AUTOMATIC CALL DISTRIBUTION—PHASE 1 FEATURE

FEATURE DOCUMENT

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

INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 This document provides general information on a group of features and capabilities which comprise the Automatic Call Distribution—Phase 1 (ACD1) System. Refer to the following feature documents for detailed information.

(a) ACD1 features:

(1) ACD Multiline Group Hunt (Section 231-090-336)

(2) Tones and Announcements to Agents (Section 231-090-338)

(3) ACD Queueing and Call Distribution to Agents (Section 231-090-339)

(4) Interface With 60A Customer Premises System (Section 231-090-422)

(5) Interface With 90A Customer Premises System (Section 231-090-424).

(b) Related features:

(1) ACD Line and Interface Maintenance (Automatic Line Insulation Test) (Section 231-090-052)

(2) Calls Waiting Lamps (Section 231-090-082)

(3) Delay Announcements (Section 231-090-123)

(4) Selected Traffic Data to Customer (Section 231-090-340)

(5) Interface With Common Systems Recorded Announcement Frame (Section 231-090-411).

REASON FOR REISSUE

1.02 This document is reissued to improve the overall description of the ACD1 System and to delete redundant detailed information pertaining to specific features that is contained in the documents listed above. Since this is a general revision, change arrows have not been used because there are no technical changes.

FEATURE AVAILABILITY

1.03 All ACD1 System features are available in all active No. 1 and No. 1A Electronic Switching System (ESS) generic programs. (Certain options are available with later generic programs; see Part 2.) Optionally loaded feature groups required to provide the ACD1 System features are:

- ACD—ACD (Phase 1)

- CTRF—Customer Traffic Data

- IRES—Inquiry and Response System.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The *Automatic Call Distribution—Phase 1 (ACD1) System* features are used to con-
centrate, queue, and evenly distribute incoming calls to assigned attendants (agents) with maximum efficiency.

BACKGROUND

Note: When considering an ACD System for a particular customer application, consideration should also be given to Basic ACD (Section 231-090-269) and ACD—Phase 2 (Section 231-090-399).

2.02 The ACD1 System improves the call handling performance for a customer with heavy incoming call characteristics (reservation center, catalog sales, classified, etc). It efficiently routes incoming ACD calls to functional groups (splits) where agents can perform any service that the agent wishes to provide. Agents can be assigned to reporting groups (not necessarily the same grouping as functional groups) for furnishing traffic and performance data to supervisory personnel so that the agent's work effort can be optimized.

2.03 The ACD1 System has the capability to serve up to 1000 agents divided into 30 functional groups. The customer can reassign agents to particular functional groups to handle special types of calls without wiring changes or rearrangement by the telephone company.

2.04 The ACD1 System offers the customer all the benefits of ESS central-office-based telephone service plus flexible, modern features. The ACD1 System and related features are described in the following paragraphs. See the applicable feature documents listed in paragraph 1.01 for greater details.

2.05 The *ACD Multiline Group Hunt* feature equitably distributes terminating traffic among assigned agents. It also provides the capability of controlling the amount and direction of incoming traffic and adjusting the work force available for handling this traffic.

2.06 The *Tones and Announcements to Agents* feature provides the following tone and announcement options.

(a) The *zip tone* option provides a tone to an agent which indicates that a call is going to be terminated at the agents console.

(b) The *city-of-orgin announcement (COA)* option provides an audible announcement to

the agent identifying the origin of the incoming trunk group.

(c) The *audible indication of intraflowed or interflowed calls* option provides a signal to an agent to indicate receipt of a call. This signal takes the place of zip tone and consists of 100-millisecond tones spaced 100-milliseconds apart for 500±100 milliseconds.

(d) The *daily announcement* option provides agent dialup access to a customer recorded daily announcement which is provided from customer premises equipment.

2.07 The *ACD Queueing and Call Distribution to Agents* feature provides methods for retaining and sequencing incoming calls and uniformly distributing the traffic load to each agent. Capabilities available with the ACD1 System are as follows:

(a) *Alternate server intraflow* places calls on their primary queue but allows them to be serviced by agents associated with other queues in the same office. Where service is by another ACD, access is via lines.

(b) *Alternate server interflow* places calls on their primary queue but allows agents associated with another ACD in the same or different office to serve these calls. Service is via customer dedicated trunks.

(c) *Night transfer service* reroutes calls to some other location via a *night directory number (NDN)* when activiated via the local night key. The NDN is changeable via service order or by the customer if the NDN leads to a line termination and the night line has the Call Forwarding Variable (CFV) feature.

(d) *Priority queueing* assigns one level of priority to special incoming calls. These priority calls are serviced in order of arrival ahead of nonpriority calls.

(e) *Abandoned call search* insures that incoming foreign exchange (FX) or tieline calls are not connected to an agent position when the calling party has abandoned after the call is routed to a delay announcement (answer supervision returned).

(f) An *inhibit outflow key* can be provided on a per queue basis to prevent a queue from re-

questing help from other queues regardless of the time limit.

(g) An *inhibit inflow key* can be provided on a queue basis to prevent a queue from accepting calls from other queues regardless of the holding time of this queue.

2.08 The *Interface With 60A Customer Premises System (CPS)* feature provides agent and supervisor equipment through which a large volume of calls can be uniformly distributed to a group of agents while providing supervisory personnel with traffic and performance data to efficiently manage the call-handling operation. The 60A CPS consists of agent and supervisor consoles (500A), display units (103A1), selector consoles (8A1), calls waiting indicators ("beehive"), and customer premises cabinet(s) J59205. Each cabinet houses the control and interface circuits for up to 72 agents and supervisors.

2.09 The *Interface with 90A Customer Premises System* feature is used for system reconfiguration, display, and control. Control and display of the system configuration are provided by a 102A1-B display unit. The ACD customer uses the 90A CPS to:

● Administer functional groups

● Administer reporting groups

● Display and zero peg counts of ACD calls.

2.10 The *ACD Line and Interface Maintenance* feature provides sequential and single line demand tests on idle, position busy, or out-of-service ACD lines equipped with agent interface circuits. The sequential tests include all automatic line insulation tests and agent interface circuit tests. Single line tests also include off-hook tests.

2.11 The *Calls Waiting Lamps* feature provides visual indicators (lamps) that indicate the status of calls waiting in queue to be answered. The states of the lamps indicate the length of time a call has been waiting.

