for second dial tone, then dials the number of the DPU extension. The original call is placed on hold by the DPU access code; therefore, it is not necessary to dial the CHD access code prior to originating a DPU request. Note that, after the DPU call is picked up, the CHD access code must be used (after flashing for dial tone) to go from one party to the other. If the call on the talking connection is abandoned, the call on hold will cause

the DPU originator's extension to be rerung (normal CHD operation).

2.05 The 1- or 2-digit speed calling feature may be used with the DPU feature for the access code, the extension number, or both the access code and the extension number.

2.06 In the event that a DPU request is unsuccessful, a busy or regular overflow tone is returned to the DPU originator. A busy tone is returned when the DPU extension is idle. Regular overflow tone is returned if the extension whose number was dialed does not have the DPU feature or if the DPU extension and the DPU originator's station are not within the same Centrex complex.

2.07 A line that has been placed on hold using the call hold feature cannot be picked up nor can a line which is being call waited. In both cases busy tone is returned to the DPU originator.

2.08 When the DPU conditions for a ringing extension are satisfied, a talking connection is established between the DPU originator and the calling party. That is, the incoming call is transferred from the called station (DPU extension) to the extension of the party who originated the DPU request. The DPU extension is made idle and may be used to receive or originate calls.

2.09 If the DPU extension is off-hook at the time the DPU request is made (i.e., the ringing extension is answered prior to the DPU request), the barge-in capability of DPU is used. Barge-in provides a burst of 440 Hz call waiting tone to the DPU extension, then bridges the DPU originator's station onto the existing connection between the DPU extension and the calling party, establishing a 3-way connection.

2.10 If the incoming call to the DPU extension has been answered and placed on key-hold (e.g., at a call director) prior to the DPU request, an attempt is made to remove the held line from the holding bridge. If the attempt is successful, the DPU extension is made idle, and the call is transferred to the DPU originator's station. If the holding bridge fails to release the line, a 3-way connection is established with the calling party, the DPU originator, and the holding bridge each comprising one leg of the connection.

3. SYSTEM PERSPECTIVE

SOFTWARE DATA STRUCTURES

A. Translation Layouts

3.01 Translation changes for the DPU feature include a Centrex digit interpreter table special service entry and a feature indicator in the ***directory number (DN)*** auxiliary block or the common block for a multiline hunt group. In addition, the DPU line must be translated for call pickup in its DN auxiliary block or multiline hunt group common block.

3.02 The Centrex digit intrepreter table entry for the DPU access code is data type (DTYP) 5, subtype (STYP) 5, and sub-subtype (SSTYP) 1 as shown in Fig. 1, Part A.

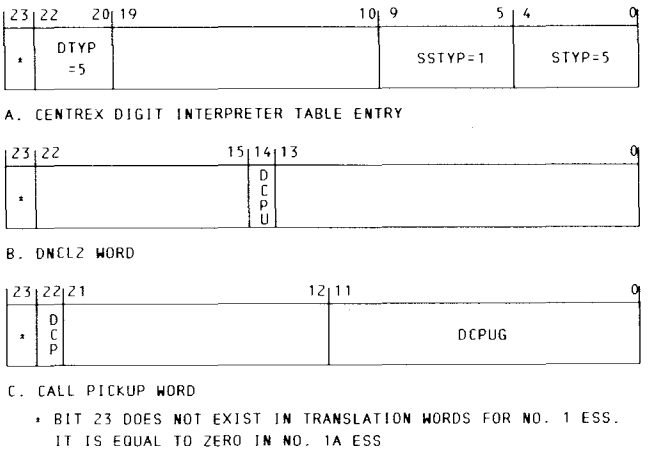


Fig. 1—DPU Translations Layout

3.03 In the DN translator, the DNCL2 word is the identical word used for call pickup (Item DCPU=1). The call pickup word is modified by setting Item DCP=1 for DPU. These words are illustrated in Fig. 1, Parts B and C, respectively.

3.04 Each line with the DPU feature must have a DN auxiliary block containing DNCL2 and the call pickup word. (The minimum size of the DN auxiliary block is four words.) The ***pickup***

group number (PUGN) is contained in the DCPUG item within the call pickup word.

3.05 For Centrex ***multiline hunt groups (MLHG),*** the DNCL2 and the call pickup words are contained in the MLHG common block. DPU can exist on an MLHG basis only for those terminals with defined directory numbers.

B. Parameters

3.06 Two parameter words are required for DPU. Both are set to zero if there are no call pickup groups for the engineering period.

3.07 The first parameter word, B6DPUP (Fig. 2) points to the starting address of the call store block containing the traffic peg counts of DPU activiations. This block is pegged each time a legitimate DPU request is originated. The number of words in the block is equal to the number of Centrex groups for the engineering period plus one. The block is indexed by the Centrex group number (CTXN) of the DPU originator's station. (CTXN≠0.)

3.08 The second parameter word is Z3PUGT, the call pickup group queue table pointer (Fig. 3). (This word is required for both CPU and DPU.) It contains the address of a call store block containing head cells for pickup group queues and defines the length of the block. Each head cell points to the queue for a single pickup group. The pickup queue is a linked list of ringing registers.

3.09 The number of words in the head cell block is equal to (2) × (TAI + PUG + 1). The block is indexed by (2) × (PUGN); PUGN≠0. TAI + PUG + 1 is used by the call pickup audit to determine the end of the head cell block. The maximum number of call pickup groups (PUG) and trunk answer indexes (TAI) in an office is 4095; therefore, the maximum number of head cell words in the block is 8192.

FEATURE OPERATION

A. Setup of Incoming Call

3.10 When a call is directed to any station within a Centrex group, translations are performed to determine whether the terminating line has ***call pickup (CPU).*** A line is required to translate for CPU since DPU uses CPU to set up incoming calls (Fig. 4). For a line that translates for CPU, the PUGN is derived from the DN translation and stored in a regular ***ringing register (RR).*** The ringing and audible ringing connections are set up, and the PUGN is used to link the RR to the appropriate pickup queue. Control is then returned to the main program which awaits ring-trip, abandon, or a pickup request.

3.11 If the called station is answered, or if the calling party abandons, the RR is removed from the pickup queue, and the normal talking path setup or abandon operation occurs.

