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 concentrate, 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-origin 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 activated 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 requesting 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 selector 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 multiplying. 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 (J1A032JS) 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 ACDI 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 announcement 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 original 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 fareed 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 (activated 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 intra-system 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 announcement 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 applicable, forces the caller to hear one announcement before the call can be answered. An ACD customer may specify from one to a maximum of four delay announcements per queue and specify the content of each message and time intervals between announcements.

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 outgoing trunk group (interflow).

4.47 If the selected facility requires interflow, a trunk is seized going to the distant ACD System and outpulsing is performed. After receiving answer report from the far-end ACD, the COA is supplied 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 performed 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 unloaded 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. Each bit is set (equal to 1) in the mask block corresponding to the functional group to which the agent console is assigned 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 logical “AND” function between the functional group mask block and the activity block to obtain the next idle agent console which is assigned to that particular 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 functional 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 incoming FX and tie trunks which have received delay announcement(s). If an on-hook indication is returned from the originating office (indicating abandon), 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, processing 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 console. This action cuts through the applique circuit and allows a ringing current to pass to the agent console. When the console recognizes the 20-Hz ringing signal, it automatically trips, sending an answer signal 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 feature 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 direct 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 provided 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 custo­
mers is three. The maximum number of TTY channels
that can be used for the selected traffic data to cus­
tomer (CTRF) feature is three per central office. The
CTRF feature can also be used by non-ACD custom­
ers.

B. ACD Customer

6.04 An ACD customer can have the following
administrative feature maximums:
- 31 functional groups (including the mainte­
nance 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 indepen­
dent features that are combined to provide a
complete system. Some of these features can be re­
limited by software and/or hardware modifications.
Refer to documents outlined in paragraph 1.01 for
detailed information on specific restriction capabili­
ties.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 Refer to documents outlined in paragraph 1.01
for detailed information concerning installa­
tion/addition/deletion procedures.

10. HARDWARE REQUIREMENTS

Note: This part contains cost factors and de­
termination of quantities. Central office Equip­
ment Engineering System (COEES) Planning
and Mechanized Ordering Modules are the re­
commended procedures for developing these re­
quirements. However, for planning purposes or
if COEES is not available, the following guide­
lines may be used.

A. Central Office

10.01 Line Side Equipment: The attendant in­
terface 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 mount­
ing up to 60 attendant interface units with 2 atten­
dant 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 con­
soles. Two signal distributor points and one scan
point are required per circuit. The attendant inter­
face frame comes equipped with duplicated power (30
attendant interface units per power distribution
bus).
A master scanner applique circuit SD-1A133-01 (order code 10670) is required to provide the connecting of miscellaneous circuits (special purpose control pairs).

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.

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.

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.

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.

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

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.

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.

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**

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 SA1 selector console, and the calls waiting indicators.

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

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

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

**TABLE A**

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

**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 AQT LG) 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 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-I)/2.

(4) The DN auxiliary block requires six words if simulated facilities 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 80A CPS feature requirements are:

(1) The DN auxiliary block requires one additional 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 11.08.

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 activated via the 90A CPS to accommodate 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 231-090-167—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).