2.12 The *Delay Announcements* feature provides for automatic routing of incoming calls to multiline hunt groups to one or more prerecorded announcements when the call is not serviced within a preset time interval. The following options are available for ACD1 customers.

(a) The *Fixed Delay Announcement* option provides an announcement to the calling party indicating that there will be a delay before service can be provided. After the call has been on queue and receiving audible ringing for a predetermined (customer specified) length of time, the call is connected to an announcement channel and receives a 10-second announcement. Following the announcement, the customer can specify that the call be connected to silence, audible ringing, or customer provided music source. After another predetermined period of time, the call can be connected to another announcement. A maximum of four unique delay announcements can be provided per queue. Announcement content and timing are customer specified and changeable by service order.

(b) The *Flexible First Delay Announcement* option (also known as Load Dependent First Delay Announcement) provides for initially connecting an incoming ACD call to one of two possible delay announcements after being placed in queue. The selection is based upon the time that the longest queued call has been waiting to be serviced. Announcement content and timing are customer specified and changeable by service order.

2.13 The *Selected Traffic Data to Customer (CTRF)* feature provides for collecting and reporting traffic data related to agents, trunk groups, queues, etc. These counts are gathered at the ESS and appear on the hourly (H) and continuous (C) traffic schedules. The data is then transmitted, via dedicated facilities, to the customer's premises where it is printed on a teletypewriter (TTY). Optionally, the data can be displayed via a light-emitting diode (LED) terminal of the 90B CPS.

2.14 Nonusage Trunk Scanning (NUTS) and Locked-up Trunk Scanning (LUTS) reports are provided as part of the CTRF feature.

(a) The *NUTS* report is a summary of customer-leased trunks (trunk network numbers) that have not been found traffic busy during the preceding 2 hours. This printout occurs once every 2 hours on the customer traffic TTY and, optionally, may also be printed at the central office. An optional NUTS summary report inhibit key may be provided on the customer's premises.

(b) The *LUTS* report is a summary of facilities that have been on the high and wet list for 2

hours or more. The LUTS summary report is included with the NUTS summary report.

2.15 The *Interface With Common Systems Recorded Announcement Frame (CSRAF)* feature is required if the customer is to record announcements from a remote location (eg, the customer's premises). If this is not a consideration, recorded announcement frame J1A058A or J1A058C may be used.

DESCRIPTION

3. USER OPERATION

CUSTOMER

A. System Configurations

3.01 In its most basic configuration, the ACD1 System consists of the 60A CPS, plus the following features:

- Multiline Group Hunt
- Queueing and Call Distribution
- Tones and Announcements to Agents
- Delay Announcements
- Calls Waiting Lamps.

Options of the above features can be selected as desired by the customer or as required for a particular application. See Part 2.

3.02 Optionally, enhanced capabilities may be included in the ACD1 System by adding the following features:

- 90A CPS
- CTRF (also requires TTY and/or 90B CPS)
- CSRAF (required in central office).

3.03 Figure 1 depicts the ACD1/ESS interface with all customer premises equipment.

B. Basic System

3.04 The ACD1 System uniformly distributes incoming ACD traffic among a group of agents
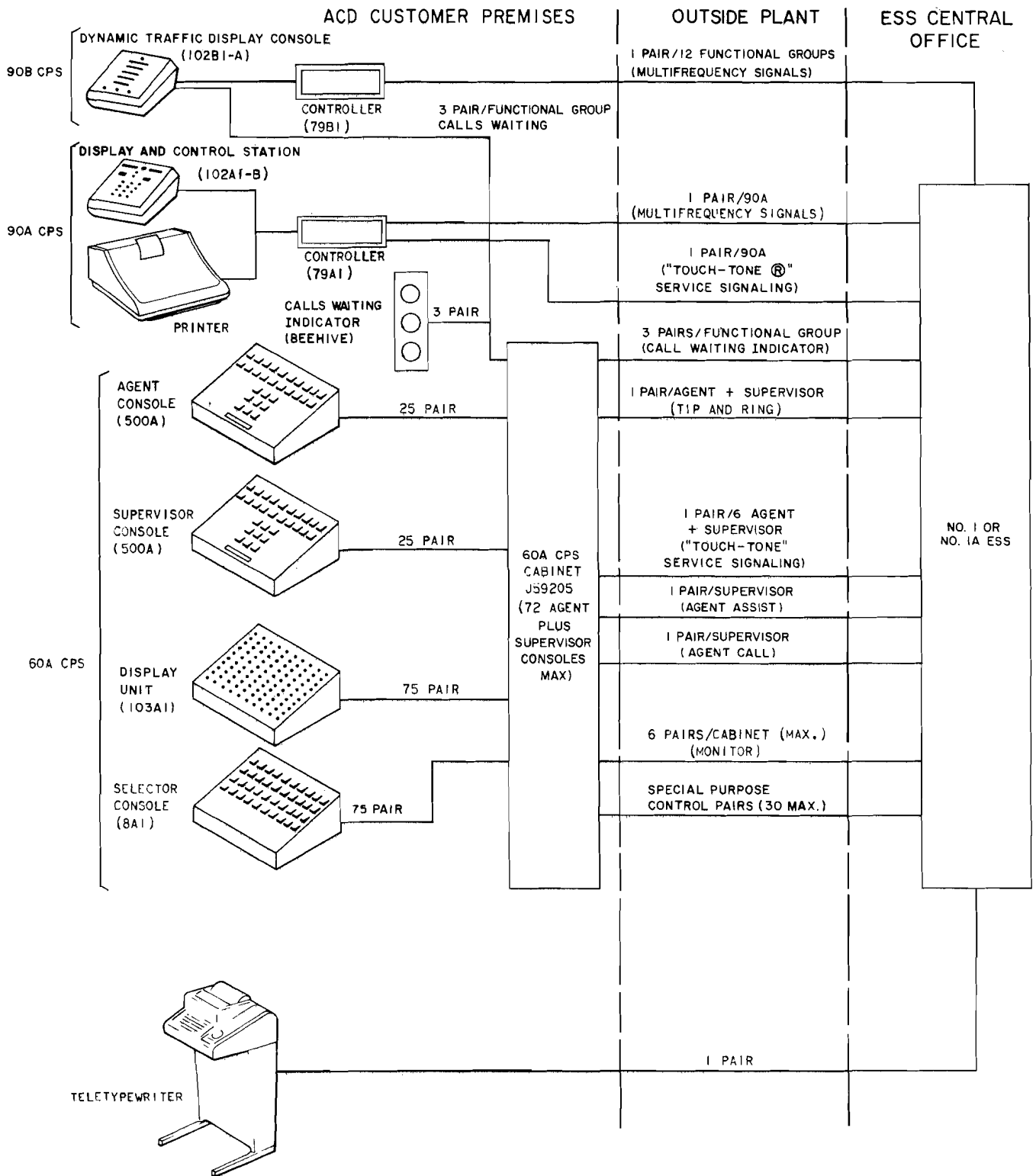
Fig. 1—ACD1 Customer/ESS Central Office Interface