B. DPU Request and Acceptance

3.12 A DPU request origination and acceptance by the system is shown in Fig. 5, Part A. As the incoming digits are collected in an ***originating register (OR),*** the Centrex digit interpreter table is used to identify the type of call and routing for a particular digit. When all digits of the DPU

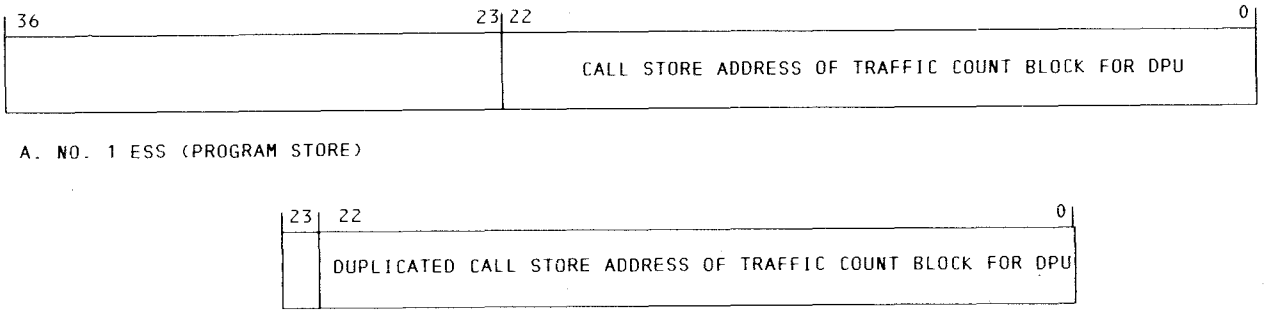


Fig. 2—Parameter Word B6DPUP

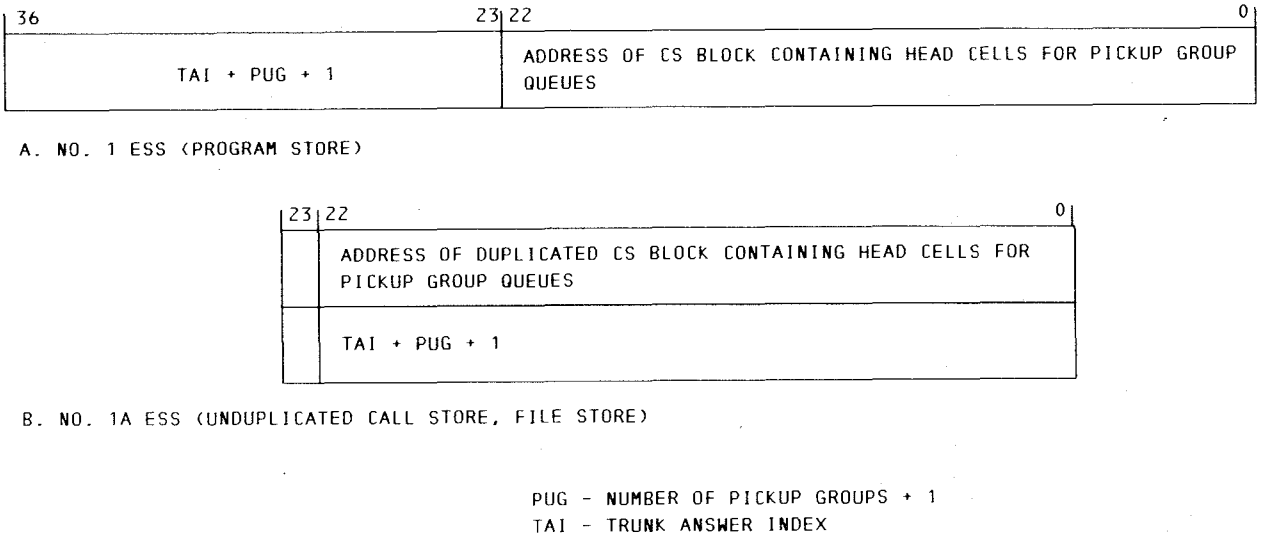


Fig. 3—Parameter Word Z3PUGT

access code are collected, the Centrex digit interpreter table returns DTYP5, STYP5, SSTYP1 to the main program. The OR used to collect the DPU access code is reinitialized to collect the extension number digits. Dial tone is returned to the DPU originator indicating that the system is ready to receive the extension number.

3.13 After all extension number digits are collected, the busy or idle condition of the DPU extension is checked. If it is idle, busy tone is returned to the DPU originator and DPU operations cease. (The extension is expected to be busy.) When the station is found to be busy, the system continues DPU operations by performing a DN translation to determine whether the dialed extension has the DPU feature. If the extension does not have the feature specified within its DN auxiliary block, regular overflow tone (RI 80) is given to the DPU originator.

3.14 When the DPU feature is specified, the system obtains the ***Centrex group number (CTXN)*** item for both the DPU originator's station and the DPU extension. The CTXNs are used to obtain the ***master Centrex complex number (MCXN)*** for each line from the associated Centrex common block. The MCXNs are compared and, if they do not match, overflow tone is given to the DPU originator. When the MCXNs match, indicating that both stations are in the same Centrex complex, the pickup request is accepted by the system. (Where both stations are within the same Centrex group, the MCXNs always match since the number is being compared with itself.) The system next performs a special translation to retrieve the PUGN from the DN auxiliary block or multiline hunt group common block for the DPU extension. Using this PUGN, the system determines if the call has been answered by searching the pickup queue for the DPU extension's ringing register. Note that, unlike CPU, the ringing register may be any entry in the pickup queue, not necessarily the first entry.

C. Pickup of Unanswered Incoming Call

3.15 When the system determines that the RR is still on the pickup queue (the DPU extension is unanswered), the RR is removed from the pickup queue and the DPU traffic activations count is incremented (Fig. 5, Part B). If the DPU request is being originated from a previously idle station, the system seizes a 3-port conference register. If the DPU originator has placed an existing connection on call hold, or if the incoming call was extended from an attendant position, a conference register or a loop register is already involved and available for the DPU operation. In this case, a conference register is not seized.

3.16 When the DPU extension has the ***call forwarding-don't answer (CFDA)*** feature, the ringing register is taken off CFDA timing. Where the incoming call to the DPU