assigned to a functional group by sequentially hunting for an available agent. The hunting process is circular and starts with the next agent position in the sequence following the last position to receive a call. Hunting progresses prior to the arrival of the next call and locates an available agent position. If this agent is no longer available when the next call arrives, the hunt resumes. When an idle agent is found, the call is assigned to that position. If an idle agent cannot be found, the call is placed in queue.

3.05 The incoming call is processed on the agent console (500A type). The IN key is depressed when the agent is available to receive an incoming call. The zip tone (500 ± 100 milliseconds of audible tone) is supplied to the agent to indicate a new ACD call. This tone is inaudible to the calling party. The zip tone can be replaced by a distinctive audible signal (100-millisecond bursts of tone spaced 100 milliseconds apart for 500 ± 100 milliseconds) to indicate receipt of an intraflowed or interflowed call. Immediately following zip tone, an announcement, intended to identify the city from which the incoming ACD call originated, is applied to the agent console. The incoming call is delayed for approximately 2.3 seconds to allow for ring-trip, zip tone application, the announcement, and the required switching functions. After the agent serves the calls, the RLS (release) key is depressed to release the active line from the console, and the agent is available for the next incoming ACD call.

3.06 *Fixed Delay Announcement* provides an announcement to the calling party which indicates that there will be a delay before service is provided. Following the announcement, the customer can specify that the call be connected to a silent termination, audible ringing, or to a customer-provided music source. A maximum of four unique delay announcements can be provided per queue.

3.07 *Load Dependent First Delay Announcement* provides an appropriate first delay announcement to an incoming ACD call based upon the time in queue for the longest delayed call. One of two possible delay announcements are selected (by the ESS) based upon the call-waiting thresholds. This feature is only applicable to the first delay announcement received by the calling party.

3.08 An ACD customer can place a functional group in the *Night Transfer Service* state by depressing the LOCAL NIGHT key on the 8A1 se-lector console. All calls to that functional group will then be forwarded to (1) another functional group, (2) another ACD, or (3) to a group of telephones as predesignated by the ACD customer.

3.09 With *Priority Queueing,* the ACD customer can designate that calls from specific originating lines or trunk groups, or calls to specific ACD directory numbers, be placed on a queue for the first available ACD position before other waiting calls that are nonpriority. Priority calls are intraflowed or interflowed only when the night transfer service is activated or with alternate queueing intraflow if the primary queue is full.

3.10 *Abandoned Call Search* is a search for calling party disconnect performed on incoming FX and tie trunks, which have received delay announcement(s), before connection is made to an agent. This prevents an incoming ACD call from being connected to an agent when the calling party has disconnected subsequent to hearing the announcement(s).

3.11 The 500A-type telephone agent console has two rows of ten keys mounted in horizontal strips. Any feature or function provided by key operation can be mechanically blocked if not desired by the customer. The system is so arranged that an agent can signal the supervisor for assistance or to discuss problem areas peculiar to a specific call. Calls can be transferred to a supervisor, another functional group, or administrative telephone. The agent can also receive and process non-ACD calls, if required, and has access to such optional features as Call Transfer (including consultation hold and add-on), Call Hold, Call Pickup, and Speed Calling. Through depression of console keys, the agent can initiate trouble traces, alert the supervisor to a unique (emergency) condition, and operate the console during loss of commercial power if no local reserve is provided.

C. Optional Features

3.12 The 90B CPS provides the ACD customer with five preselected 3-digit traffic counts (referred to as a display group). Updated traffic counts are sent out from the ESS to the customer's premises every 100 seconds over a dedicated trunk. For each customer traffic group, an ACD customer may receive up to 12 display groups of counts. Thus, if a customer has 12 display groups with 5 traffic counts per

traffic display console, a total of 60 unique traffic counts can be displayed. The ACD customer may have a display group routed to as many as five dynamic traffic display consoles. This option is referred to as multipling. Even though five dynamic traffic display consoles may be provided per display group, only twenty 90B CPS traffic display consoles are allowed per ACD customer. In addition, the console has three calls-waiting indicators (multiples of the "beehive" calls-waiting lamps) to indicate that functional group's delay status. An alarm indicator (labeled invalid data) is provided in the event that invalid data is detected by the ESS. This invalid data indicator is triggered when data is not sent from the ESS within approximately 300 seconds. The LED displays on the display console provide the following traffic data on a per-functional group basis:

    (a) Number of positions performing auxiliary work

    (b) Number of positions occupied

    (c) Number of calls on queue

    (d) Number of calls that have been waiting on queue for greater than X seconds, where X is a time interval specified by the ACD customer in increments of 3 seconds

    (e) Percent of calls answered before delay (percentage of calls answered within a customer-specified time since last printing).

3.13 A TTY located on the customer premises (a system option) is connected over a dedicated path to a TTY channel in the central office. This TTY channel outputs management information system data (traffic count data), nonusage trunk scan data, and lockup trunk scan data. The reports are provided at customer-specified intervals in multiples of 1/2 hour or totals keyed to the hour and the day. The display intervals can be changed by service order. This information is printed via a Model 35 or Model 43 receive-only TTY. The following data can be supplied to the ACD customer once every 1/2 hour. Following each type of data listed is a letter or letters representing the function of that count (F for functional group, R for reporting group, and T for trunk group).

    (a) Total queue usage (F)

    (b) Number of queue overflows (F)

    (c) Number of calls abandoned (F)

    (d) Number of direct incoming calls (F and T)

    (e) Number of calls answered in less than X seconds (where X is a number of seconds as specified by the ACD customer) (F)

    (f) Number of calls answered in greater than X seconds (F)

    (g) Number of calls placed on queue (F)

    (h) Number of calls transferred out (F and R)

    (i) Positions occupied usage (F and R)

    (j) Available and idle usage (F and R)

    (k) Auxiliary work usage (F and R)

    (l) After call work usage (F and R)

    (m) Number of outgoing calls (T)

    (n) Trunk group usage (T)

    (o) Number of outgoing overflows (T)

    (p) Trunk group maintenance usage (T)

    (q) Number of calls intraflowed in (F)

    (r) Number of calls intraflowed out (F)

    (s) Percent of all calls answered that were answered in less than X seconds (F)

    (t) Number of outgoing extension calls (F and R)

    (u) Incoming talk time usage (F and R)

    (v) Extension talk time usage (F and R)

    (w) Number of calls transferred in (F and R)

    (x) Number of trouble reports (T).

TELEPHONE COMPANY

3.14 Not applicable.

4. SYSTEM OPERATION

HARDWARE

A. General

4.01 Refer to Part 3 for hardware required on the customer's premises. Hardware required in the ESS office is described below for the applicable feature.

B. 60A CPS

4.02 The attendant interface frame (AIF) J1A089A and a TOUCH-TONE service signaling pair (one per six agent/supervisor consoles) are required to provide the interface with the customer premises equipment.

4.03 The attendant interface circuits SD-1A353 (J1A089AA) are required to provide the link between the central office and the agent consoles.

4.04 A master scanner applique circuit SD-1A133 (J1A033FD) is required to provide the connecting of miscellaneous circuits (special purpose control pairs).

4.05 Outgoing trunk circuits for local and tandem reverse battery supervision SD-1A165 (J1A032BB or J1A084BB) are required to provide the monitoring function for supervisor consoles.

C. Tone and Announcements

4.06 The city-of-origin trunk applique unit SD-1A343 (J1A342JS) provides the interface between the recorded announcement circuit and the FX (short haul) trunk circuit.

4.07 Two-way trunk circuits SD-1A358 (J1A033CM) (E&M lead supervision multifrequency) and SD-1A359 (J1A033CN) (E&M lead supervision dial pulsing) are used to provide the city-of-origin announcement feature.

4.08 Foreign exchange trunk circuits SD-1A360 (J1A033CP) (for long haul FX trunks) and SD-1A241 (J1A033CF) (for short haul FX trunks) are also used to provide the COA feature.

D. Delay Announcements

4.09 Audible ring and recorded announcement circuits SD-1A221 (J1A033DT or J1A088DT) are required to provide connecting trunks with nonbarge-in delay announcements.

4.10 Tone and recorded announcement circuits SD-1A218 (J1A032DC or J1A084DC) are required to connect music or silence to incoming ACD call lines while on queue.

E. Calls Waiting Lamps

4.11 A signal distributor applique circuit SD-1A146 (J1A033FH) is required to carry out the function of closing a metallic path to operate calls waiting lamps.

F. 90A CPS/90B CPS

4.12 Two-way trunk circuits SD-1A192 (J1A032CB or J1A084CB) are required to operate the 90A CPS and 90B CPS.

OFFICE DATA STRUCTURES

> *Note:* Office data structures for ACD1 features and related features, covered by separate documentation, are briefly described in this part. For detailed information and layouts, refer to the applicable documents listed in paragraph 1.01.

A. Translations

60A CPS

4.13 The multiline group common block is required with 60A CPS. It contains translation information for the number of functional groups (NOS), reporting groups (NORG), and data groups (DAG).

4.14 The directory number (DN) auxiliary block is used to indicate a valid centrex terminating major class (TMAJ), and item C60A is set to 1 for all ACD lines using the 60A CPS console.

4.15 The line equipment number (LEN) auxiliary block contains the centrex originating major class (OMAJ) and item CSDA, which indicates that the multiline group uses call store in the H8DAG and H8MRCC tables.

4.16 The listed directory number (LDN) auxiliary block contains the functional group number to which calls to this DN are to be terminated. Item

TPRI may optionally be set to 1 to indicate calls to that listed DN are to be given priority treatment.

4.17 The DAG translator must have mask block index (MBI) set to indicate the mask block translator.

Calls Waiting Lamps

4.18 The centrex common block contains the supervisor position indicator (ST) in Word 20. This item, when set to 1, indicates supervisor position is provided.

4.19 The unit type (UTYP) 55 auxiliary block is required with calls waiting lamps. It contains translation information for data link control and nondata link control of calls waiting lamps monitoring line queued calls.

4.20 The lamp group translator contains a list of the data link groups to which the data link orders are transmitted. One lamp group auxiliary block is associated with every centrex data link calls waiting lamps customer.

4.21 A UTYP 29 auxiliary block is associated with customer agents if the data link type is equal to two. The remote data interface is used to retrieve a list of multiline hunt group terminal numbers associated with the data link and the data accumulation group number.

4.22 The data link group translator contains item BCW which is an indicator for "beehive" calls waiting (BHCW) lamps associated with agent consoles.

Delay Announcement

4.23 The UTYP 55 auxiliary block stores the delay announcement entries. The entries are as follows:

(a) AFDA—Service after delay announcement

(b) RLY—Relay method

(c) RI—Base route index (RI)

(d) NDARI—Number of delay announcment RI

(e) DA1, DA2, DA3, DA4—Delay announcement multiplication factor

(f) STON—Steady tone

(g) ISTN—Initial special tone starting point.

4.24 The trunk network number (TNN) associated with the SD-1A221 trunk circuit, which provides the orginal first delay announcement, is translated per the UTYP 47 auxiliary block. This translation associates the TNN with a trunk make-busy (TMB) key.

4.25 The trunk network number to trunk group number (TNN-TGN) auxiliary block is required to associate the trunk and the TMB circuits. The key member number (AKMN) defines the word location at the TNN within the assigned UTYP 47 auxiliary block group.

4.26 A master scanner primary translation is required to associate the UTYP 47 nontrunk program index (NTPI) to the member number of the corresponding TMB key number.