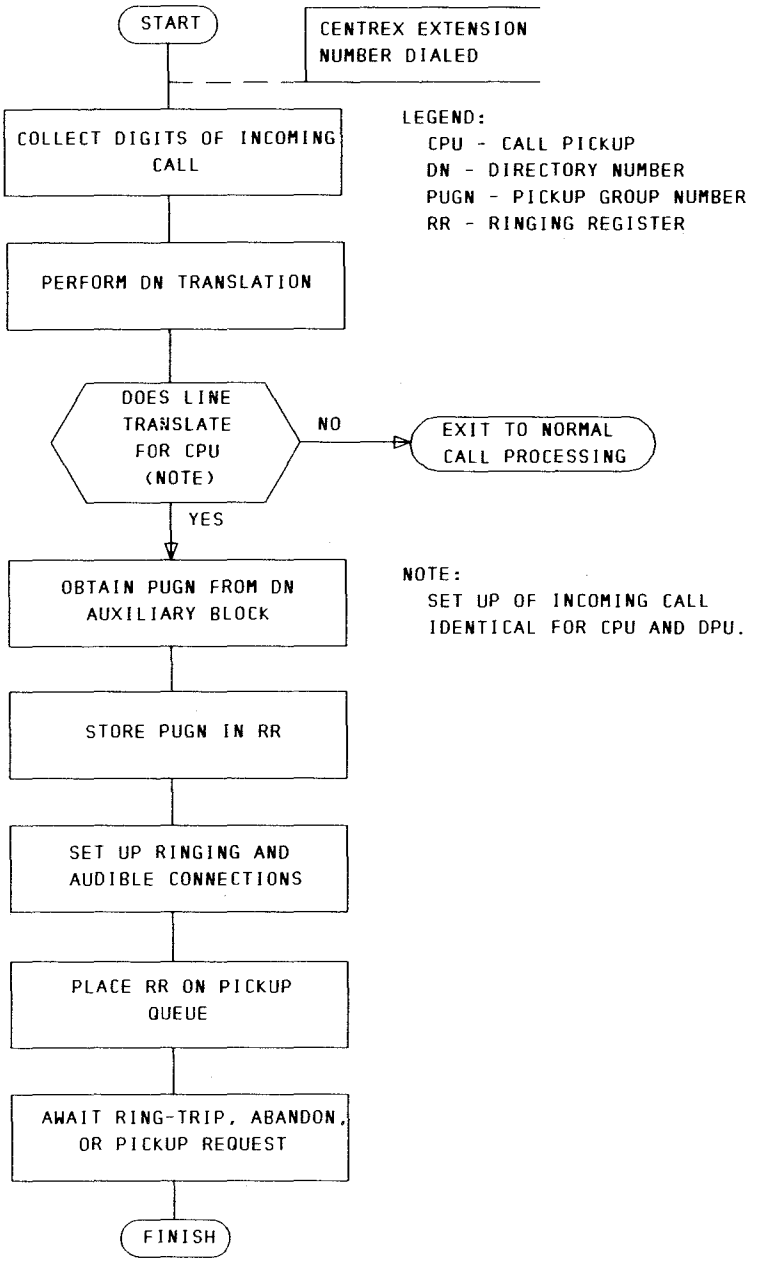


Fig. 4—Setup of Incoming Call To a Line With CPU/DPU–Functional Flow Diagram

extension is via a line, the system reserves a path between the incoming line and the DPU originator's station and stores path memory information in the conference register. The system then attempts to set up the connection between the DPU originator and the incoming call. When the attempt succeeds, the incoming call is connected to the DPU originator, the RR and conference register are released, and the DPU extension is returned to the idle state. Should the attempt fail, the DPU originator is given regular overflow tone, the ringing and audible connections are restored, the RR is returned to the pickup queue, CFDA timing is resumed (if applicable), and the conference register is released.

3.17 Where the incoming call is on a trunk, no reserve path operation occurs when the DPU request is initiated from an idle station. If the talking connection cannot be successfully established in this case, reorder tone is given to

both the DPU originator and the incoming trunk (connected to audible), the RR and conference register are released, and the DPU extension is returned to the idle state. However, when the DPU originator has placed a call on hold using a 3-port conference circuit, the ringing and audible connections are reestablished regardless of whether the incoming call is via a line or trunk.

D. Barge-in (Pickup of Extension on Talking Connection)

3.18 When the DPU extension is on a talking connection, the DPU originator's station will be bridged onto the existing connection (barge-in). This is accomplished using the call waiting function and a 3-port conference circuit (Fig. 5, Part C).

3.19 The regular DPU operations detailed in B above proceed up to the point where the pickup queue is searched. When the system does not find the RR on the pickup queue, it assumes that the call has been answered since the extension is busy. At this point, the DPU traffic activations count is pegged, and normal call waiting operations are followed. (The call could be on key-hold rather than in a talking connection; this possibility is covered in E below.) A conference register is seized to set up data for the remainder of the barge-in operation.

3.20 Next, a trace function is performed on the connection to the DPU extension to determine the status of the line, the network path involved, and the identity of any call register that may be associated with the call. For the barge-in operation to be successful, the line to be bridged must be a stable, valid, and connected path. When these criteria are not met, busy tone is returned to the DPU originator. For example, the stable connection check will fail whenever the DPU extension user has exercised the call hold feature or whenever the DPU extension is being call waited.

3.21 When the stable connection criteria are met, the conference register is used to describe the configuration of the call and the various translation characteristics of the terminals involved. The call is now moved to a 3-port conference circuit, and the DPU extension is marked originating in order to eliminate disconnect timing. The connection between the DPU extension and the other party is momentarily split while a burst of call waiting tone is applied to the DPU extension. At this point, a 50 ms open is sent; however, its function is only applicable when the incoming call has been placed on key-hold.

3.22 Following the call waiting tone and the open, the DPU extension and the other party are connected to two ports of a 3-port conference circuit, and an attempt is made to connect the DPU originator's station onto the third port. When a successful 3-way talking connection is established, the conference register is released. Should the connection attempt fail, busy tone is given to the DPU originator, the original talking connection between the DPU extension and the other party is restored, and the conference register and 3-port conference circuit are released. If, after the 3-way talking connection is established one of the parties abandons, the 3-port conference circuit is released, assuming a valid connection can be established between the two remaining parties.

E. Directed Call Pickup of a Call on Key-Hold

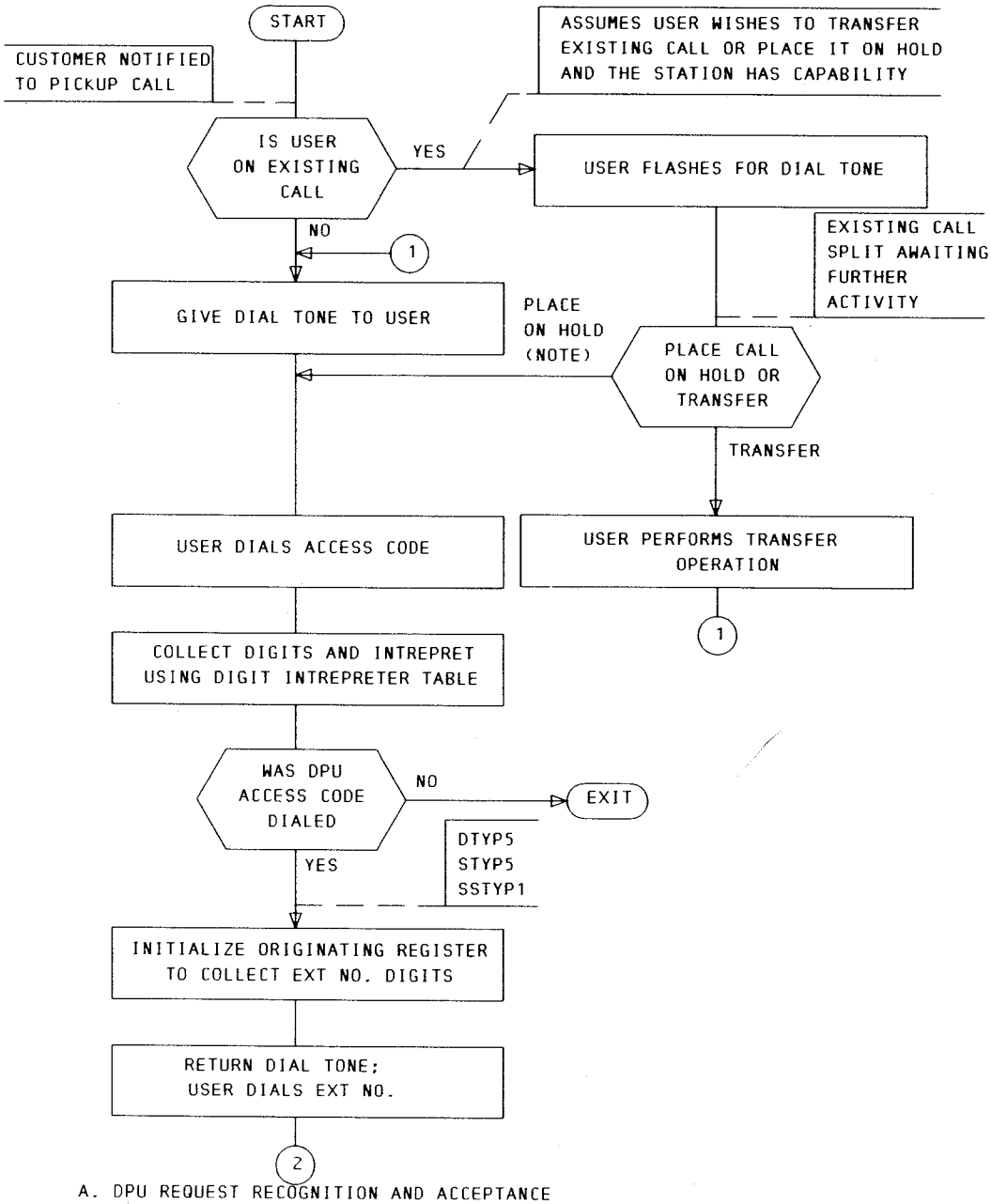
3.23 When the incoming call has been answered and placed on a holding bridge, such as may be done by a secondary attendant using a call director, the DPU barge-in function attempts to remove the held line from the holding bridge and transfer the call to the DPU originator's station. The 50 ms open following the call waiting tone (3.21) is an attempt to get the holding bridge to release. If the holding bridge releases, a disconnect is detected from the DPU extension, and a talking connection is established between the incoming call and the DPU originator's station.

3.24 Since the DPU feature has no direct control over the holding bridge, the 50 ms open may not cause the bridge to release. In this event, a 3-way connection is established between the incoming call, the DPU originator's station, and the holding bridge. The DPU extension will remain in the busy state until the connection is abandoned or manually removed from the holding bridge.

FEATURE ATTRIBUTES

4. APPLICABILITY

4.01 The DPU feature is provided on a per station basis to stations within the same Centrex group or to stations belonging to different Centrex groups where they are within the same Centrex



A. DPU REQUEST RECOGNITION AND ACCEPTANCE

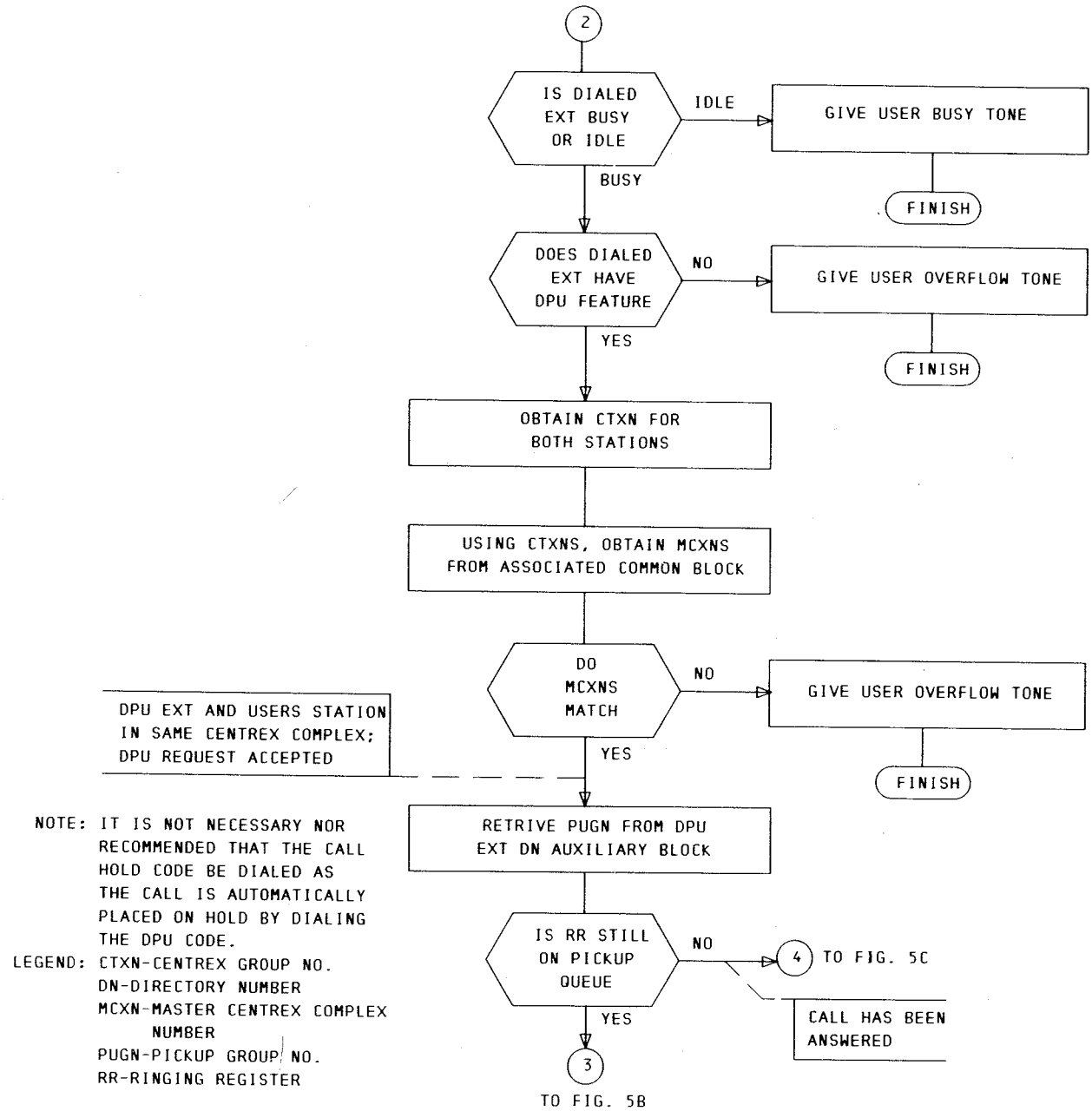


Fig. 5—Directed Call Pickup Functional Flow Diagram (Sheet 1)