4.27 An RI expansion table is required for the alternate RI and stop RI.

4.28 The listed directory number (LDN) auxiliary block is utilized to provide selective delay announcements for calls incoming on certain trunks. The starting point (STP) is used in calculating the starting RI which accesses the delay announcement for the particular incoming call. The starting RI is found by adding the STP value to the number of announcements already given and the base RI.

4.29 Trunk circuits SD-1A221, having the Q and S options that are used for delay announcement routing, must be equipped with a trunk network number to peripheral equipment number (TNN-PEN) auxiliary block. Also, a trunk class code expansion table is required for the SD-1A221 trunk circuit and for the SD-1A218 trunk circuit.

ACD Queueing and Call Distribution

4.30 The UTYP 55 auxiliary block is required with queueing and call distribution. It requires 18 words although words 14 through 17 are not used.

4.31 The alternate server pool (ASP) translator is used to convert an ASP member number (ASPMN) to a queueing for lines and trunks (QTL) queue number. This translator is used with alternate

server intraflow (ASI) when queue has a delay time less than its program store inflow trigger in seconds (PIFT) and the system finds an ASPMN that this queue can help.

4.32 The UTYP 54 auxiliary block translations are required to specify the key type (KTYP), the associated queue number, and the master scanner address where night transfer, inhibit outflow, or inhibit inflow keys are provided.

4.33 The DN auxiliary block contains an RI which leads to a trunk group. The existence of the QTL queue number provides QTL queueing based on the dialed DN. A priority call cannot supplant a nonpriority call if the queue is full.

4.34 The LEN translation for the originating Centrex/ESSX-1 service line requires that bit 11 (item OP) must be set to provide originating priority handling for this line or trunk.

4.35 A simulated facilities group can optionally be associated with a QTL queue (eg, for interflow). The fourth word contains the QTL queue number in bits 7 through 0. The simulated facilities auxiliary block is four words in length.

B.   Parameters/Call Store

Calls Waiting Lamps

4.36 The centrex console group head cell contains timing counter and time period indicators used to operate the calls waiting lamps.

4.37 The calls waiting lamps on the consoles are controlled via two ferreed switches and stored data located in word 4 of the centrex console register. The QTL call store head cell contains processing information used with the UTYP 55 auxiliary block data for activating the lamps controlled via nondata link orders for line queued calls. Parameter word Z3LMPG points to a call store block used to store information for agent calls waiting (AGCW) and BHCW lamps.

ACD Queueing and Call Distribution

4.38 Parameter word M5INT2 defines the length and starting address of the alternate server intraflow overload blocks. The length and starting address of the QTL head tables is defined by parameter word M5MILH. Queueing registers are required to provide ACD service, and simulated facilities registers are required for interflow trunks.

Delay Announcements

4.39 The Delay Announcement feature requires QTL call store head cell (AQTLHT) addressed by parameter word M5MILH. Set card AQTLG defines the quantity of customer queueing groups for the present engineering period.

4.40 The loading of the QTL delay announcement feature package 9FQDAN affects QTL call store head cell items SADA, RLY, NDA, BASE RI, DA1, DA2, DA3, DA4, NUM DA, and STON.

4.41 The Delay Announcements feature utilizes four words, 0, 1, 3, and 9 of the QTL call store head cell.

4.42 The general purpose queueing register is seized when an incoming call encounters line queueing. The register contains delay announcements data items DA, AGDA, REL, FAIL, NDA, FREE, AFDA, SUPOC, DELTI, and STP.

FEATURE OPERATION

4.43 When a call is made to one of the listed directory numbers (LDNs) assigned to the ACD customer, the directory number translator returns the queue number onto which the call is to be loaded. If that queue number is in the night transfer state (activiated via the LOCAL NIGHT key located on the 8A1 selector console), then that incoming call will be routed to a night directory number. This night directory number may be (1) in another functional group, (2) in another ACD, or (3) to a group of telephones (any 10-digit directory number) as predesignated by the ACD customer. If that queue is not on night service and there is space on the seized queue, a check is made to determine if the calling party is entitled to priority service.

4.44 A call has priority if (1) the directory number dialed has the priority bit set in its directory number translation (regardless of whether the call is intrasystem or not) or (2) the incoming line or trunk has the priority bit set in its LEN translator. If a call is entitled to priority service, the call is placed on queue in front of nonpriority calls; otherwise, the call is loaded at the end of the queue. After being placed on queue, the calling party is given audible ringing.

4.45 If the ACD customer has the delay announce-
ment feature and a call remains on queue
after a predetermined time interval is exceeded, the
calling party receives a delay announcement. The
service after delay announcement option, if applica-
ble, forces the caller to hear one announcement be-
fore the call can be answered. An ACD customer may
specify from one to a maximum of four delay an-
nouncements per queue and specify the content of
each message and time intervals between announce-
ments.

4.46 A facility that will provide the best service is
then selected. This facility can be (1) an agent
console in the primary functional group (as specified
by the LDN), (2) an agent console in an alternate
functional group (intraflow), or (3) a trunk in an out-
going trunk group (interflow).

4.47 If the selected facility requires interflow, a
trunk is seized going to the distant ACD Sys-
tem and outpulsing is performed. After receiving
answer report from the far-end ACD, the COA is sup-
plied to the agent (if applicable). The COA is supplied
by the outgoing facility if the incoming facility does
not have the announcement feature. The talking path
is then completed between the calling party and the
agent. If the selected facility is not a trunk facility
(ie, an alternate functional group or the primary
functional group), an ACD multiline hunt is per-
formed to find an idle agent console.

4.48 Active queues (those which have at least one
idle console in the associated functional
group) are unloaded periodically. Before a call is un-
loaded from the queue, an ACD multiline group hunt
must be performed to determine the most idle agent
console in the functional group. Each functional
group is assigned a block of call store. This call store
area is the functional group assignment block for the
multiline group hunt activity block. Each bit in the
functional group assignment block corresponds to a
particular agent console in the ACD. That bit is set
(equal to 1) in the mask block corresponding to the
functional group to which the agent console is as-
signed and is reset (equal to 0) in all other functional
groups.

4.49 When a call is unloaded from the queue, the
functional group assignment block associated
with the functional group to which the call is to be
completed is accessed. The first word of this block
contains the start hunt pointer which indicates with

which terminal (agent console line) the hunt is to
begin. The hunt then proceeds by performing a logi-
cal "AND" function between the functional group
mask block and the activity block to obtain the next
idle agent console which is assigned to that particu-
lar functional group.