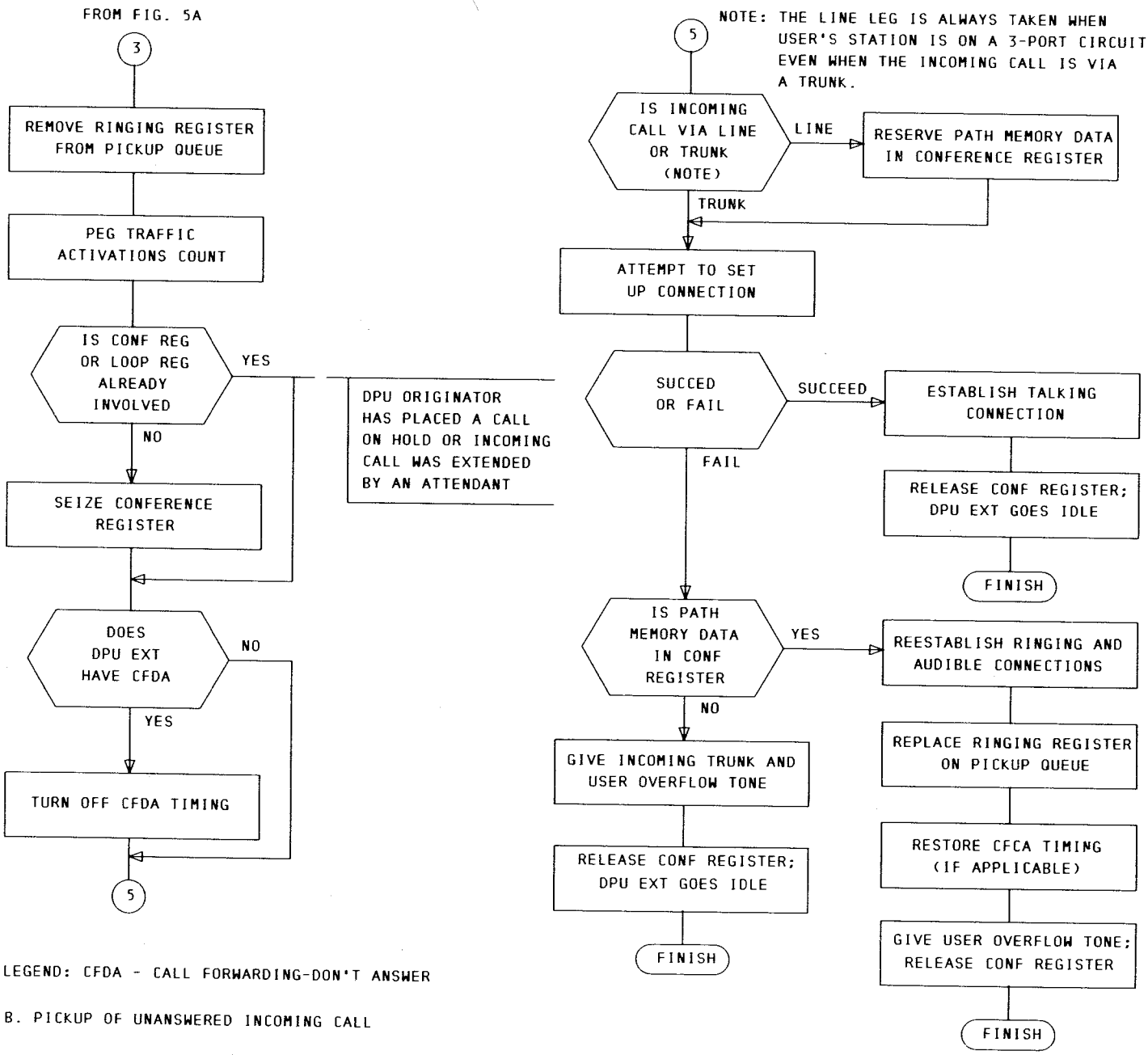


Fig. 5—Directed Call Pickup Functional Flow Diagram (Sheet 2)

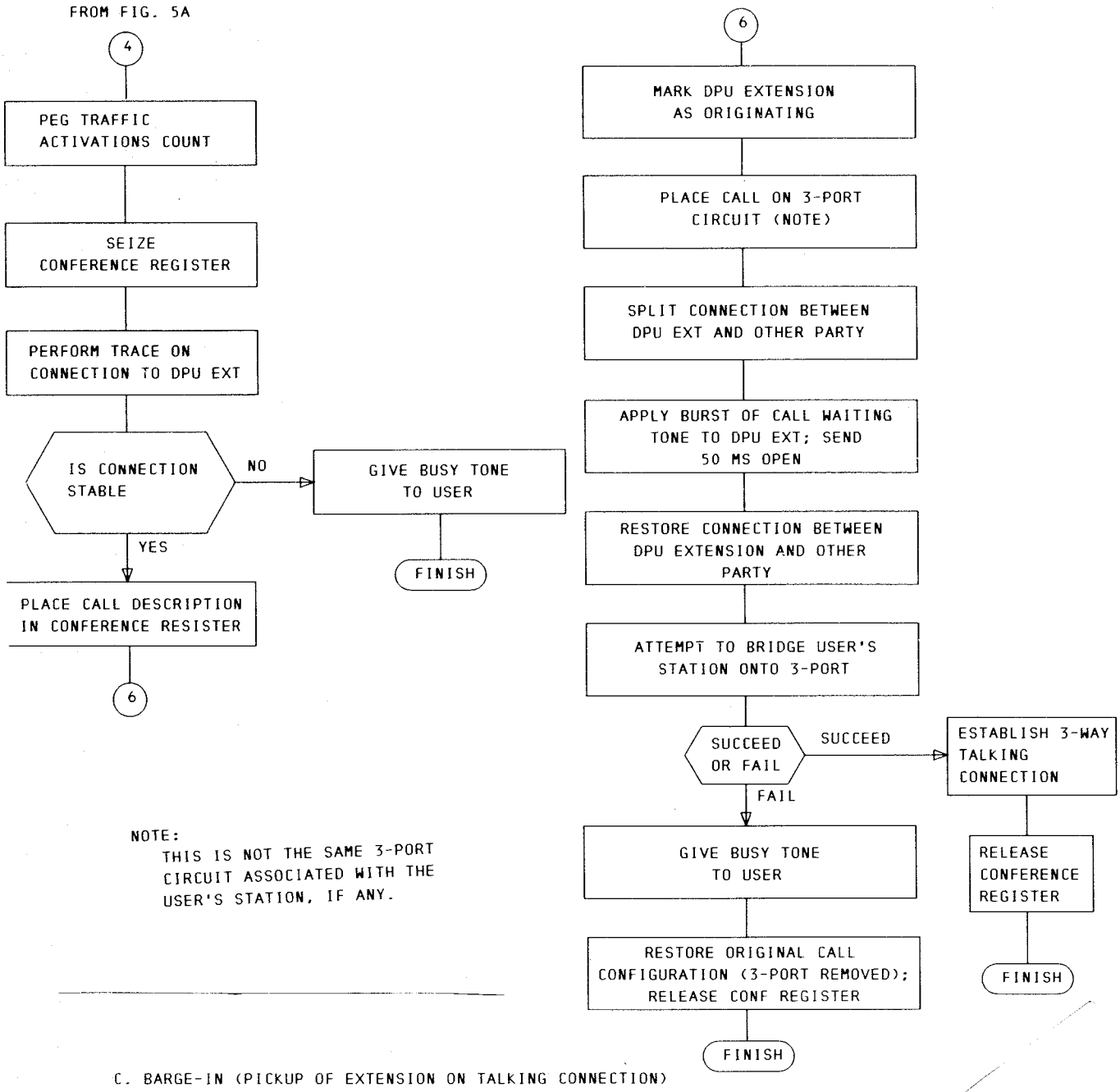


Fig. 5—Directed Call Pickup Functional Flow Diagram (Sheet 3)

complex. A station may be a single line in a series completion group.

4.02 The DPU feature is provided to Centrex multiline hunt group stations on a per multiline hunt group basis. However, only those terminals with defined directory numbers are allowed to have the DPU feature.

5. LIMITATIONS AND RESTRICTIONS

OPERATIONAL

5.01 A DPU request is disallowed when the DPU extension:

(a) is idle

(b) is not in the same Centrex complex as the DPU originator's station

(c) is involved in a station ringer test

(d) has call hold feature and has a call on hold

(e) has call waiting feature and is being call waited

(f) has call forwarding—don't answer and the call has been forwarded, or

(g) is involved in any user activity (e.g., call transfer) resulting in an unstable connection.

ASSIGNMENT

5.02 An ESS office is limited to 4095 call pickup groups and trunk answer indexes. There are no limits regarding the number of lines that can have the same pickup group number (PUGN) or of the number of ringing registers (up to the office limit) that may be on a pickup queue.