4.50 When an idle console is found, the activity bit
corresponding to that console is updated to
indicate its busy status, and the ringing connection
is established. The start hunt pointer in the func-
tional group assignment block is then updated to
point to the row which contains the next available
agent console.

4.51 Before the connection is made to an agent, an
abandoned call search is performed on all in-
coming FX and tie trunks which have received delay
announcement(s). If an on-hook indication is re-
turned from the originating office (indicating aban-
don), the call is removed from the system and the
trunk is not connected to the agent console. If the
calling party is found in the off-hook condition, pro-
cessing is continued.

4.52 Before applying the actual ringing current to
the agent console, a relay is operated in the
agent interface circuit associated with the agent con-
sole. This action cuts through the applique circuit
and allows a ringing current to pass to the agent con-
sole. When the console recognizes the 20-Hz ringing
signal, it automatically trips, sending an answer sig-
nal back to the ESS. When the ESS recognizes the
answer signal, an optional agent alert signal (called
zip tone, consisting of a 0.5- ± 0.1-second burst of tone
at 480 Hz) is applied to the agent line. Zip tone alerts
the agent that an incoming ACD call is terminated
at the console.

4.53 After receiving zip tone (if applicable), checks
are performed to determine if the COA fea-
ture should be provided. This announcement informs
the agent of the city from which the incoming call
originated. The ESS determines whether the call is
entering the office via a FX or tie trunk, normal di-
rect distance dialing network, 800 Service, or local
line. If the call is on a facility that does not have the
announcement capability, the announcement is pro-
vided via relay operation. If the incoming ACD call
is on a trunk that has the announcement capability,
the agent will be given COA via the incoming facility.
At the conclusion of COA (or zip tone if COA is not
subscribed to), the applique circuit is switched to the
talking state.

4.54 Once an ACD call has been terminated to an agent position, the attendant can provide the calling party with a service or perform any function that the agent console is capable of providing.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The ACD1 System is provided on a per-customer group basis.

6. LIMITATIONS

OPERATIONAL

6.01 Not applicable.

ASSIGNMENT

A. Central Office

6.02 The ESS central office may theoretically have a maximum of 63 ACD customers. However, the total number of functional groups handled by any single No. 1/1A ESS central office cannot exceed 2047.

6.03 The maximum number of TTY channels that can be used per central office for ACD customers is three. The maximum number of TTY channels that can be used for the selected traffic data to customer (CTRF) feature is three per central office. The CTRF feature can also be used by non-ACD customers.

B. ACD Customer

6.04 An ACD customer can have the following administrative feature maximums:

- 31 functional groups (including the maintenance functional group)

- 31 reporting groups.

6.05 An ACD customer can have the following equipment maximums:

- 1000 agent and supervisor consoles

- 15 90A CPSs

- 20 90B CPS dynamic traffic display consoles (when assigned to one customer traffic group)

- 1 TTY channel.

7. INTERACTIONS

7.01 Not applicable.

8. RESTRICTION CAPABILITY

8.01 The ACD1 System consists of many independent features that are combined to provide a complete system. Some of these features can be restricted by software and/or hardware modifications. Refer to documents outlined in paragraph 1.01 for detailed information on specific restriction capabilities.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 Refer to documents outlined in pargraph 1.01 for detailed information concerning installation/addition/deletion procedures.

10. HARDWARE REQUIREMENTS

Note: This part contains cost factors and determination of quantities. Central office Equipment Engineering System (COEES) Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

A. Central Office

10.01 *Line Side Equipment:* The attendant interface frame J1A089A and a TOUCH-TONE service signaling pair (one per six agent/supervisor consoles) provide the interface with the customer premises equipment. The 2-foot 2-inch frame is equipped with 15 plug-in chassis mounting units. These units are the frame control panel, frame fuse panel, two terminal strip units, and a frame filter. The attendant interface frame is capable of mounting up to 60 attendant interface units with 2 attendant interface circuits per unit (120 attendant interface circuits per frame). The attendant interface circuits SD-1A353-01 (order code 20100) provide the link between the central office and the agent consoles. Two signal distributor points and one scan point are required per circuit. The attendant interface frame comes equipped with duplicated power (30 attendant interface units per power distribution bus).

10.02 A master scanner applique circuit SD-1A133-01 (order code 10670) is required to provide the connecting of miscellaneous circuits (special purpose control pairs).

10.03 A signal distributor applique circuit SD-1A146-01 (order code 10270) is required to carry out the function of closing a metallic path to operate calls waiting lamps.

10.04 *Trunk Side Equipment:* The city-of-origin trunk applique unit SD-1A342-01 (order code 20000) provides the interface between the recorded announcement circuit and a FX (short haul) trunk circuit.

10.05 Two FX trunk circuits are used to provide the COA feature. They are SD-1A360-01 (for long haul FX trunks) (order codes 15800, 15801) and SD-1A241-01 (for short haul FX trunks) (order code 15900). Both of these FX units are mounted on the miscellaneous trunk frames J1A033C.

10.06 Two 2-way trunk circuits are used to provide the COA feature. They are SD-1A358-01 (2-way trunk E&M lead supervision multifrequency) (order code 08400) and SD-1A359-01 (2-way trunk E&M lead supervision dial pulsing) (order codes 08500, 08501). Each of the 2-way trunk units is a 6- by 25-inch unit mounted on the miscellaneous trunk frames J1A033C.

10.07 Audible ring and recorded announcement circuits SD-1A221-01 (order codes 07970, 07971, 07972, 07974, 07975, or 07976) or miniature circuits SD-1A221-05 (order codes 07901 or 07903) are required to provide connecting trunks with nonbarge-in delay announcements.

10.08 A recorded announcement circuit SD-1A139-01 provides the circuit characteristics required by the 2-way and FX (long haul) trunk units.

10.09 Tone and recorded announcement circuits SD-1A218-01 (order code 07870) or miniaturized circuits SD-1A218-05 (order code 07800) are required to connect music or silence to incoming ACD call lines while on queue.

10.10 Outgoing trunk circuits for local and tandem reverse battery supervision SD-1A165-02 (order codes 00200, 00205, 00240, or 00270) or miniaturized circuits SD-1A165-05 (order codes 00206, 00207, or 00208) are required to provide the monitoring function for supervision consoles.