5.03 An individual station or multiline hunt group can be assigned only one PUGN. The PUGNs need not be assigned in blocks per customer group.

5.04 Assignment of the DPU feature within a multiline hunt group is limited to those terminals that have defined directory numbers.

6. COMPATIBILITY AND INTERACTIONS

COMPATIBILITY WITH OTHER FEATURES AND HARDWARE

6.01 The DPU feature cannot be assigned to a station with special ringing or to a terminal within a multiline hunt group with queueing since the associated ringing registers are not placed on a call pickup queue.

6.02 Attendants utilizing 51A-customer premises system (CPS) consoles cannot originate DPU requests.

DYNAMIC INTERACTIONS WITH OTHER FEATURES AND HARDWARE

6.03 Since all DPU extensions have the ***call pickup (CPU)*** feature, an incoming call to a DPU extenson can be picked up from another station in the same pickup group when it is the only extension ringing or when it has rung longest. [See reference listed in Part 19. A. (1).]

6.04 When the ***call forwarding—don't answer (CFDA)*** feature is assigned to the DPU extension, unanswered incoming calls can be picked up only when the system recognizes a DPU request prior to CFDA timeout and forwarding. [See reference listed in Part 19. A. (2).]

6.05 The ***call hold (CHD)*** feature may be assigned to the DPU extension, the DPU originator's station, or both. When the CHD feature has been used at the DPU extension to place a call on hold, all DPU requests to that extension are disallowed. When an existing call is to be placed on hold in order to originate a DPU request, the user needs only to flash for dial tone and dial the DPU access code and extension number. The call is placed on hold without dialing the CHD access code. At this point, normal call hold operations apply. [See reference listed in Part 19. A. (3).]

6.06 When the ***calling waiting*** feature is assigned to the DPU extension, a DPU request is disallowed any time the extension is being call waited. [See reference listed in Part 19. A. (4).]

6.07 The ***1- or 2- digit speed calling*** feature may be used in conjunction with the DPU feature to specify the DPU access code, the DPU

extension number, or both. [See references listed in Part 19. D. (8). and A. (12).]

7. COST FACTORS

MEMORY-NO. 1 ESS

A. Fixed

7.01 The following memory is required whether or not DPU is used.

- ***Generic (program store):*** Approximately 250 additional PS words are required. Also, the call pickup (CPU) and call waiting routines are required.

- ***Parameter (program store):*** Two parameter words are required for DPU (B6DPUP and Z3PUGT). Z3PUGT is common to DPU and CPU.

B. Conditional

7.02 The following memory is required only when DPU is activated.

- ***Call Store:*** The call store words can be computed as follows:

  (a) The CS pickup group queue table =(2) ×(highest PUGN for the engineering period) + 4.

  (b) The CS table for traffic peg counts for DPU activation per Centrex group = number of Centrex groups + 1.

  (c) Number of CS words for conference registers = (32) × (increased number of conference circuits).

Item (b) is uniquely chargeable to the DPU feature. No additional cost is incurred for item (a) when the DPU feature is added to an existing call pickup group. The total cost is applicable when item (a) is created exclusively for the DPU feature. The cost is to be shared when the DPU feature and the call pickup feature are being activated simultaneously. A similar situation applies in relation to item (c) and other features using conference registers.

C. Variable

7.03 The following memory is required when DPU is provided on a per ***line*** basis.

- ***Translation (program store):***The increase in PS words varies between four and zero dependent upon the following:

  (a) A minimum of four additional words is required when a line does not have a DN auxiliary block. Only two of these words are actually used by DPU: Call pickup and DNCL2.

  (b) Two PS words are required where a line has a DN auxiliary block, but does not have the call pickup and DNCL2 words.

  (c) One PS word is required where a line has a DN auxiliary block and a DNCL2 word, but does not have the call pickup word.

  (d) No additional PS words are required for a line that is already translated for CPU.

7.04 The following memory is required when DPU is provided on a per ***multiline hunt group*** (MLHG) basis.

- ***Translation (program store):*** The increase in PS words varies between two and zero dependent upon the following:

  (a) Two PS words (call pickup and DNCL2) are required in the MLHG common block when DNCL2 is not already there.

  (b) One PS word (call pickup) is required when DNCL2 is already in the common block.

  (c) No additional PS words are required when the MLHG is translated for CPU.

MEMORY-NO. 1A ESS

A. Fixed

7.05 The following memory is required whether or not the feature is used.

- ***Generic (program store):*** Approximately 325 additional PS words are required. Also, the call pickup (CPU) and call waiting routines are required.

- ***Parameter (unduplicated CS, file store):*** Two parameter words are required for DPU (B6DPUP and Z3PUGT). Z3PUGT is common to DPU and CPU and occupies two words in No. 1A ESS.

B. Conditional

7.06 The following memory is required only when the feature is activated.

- ***Call Store (duplicated CS):*** The call store words can be computed as follows:

  (a) The CS pickup group queue table = (2) × (highest PUGN for the engineering period) + 4.

  (b) The CS table for traffic peg counts of DPU activation per Centrex group = number of Centrex groups + 1.

  (c) Number of CS words for conference registers =(32) × (increased number of conference circuits).

Item (b) is uniquely chargeable to the DPU feature. No additional cost is incurred for item (a) when the DPU feature is added to an existing call pickup group. The total cost is applicable when item (a) is created exclusively for the DPU feature. The cost is to be shared when the DPU feature and the call pickup feature are being activated simultaneously. A similar situation applies in relation to item (c) and other features using conference registers.

C. Variable

7.07 The following memory is required when DPU is provided on a ***line*** basis.

- ***Translation (unduplicated CS, file store):*** The increase in number of words varies between four and zero dependent upon the following:

  (a) A minimum of four additional words is required when a line does not have a DN auxiliary block. Only two of these word are actually used by DPU: Call pickup and DNCL2.

  (b) Two words are required where a line has a DN auxiliary block, but does not have the call pickup and DNCL2 words.

  (c) One word is required where a line has a DN auxiliary block and a DNCL2 word, but does not have the call pickup word.

  (d) No additional words are required for a line that is already translated for CPU.

7.08 The following memory is required when DPU is provided on a per ***multiline hunt group*** (MLHG) basis.

- ***Translation (unduplicated CS, file store):*** The increase in number of words varies between two and zero dependent upon the following:

  (a) Two words (call pickup and DNCL2) are required in the MLHG common block when DNCL2 is not already there.

  (b) One word (call pickup) is required when DNCL2 is already in the MLHG common block.

  (c) No additional words are required when the MLHG is already translated for CPU.

PROCESSOR TIME

7.09 The impacts on processor capacity in terms of processor time are:

(a) Cycles required per incoming call to each DPU extension to place RR on pickup queue and to remove it when no pickup request is originated (shared cost whenever customer has other feature(s) requiring use of RR on pickup queue):

- No. 1 ESS: 50

- No. 1A ESS: 100

(b) Cycles required per directed call pickup of an unanswered call, including (a):

- No. 1 ESS: 4100
- No. 1A ESS: 8100

(c) Cycles required per directed call pickup of an answered call (barge-in), including (a) and (b) up to the point where the pickup queue is checked (Fig. 5, Part A):

- No. 1 ESS: 6550
- No. 1A ESS: 12,900

7.10 The cycle time for the No. 1 ESS is 5.5 usec. The cycle time for the No. 1A ESS is 0.7 usec.

HARDWARE

7.11 The barge-in function of the DPU feature utilizes 3-port conference circuits SD-1A284-01 and tone circuits SD-1A218-01. Each 3-port conference circuit requires three scan points and nine signal distributor points. Each call waiting tone circuit requires one scan point and two signal distributor points.