10.11 Two-way circuits SD-1A192-02 (order codes 01340, 013C0, 01358, 013D8, 013L0, 013M8, or 01370) or miniaturized circuits SD-1A192-05 (order codes 01300, 01301, 01302, 01303, 01304, 01305, or 01306) are required to operate the 90A CPS and 90B CPS.

B. Customer Premises

10.12 The 60A CPS cabinet J-59205 provides the interface with the ESS central office. Each cabinet is capable of containing circuitry for up to 72 agent and/or supervisor positions (500A-type telephone consoles). The 60A CPS cabinet also supports the operation of the 103A1 display unit, the 8A1 selector console, and the calls waiting indicators.

10.13 An optional 90A CPS inquiry and display station is available for ACD administration.

10.14 An optional 90B CPS dynamic traffic display console is available for providing selected traffic counts.

10.15 An optional TTY is available for the printing of an expanded list of traffic counts, nonusage trunk scan data, and lockup trunk scan data.

11. SOFTWARE REQUIREMENTS

Note: This part contains cost factors and determination of quantities. Central Office Equipment Engineering System (COEES) Planning and Mechanized Ordering Modules are the recommended procdures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

MEMORY

A. No 1 ESS

Fixed

11.01 The *base generic program (program store)* memory requirements, whether or not the feature is used, are as follows:

● Calls Waiting Lamps—approximately 750 words

• Delay Announcements—approximately 1300 words

• Tones and Announcements—approximately 10 words for zip tone and 15 words for COA

• ACD Queueing and Call Distribution—approximately 4096 words.

Conditional

11.02 Table A provides a list of feature groups and their associated feature packages required in *program store* to implement the ACD1 in No. 1 ESS.

11.03 The following *call store* memory is required.

(a) The *ACD queueing* requirements are as follows:

(1) The length of the alternate server interflow overload block (ASOB) is two times the number of alternate server pools (ASP) in the office plus two.

(2) The length of the head cell block is 16 times the value of set card AQTLG ($1 \leq AQTLG \leq 225$) plus 16.

TABLE A

PROGRAM STORE MEMORY

| FEATURE GROUP | NO. | FEATURE PACKAGE | | 1E7 (NOTE) | | 1AE6 |
		ACRONYM	NAME	PACKAGE WORDS	CODE WORDS	CODE WORDS
ACD	4	ACD*	Automatic Call Distribution	2496	2301	3200
	6	ACDT*	Custom Data Collection	832	775	1024
	27	SIG*	TOUCH-TONE Service Key Signaling	256	201	320
	39	BASI*	Basic ASI Intraflow for QTL Customers	448	395	608
	40	BQNS*	Basic QTL Queueing Night Transfer Service	192	163	256
	41	BTRK*	Basic Intraflow QTL Trunk Termination Code	1920	1679	2656
	43	GINF*	General Intraflow Logic for QTL Customers	512	441	608
	45	QPRI*	Priority QTL Queueing	192	111	160
	98	PTDT*	Prevent Terminating Disconnect Timing	128	42	96
IRES	19	IRES	Inquiry and Response System	4800	4509	6208
CTRF	12	CTRF	Customer Traffic Data	1920	1840	2592
		OPSW	Outpulsing Switching Routines	192	117	160

Note: For No. 1 ESS, the arithmetic difference between package words and code words is patch space. All No. 1A ESS feature packages share a common patch space.

* Feature packages are shared between two or more feature groups.

(3) A block of call store equal to the total number of 14-word queueing registers is required (specified by set card NQR).

(4) The QTL head cell (set card AQTLG) requires a constant 16 words plus 16 words per queue.

(5) When the office has data link sequencing, a simulated facilities link index (SFLI) table is required. Its length is the value of set card NSF divided by four.

(6) When the office uses set card SFLA (simulated facilities line number activity words), a pseudo trunk number displacement (PTND) table is required. Its length is half the value of set card SFG.

(b) For the **Delay Announcements** feature, the general purpose queueing register and QTL head cell are shared with queueing. [See (a)(3) and (a)(4) above.]

(c) The **Calls Waiting Lamps** feature requires 10 words per lamp group defined by set card NLB.

Variable

11.04 The following **translations (program store)** memory is required when the features are provided.

(a) The **ACD Multiline Group Hunt** feature requirements are:

(1) The multiline hunt group (MLHG) common block requires 17 words per customer.

(2) The directory number (DN) auxiliary block requires six words per terminal plus six words per listed directory number (LDN).

(3) The line equipment number (LEN) auxiliary block requires 10 words per terminal.

(4) The hunt lists requires 17 words per 16 terminals.

(5) The master scanner number (MSN) translation requires four words per terminal if equipped for terminal make busy.

(6) The data group (DAG) translator requires $2+(20+A+B)\times C$ words, where A = number of splits/2; B = number of reporting group/2; and C = number of DAGs.

(7) The mask block translator requires $2+(A\times B)\times (2+D)$ words, where A and B are as defined above and D = integer ([number of MLHG terminals]/16).

(b) The **ACD Queueing and Call Distribution** feature requirements are:

(1) The unit type 55 translator (UTYP 55) requires 18 words.

(2) The unit type 54 translator (UTYP 54) requires three words per queue with night transfer, three words per queue with inhibit inflow and three words per queue with inhibit outflow.

(3) The alternate server pool translator requires $2+E\times(F+2)$ words, where E = number of ASP groups and F = (Number of queues in ASP-1)/2.

(4) The DN auxiliary block requires six words if simulated facilties are used for interflow.

(5) The simulated facilities groups (SFGs) require four words per SFG.

(c) The **60A CPS** feature requirements are:

(1) The DN auxiliary block requires four or five words if terminal make busy is provided.

(2) The LEN auxiliary block requires eight or nine words if terminal make busy is provided.

(3) The centrex digit interpeter requires one word.

(4) The signal pair LEN auxiliary block requires six words.

(d) The **Tones and Announcements** feature requirements are:

(1) The DN auxiliary block requires one additional word.

(2) The LEN auxiliary block requires two additional words.

(3) The trunk group (TG) auxiliary block requires one word per TG.

(4) The trunk class code (TCC) expansion table requires four words per trunk type.