8. AVAILABILITY

8.01 The DPU feature is available with Issue 1 of the CC-CTX-7 and SP-CTX-7 and later No. 1 ESS generic programs. It is available with Issue 1A2W<G1>1 and later No. 1A ESS generic programs.

8.02 The DPU feature has not been retrofit into earlier generic programs.

CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM

9. PLANNING

9.01 Not applicable.

10. HARDWARE

10.01 The trunk order code for the 3-port conference circuit (SD-1A284-01) is 04370.

10.02 The order code for the standard tone circuit (SD-1A218-01) is 07870. The order code for the miniaturized version is 07800.

10.03 Refer to the appropriate schematic diagram for power and current requirements.

11. DETERMINATION OF QUANTITIES

HARDWARE

11.01 For determination of quantities of the SD-1A218-01 (tone) and SD-1A284-01 (3-port) service circuits see references listed in Part 19. B. (11) and B. (12) for No. 1 ESS and No. 1A ESS, respectively.

MEMORY

11.02 Conference registers are provided on a one-to-one basis with 3-port conference circuits. However, conference registers without corresponding 3-port conference circuits are utilized for approximately 500 ms when a DPU request is initialized from a previously idle station to pick up an unanswered incoming call. The significance of this fact is dependent upon the primary use to be made of the DPU feature by the customer. The number of conference registers is defined by set card NCF.

11.03 One call store word is required per Centrex customer group to record the DPU activations traffic count. The number of Centrex groups + 1 is defined by set card CTG.

11.04 Two call store words are required per call pickup group for the pickup group queue table. The number of pickup groups is defined by the TAI and PUG set cards. The TAI set card defines the maximum number of trunk answer indexes. The PUG set card defines the maximum number of pickup groups; TAI + PUG + 1 $\leq$ 4096.

11.05 Additional information on determination of memory impact is given in references listed in Part 19 B. (1), B. (2), and D. (2) for the No. 1 ESS and in Part 19 B. (3), B. (4), B. (5), B. (6), and D. (3) for the No. 1A ESS.

12. ASSIGNMENTS AND RECORDS

ASSIGNMENT RECOMMENDATIONS AND GUIDELINES

12.01 Pickup group numbers (PUGNs) should be assigned sequentially starting from 1 to prevent waste of call store. Using lower values of the pickup group queue table first will reduce its engineered size.

INPUT AND RECORD KEEPING

A. ESS Translation Forms

12.02 The following ESS translation forms, detailed in the reference listed in Part 19. D. (1), are affected by the DPU feature:

(a) ESS 1101—Directory Number Record: contains a DPU indicator on a per station basis.

(b) ESS 1105 or ESS 1115—Mutiline Hunting Group Record: provides the call pickup feature indicator on a per multiline hunting group basis.

(c) ESS 1107—Supplementary Information Record: contains a call pickup group number (type 61 entry) on a per station basis.

(d) ESS 1108—Call Pickup Groups-Index: identifies pickup group numbers and their associated Centrex group number and ESS 1107 form entry.

(e) ESS 1109—Centrex Group Record: provides records of access codes which are used to initiate directed call pickup actions (Data Type 5, Subtype 5, Sub-subtype 1).

B. Recent Change (RC) Messages

12.03 The following RC messages are affected by the DPU feature:

RC Message	Functions
RC:CTXDI	Builds DTYP5, STYP5, SSTYP1 Centrex digit interpreter table entry for the DPU feature. Details are given in references listed in Part 19. A. (5) and A. (16).
RC:LINE	Adds DPU feature to Centrex lines by utilizing keyword DMA—directed call pickup. Details are given in references listed in Part 19. A. (7) and A. (8).
RC:MLHG	Adds DPU feature to Centrex multiline hunt group by utilizing keyword DMA-directed call pickup. Details are given in references listed in Part 19. A. (7) and A. (8).

UNIFORM SERVICE ORDER CODES (USOC)

12.04 The uniform service order code (USOC) for the DPU feature is DMA.

13. NEW INSTALLATION AND GROWTH

13.01 The new installation procedure for adding the DPU feature to a Centrex customer is illustrated in Fig. 6.

13.02 The DPU feature can be added to a station using the recent change messages (Part 12) when an existing pickup group is available. When no pickup group is available or when the pickup group is being engineered for the first time, a parameter run must precede the use of the service order code.

14. TESTING

14.01 TTY input and output messages given in references in Part 19. C. can be used to verify the DPU feature. The messages are:

(a) VFY-DN verifies features associated with one or a group of directory numbers. System should respond with a TR01 output message.

(b) VFY-LEN verifies features associated with a line. System should respond with a TR03 output message.

(c) VFY-XDGNT verifies the information in the Centrex digit interpreter. System should respond with a TR18 output message.

(d) VFY-CSTG-34 verifies the common block for the multiline hunt group. System should respond with a TR15 output message.