(5) The trunk network number (TNN) to peripheral equipment number (PEN) requires four words.

(6) The route index expansion table requires two words for the route index.

(7) The trunk group number (TGN) primary table requires one word.

(8) The centrex common block requires one word for the first level of access code digit interpretation. If additional digit interpretation is required, a 15-word table is required for each level of digit interpretation.

(e) The **90A CPS** feature requirements are:

(1) The DN auxiliary block requires one additonal word.

(2) The TGN auxiliary block requires three or four words per TNN.

(3) The TCC expansion table requires four words.

(4) Centrex digit interpretation requires one word.

B. No. 1A ESS

Fixed

11.05 The **base generic program (program store)** memory requirements, whether or not the feature is used, are as follows:

- Calls Waiting Lamps—approximately 950 words

- Delay announcements—approximately 1700 words

- Tones and Announcements—approximately 15 words for zip tone and 20 words for COA

- ACD Queueing and Call Distribution—approximately 5600 words.

Conditional

11.06 Table A provides a list of feature groups and their associated feature packages required in **program store, file store** to implement ACD1 in the No. 1A ESS.

11.07 The **duplicated call store** requirements are identical to No. 1 ESS call store requirements. See paragraph 11.03.

Variable

11.08 The **translations (unduplicated call store, file store)** requirements are identical to No. 1 ESS translations requirements. See paragraph 11.04.

REAL TIME IMPACT

11.09 For the real time impact of the various features comprising an ACD1 System, refer to the applicable document(s) listed in paragraph 1.01.

12. DATA ASSIGNMENTS AND RECORDS

12.01 Refer to documents outlined in paragraph 1.01 for detailed information concerning data assignments and records.

13. TESTING

13.01 Refer to documents outlined in Paragraph 1.01 for detailed information concerning testing procedures.

14. OTHER PLANNING TOPICS

14.01 Because of the expected high-calling rate on agent lines, the line link network should be deloaded for associated LENs on the same concentrator.

ADMINISTRATION

15. MEASUREMENTS

15.01 Refer to documents outlined in Paragraph 1.01 for detailed information concerning charging procedures.

16. CHARGING

AUTOMATIC MESSAGE ACCOUNTING

16.01 Refer to documents outlined in paragraph 1.01 for detailed information concerning traffic measurements.

UNIFORM SERVICE ORDER CODES

16.02 Consult the telephone company uniform service order codes (USOC) coordinator or refer to the AT&T USOC Manual for the USOCs applicable to ACD1.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following terms are defined as applicable to the ACD1 System.

Customer Traffic Group: This is an arbitrary number assigned for a customer which is used to locate data that describes the counts to be collected and printed for that customer.

Functional Group or Split: This is a grouping of agents assigned to handle one particular type of call. (See reporting groups.)

Load Compensating Packages: These are predetermined agent position configurations that can be activiated via the 90A CPS to accomodate changes in the volume of incoming traffic due to lunch hours, holidays, weekends, etc.

Reporting Groups: These are groupings of agents for customer traffic counts. (Reporting groups do not necessarily coincide with functional groups.)

18. REFERENCES

18.01 The following documents contain information pertaining to or affected by the ACD1 feature.

A. Bell System Practices

(1) Section 231-090-336—Feature Document— ACD Multiline Group Hunt Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(2) Section 231-090-338—Feature Document— Tones and Announcements to Agents Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(3) Section 231-090-339—Feature Document— ACD Queueing and Call Distribution to Agents Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(4) Section 231-090-422—Feature Document— Interface With 60A Customer Premises System Feature—Automatic Call Distribution— Phase 1—2-Wire No. 1 and No. 1A Electronic Switching Systems

(5) Section 231-090-424—Feature Document— Interface With 90A Customer Premises System Feature—Automatic Call Distribution— Phase 1—2-Wire No. 1 and No. 1A Electronic Switching Systems

(6) Section 231-090-052—Feature Document— Automatic Line Insulation Test Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(7) Section 231-090-082—Feature Document— Calls Waiting Lamps Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(8) Section 231-090-123—Feature Document— Delay Announcements Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(9) Section 213-090-167—Feature Document— Automatic Queueing for Trunks and Lines Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(10) Section 231-090-399—Feature Document— Automatic Call Distribution (ACD) Feature, Phase 2 Description—2-Wire No. 1 and No. 1A Electronic Switching Systems

(11) Section 231-118-340—Overall Procedures for Implementing Automatic Call Distribution (ACD) Phase 1 (CTX-8, Issue 2 through 1E4 Generic Programs)—2-Wire No. 1 Electronic Switching System

(12) Section 231-090-340—Feature Document— Selected Traffic Data to Customer Feature— 2-Wire No. 1 and No. 1A Electronic Switching Systems

(13) Section 231-090-411—Feature Document— Interface With Common Systems Recorded

Announcement Frame Feature —2-Wire No. 1 and No. 1A Electronic Switching Systems

(14) Section 533-090-100—Phase 1 ACD—60A CPS, 90A CPS, and 90B CPS Descriptive Operation and Theory of Operation

(15) Section 533-200-601—ACD-ESS Phase 1 Traffic Engineering.

B. TTY Input and Output Manuals

(1) Input Message Manual IM-1A001, No. 1 Electronic Switching System

(2) Output Message Manual OM-1A001, No. 1 Electronic Switching System

(3) Input Message Manual IM-6A001, No. 1A Electronic Switching System

(4) Output Message Manual OM-6A001, No. 1A Electronic Switching System.

C. Other Documentation

(1) Translation Guide TG-1A, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(2) Office Parameter Specification PA-591001, 2-Wire No. 1 Electronic Switching System

(3) Parameter Guide PG-1, 2-Wire No. 1 Electronic Switching System

(4) Office Parameter Specification PA-6A001, 2-Wire No. 1A Electronic Switching System

(5) Parameter Guide PG-1A, 2-Wire No. 1A Electronic Switching System

(6) Translation Output Configuration PA-591003, 2-Wire No. 1A Electronic Switching System

(7) Translation Output Configuration PA-591002, 2-Wire No. 1A Electronic Switching System

(8) BISP 759-100-000—Subject Index—Central Office Equipment Engineering System (COEES)

(9) BISP 759-100-100—General Description—Central Office Equipment Engineering System (COEES).