14.02 To verify that the DPU feature has been assigned to a station, perform a test call

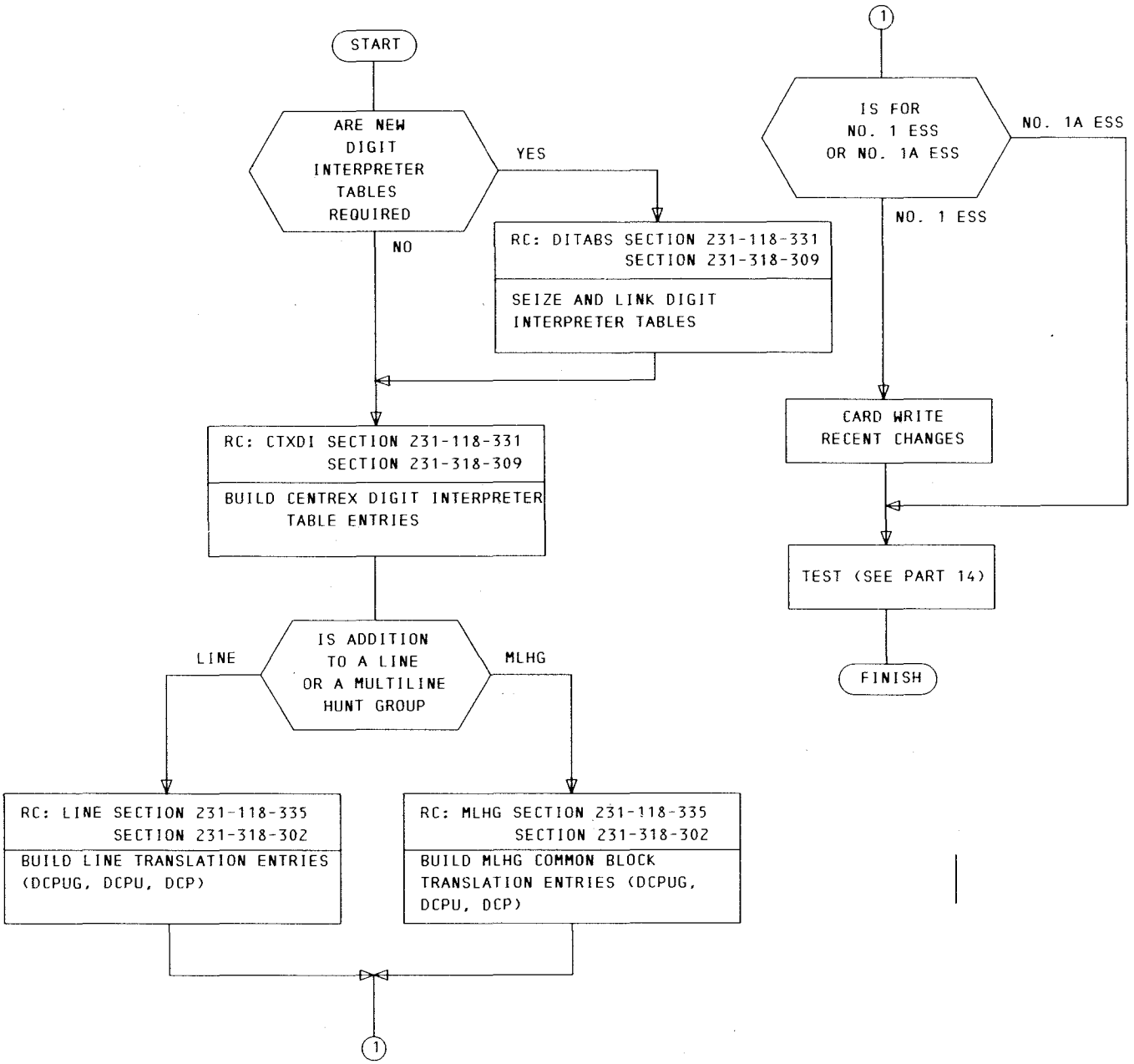


Fig. 6—Procedure for Adding DPU Feature

to the station and originate a DPU request to that station from another station within the Centrex complex. Test calls should be made to pick up the DPU extension in all three states: unanswered (ringing), talking connection, and on key-hold (if applicable).

15. MEASUREMENTS

15.01 Traffic peg counts for DPU activations are kept per customer group. The counts are available for H, C, and DA15 schedules under

Traffic Measurement Code (TMC) 52. See references listed in Part 19. A. (13) and D. (1).

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

Barge-in	A capability of the DPU feature allowing the DPU originator to bridge onto an established talking connection involving the DPU extension and another party.
Centrex Complex	Two or more Centrex groups sharing certain features, such as tie line, FX trunks, call pickup groups, etc.
Centrex Group	A group of facilities (lines, trunks, attendants, features, etc.,) with a common dialing pattern providing Centrex service features.
DPU Extension	The terminating station having the DPU feature.
DPU Originator	The user who originates a directed call pickup request from any station in the Centrex complex.
Pickup Group	A group of terminals with defined directory numbers sharing common pickup features.
Pickup Queue	A waiting area in call store assigned to each pickup group, where the ringing register associated with an incoming call is placed to await ring-trip, abandon, or a pickup request.

18. REASONS FOR REISSUE

18.01 Not applicable.

19. REFERENCES

A. Bell System Practices

(1) Section 231-090-089—Feature Document, Call Pickup (CPU) Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(2) Section 231-090-073—Feature Document, Call Forwarding Features, 2-Wire No. 1 and No. 1A Electronic Switching Systems (When published)

(3) Section 231-090-076—Feature Document, Call Hold (CHD) Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(4) Section 231-090-081—Feature Document, Call Waiting Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(5) Section 231-118-331—Centrex-CO Recent Change Procedures (CTX-6 and -7 Generic Programs), 2-Wire No. 1 Electronic Switching System

(6) Section 231-318-309—Centrex-CO Recent Change Formats (1A2W<G1>1 Generic Program), 2-Wire No. 1A Electronic Switching System (When published)

(7) Section 231-118-335—Line Recent Change Procedures (Non-Centrex and Centrex) (CTX-7 and Later Generic Programs), 2-Wire No. 1 Electronic Switching System

(8) Section 231-318-302—Line Recent Change Formats (Non-Centrex and Centrex) (1A2W<G1>1 and Later Generic Programs), 2-Wire No. 1A Electronic Switching System (When published)

(9) Section 231-118-329—Traffic Measurement Recent Change Procedures (CTX-6 and Later Generic Programs), 2-Wire No. 1 Electronic Switching System

(10) Section 231-318-307—Traffic Measurement Recent Change Format (1A2W<G1>1 and Later Generic Programs), 2-Wire No. 1A Electronic Switching System (When published)

(11) Section 966-102-100—Centrex and PBX-CO Service, General Description, 2-Wire No. 1 Electronic Switching System

(12) Section 231-090-401—Feature Document, Speed Calling Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems (When published)

(13) Section 231-120-301—Traffic Measurements, 2-Wire No. 1 Electronic Switching System

B. Traffic Facilities Practices

(1) Division D, Section 10g.-Program Stores, No. 1 Electronic Switching System

(2) Division D, Section 10h.-Call Stores, No. 1 Electronic Switching System

(3) Division D, Section 11f.(5)-Duplicated Call Stores, No. 1A Electronic Switching System (When published)

(4) Division D, Section 11f.(6)-Unduplicated Call Stores, No. 1A Electronic Switching System

(5) Division D, Section 11f. (7)-Program Stores, No. 1A Electronic Switching System

(6) Division D, Section 11f. (8)-File Stores, No. 1A Electronic Switching System

(7) Division D, Section 10i.-Traffic Measurements, No. 1 Electronic Switching System (When published)

(8) Division D, Section 11g.-Traffic Measurements, No. 1A Electronic Switching System (When Published)

(9) Division D, Section 10j.-Centrex, No. 1 Electronic Switching System

(10) Division D, Section 11h.-Centrex, No. 1A Electronic Switching System (When published)

(11) Division D, Section 10d.-Service Circuits, No. 1 Electronic Switching System

(12) Division D, Section 11d.-Service Circuits, No. 1A Electronic Switching System (When published)

C. TTY Input and Output Manuals

(1) Input Message Manual IM-1A001 (No. 1 ESS)

(2) Output Message Manual OM-1A001 (No. 1 ESS)

(3) Input Message Manual IM-6A001 (No. 1A ESS)

(4) Output Message Manual OM-6A001 (No. 1A ESS)

D. Other References

(1) Translation Guide TG-1A, No. 1 ESS 2-Wire

(2) Office Parameter Specification PA-591001, No. 1 ESS - 2-Wire

(3) Office Parameter Specification PA-6A001, No. 1A ESS - 2-Wire

(4) Translation Output Configurations PA-591003, No. 1 ESS - 2-Wire

(5) Translation Output Configurations PA-6A002, No. 1A ESS - 2-Wire

(6) Schematic Diagram and Circuit Description SD-1A218-01—Tone or Recorded Announcement Circuit

(7) Schematic Diagram and Circuit Description SD-1A284-01—3-Port Conference Circuit with Autonomous Termination

(8) GL75-02-071 (EL3848) Speed Calling and Customer Changeable Speed Calling Feature, FD 231-190-401, No. 1 Electronic Switching System.